United States
Department of
Agriculture

Forest Service

Intermountain
Region

August 2012

Supplemental Draft Environmental Impact Statement

Scriver Creek Integrated Restoration Project

Volume 1: Chapters 1, 2, and 3

Forestland restoration within the Scriver drainage is essential to both improving forest resiliency and restoring wildlife habitat in low- to mid-elevation forests that historically were dominated by large ponderosa pine.

Road management activities within the Scriver drainage are needed to improve water quality and fish habitat. Activities include improving existing road conditions, decommissioning unneeded roads and replacing culverts that are barriers to fish passage

Boise National Forest

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Draft Supplemental Environmental Impact Statement

USDA Forest Service, Intermountain Region

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Abstract

The Forest Service is analyzing proposed landscape vegetation treatment and road restoration activities in the 11,510 acre Scriver Creek Integrated Restoration Project area on the Emmett Ranger District of the Boise National Forest. The purpose of the proposed action is as follows:

- Manage forest structure, density, and species composition to accelerate development of large tree size class and old forest habitat dominated by early seral tree species (e.g., ponderosa pine) that will contribute to achievement of Forest Plan desired vegetation and associated wildlife habitat conditions.
- Improve watershed conditions by reducing road-related impacts to wildlife, fish, soil, and water resources while providing for the transportation system necessary to meet long-term management needs.
- Utilize wood products resulting from restoration treatments to support local and regional economies.

The preferred alternative is Alternative C.

Comments on this DEIS should be postmarked or received no later than 45 days after a Notice of Availability is published in the *Federal Register*. Written comments must be submitted to: Emmett District Ranger, Emmett RD, 1805 Highway 16, Room 5; Emmett, ID 83617; or by fax to 208-365-7037. The office hours for those submitting hand-delivered comments are: 8 a.m. to 4:30 p.m. Monday through Friday, excluding holidays. Oral comments must be provided at the Emmett RD office during normal business hours via telephone 208-365-7000 or in person. Electronic comments may be submitted by email or through the Scriver Creek Integrated Restoration Project webpage. Email comments must be submitted in a format such as an email message, plain text (.txt), rich text format (.rtf), and Word (.doc) to comments-intermtn-boise-emmett@fs.fed.us. To submit comments from the project webpage, go to the Boise National Forest webpage (http://www.fs.usda.gov/boise), select "Scriver Creek Integrated Restoration Project" under "Related Links" on the right panel. To access the comment web form, select "Comment on Project" under "Get Connected" on the right panel.

Reviewers have the obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and will alert the agency to reviewers' positions and contentions (Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553, 1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the Final Environmental Impact Statements (City of Angoon v. Hodel, 9th Circuit Court of Appeals, 1986 and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 [E.D. Wis. 1980]). Comments should be specific and should address the adequacy of the statement or merits of the alternatives discussed (40 CFR 1503.3)

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Acronyms, Initialisms, and Abbreviations

$\mu g/m^3$	Micrograms per cubic meter
ACS	Aquatic Conservation Strategy
AOI	Annual Operating Instructions
AOP	Aquatic Organism Passage
APE	Area of Potential Effect
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	Best Management Practices
C&H	Cattle and Horse
CAA	Clean Air Act
CEQ	Council on Environmental Quality
cfs	Cubic Feet Per Second
CI	Crowning Index
cm	Centimeters
CO^2	Carbon Dioxide
Corps	Army Corps of Engineers
CSE	Common Stand Examination
CWA	Clean Water Act
CWD	Coarse, Woody Debris
d.b.h	Diameter At Breast Height
DC	Desired Condition
DD	Detrimental disturbance
DEIS	Draft Environmental Impact Study
DEM	Digital Elevation Model
EC	Existing Condition
ECA	Equivalent Clearcut Area
EGC	Effective Ground Cover
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FA	Functioning Appropriately
FEIS	Final EIS
FFE	Fire and Fuels Extension
FVS-FFE	Forest Vegetation Simulator to the Fire and Fuels Extension
Forest Plan	Boise National Forest Land and Resource Management Plan
Forest	Boise National Forest
FR	Functioning At Risk
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSV	Forest Service Vegetation Simulator
ft^2	Square feet
FUR	Functioning At Unacceptable Risk
GIS	Geographic information system

GRAIP	Geomorphic Road Analysis and Inventory Package
HRV	Historic Range of Variability
HU	Hydrologic Unit
Idaho CWCS	Idaho Comprehensive Wildlife Conservation Strategy
IDEQ	Idaho Department of Environmental Quality
IDL	Idaho Department of Lands
IDT	Interdisciplinary Team
IFPA	Idaho Forest Practices Act
INFRA	Infrastructure database
IRA	Inventoried Roadless Area
km	Kilometers
LSP	Landslide prone
LWD	Large Woody Debris
M	Modification
MA	Management Areas
Mg	Middleground
MIS	Management Indicator Species
MK	Megahan/Ketchum
ML	Maintenance Level
MM	Maximum Modification
mm	Millimeter
MMBF	Million Board Feet
MOU	Memorandum of Understanding
MPC	Management Prescription Category
Mph	Miles per Hour
MT/ID	Montana/Idaho
MVUM	Motor Vehicle Use Map
NAAQS	National Ambient Air Quality Standards
NEDC	Northwest Environmental Center
NEPA	National Environmental Policy Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NT	Not Treated
OHV	Off Highway Vehicle
ON	Over Natural
OSHA	Occupational Safety & Health Administration
PM	Particulate Matter
PNV	Potential Net Value
POD	Points Of Diversion
PR	Partial Retention
PVG	Potential Vegetation Group
RAWS	Remote Automated Weather Station
RCA	Riparian Conservation Areas
RD	Ranger District
RM	Roaded Modified

RNA	Resource natural areas
ROD	Record of Decision
S&G	Sheep and Goat
SDEIS	Supplemental Draft Environmental Impact Study
SHA	Soil Health Assessment
SHPO	State Historic Preservation Office
SINMAP	Stability Index Mapping
SIS	Smoke Impact Spreadsheet
SOPA	Schedule of proposed actions
SPZ	Streamside Protection Zone
SSRP	Stand Susceptibility Rating System
SWRA	Soil, Water, Riparian, And Aquatic Resources
TAP	Transportation Analysis Process
TEA	Transaction Evidence Appraisal
TEPC	Threatened, Endangered, Proposed, and Candidate Species
TES	Threatened, Endangered, Sensitive
TESW	Threatened, Endangered, Sensitive, and Forest Watch Species
TMDL	Total Maximum Daily Load
TSRC	Total Soil Resource Commitment
USFWS	U.S. Fish and Wildlife Service
VQO	Visual Quality Objective
WARS	Watershed and Aquatic Recovery Strategy
WCF	Watershed Condition Framework
WCI	Watershed Condition Indicator
WCS	Wildlife Conservation Strategy
WIGU	Wildlife Guideline
WTY	Whole Tree Yarding

Chapter 1—Purpose and Need

This supplemental draft environmental impact statement (SDEIS) discloses in detail the environmental impacts of the No Action Alternative (Alternative A), Proposed Action (Alternative B), and two additional action alternatives (Alternatives C and D), for the Scriver Integrated Restoration Project (Project). The area is located on the Emmett Ranger District (RD) of the Boise National Forest (Forest). This document has been prepared under the National Environmental Policy Act [(NEPA); 42 U.S.C. 4321 *et seq.*, 40 CFR 1500-1508] and the *Boise National Forest Land and Resource Management Plan* (Forest Plan) as amended in 2010 (Forest Service 2003a, 2010a).

The need for an SDEIS is to allow the Forest Service to clearly identify all permits, licenses, and other entitlements that were not otherwise identified in the Draft Environmental Impact Study (DEIS) released December 30, 2011 (FR Vol. 76, No. 251; NOA for EIS No. 20110438)that may be needed to implement the proposed activities. Specifically, an SDEIS is needed to identify that it is uncertain whether a National Pollutant Discharge Elimination System (NPDES) permit may be required and comments on the SDEIS will be requested from the appropriate regulatory agencies and public to help assess whether such a permit is required (refer to section 1.9.2). Disclosure of this uncertainty in a DEIS is required at 40 CFR 1502.25(b).

Also, as identified in the June 18, 2012, Federal Register Notice of Intent to prepare an SDEIS, the Proposed Action identified in the DEIS released December 30, 2011, has been modified concerning road systems, logging systems, and watershed restoration opportunities as a result of updated field information. These updates resulted in measurable changes in the effects disclosures from those displayed in the DEIS. Finally, Alternatives C and D were developed in response to comments received on the DEIS and their respective effects disclosures have not been reviewed by the public. Thus, the Responsible Official has determined that the purpose of the act (NEPA) would be furthered by issuing an SDEIS for additional review and comment prior to the final environmental impact statement (FEIS).

1.1 Relationship of this Project to the 2010 Forest Plan

In 2003, the Forest issued a revised Forest Plan (Forest Service 2003a). On July 1, 2010, Forest Supervisor, Cecilia R. Seesholtz, issued an amendment to the 2003 Forest Plan to integrate a wildlife conservation strategy (WCS) for the forested biological community. This Forest Plan WCS complements the *Idaho Comprehensive Wildlife Conservation Strategy* (Idaho CWCS) (IDFG 2005) by building on the broad-scale conservation needs identified in the Idaho CWCS for the Forest area.

The vegetation management strategy of the Forest Plan calls for managing within the historic range of variability (HRV) using a combination of passive and active management (Forest Service 2010c, p. 6). The strategy is based on the assumption that conditions within the range of the HRV will promote a network of habitats to support the diverse array of native and nonnative vertebrate wildlife species.

The Forest Plan identifies conservation and restoration of low- to mid-elevation, dry ponderosa pine (*Pinus ponderosa*) forests as a management priority. The analysis for the 2010 Forest Plan amendment found that habitats for some wildlife species have declined substantially[1] compared to historic conditions. An underlying philosophy of the 2010 Forest Plan and the WCS is that restoring desired conditions within the HRV and emulating natural disturbance processes within individual forested stands and across landscapes will contribute to species conservation and recovery (Forest Service 2010c p. 6, Haufler et al. 1996, Hunter et al. 1988, Noss 1987, Raphael et al. 2000, McComb and Duncan 2007, and Wisdom et al. 2000).

The 2010 amendment added a comprehensive and diverse set of management direction for vegetative and wildlife habitat conservation and restoration. The new wildlife guideline (WIGU15) emphasizes using conservation principles to identify treatment priorities, design restoration treatments, and help understand the effects of proposed activities on vegetative and wildlife habitat diversity (Forest Service 2010a, p. III-28 and Appendix E).

The Forest Plan includes objectives that identify the need to focus restoration-related management activities for the remainder of the planning period within priority watersheds. In addition, the Forest will address and integrate related multiple-use objectives in vegetative restoration projects where practical and efficient to do so. The Proposed Action (Alternative B) for the Project addresses the following priorities and management objectives from the 2010 Forest Plan:

- *Restoration and maintenance of priority forested acres*—The 2010 Forest Plan focuses forest restoration and maintenance in low- to mid-elevation forests dominated by ponderosa pine in the nonlethal and mixed1 fire regimes. The Forest Plan also emphasizes areas occupied by wildlife species of concern, such as the white-headed woodpecker (*Picoides albolarvatus*). The Project area is in a watershed identified as "Active, High Priority" for restoration under the *Vegetation and Wildlife Habitat Restoration Strategy* (Forest Service 2010a). Restoration in low- to mid-elevation pine forests starts with forested acres currently within desired conditions and develops landscape patches of large tree size class and old forest habitat more typical of historical size and extent (Forest Service 2010a, Appendices A and E). In addition, maintenance activities designed to retain patches within desired conditions are used to develop and sustain functional landscape patches over time. The Proposed Action would maintain and restore low- to mid-elevation forested stands/patches in the nonlethal and mixed1 fire regimes within the Project area.
- *Restoration of forested stands in the Scriver Creek subwatershed*—The Project is in Management Area (MA) 14, Lower Middle Fork Payette River. Objective 1423 (Forest Service 2010a, p. III-290) identifies a need to restore vegetative conditions in Potential Vegetation Group (PVG) 1[2], PVG 2[3], PVG 3[4], PVG 5[5], and PVG 6[6] within MA 14, emphasizing the large tree size class in all watersheds.

[1] Other broad-scale assessments have reached similar conclusions (USDA Forest Service 2000b, NPPC 2005, IDFG 2005, and Mehl and Haufler 2004).

[2] PVG 1 = Dry Ponderosa Pine/Xeric Douglas-fir

- *Restoration of a Watershed and Aquatic Recovery Strategy (WARS) priority subwatershed and National Watershed Condition Framework (WCF) priority watershed*—The Scriver Creek subwatershed is a high priority for active restoration to improve watershed and aquatic conditions under the Forest Plan. Additionally, the Forest Service has completed a national assessment of the current condition and prioritization of subwatersheds on National Forest System (NFS) lands. This WCF (Forest Service 2011c) identified two subwatersheds on the Forest as priority watersheds. The Scriver Creek subwatershed is one of the WCF priority watersheds.
- *Removal of wood products as an outcome of forest maintenance and restoration treatments on acres in the suited timber base*—The 2010 Forest Plan amendment reallocated acres previously assigned to Management Prescription Category (MPC) 5.2 (Commodity Production Emphasis) to MPC 5.1 (Restoration and Maintenance Emphasis). Although this reallocation does not change the number of acres in the suited timber base, it does change the focus of treatments from an emphasis on wood product growth and yield to an emphasis on forest restoration with wood products as an outcome or byproduct of restoration activities. All acres within the Project area are now allocated to MPC 5.1. The Proposed Action includes removing wood products as a byproduct of forest restoration and maintenance treatment on acres in the suited timber base.

1.2 PROJECT HISTORY

The Emmett RD began planning for this project in 2007 after completing an interdisciplinary evaluation of the resource conditions in the Scriver Creek subwatershed. This project was originally scoped in January 2007. Following scoping, the interdisciplinary team (IDT) evaluated the public and internal comments and began the environmental analysis of the Project. However, in summer 2007, the Forest, including the Emmett RD, experienced a particularly challenging and extensive wildfire season, postponing the environmental analysis of this project. In 2009 and 2010, the Project area conditions were reviewed in light of current information about vegetation, wildlife, fuels conditions, and restoration needs. Based on this review, minor changes to the original Proposed Action were made, and the Emmett RD scoped this Project a second time in April 2010.

1.3 PROJECT AREA DESCRIPTION

The Project area covers approximately 11,510 acres in the Scriver Creek subwatershed, which is a tributary to the Middle Fork Payette River drainage approximately 6 miles north of Crouch, Idaho (Figure 1-1). The Project area is located entirely on NFS lands in Sections 3-10, 15-18, and 20, T. 10 N., R. 4 E.; Sections 21-23, and 26-34, T. 11 N., R. 4 E., Boise Meridian, Boise and Valley Counties, Idaho.

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[3] PVG 2 = Warm Dry Douglas-fir/Moist Ponderosa Pine

[4] PVG 3 = Cool, Moist Douglas-fir

[5] PVG 5 = Dry Grand Fir

[6] PVG 6 = Cool, Moist Grand Fir.

1.3.1 Land Management History of the Project Area

The Project area has a long and diverse history of land management activities, including timber harvest, reforestation, road building, fire suppression, and livestock grazing. Forest records document these activities since the 1950s. However, it is believed that land management activities in this area date back to the early 1900s.

Timber harvest records indicate that approximately 10,285 acres (89 percent) of the 11,500 acres within the Project area were harvested between 1955 and 1988. A variety of silvicultural methods were used, including commercial thin, liberation, overstory removal, regeneration cut, release, clearcut, and seed prep cut. Past timber harvest operations also used a variety of harvest methods, including tractor, jammer, cable, skyline, and helicopter. About 1,600 acres in the Project area were reforested following timber harvest activities.

An extensive road system was constructed in this area. Road construction in this area began sometime in the 1930s based on the area's proximity to the South Fork Payette River Corridor and to the communities of Crouch and Garden Valley, Idaho. Emmett RD records indicate that road construction to facilitate timber harvest activities occurred in the area between 1955 and 1988. District aerial photographs from 1962 show a substantial number of roads constructed to access the Scriver Creek area (Figure 1-2). Most of these roads were abandoned in the 1960s and are not part of the designated NFS transportation system. Field reconnaissance in 2006 indicated that many of the old road prisms still exist in the Project area. However, most old road prisms have naturally revegetated and cannot be used for motorized vehicle travel.

Prior to the mid-1960s, both the Scriver Creek Cattle and Horse (C&H) and the Scriver Creek Sheep and Goat (S&G) allotments used areas of the Scriver Creek subwatershed for livestock grazing. In 1961, the Scriver Creek C&H allotment was closed from a lack of suitable rangeland and difficulties of managing livestock (cattle) in the area. At that time, the Scriver Creek S&G allotment was incorporated into what is now the Middle Fork South S&G allotment because the Scriver Creek allotment area was too small to support a band of sheep for the intended grazing season. Currently, about 9,943 acres of the 46,804-acre Middle Fork South S&G allotment occurs within the Scriver Creek subwatershed.

The *Forest-wide Risk Assessment for Management of the Boise National Forest* (Forest Service 2000b) rates the Scriver Creek subwatershed as moderate/high fire hazard. The area has a moderate/high fire occurrence for both lightning- and human-caused fires due to local weather patterns and public accessibility. Forest records indicate 36 fire starts have occurred in the Scriver Creek area since the early 1900s. Generally, these fires range from 0.1 acres (a spot fire) to 5 acres. However, there have been several large fires that have burned near the Scriver Creek Project area. Most recently, the Anderson Wildfire (1986) burned approximately 18,000 acres adjacent to the Scriver Creek Project area.

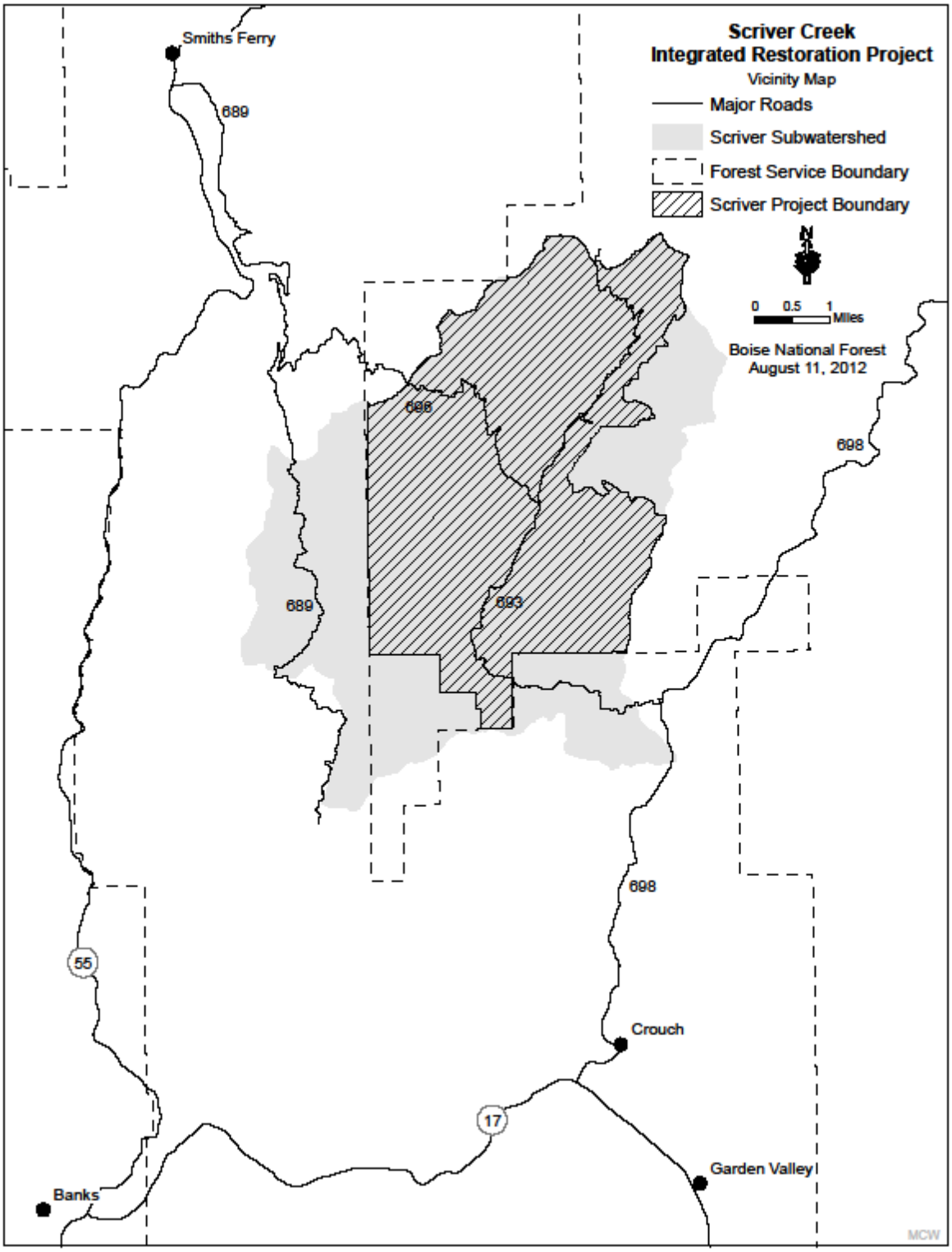

Figure 1-1. Scriver Creek Integrated Restoration Project Vicinity Map

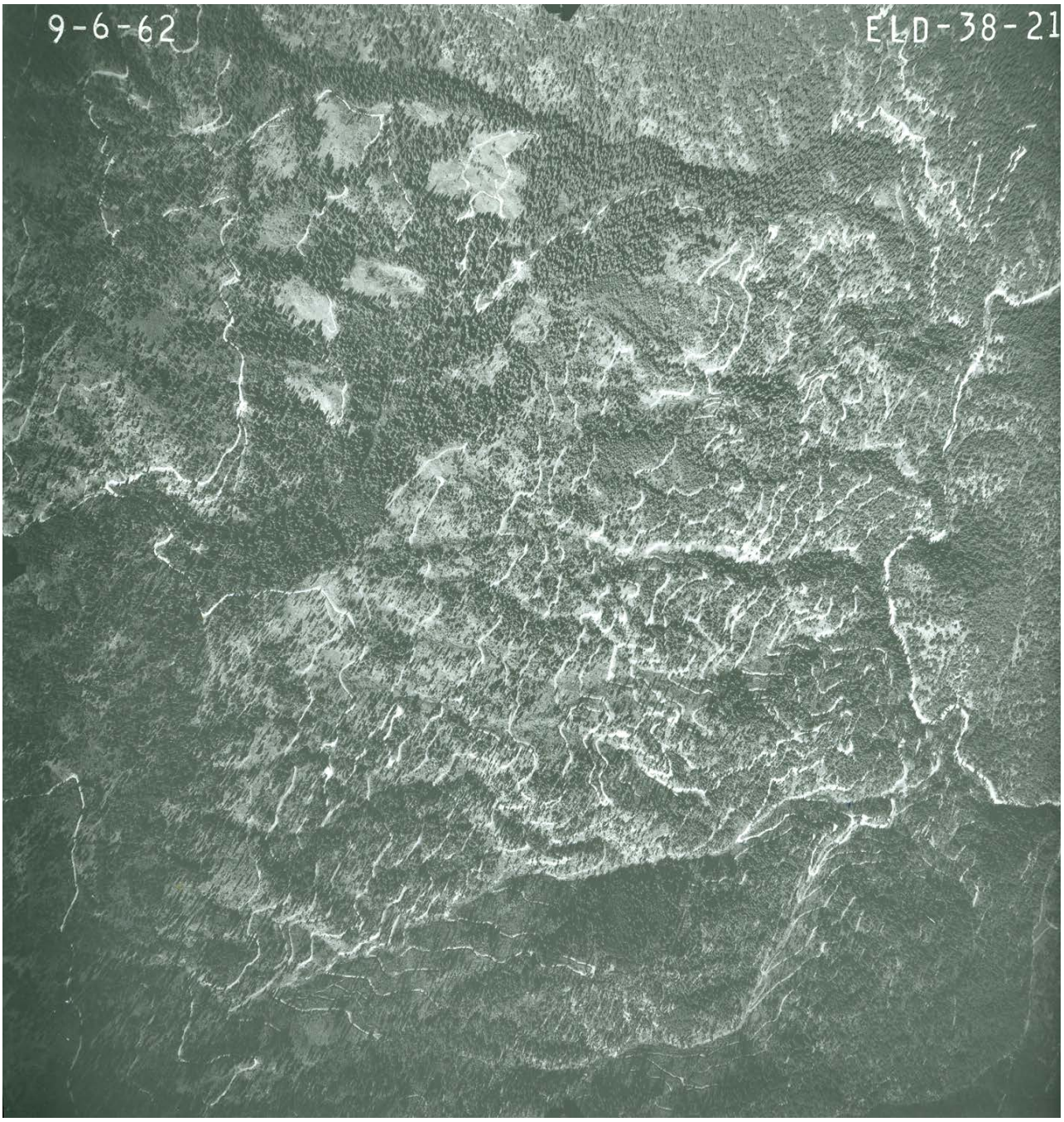

Figure 1-2. 1962 Aerial Photograph of the Scriver Creek Area Illustrating the Extensive Road System to Facilitate Vegetation Management Activities

1.4 PURPOSE AND NEED

<u>Purpose 1</u>: Manage forest structure, density, and species composition to accelerate development of large tree size class and old forest habitat dominated by early seral tree species (e.g., ponderosa pine) that will contribute to achievement of Forest Plan desired vegetation and associated wildlife habitat conditions.

The 2010 Forest Plan includes a *Vegetation and Wildlife Habitat Restoration Strategy* (Strategy) that lists Forest-wide restoration priorities. The Strategy identifies the Scriver Creek subwatershed as a high priority for restoration and specifies that active treatments are needed for restoration. High priority, active forest restoration watersheds were historically dominated by nonlethal and mixed1 fire regimes. These areas are most likely to be successfully restored because of their current acreage in medium and large tree class size (Forest Service 2010a, Appendix A, p. A-16). Though the Strategy emphasizes restoring the medium and large tree size class, restoring other tree size classes that, in combination, contribute to historical landscape patches and patterns helps achieve the "Conservation Principles" described in Appendix E of the 2010 Forest Plan.

Five Potential Vegetation Groups (PVGs) occur in the analysis area: PVG 6 (80 percent), PVG 2 (13 percent), PVG 5 (4 percent), and PVG 8[7] and PVG 9[8] (3 percent). PVGs 2 and 5 represent the nonlethal fire regime, with a fire interval of 5–25 years that develops relatively homogenous patches dominated by large ponderosa pine trees with small inclusions (typically <1 acre) of smaller tree size classes. Historically, periodic fires in PVGs 2 and 5 inhibited the development of continuous ladder fuels of saplings or pole-sized trees that could carry fire into the crowns of larger ponderosa pine trees. PVG 6 spans both the mixed1 and mixed2 fire regimes. Acres of PVG 6 within the Project area in need of restoration fall within the drier habitat types and are more consistent with a mixed1 fire regime where relatively frequent fires maintained the dominance of earlier seral tree species, including ponderosa pine; western larch (*Larix occidentalis*); and, to a lesser degree, Douglas-fir. As a result of past fire suppression and management activities, such as historic timber harvest discussed in section 1.4.1, large ponderosa pine are absent or reduced in these PVGs compared to historical densities (Forest Service 2010a, Appendix A, Table A-1 and Table A-2, p. A-3 and A-6). PVGs in the Project area have the following specific needs:

- Stand structure of small and medium tree size class stands in PVGs 2 and 5 and the drier habitat types of PVG 6 needs to be changed to accelerate movement towards the large tree size class and old forest habitat dominated by early seral species such as ponderosa pine. Tree size class reflects the physical development stage of a forest stand. The grass/forbs/shrub/seedling (GFSS), sapling, and small tree size classes in the Scriver Creek Project area represent a relatively small percentage of the acres within the various PVGs, while the medium and large tree size classes generally dominate the Project area. Although the large tree size class is over-represented in PVG 6 (80 percent of the analysis area), the existing large tree species composition is dominated by late seral species, such

[7] PVG 8 = Cool, Moist Subalpine Fir

[8] PVG 9 = Hydric Subalpine

as grand fir (*Abies grandis*), rather that the desired early to mid-seral species, such as ponderosa pine. The large tree size class is under-represented in PVGs 2 and 5 when compared to tree size class desired conditions defined in the 2010 Forest Plan (Forest Service 2010a, Appendix A, Tables A-4 and A-5, p. A-7 and 8). In addition, the medium tree size class is over-represented in PVGs 2 and 5 and under-represented in PVG 6 compared to the desired conditions defined in the 2010 Forest Plan (Forest Service 2010a, Appendix A, Tables A-4, p. A-7).

- Canopy cover and ladder fuel conditions in PVGs 2 and 5 and the drier habitat types within PVG 6 need to be modified to fall within low and moderate canopy cover classes composed of the desired mix of early to mid-seral tree species. Canopy cover (a byproduct of stand density) represents the total nonoverlapping cover of all trees in a stand, except the seedling tree size class. Canopy cover of stands identified as large tree size class in the Project area exceed the desired canopy cover levels in PVGs 2 and 5 and the drier habitat types of PVG 6 (Forest Service 2010a, Appendix A, Table A-5, p. A-8). In addition, while some areas fall within the appropriate canopy cover classes, the mix of tree species that contribute to that canopy and/or structural variation within a forested area are not consistent with desired conditions (i.e., currently late seral species vs. desired early to mid-seral species). In these cases, tree canopies need to be reduced in the short term to provide the appropriate growing conditions to restore the desired early seral species (e.g., ponderosa pine) in the long term and/or reduce undesirable ladder fuels that have increased the risk of losing desirable vegetative features to uncharacteristic disturbance events.
- Stands dominated by ponderosa pine need to be increased to Forest Plan desired conditions (Forest Service 2010a, Appendix A, Table A-5, p. A-8). The desired condition is landscapes dominated by early-seral[9] species in the nonlethal and mixed1 fire regime. Douglas-fir are overabundant in PVGs 2 and 5 within the Project area. Grand fir is overabundant in the in the overstory and understory of the drier habitat types of PVG 6 and exceeds the desired conditions for species composition by a wide margin (section 3.2.5).
- Densities in plantations need to be reduced and a more natural grouping of irregularly spaced clumps of small diameter trees (<8 inches d.b.h.[10]) need to be created. Tree densities within plantations are resulting in inter-tree competition that is substantially slowing progression toward larger tree size class patches that are lacking in the Project area. The uniform tree spacing in these plantations should be broken up to create a more natural grouping and irregular spacing of trees that is typical of the forest types when historical disturbances were operating on the landscape.
- Habitat for the white-headed woodpecker (PVGs 2 and 5) and flammulated owl (*Otus flammeolus*) (drier habitat types within PVG 6) need to be restored within the forest types they historically occupied. The Ponderosa Pine Task Force (Mehl and Haufler 2004)

[9] The species or community that is replaced by another species or community as succession progresses. In PVGs 2 and 5, Douglas-fir replaces early seral pine in absence of disturbances. In the drier habitat types of PVG 6 ponderosa pine are replaced by grand fir and Douglas-fir.

[10] d.b.h. = diameter at breast height

identified approximately 3,130 acres of forested stands within in the Project area as having high potential for restoring ponderosa pine. Restoring ponderosa pine forests in PVGs 2 and 5 would benefit bird species, such as the white-headed woodpecker, which is a species of conservation concern according to the State of Idaho (IDFG 2005). Restoring ponderosa pine communities in the drier habitats of PVG 6 would benefit the flammulated owl, an R-4 Sensitive species. These restoration efforts would benefit other wildlife species associated with low- to mid-elevation forests that were historically dominated by ponderosa pine.

Purpose 2: Improve watershed conditions by reducing road-related impacts to wildlife, fish, soil, and water resources while providing for the transportation system necessary to meet long-term management needs.

The Scriver Creek subwatershed is identified in the Forest Plan Aquatic Conservation Strategy (ACS) as a high priority subwatershed for active restoration to improve watershed and aquatic conditions. Much of the existing road system in the Scriver Creek subwatershed is poorly located and deteriorating. In some cases, deterioration is occurring within Riparian Conservation Areas (RCAs). The *Scriver Creek Subwatershed Travel Analysis Process Report* (TAP) (Forest Service 2011b) determined that many roads are a source of management-induced sediment reaching Scriver Creek, and this sediment is impacting watershed quality and aquatic resource conditions (Forest Service 2011b). The Forest Service has also completed a national assessment of the current condition and prioritization of subwatersheds on NFS lands. This WCF assessment identified the Scriver Creek subwatershed as a priority watershed (Forest Service 2011c).

The following specific actions have been identified as necessary to reduce road-related effects to resources:

- Decommissioning[11] authorized roads and obliterating[12] unauthorized routes within the Scriver Creek subwatershed to reduce sediment to streams, improve soil productivity, and thereby improve overall watershed and aquatic resource conditions. The 2010 Forest Plan states that the transportation system should be managed to reduce the degradation of resources (FROB04 and FROB06; Forest Service 2010a, p. III-60). Roads not needed for land and resource management should be evaluated for disposal and decommissioning (FROB04 and FROB06; Forest Service 2010a, p. III-60 and 61).
- Total road/route density and RCA road/route density within the Scriver Creek subwatershed are approximately 4.9 miles per square mile (mi/mi^2) and 5.4 mi/mi^2, respectively. The TAP identified 12.8 miles of authorized roads and 3.3 miles of unauthorized routes that are no longer needed to meet long-term management objectives

[11] Decommission or obliteration would be done in a manner that minimizes resource effects while accomplishing the road management objective to return the prism to a productive state. In some cases, this would include complete recontouring and revegetation, while in other situations, it may include closing the entrance into the route and letting the route naturally revegetate when compaction within the prism is being reduced through freeze and thaw, it is hydrologically stable and revegetating on its own.

[12] While decommissioning applies to closing NFS roads and obliteration applies to removing unauthorized roads, the terms may be used interchangeably throughout this document for both types of routes.

and should be obliterated or decommissioned (Forest Service 2011b). Reducing road/route-related effects on water quality and aquatic/riparian species and their habitats is identified in the 2010 Forest Plan as Forest-wide objective SWOB18 (Forest Service 2010a, p. III-21)

- Roads are also considered a total soil resource commitment (TSRC) as defined by converting a productive site to an essentially nonproductive site for more than 50 years (Forest Service 2010a, p. GL-50). Reducing road/route-related effects on soil productivity is identified in the 2010 Forest Plan as Forest-wide objective SWOB18 (Forest Service 2010a, p. III-21)
- Reducing the effects of roads needed for long-term management. To reduce the effects of existing roads on resources, 2.8 miles of existing authorized road in an RCA needs to be realigned outside of the RCA, 3 stream crossings need to be replaced with new structures that allow fish passage, and other road improvements need to be completed to reduce sediment delivery to streams and improve overall riparian function.
- In addition, 2.8 miles of NFS roads need to be reconstructed to reduce sediment delivery to streams. Reconstruction would include upgrading the surface type with new surface aggregate and placing new aggregate for up to 300 feet on both sides of perennial stream crossings on roads that facilitate vegetation management.
- Closing roads within the Project area that have been identified in the TAP as necessary for vegetation management only after the project has finished. To meet other resource objectives, impacts indirectly tied to increased motorized access (e.g., removing snags and down logs for fuelwood that are important to the quality of wildlife habitat) need to be mitigated. Roads identified in the TAP as only needed for vegetation management need to be closed to general public access.
- Constructing new NFS roads to support the long-term management of the vegetative resource within the Project area. The TAP identified the need to construct 2.7 miles of new NFS road to facilitate access to current and future vegetation management areas (Forest Service 2011b). Because these roads are needed only to facilitate vegetation management, these roads would be closed to motorized use when no longer needed to reduce road and access-related effects to other resources (see above).

Purpose 3: Utilize wood products resulting from restoration treatments to support local and regional economies.

- Providing a predictable and recurring supply of wood products from lands identified as suitable for timber management in the Forest Plan is needed. Providing wood products that contribute to sustaining a wood products processing industry is essential for continuing forestland restoration and maintenance services in southwest Idaho and to support local and regional economic sustainability. Activities are proposed within MPC 5.1 (Restoration and Maintenance Emphasis within Forested Landscapes). Most forestlands in MPC 5.1 have been identified in the Forest Plan as suitable for timber management where wood products produced from treatments are an outcome of achieving restoration objectives. MPC 5.1 emphasizes restoring or maintaining vegetation within desired conditions to provide a diversity of wildlife habitats, reduce risk from undesirable disturbance events, and support sustainable human uses of resources (Forest Service 2010a, p. III-90).

1.5 PROPOSED ACTION

The Proposed Action, described in detail in section 2.4.2, includes a variety of restoration activities:

- Commercial timber harvest activities on an estimated 3,265 acres
- Thinning of noncommercial trees on an estimated 839 acres of existing plantations
- Fuels treatment on an estimated 4,104 acres
- Realignment, reconstruction, maintenance, and decommissioning of an estimated 71.4 miles of existing roads; construction of an estimated 2.7 miles of new roads; and replacement of three fish passage Aquatic Organism Passage (AOP) barrier culverts

1.6 DECISIONS TO BE MADE

Based on the analysis in the FEIS, the Forest Supervisor will make one or more of the following decisions:

- Should vegetation restoration in the Project area be completed, and if so, which forested stands should be treated and what silvicultural treatments should be applied?
- Should activity fuel treatments be completed at this time in the Project area, and if so, which treatments should be applied?
- Should modifications be made to the NFS transportation system as recommended by the TAP (Forest Service 2011b), and if so, which road activities should occur?
- What design features, mitigation measures, and/or monitoring should be applied to the project?

1.7 FOREST PLAN DIRECTION RELEVANT TO THE PROJECT AREA

The Project area is in MA 14, Lower Middle Fork Payette River (Forest Service 2010a, p. III-282 to III-294). The entire Project area falls within MPC 5.1, Restoration and Maintenance Emphasis within Forested Landscapes (Figure 1-3) (Forest Service 2010a, p. III-90 to 91):

> *This prescription applies to lands that are predominantly (>50 percent) forested. Emphasis is on restoring or maintaining vegetation within desired conditions in order to provide a diversity of habitats, reduced risk from disturbance events, and sustainable resources for human use. Commodity production is an outcome of restoring or maintaining the resilience/resistance of forested vegetation to disturbance events; achievement of timber growth and yield is not the primary purpose. The full range of treatment activities may be used. Restoration occurs through management activities and succession. Combinations of mechanical and fire treatments are used to restore forested areas while maintaining or improving resources such as soils, water quality, fish and wildlife habitat, and recreation settings. The risk of temporary and short-term degradation to the environment is minimized, but impacts may occur within acceptable limits as resources are managed to achieve long-term goals and objectives.*

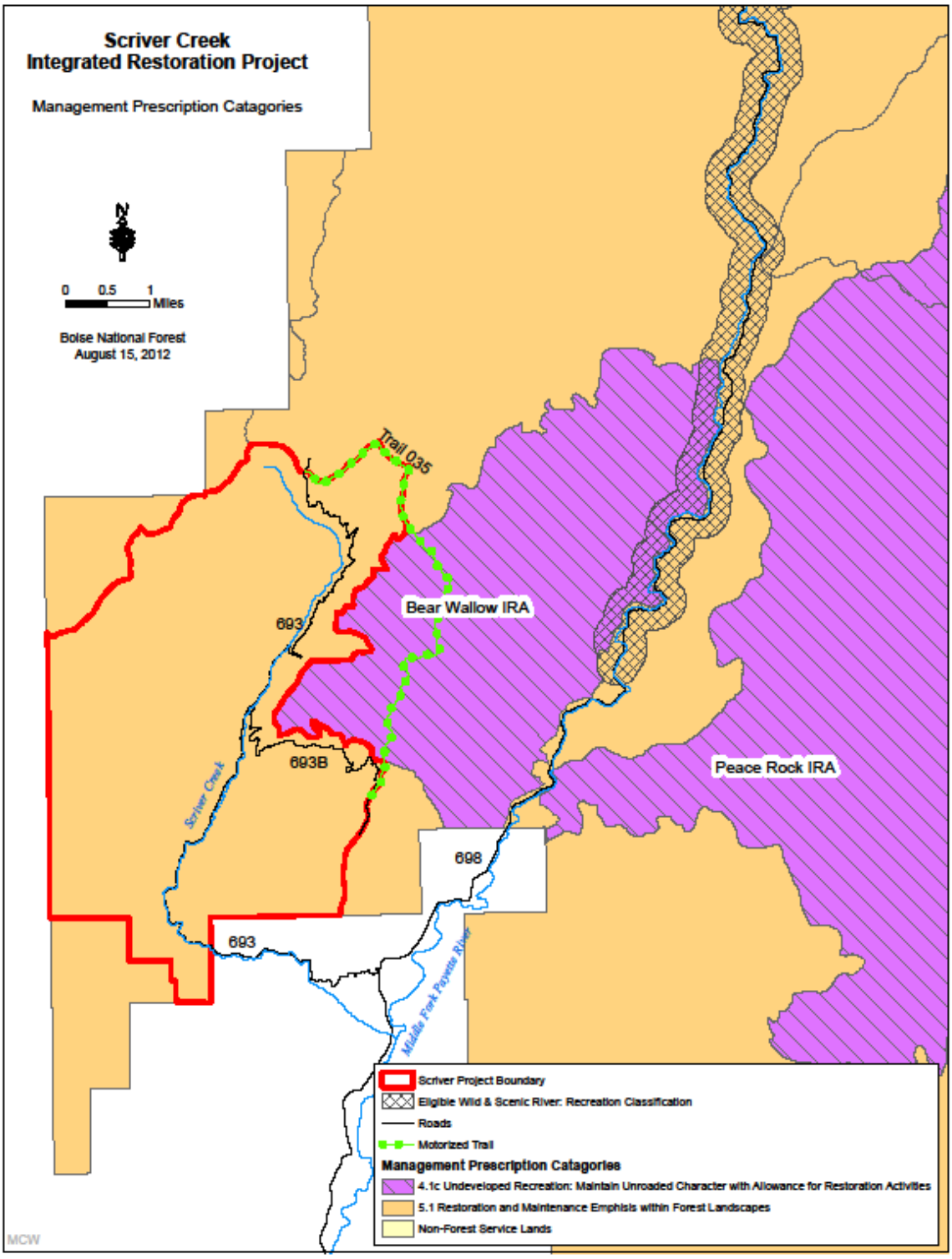

Figure 1-3. Relationship of the Scriver Integrated Restoration Project and Forest Plan Management Prescription Categories

The Proposed Action is designed to specifically address the Forest Plan objectives summarized below:

Forest-wide, Soil, Water, Riparian, and Aquatic Resources (SWRA) Objective SWOB18—Reduce road-related effects on soil productivity, water quality, and aquatic/riparian species and their habitats. Refer to the WARS for mid-scale prioritization indicators to assist in fine and site/project scale restoration prioritization planning (Forest Service 2010a, p. III-21).

Forest-wide, Wildlife Resources Objective WIOB16—Reduce road-related effects on sensitive wildlife species and their habitats. Refer to the conservation principles in Appendix E and the Vegetation and Wildlife Habitat Restoration Strategy and Source Environment Restoration Strategy Maps to assist in fine and site/project scale restoration prioritization planning (Forest Service 2010a, p. III-26).

Forest-wide, Vegetation Objective VEOB01—During fine-scale analysis, prioritize areas for restoration and maintenance consistent with the Vegetation and Wildlife Habitat Restoration Strategy Map and associated MA objectives. Within priority areas focus treatments in: (a) Forests in the nonlethal and mixed1 fire regimes, (b) aspen (*Populus* spp) in both climax stands and as a seral component of coniferous stands, (c) native herbaceous understory in shrub communities (d) woody riparian species, (e) western larch, and (f) whitebark pine (*Pinus albicaulis*) (Forest Service 2010a, p. III-31).

Forest-wide, Facilities and Roads Objective FROB06—Identify roads and facilities that are not needed for land and resource management, and evaluate for disposal or decommissioning (Forest Service 2010a, p. III-61).

MA 14, SWRA Objective 1418—Maintain or improve headwater streams for spawning and rearing habitats native fishes (Forest Service 2010a, p. III-290).

MA 14, SWRA Objective 1420—Cooperate and participate with the State of Idaho for implementation of the Total Maximum Daily Load (TMDL) for the Middle Fork Payette River (Forest Service 2010a, p. III-290).

MA 14, Vegetation Objective 1423—Restore PVG1 (Dry Ponderosa Pine/Xeric Douglas-fir), PVG2 (Warm Dry Douglas-fir/Moist Ponderosa Pine), PVG3 (Cool, Moist Douglas-fir), PVG5 (Dry Grand Fir) and PVG6 (Cool Moist Grand Fir) vegetation groups as described in Appendix A emphasizing the large tree size class in all watersheds in the MA (Forest Service 2010a, p. III-290).

MA 14, Timberland Resources Objective 1450—Manage stand density through thinning and other appropriate silvicultural treatments on suited timberlands to promote growth, to provide timber products, and to reduce hazards from uncharacteristic fire, insects, and diseases. Use thinning also to reduce the spread and intensification of dwarf mistletoe (*Arceuthobium pusillum*) (Forest Service 2010a, p. III-293).

MA 14, Facility and Roads Objective 1458—Reduce road-related impacts to wildlife, fish, soil, and water resources through road reconstruction and rehabilitation, or decommissioning, with emphasis on the Anderson Creek, Cow Creek, Wetfoot, Sixmile, and Scriver Creek drainages (Forest Service 2010a, p. III-293).

1.8 REGULATORY REQUIREMENTS AND REQUIRED COORDINATION

As part of the analysis for this project, the IDT evaluated various alternatives under the laws, regulations, and requirements relating to federal natural resource management. Several of the design features presented in Chapter 2 were developed and incorporated to ensure these requirements would be met. The following sections summarize the results of the analysis for those concerns most often noted. Additional details can be found in Chapters 2, 3, and/or the Project Record.

1.8.1 Clean Air Act

Using prescribed fire on about 962 acres to abate activity fuels and burning of landing slash, dust, and vehicle emissions would temporarily degrade air quality in the immediate vicinity of the Project area (section 3.5). However, within the constraints of associated design features (section 2.4.2.1), Alternatives B, C, or D would not noticeably affect air quality in the vicinity of any sensitive areas, population centers, or in any Class I Areas (section 3.5).

1.8.2 Federal Water Pollution Control Act (Clean Water Act)

The Proposed Action is consistent with the Clean Water Act (CWA) and its amendments. Effects to water quality and fisheries are disclosed in section 3.6. Alternative B would work toward the goals established in both the Middle Fork Payette River sediment and temperature TMDLs. Alternative B would reduce the anthropogenic sediment delivered to Scriver Creek, thereby reducing the amount of sediment reaching the mainstem Middle Fork Payette River (section 3.6). Implementing Alternatives B, C, or D would be expected to reduce stream temperatures in the long term and assist attainment of stream temperature targets in relation to the temperature TMDL (section 3.6).

At this time, it is uncertain whether this project will require a NPDES permit, due to the following:

- The Environmental Protection Agency (EPA) issued a formal notice on May 23, 2012, in the Federal Register (77 FR 30473) indicating its intent to expeditiously propose revisions to its Phase I stormwater regulations (40 C.F.R. §122.26) to specify that stormwater discharges from logging roads are not stormwater discharges “associated with industrial activity.” The notice also states that the EPA intends to further study and seek public comment on alternative approaches for addressing stormwater discharges from forest roads.
- Consolidated Appropriations Act, 2012, § 429, Pub. L. No. 112-74, 125 Stat. 786, 1046-1047 (Dec. 23, 2011) specified that, until September 30, 2012, no NPDES permits are required for stormwater discharges from roads associated with silvicultural activities.
- Permanent legislation is also pending in both the U.S. Senate and House of Representatives that would amend Section 402 of the CWA to exempt stormwater discharges resulting from silvicultural activities from NPDES permit requirements.

Due to these factors, it is uncertain at this time whether NPDES permitting requirements apply to stormwater discharges from logging roads related to this project. If a NPDES permit is required for this project, the Forest Service will comply with applicable NPDES permitting requirements. The Forest Service is requesting comments/clarification from the EPA and the Idaho Department

of Environmental Quality (IDEQ) during the SDEIS comment period concerning whether an NPDES permit is required.

1.8.3 Endangered Species Act

The Endangered Species Act (ESA), 16 USC 35 §§1531 et seq. 1988) provides for the protection and conservation of threatened and endangered plants and animal species. The action alternatives were assessed to determine the effects on threatened and endangered plant and animal species. The U.S. Fish and Wildlife Service (USFWS) provides the Forest with a list of threatened, endangered, proposed, and candidate species to consider in project planning. Two threatened wildlife species, Canada lynx (*Lynx canadensis*) and northern Idaho ground squirrel (*Spermophilus brunneus brunneus*), and one threatened fish species, bull trout (*Salvelinus confluentus*), were considered in this assessment (USFWS 2010a). In addition, potential for effects to three wildlife candidate species—southern Idaho ground squirrel (*Spermophilus brunneus endemicus*), wolverine (*Gulo gulo*), and yellow-billed cuckoo (*Coccyzus americanus*)—were assessed. The wildlife biological assessment (BA) prepared for this project indicates that the Proposed Action would have "No Effect" on Canada lynx and northern Idaho ground squirrel and would "Not Impact" southern Idaho ground squirrel, wolverine, and yellow-billed cuckoo (section 3.4 and Wildlife Technical Report and BA and Biological Evaluation (BE), which are available in the Project Record). The fisheries BA prepared for this project indicates the Proposed Action would have a "No Effect" on bull trout and the associated designated critical habitat (section 3.6 and Fisheries Technical Report and BA, which are available in the Project Record). No threatened or endangered plant species are located in Boise or Valley counties in Idaho. However, there is one candidate plant species, whitebark pine, listed for Boise and Valley counties, Idaho (USFWS 2010b). The plant BE prepared for this project indicated the Proposed Action would have "No Effect" on whitebark pine (section 3.8 and Botany BE and Botany Specialist Report, which are available in the Project Record).

1.8.4 Idaho Forest Practices Act

Rules pertaining to the Idaho Forest Practices Act would be implemented. In addition, logging operations and road maintenance activities would be administered on the ground by Forest Service personnel to ensure compliance with any contract requirements.

1.8.5 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) protects all migratory birds and their parts (including eggs, nests, and feathers) from "take". Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. The original intent was to put an end to the commercial trade in birds and their feathers that had wreaked havoc on the populations of many native bird species. On January 10, 2001, President William Clinton signed Executive Order (EO) 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, directing executive departments and agencies to take certain actions to further implement the MBTA. The Bald and Golden Eagle Protection Act affords additional protection to all bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos canadensis*)

The Forest Service and USFWS have entered into a memorandum of understanding (MOU) to promote the conservation of migratory birds as a direct response to EO 13186 (Forest Service and USFWS 2008). One of the steps outlined for the Forest Service is applicable to this analysis, "Within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors." The Forest Service additionally agreed, to the extent practicable, to evaluate and balance benefits against adverse effects, pursue opportunities to restore or enhance migratory bird habitat, and consider approaches for minimizing take that is incidental to otherwise lawful activities.

Alternatives B, C, and D would comply with the MBTA but may result in an "unintentional take" of individuals during proposed activities. However the project complies with the USFWS Director's Order No. 131 related to the applicability of the MBTA to federal agencies and requirements for permits for "take". In addition, this project complies with EO 13186 because the analysis meets Agency obligations as defined under the 2008, MOU between the Forest Service and USFWS designed to complement EO 13186. If new requirements or direction result from subsequent interagency MOUs pursuant to EO 13186, this project would be reevaluated to ensure that it is consistent (Wildlife Technical Report and BA, p. 129, both available in the Project Record).

1.8.6 National Forest Management Act

On April 9, 2012, the Department of Agriculture issued a final planning rule for NFS land management planning (2012 Planning Rule, 77 FR 68 [21162-21276]). None of the requirements of the 2012 Planning Rule apply to projects and activities on the Forest, as the Forest Plan (Forest Service 2003a, 2010a) was developed under a prior planning rule (36 CFR §219.17(c)). Furthermore, the 2012 Planning Rule explains, "[The 2012 Planning Rule] supersedes any prior planning regulation. No obligations remain from any prior planning regulation, except those that are specifically included in a unit's existing plan. Existing plans will remain in effect until revised" (36 CFR §219.17).

1.8.6.1 Forest Plan Consistency

NFMA requires that projects and activities be consistent with the governing Forest Plan (16 USC 1604 (i)).

The IDT initially evaluated existing resource conditions within the Scriver Creek subwatershed for vegetation, watershed, fisheries, wildlife, recreation, range, transportation, and fuel resources, in relation to the desired conditions for these resources established in the Forest Plan. The Purpose and Need and the Proposed Action were developed in response to this evaluation (Forest Service 2006). Implementation of Alternative B, C, or D has been determined to be consistent with the goals, objectives, standards, and guidelines in the 2010 Forest Plan (Forest Plan Consistency Table available in the Project Record).

1.8.6.2 Other National Forest Management Act Consistency Requirements (Findings)

1. Suitability for Timber Production: No timber harvest, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suited for timber production (16 USC 1604(k))—Acres within MPC 5.1 fall within the lands suited for timber production. All lands identified for commercial treatments have been determined to be suited for timber production (see vegetation, hydrology, and soils technical reports in the Project Record).

2. Timber Harvest on NFS 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:

a. Soil, slope, or other watershed conditions will not be irreversibly damaged (16 USC 1604(g)(3)(E)(i))—All treatment areas are consistent with this requirement (see sections 3.6 and 3.8 as well as the soils and hydrology specialists' report available in the Project Record).

b. There is assurance that the lands can be adequately restocked within five years after final regeneration harvest (16 USC 1604(g)(3)(E)(ii))—No regeneration harvests are proposed (see section 2.4).

c. Protection is provided for streams, streambanks, 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))—Proposed activities would not seriously and adversely affect water conditions or fish habitat (see sections 3.6 and 3.7 as well as the hydrology and fisheries specialists' reports available in the Project Record).

d. The harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber (16 USC 1604(g)(3)(E)(iv))—The harvest system chosen was based on that which best accomplished the multiple resource objectives for which output of timber would be an outcome of these restoration efforts (section 1.4, Purpose and Need #3). The dollar return between alternatives varies depending on how the various resource issues (see section 1.11) are addressed (section 3.15, "Financial Assessment").

3. 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 evenaged stand of timber will be used as a cutting method on NFS lands only where:

a. 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 (16 USC 1604(g)(3)(F)(i))—No clearcuts are proposed for this project.

b. 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 (16 USC 1604(g)(3)(F)(ii))—Chapter 3 discloses the potential environmental and biological (sections 3.2–3.11, 3.14, 3.18, and 3.19), esthetic (sections 3.13, 3.16, and 3.17), engineering (section 3.12) and economic (section 3.15) impacts of areas to be treated. The project has also been determined to be consistent with the multiple use objectives for this area identified in the Forest Plan (see section 1.86 as well as the Forest Plan Consistency Table available in the Project Record).

c. Cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain (16 USC 1604(g)(3)(F)(iii))—Disclosures are located in Chapter 3. Section 3.16, "Visual Resources," identifies that the visual quality objectives for the area have been met.

d. Cuts are carried out according to the maximum size limit requirements for areas to be cut during one harvest operation, 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 (FSM R1 supplement 2400-2001-2 2471.1, 16 USC 1604(g)(3)(F)(iv))—All treatments meet Forest Plan standard requirements (i.e., TRST02 and TRST03) for maximum size openings (see the Forest Plan Consistency Table available in the Project Record).

e. 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 (16 USC 1604(g)(3)(F)(v))—Chapter 3 discloses that proposed activities are consistent with Forest Plan requirements for protection of soil (section 3.8), watershed (section 3.6), fish (section 3.7), wildlife (section 3.4), recreation (sections 3.13 and 3.17), and esthetic (section 3.16) resources, and the regeneration of the timber resource (section 3.4). Also refer to findings documented in the Forest Plan Consistency Table (available in the Project Record).

4. Stands of trees are harvested according to requirements for culmination of mean annual increment of growth (16 USC 1604(m)). This requirement applies only to final regeneration harvest of even-aged stands on lands identified as suitable for timber production and where timber production is the primary purpose for the harvest. None of the alternatives propose final regeneration harvest of even-aged managed stands on any lands, including those identified as suitable for timber production and where timber production is the primary purpose for the harvest. See section 2.4.

5. Construction of temporary roadways in connection with timber contracts, and other permits or leases: Unless the necessity for a permanent road is set forth in the forest development road system plan, any road constructed on land of the NFS in connection with a timber contract or other permit or lease shall be designed with the goal of reestablishing vegetative cover on the roadway and areas where the vegetative cover has been disturbed by the construction of the road, within ten years after the termination of the contract, permit, or lease either through artificial or natural means. Such action shall be taken unless it is later determined that the road is needed for use as a part of the National Forest Transportation System (16 USC 1608(b))—As disclosed in Chapter 3, all temporary roads built in conjunction with any of the action alternatives have been designed with the goal of reestablishing vegetative cover on the roadway and areas where the vegetative cover has been disturbed by the construction of the road, within 10 years after the termination of the contract associated with the commercial and noncommercial vegetation activities (see sections 3.8 and 3.12 and the soils resource and transportation system technical reports that are available in the Project Record).

6. Standards of roadway construction: Roads constructed on NFS lands shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation, and impacts on land and resources (16 USC 1608(c))—Roads proposed to be constructed on NFS lands under any of the action alternatives have been designed to standards appropriate for the intended uses, considering safety, cost of transportation, and impacts on land and resources (see sections 3.6, 3.8, 3.12, 3.13, and 3.15 as well as the hydrology, soils, transportation, economic assessment, and recreation technical reports available in the Project Record and the TAP [Forest Service 2011b]).

1.8.7 National Historic Preservation Act

The National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their activities and programs on historic properties. Federal activities and programs are defined as "undertakings" by the 36 CFR 800 regulations implementing NHPA Section 106. Historic properties are significant cultural resources that are included in or eligible for inclusion in the National Register of Historic Places. The Forest Archeologist anticipates this project (Alternatives B, C, or D) would have no adverse effect to historic properties based on design features CR-1 and CR-2 (section 3.13). The Forest will prepare report for the Idaho State Historic Preservation Office (SHPO) to review and respond to, prior to a decision on this project.

1.8.8 Idaho Stream Alteration Act

All action alternatives would adhere to the requirements of the Idaho Stream Alterations Act and the 404 Permit processes of the U.S. Corps of Engineers (Watershed and Fisheries Technical Report available in the Project Record).

1.8.9 Inventoried Roadless Areas and Idaho Roadless Rule

In October 2008, the USDA adopted a state-specific, final rule establishing management direction for designating roadless areas in Idaho (36 CFR §294; 73 Federal Register 61456-61496). The final rule designates 250 Idaho Roadless Areas and establishes 5 management themes that provide prohibitions with exceptions or conditioned permissions governing road construction, timber cutting, and discretionary mineral development. This project does not propose any activities within an Inventoried Roadless Area (IRA) or Idaho Roadless Area. However, activities are proposed immediately adjacent to the Bear Wallow IRA. All action alternatives would maintain the integrity of the Bear Wallow IRA and its boundary. No impacts to this IRA are anticipated with implementation of any of the action alternatives (section 3.16). This project is consistent with the Idaho Roadless Rule.

1.8.10 Executive Order 11988, Floodplain Management

EO 11988 would be met since this project would not impact floodplains in the Project area and thereby would not increase flood hazard (section 3.6 and watershed and fisheries specialists' reports available in the Project Record). Soil, water, riparian and aquatic (SWRA) resource standards and guidelines in the 2010 Forest Plan were specifically designed to ensure that management actions implementing the Forest Plan, such as this one, would avoid or minimize short- and long-term impacts to floodplain as required under this executive order. Sections 3.6, 3.7, and 3.8 disclose the anticipated effects to SWRA resources. Determinations of consistency with Forest Plan standards and guidelines are specifically addressed in the Forest Plan

Consistency Tables and watershed and fisheries technical reports found in the Project Record. Design features and section 2.4.5.8 were specifically developed to, in part, avoid or minimize effects to floodplains as required under this EO.

1.8.11 Executive Order 11990, Protection of Wetlands

This project is consistent with EO 11990 since the Proposed Action would not impact wetlands in the Project area (section 3.6 and watershed and fisheries specialists' reports available in the Project Record). SWRA resource standards and guidelines in the 2010 Forest Plan were specifically designed to ensure that management actions implementing the Forest Plan, such as this one, would avoid or minimize short- and long-term impacts to wetlands as required under this executive order. Sections 3.6, 3.7, and 3.8 disclose the anticipated effects to SWRA resources. Determinations of consistency with Forest Plan standards and guidelines are specifically addressed in the Forest Plan Consistency Tables and watershed and fisheries technical reports found in the Project Record. Design features and section 2.4.5.8 were specifically developed to, in part, avoid or minimize effects to wetlands as required under this EO.

1.8.12 Executive Order 13443, Facilitation of Hunting Heritage and Wildlife Conservation

The Project area provides habitat for several game species, including deer (*Odocoileus* spp.), elk (*Cervus canadensis*), black bear (*Ursus americanus*), mountain lion (*Felix concolor*), wolf (*Canis lupus*), and forest grouse. The effects to wolves, deer and elk are presented in sections 3.4.5.1 and 3.4.5.2. Project design features (section 2.4.2.1) have been included to minimize and avoid impacts to these species so that habitat is provided to support IDFG's population objectives.

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 coarse wood desired conditions apply to all management activity areas and provide for these components on the landscape in amounts, distribution, and sizes that were historically expected to exist within each of the PVGs (Wildlife Technical Report and Biological Assessment, p. 130, both available in the Project Record).

Dusky grouse (*Dendragapus obscurus*) and ruffed grouse (*Bonasa umbellus*) are present in the Project area. Both grouse species are associated with forested habitats. 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 (*Abies lasiocarpa*), 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. All of the action alternatives would reduce tree densities and canopy cover within dense stands, thus, improving conditions for the dusky grouse. There would likely be no change to ruffed grouse habitat from this project although the availability of drumming logs is important for breeding habitat and management to retain or provide large downed logs would benefit ruffed grouse (wildlife technical report and BA, p. 130, both available in the Project Record).

1.8.13 Prime Farmland, Rangeland, and Forest Land (USDA Regulation 9500-3)

No prime farmlands, rangelands, or forest lands are located on the Forest (Forest Service 2003b, p. 3-979). Therefore, no effects to prime farmland, rangeland, or forest lands would occur with the implementation of any of the action alternatives.

1.8.14 Executive Order 12898, Environmental Justice

In accordance with EO 12898 (59FR 32, 1994), the action alternatives were assessed to determine whether they would have disproportionately high and adverse human health, including social and economic effects, on minority or low-income human populations. No effects have been identified.

1.8.15 Other Disclosures

No Research Natural Areas (RNAs), Wild and Scenic Rivers, protected caves, or parklands are located within the Project area and, consequently, no effects to any of these resources would be expected. These resources will not be discussed further in this document.

1.9 PUBLIC INVOLVEMENT

This project has been listed in the Forest Schedule of Proposed Actions (SOPA) since October 2006. A scoping package describing the Proposed Action was mailed to interested individuals, agencies, and/or groups on January 17, 2007. A total of 9 interested parties responded. Respondents expressed a variety of concerns and opinions regarding the Proposed Action. The Project Record contains all written comments received during scoping and discloses how the IDT addressed those concerns. The project was scoped a second time in April 2010 since the project was postponed, partly because of a particularly challenging and extensive 2007 wildfire season followed by the salvage project in 2008 . A total of 7 interested parties responded to the April 27, 2010, scoping effort. Respondents to the second scoping effort also expressed a variety of concerns and opinions regarding the Proposed Action. The Project Record contains all written comments received during the 2010 scoping and discloses how the IDT addressed those concerns.

A Notice of Intent to prepare an EIS was published in the Federal Register on January 25, 2007. A second Notice of Intent, which invited comments and described the current Proposed Action, was published in the Federal Register on May 7, 2010.

A Notice of Availability of the DEIS for this project was published in the Federal Register on December 30, 2011 (FR Vol. 76, No. 251; NOA for EIS No. 20110438) and a legal notice published on December 30, 2011, in *The Idaho Statesman* announcing release of the DEIS. A summary of the DEIS outlining the alternatives and associated environmental analysis was mailed to 55 individuals, agencies, and/or groups on December 21, 2011. The entire DEIS was posted on the Forest's website, with paper and electronic copies available upon request.

Response letters, phone calls, in-person meetings, and/or e-mails were received from 11 interested parties.

The proposal was presented to the Valley County Commissioners at the June 14, 2010 County Commissioner meeting and Boise County Commissioners at the May 17, 2010 County Commissioner meeting and again to both commissions in January 2012.

1.10 TRIBAL NOTIFICATION/CONSULTATION

The federal government's trust responsibility to federal recognized tribes compels agencies to conduct their activities consistent with rights legally accruing to a tribe or tribes by virtue of inherent rights and sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order 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.

Three federal recognized tribes have expressed tribal interests and rights on NFS lands that fall within the Boise National Forest: Nez Perce Tribe, Shoshone-Bannock Tribes, and Shoshone Paiute Tribes. Shoshone-Paiute tribal representatives were presented the project proposal at three Wings and Roots meetings occurring on March 9, 2006; September 14, 2006; and May 13, 2010. Tribal Chairpersons and representatives of both the Nez Perce and Shoshone-Bannock tribes were mailed project proposals on January 17, 2007, April 27, 2010, and provided notification of the DEIS on December 30, 2011. The tribal notification and/or consultation processes described above did not result in the identification of any potential impacts to treaty rights, treaty resources, or other unextinguished tribal rights and interests. Some tribal representatives identified beneficial effects to resources as a result of proposed restoration of vegetation, wildlife habitat, soil, and water resources consistent with those identified during the 2010 Forest Plan amendment process (Forest Service 2010b , Section 3.6, Tribal Interest and Rights).

1.11 IDENTIFICATION OF ISSUES

To identify if issues raised during scoping and the DEIS comment period reflect unresolved conflicts, and thus suggested the need to develop alternatives to the Proposed Action, the IDT and the Responsible Official evaluated the concerns raised as follows:

- Was the concern beyond the scope of the project or not relevant to the action proposed (e.g., identified cause-effect relationship would not result should the proposal be implemented)?
- Was the concern addressed and resolved though application of the Forest Plan standards and guidelines or best management practices?
- Can the concern be addressed and resolved through implementation of project-specific mitigation measures to the Proposed Action?
- Was the concern addressed during processes or analyses routinely conducted by the IDT?

1.11.1 Issues Identified through Scoping or Comments received on the Draft Environmental Impact Statement used in Alternative Development

Four concerns were raised that the Responsible Official determined to be issues and unresolved conflicts with the Proposed Action. To resolve these issues, two additional action alternatives, Alternatives C and D, were developed to clearly display the effects and tradeoffs of responding to these issues. The four issues are as follows:

- *Issue 1:* All acres in need of restoration that are accessible from the proposed transportation system should be included in the Proposed Action. Commenters believed that including additional acres for commercial treatment that did not require additional road access may improve the economics of the project and more fully accomplish Purposes 1 and 3.
- *Issue 2:* All road-related restoration opportunities identified in the TAP should be carried forward into the Proposed Action regardless of whether funding would be generated from the project to complete the activity. Commenters believed that carrying all road-restoration opportunities through the NEPA process would allow these projects to be implemented whenever funding became available. They identified many cases where restoration funds became available but could not be used because the NEPA process could not be completed before the deadline. Commenters believed carrying these additional activities forward now would allow Purpose 2 to be more fully accomplished should unanticipated funds become available.
- *Issue 3:* Commercial treatments in units immediately adjacent to the Bear Wallow IRA could impact the visual quality and detract from the natural appearance of these areas as viewed from the IRA. While the Proposed Action includes mitigation to address this concern, commenters believe that not treating these areas could result in a more natural appearance than what would occur under the mitigated Proposed Action.
- *Issue 4:* The Proposed Action removes some large diameter trees important to the quality of habitat preferred by some terrestrial wildlife species. Some commenters believe that prohibiting the removal of any tree ≥20 inches d.b.h. would benefit some wildlife species. While the Proposed Action retains many of the large trees, there are cases where later seral large trees (e.g., grand fir) would be removed to facilitate retaining and regenerating early seral species such as ponderosa pine. Thus, while retaining and restoring early seral tree species in forests would benefit some wildlife species over time (e.g., flammulated owl), it would have tradeoffs to other wildlife species who prefer larger, later seral tree species [e.g., pileated woodpeckers (*Dryocopus pileatus*)].

Refer to section 2.4, for detailed descriptions of the alternatives considered in detail in this SDEIS and how each alternative addressed the Purpose and Need for this action and/or Issues 1–4 above.

1.11.2 Concerns Raised in Response to Scoping and Review of the Draft Environmental Impact Statement

The Responsible Official also reviewed other concerns raised during scoping or as comments on the DEIS. These concerns are valuable, but they do no raise unresolved conflicts with the Proposed Action and therefore are not treated as issues. Typically, these concerns have been addressed by incorporating additional mitigation or design features and/or more specifically addressed the analysis and disclosure of effects in Chapter 3. These concerns address a variety of subjects. The following provide an overview of the types of concerns identified:

- In the EIS, please indicate which is the primary roads goal [purpose #2]: (1) to road-up the area for future timber sales or (2) Improve watershed conditions by reducing road-related impacts. Refer to section 3.12.
- The new road construction planned for Scriver Creek project will have compacted road surfaces that will generate overland flow containing sediment during precipitation events. Much of the sediment often enters the stream channel system, locally increasing peak flows and increasing aquatic resource-harming turbidity. Refer to sections 3.6, 3.7, and 3.8.
- The new road construction…will fragment wildlife habitat and alter animal behavior by causing changes in home ranges, movement, and reproductive success and will divide large landscapes into smaller patches and convert interior habitat into edge habitat. Refer to section 3.4.
- The NEPA process requires the Responsible Official to analyze all reasonable alternatives in detail…To reject a citizen-generated alternative, the Responsible Official must write a convincing reason why the alternative is unreasonable. Refer to section 2.3.
- Logging areas that are used by the public for recreation will harm the stability of the local communities. The stability of local business actually suffers when recreationists choose to go elsewhere for their forest experiences. Refer to section 2.4.5.9, features RR-1 through RR-4 and the effects disclosures in sections 3.13, 3.15, and 3.16.
- Please provide a list of the [wildlife] species that occupy habitat or have unoccupied habitat in the Project area…Listing the species that occupy or have habitat near the Project area in the EIS will help the public understand the project in context of non-vegetative natural resources. Refer to effects disclosures in section 3.4 and the wildlife technical report available in the Project Record.
- The increased open motorized route density also increases concerns about snag retention, which affects a host of issues from snag-dependent wildlife to coarse woody debris recruitment. … [This could be addressed] …include seasonal or permanent closures of firewood gathering in areas where snag density is a concern to individually marking large snags and trees along roads as do not cut wildlife trees. Refer to section 2.4.5.3, features WL-3, WL-5 and WL-6 and the effects disclosures in sections 3.2 and 3.4.
- Our concerns with the project proposal were its impact to the groomed snowmobile system and impacts to NFS trail 035 (Bear Wallow Trail). Refer to section 2.4.5.9, feature RR-1 and effects disclosures in section 3.13.
- Prohibiting log hauling during weekends and holidays is important for public safety. Refer to section 2.4.5.6, feature TH-2 and effects disclosures in section 3.13.

- Retention of some sapling and pole-sized regeneration clumps where feasible…may mitigate some of the loss of elk hiding cover modeled in the DEIS. Refer to Chapter 3, section 3.2.2, silvicultural prescriptions and effect disclosures for elk, section 3.4.
- Additional mitigation measures for sediment delivery should be considered where retention of roads is deemed necessary. Refer to section 2.4.5.6, features TH-7, TH-11; section 2.4.5.7, features RM-1 through RM-4; and section 2.4.5.8, features SW-1 through SW-5, SW-7, and SW-9 through SW-11.
- Please include jobs analysis in the financial assessment portion of the EIS. Refer to section 3.15.
- Implementation priority should be given to projects that will have a beneficial economic impact on the local communities and counties that rely on the Forest for their jobs and income. Refer to section 2.4.7 and effects disclosures in section 3.15.
- Please remove the diameter limitations for ponderosa pine in this project. Placing these diameter limitations will create problems for treatment layouts and unnecessarily restricts the tools available to the Silviculturists…If diameter limitations are maintained, the cost of the project will be negatively impacted. Refer to section 2.4.5.6, feature TH-9; section 3.2.2, silvicultural prescriptions; section 3.2.4.2.1, ponderosa pine restoration; and Appendix D, Strata Treatment Outcomes.
- Please confirm that the roads scheduled for obliteration/removal will not be needed for future management/fire suppression activities. Refer to disclosures in section 3.12 and project TAP in the Project Record.
- The need for a "predicable and recurring supply of wood products" from NFS lands is key to the landscape restoration work that needs to be achieved to mitigate the loss of habitat due to wildfire, insects, and disease on the national forests. Refer to section 1.4, Purpose and Need #3.
- Concerned with the effects of the relocation of NFS road 696 on snags, coarse woody debris, and elk security cover. Refer to effects disclosures in sections 3.2.8, 3.2., 3.4., and 3.4.5.2
- Our concern is the development of only one action alternative given a project as large and complex as this. Examining only one alternative defeats part of the purpose of NEPA, which is to find ways to minimize impacts identified in the analysis. Refer to sections 2.3 and 2.4; two additional action alternatives were developed and analyzed in detail.
- Please assure the two publicly generated alternatives that have been rejected by the Responsible Official here are analyzed in detail in the final EA [refer to the December 30th DEIS, Chapter 2, section 2.3, Alternatives Eliminated from Detailed Study]. Refer to sections 2.3 and 2.4.
- Fuelwood collection is a big concern…look for options to mitigate or decrease open road densities that help facilitate this activity. Refer to section 2.4.2, 2.4.3, and 2.4.4, description of road activities within each action alternative and road closures; and section 2.4.5.7, feature RM-5.
- Restoring habitat for white-headed woodpeckers will inevitably decrease habitat and cover for species such as pileated woodpecker, flammulated owl, northern goshawk (*Accipiter gentilis*), and Rocky Mountain elk. While the Forest Service has set aside what

appears to be sufficient acres of habitat for these species, the areas designated for these species does not necessarily match up with the actual areas of use by these species. Refer to effects disclosures in section 3.4.

- The DEIS doesn't clearly demonstrate how project activities and subsequent management would be consistent with existing TMDLs. Refer to effects disclosures in section 3.6.
- The DEIS's cumulative effects discussion fails to adequately consider the quantitative loss of habitat for the American three-toed woodpecker (*Picoides tridactylus*), fisher (*Martes pennant*), boreal owl (*Aegolius funereus*), flammulated owl, Canada lynx, great gray owl (*Strix nebulosa*), northern goshawk…and several other species. Refer to effects disclosures in section 3.4.
- We are concerned that the pervasive tendency to all-out suppress most fires with little regard to how near or far they are from human-built structures will continue. The cycle of fire suppression followed by fuel reduction (much of it commercial logging) to emulate fire followed by more fire suppression will continue the present downward spiral of ecosystem degradation. Refer to disclosures in sections 3.2.3 and 3.3.
- The DEIS fails to disclose soil detrimental disturbance (DD) levels outside proposed activity areas, despite hydrological concerns they may cumulative effect. Refer to effects disclosures in sections 3.6 and 3.8; Appendix C; and definition of "activity area" in section 3.8 and the Glossary.
- Fragmentation effects could continue to reduce the ability to provide for the habitat needs of old growth and "old forest" associated species for decades to come following project implementation and other activities in the Project area. Refer to effects disclosures in section 3.4.

The FEIS will respond to all comments/concerns raised during the comment periods on the DEIS, issued on December 30, 2011, as well as those provided following review of this SDEIS. The response to comments will be included as an appendix to the FEIS.

1.12 DOCUMENT ORGANIZATION

This document is tiered to the FEIS and planning record for the 2003 Forest Plan. This document is also tiered to the *Final Environmental Impact Statement Supporting Forest Plan Amendments to Integrate the Boise National Forest Wildlife Conservation Strategy, Phase 1: Forested Biological Community* (Forest Service 2010b), Record of Decision (Forest Service 2010c), and the 2010 Forest Plan (Forest Service 2010a). This documentation includes monitoring reports. Analyses from the 2003 FEIS and the 2010 FEIS have been referenced rather than repeated in some instances. Analyses pertaining to the FEIS for the 2003 Forest Plan (Forest Service 2003a) and the FEIS for the 2010 amendment (Forest Service 2010b) to the Forest Plan are contained in the Project Record located at the Forest Supervisor's Office in Boise, Idaho. Detailed information that supports the analyses presented in this document, unless specifically noted otherwise, is contained in the Project Record located at the Forest Supervisor's Office. This document consists of the following main chapters:

Chapter 1, Purpose and Need—Describes the relationship of this project to the 2010 Forest Plan, Purpose and Need for the action, the Proposed Action, decisions to be made, Forest Plan direction, regulatory requirements and required coordination, public involvement efforts, and identification of significant issues.

Chapter 2, Alternatives—Includes descriptions of alternatives considered but eliminated from detailed study; descriptions of the alternatives considered in detail; design features associated with the alternatives, and; a comparative summary of the environmental consequences, activities, and outputs.

Chapter 3, Affected Environment and Environmental Consequences—Describes the existing conditions of the resources within the analysis area(s) and the environmental impacts of the alternatives on those resources.

Chapter 4, Consultation and Coordination—Provides a list of the primary preparers of this document, a summary of the scoping and public involvement efforts, and a list of agencies, organizations, and persons who received copies of the DEIS and this SDEIS.

Four appendices follow the main chapters:

Appendix A—Roads Tables by Alternative

Appendix B—Cumulative Effects: Past, Present, and Reasonably Foreseeable Actions

Appendix C—Soils Detrimental Disturbance Table

Appendix D—Vegetative Strata Descriptions

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Chapter 2—Alternatives

2.1 INTRODUCTION

This chapter describes in detail the No Action (Alternative A) and Proposed Action (Alternative B) alternatives, as well as new alternatives developed in response to public comments on the DEIS (Alternatives C and D). Also presented are alternatives considered but eliminated from detailed study, including reasons for their elimination. This chapter concludes with a comparative summary table of the alternatives considered in detail (section 2.5). This comparison, combined with the more detailed disclosure in Chapter 3, provides the Responsible Official with the necessary information to make an informed choice between alternatives.

2.2 DEVELOPMENT OF ALTERNATIVES

Issues identified in Chapter 1 were used to generate a preliminary set of alternatives, which were divided into "alternatives considered but eliminated from detailed study" and "alternatives considered in detail." Both sets of alternatives are included in the reasonable range of alternatives considered.

Only alternatives that met the purpose and need and which addressed one or more of the issues identified by the Responsible Official were considered for detailed study. However, not all alternatives that met these criteria were studied in detail, as the number would have been prohibitively large. Instead, the Responsible Official identified those alternatives that met the criteria and created a reasonable range of outputs, costs, management requirements, and effects.

2.3 ALTERNATIVES ELIMINATED FROM DETAILED STUDY

NEPA requires federal agencies to rigorously explore and objectively evaluate a reasonable range of alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). The following alternatives were considered but eliminated from detailed study.

2.3.1 No Timber Harvest or Road Construction

An alternative was considered but eliminated from detailed in response to the following comment received in the DEIS released December 30, 2011:

> An alternative must be analyzed in detail that implements all proposed actions except 1) temporary and/or system road construction, and 2) commercial timber harvest. The Responsible Official can choose not to select this alternative in the final decision. The rationale provided for the need to consider this alternative was "I am concerned that commercial timber removal and road construction activities will harm the countless natural resources within the sale area and aquatic resources many miles downstream from the sale.

While the Council on Environmental Quality (CEQ) regulations do not specifically define what a "reasonable" alternative is, it is generally understood to mean those that are technically and

economically feasible project alternatives that would satisfy the primary objectives of the project defined in the Purpose and Need statement. In this case, to accomplish Purpose and Need #1[13] (section 1.4), both commercial and noncommercial vegetation management (i.e., timber harvest) would be required. Without commercial timber harvest, Purpose #3[14] could not be met. Assessing an alternative in detail that does not even partially accomplish 2 out of 3 of the purpose and needs for this project would not be reasonable.

In addition, the Project area falls within MPC 5.1 under the Forest Plan. As described in section 1.7, this prescription applies to lands that are predominantly (>50 percent) forested. Emphasis is on restoring or maintaining vegetation within desired conditions in order to provide a diversity of habitats, reduce risk from disturbance events, and provide sustainable resources for human use. Not providing for opportunities for commodity production as an outcome of restoring or maintaining the resilience/resistance of forested vegetation within this allocation unit, when it can accomplish the restoration objectives while meeting other resource sustainability goals, would not be reasonable.

Also, forestlands within MPC 5.1, other than PVGs 1 and 11, are classified as suited forestland under the Forest Plan and are available for timber production. Thus, timber volume from this Forest Plan MPC allocation unit is included in the base schedule where regular and predictable wood product outputs are planned and contribute to the Forest's Allowable Sale Quantity (ASQ). Use of timber harvest to accomplish restoration objectives in this MPC was part of the intended uses in this allocation unit under the Forest Plan. Thus, where timber harvest is an appropriate tool to accomplish restoration objectives within this allocation unit and contribute to the Forest ASQ, it would be unreasonable to not consider such a tool.

Road construction proposed under any of the action alternatives is to both support vegetation management as well as provide for the opportunity to move a primary egress and ingress road out of a riparian corridor to a more sustainable location that would not result in unacceptable impacts to biological and physical resources. Closing this primary egress and ingress road (NFS road 696) would not be reasonable in light of the identified transportation management needs this road serves, including public safety (refer to TAP and section 3.12). Thus, to mitigate the environmental harm resulting from its current location, provide ingress and egress important to public access needs and safety, NFS road 696 must be moved out of the riparian corridor and a new road constructed/reconstructed to the west.

Finally, as disclosed in Chapter 3, the proposed timber harvest and road construction would not harm the countless natural resources within the sale area and aquatic resources many miles downstream from the sale. While there are always trade-offs to resources and services when balancing multiple uses on National Forest System lands, actions proposed in this project do not result in effects that would impact the sustainability of the biological and physical resources within the area and downstream. To the contrary, proposed road reconstruction, realignment and

[13] Purpose 1: Manage forest structure, density, and species composition to accelerate development of large tree size class and old forest habitat dominated by early seral tree species (e.g., ponderosa pine) that will contribute to achievement of Forest Plan desired vegetation and associated wildlife habitat conditions.

[14] Purpose 3: Utilize wood products resulting from restoration treatments to support local and regional economies.

decommission and vegetation management treatments would have measurable beneficial effects (e.g., sections 3.2, 3.4, 3.6 and 3.7).

2.4 ALTERNATIVES ANALYZED IN DETAIL

All alternatives considered in detail comply with the same federal laws and regulations. The three action alternatives meet the purpose and need for this action and address the four issues identified below to varying degrees.

As disclosed in Chapter 1 of this document, four concerns were raised that the Responsible Official determined to be issues and unresolved conflicts with the Proposed Action. To resolve these issues, two additional action alternatives, Alternatives C and D, were developed to clearly display the effects and tradeoffs of responding to these issues.

Issue 1: All acres in need of restoration that are accessible from the proposed transportation system should be included in the Proposed Action. Commenters believed that including additional acres for commercial treatment that did not require additional road access may improve the economics of the project and more fully accomplish Purposes 1 and 3.

Issue 2: All road-related restoration opportunities identified in the TAP should be carried forward into the Proposed Action regardless of whether funding would be generated from the project to complete the activity. Commenters believed that carrying all road-restoration opportunities through the NEPA process would allow these projects to be implemented whenever funding became available. They identified many cases where restoration funds became available but could not be used because the NEPA process could not be completed before the deadline. Commenters believed carrying these additional activities forward now would allow Purpose 2 to be more fully accomplished should unanticipated funds become available.

Issue 3: Commercial treatments in units immediately adjacent to the Bear Wallow IRA could impact the visual quality and detract from the natural appearance of these areas as viewed from the IRA. While the Proposed Action includes mitigation to address this concern, commenters believe that not treating these areas could result in a more natural appearance than what would occur under the mitigated Proposed Action.

Issue 4: The Proposed Action removes some large diameter trees important to the quality of habitat preferred by some terrestrial wildlife species. Some commenters believe that prohibiting the removal of any tree ≥20 inches d.b.h. would benefit some wildlife species. While the Proposed Action retains many of the large trees, there are cases where later seral large trees (e.g., grand fir) would be removed to facilitate retaining and regenerating early seral species such as ponderosa pine. Thus, while retaining and restoring early seral tree species in forests would benefit some wildlife species over time (e.g., flammulated owl), it would have tradeoffs to other wildlife species who prefer larger, later seral tree species (e.g., pileated woodpeckers).

2.4.1 Alternative A: No Action

This is a required alternative that provides a baseline against which to measure and compare the impacts of the Proposed Action. Under this alternative, no new management activities would occur in this area although all other ongoing activities (e.g., recreational activities, public fuelwood gathering, livestock grazing, motorized travel) would continue. Suppression of wildfires within the Project area would also continue as needed. Refer to Figure 2-1 for a display of the existing transportation system.

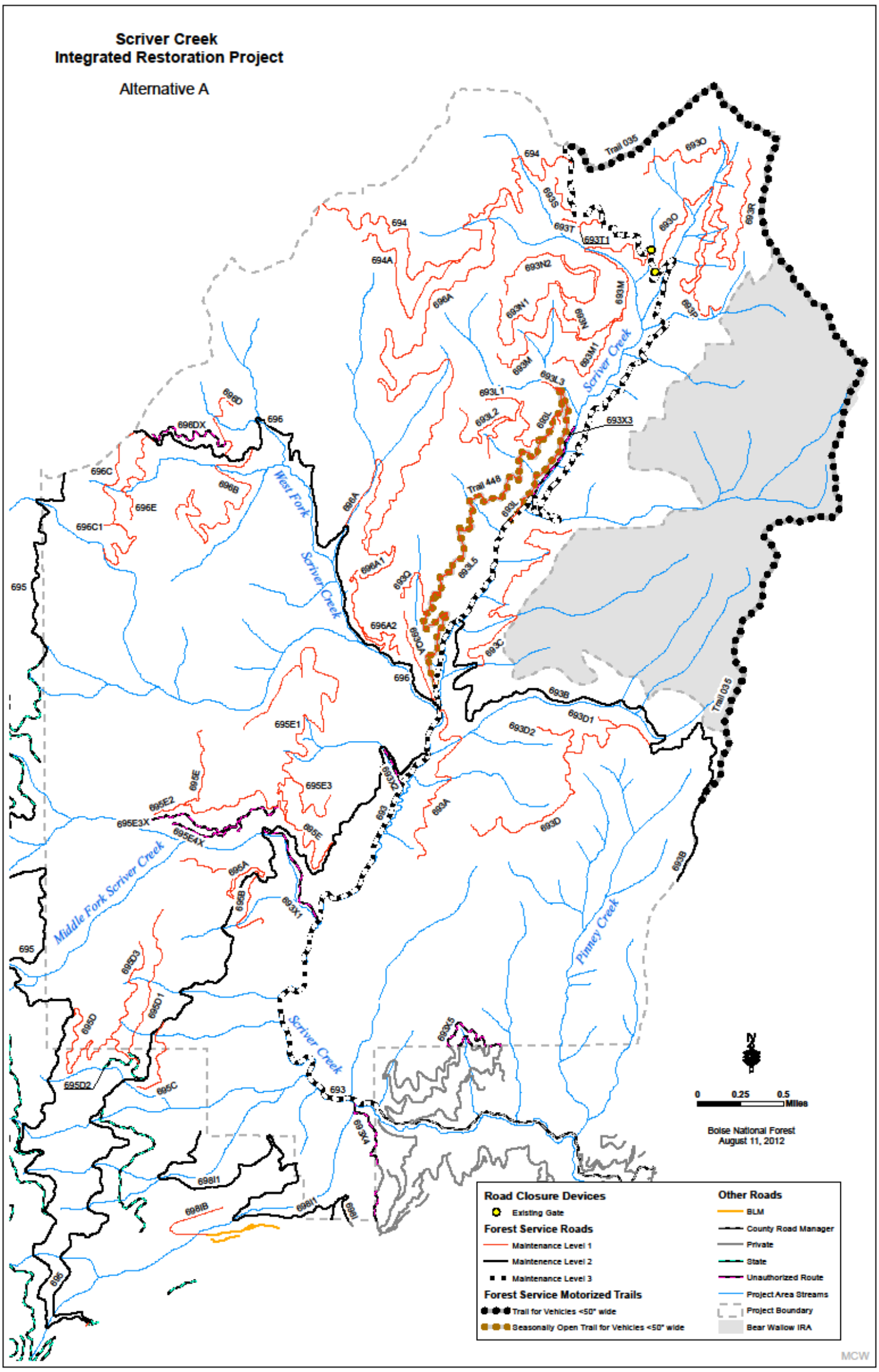

Figure 2-1. Current Transportation System within the Scriver Creek Integrated Restoration Project Area

2.4.2 Alternative B: Proposed Action

Alternative B (Proposed Action) was developed to meet the Project's Purpose and Need presented in Chapter 1. The Proposed Action would carry out the project design features and activities described below.

To accomplish Purpose 1, "Manage forest structure, density, and species composition to accelerate development of large tree size class and old forest habitat dominated by early seral tree species (e.g., ponderosa pine) that will contribute to achievement of Forest Plan desired vegetation and associated wildlife habitat conditions" and Issues 1 and 3, the following activities are proposed:

- Vegetation restoration involving commercial timber harvest activities would be conducted on about 3,265 acres, utilizing tractor/off-road jammer (1,212 acres), skyline (969 acres), and helicopter (1,084 acres) logging systems. In addition to the tractor/off-road jammer acres, mechanized feller bunchers (track mounted) would be used on acreage designated as skyline or helicopter yarding where ground slope is less than 35 percent (Figure 2-2).
- Thinning of noncommercial trees would occur on approximately 3,265 acres following commercial timber harvest activities (Figure 2-2).
- Noncommercial thinning of small diameter (typically less than 8 inches d.b.h. would occur on about 839 acres of existing plantations. Approximately 163 acres of these thinning activities would occur within RCAs (Figure 2-2).

The following activity fuel treatments would occur on approximately 4,104 acres identified in Figure 2-3:

  - Lopping of activity fuels on approximately 839 acres of noncommercially thinned plantations. Slash would be lopped to a depth of no greater than 36 inches;
  - Whole tree yarding (WTY) followed by prescribed underburning on about 500 acres, and
  - Lopping (LOP) of slash to a depth of no greater than 36 inches followed by prescribed underburning on about 462 acres;
  - Lopping of slash to a depth of no greater than 36 inches only on about 622 acres;
  - Whole tree yarding (WTY) with haul back of some pole and top material back in to units deficit large coarse woody debris (CWD) on about 1011 acres; and
  - WTY with burning of landing piles on about 670 acres.

- Road activities on approximately 43.6 miles of roads to facilitate commercial timber harvest. Road activities include the following:
  - Construction of about 2.7 miles of new specified NFS road (Figure 2-2 and Appendix A)
  - Construction of approximately 1.0 mile of temporary road (Figure 2-2 and Appendix A)
  - Realignment of a segment of NFS road 696D. Realignment would use approximately 0.4 miles of an existing unauthorized road prism and require construction of about 0.1 miles of new road prism. Once construction is completed, approximately 0.1 miles of the relocated segment of NFS road 696D would be decommissioned (Figure 2-2 and Appendix A).

  - Road maintenance activities on about 40.9 miles of NFS roads to the approved road management objective. Road maintenance activities may include but are not limited to road prism blading, spot aggregate placement, drainage improvements, roadway clearing, and roadway ditch/culvert inlets cleaning.
- Use and/or development of approximately 15 helicopter landings, including 1 existing helicopter landing and 14 new landings.

To accomplish Purpose 2, "Improve watershed conditions by reducing road-related impacts to wildlife, fish, soil, and water resources while providing for the transportation system necessary to meet long-term management needs," and Issue 2 the following activities are proposed:

- Approximately 16.1 miles of road would be decommissioned, including designated NFS roads (12.8 miles) and unauthorized routes (3.3 miles). Road decommissioning methods may include one or more of the following activities: recontour or partially recontour sight distance from existing road junctions and/or portions of road segments where resource concerns exist, barricade road junctions, pull existing stream crossing structures and stabilize crossings, provide long-term drainage (e.g., waterbars and dips), scarify and/or rip road prism, and seed and mulch disturbed areas (Figure 2-2 and Appendix A).
- NFS road 696 would be realigned to provide long-term access and eliminate segments of the road within the RCA corridors. Realignment would use approximately 3.5 miles of existing NFS roads and require construction of about 4.3 miles of new road prism. Once relocation construction is completed, approximately 3.7 miles of the relocated segments of NFS road 696 would be decommissioned (Figure 2-2 and Appendix A).
- Upon completion of vegetation restoration and activity fuel treatments, road closure devices, such as gates, barrier rock, and/or berms, would be installed on the following ML1 NFS Roads: 693A, 693D[15], 694, 695A, 695B, 695D1, 695E3[16], portion of NFS road 696[17], portion of NFS road 696B, portion of NFS road 696B[18], portion of the 696C[19], and 696C1[20]. ML1 roads opened to support vegetation management operations would not be available for public use (i.e., would not be added to the Emmett RD's MVUM during vegetation management operations) (Figure 2-2).
- New surface aggregate would be placed on about 2.8 miles of NFS roads to upgrade the road surface type.
- New aggregate would be placed for up to 300 feet on both sides of perennial stream crossings on all NFS road to be used for commercial harvest activities, excluding the roads proposed to be decommissioned (Figure 2-4).

[15] NFS Road 693D would be assigned road number 693B1 under this alternative.

[16] NFS Road 695E3 would be assigned road number 696A under this alternative.

[17] NFS Road 696 would be assigned road number 696D under this alternative.

[18] A portion of NFS Road 696B would be assigned road number 696C under this alternative.

[19] A portion of NFS Road 696C would be assigned road number 696E under this alternative.

[20] NFS Road 696C1 would be assigned road number 696F under this alternative.

- Road/stream crossing replacements would be completed between July 1 and September 30 at the following three road/stream crossings to provide aquatic organism passage:
  - NFS road 695 and Middle Fork Scriver Creek
  - NFS road 693A and Scriver Creek
  - NFS road 693 and Scriver Creek (Figure 2-2)

To accomplish Purpose 3, “Utilize wood products resulting from restoration treatments to support local and regional economies,” the following activity is proposed:

- Provide approximately 20.8 million board feet (MMBF) as sawlogs to local and/or regional processing facilities.

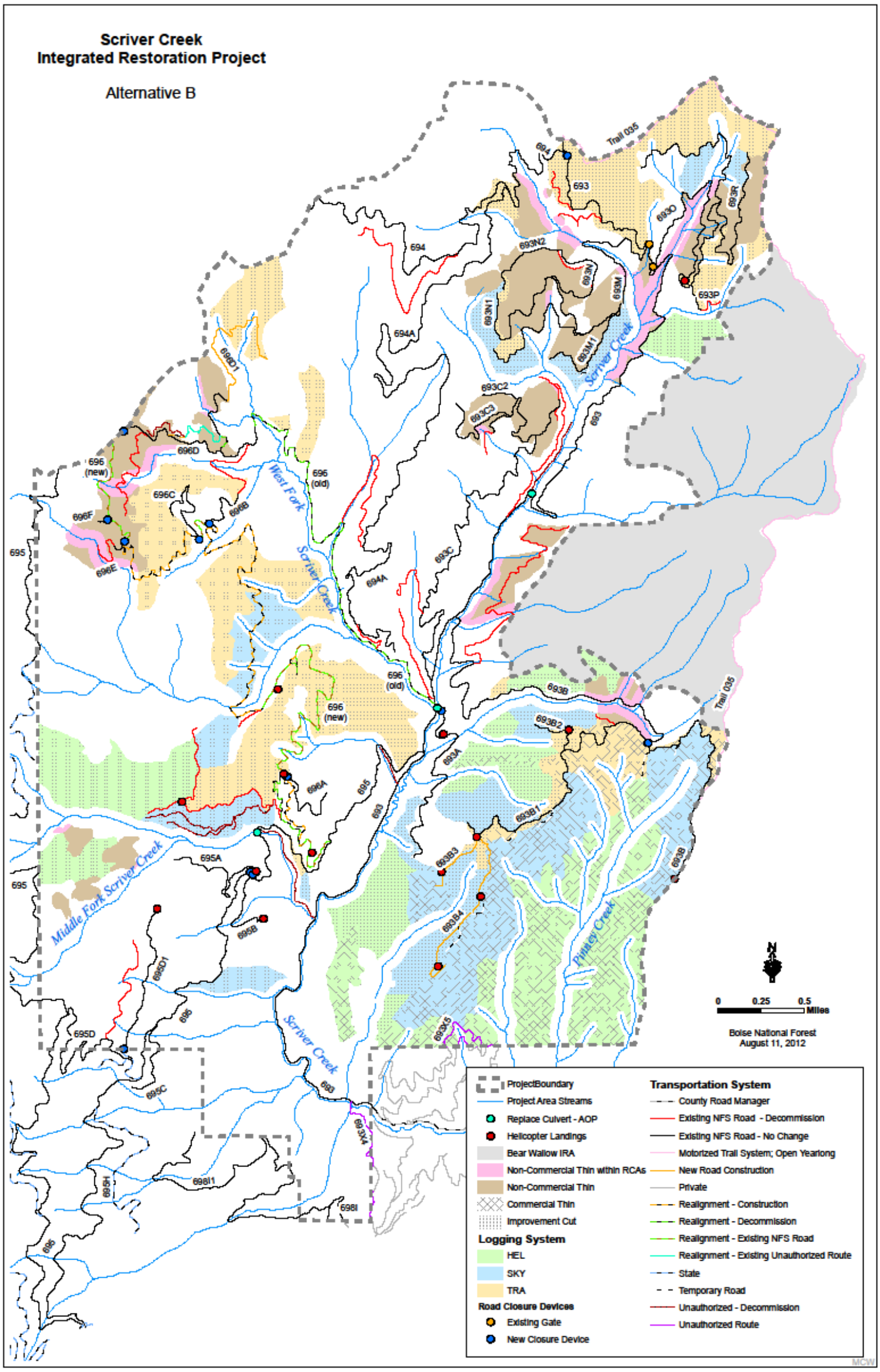

Figure 2-2. Alternative B Proposed Vegetation Treatments and Road Activities Map

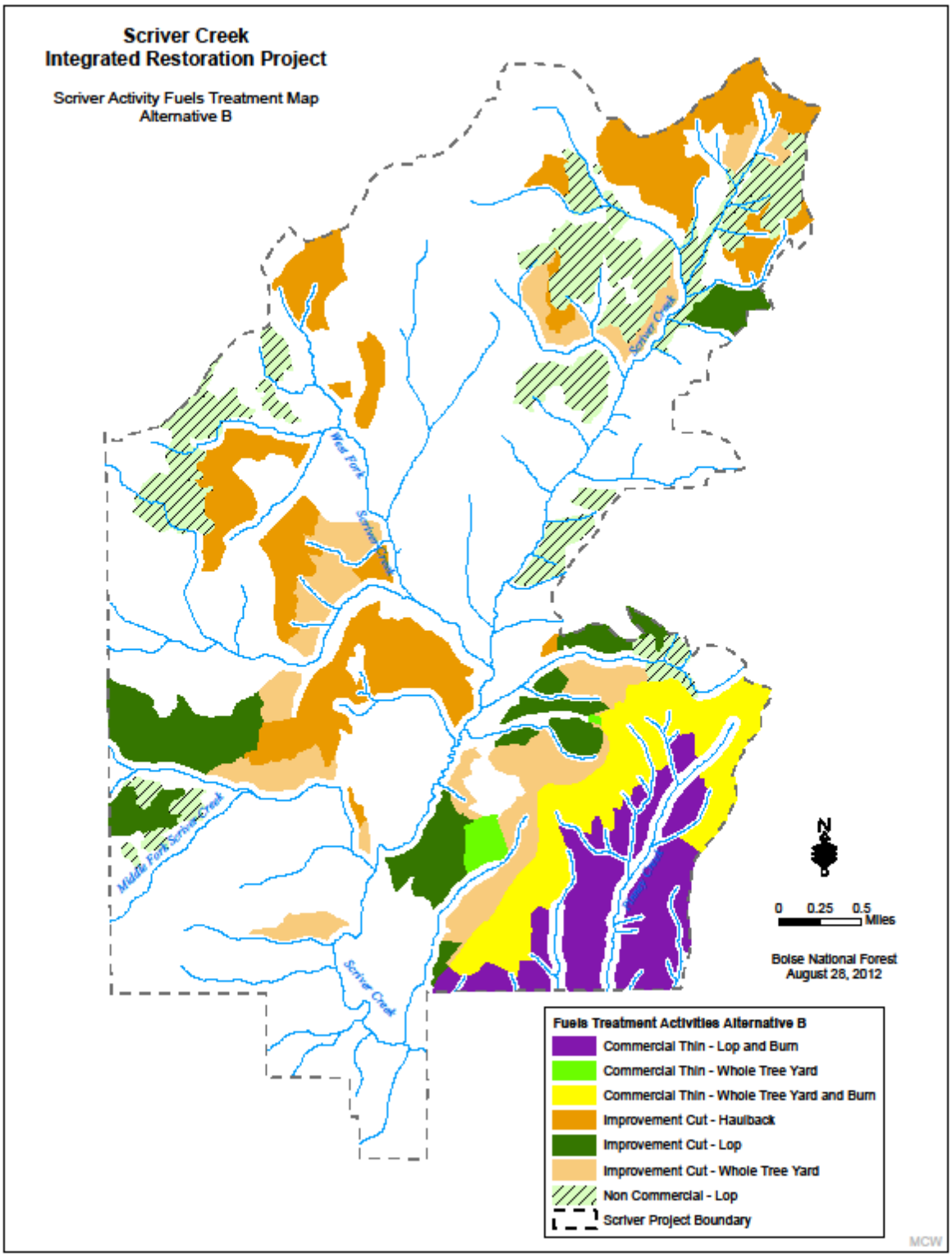

Figure 2-3. Alternatives B Proposed Fuels Treatment Map

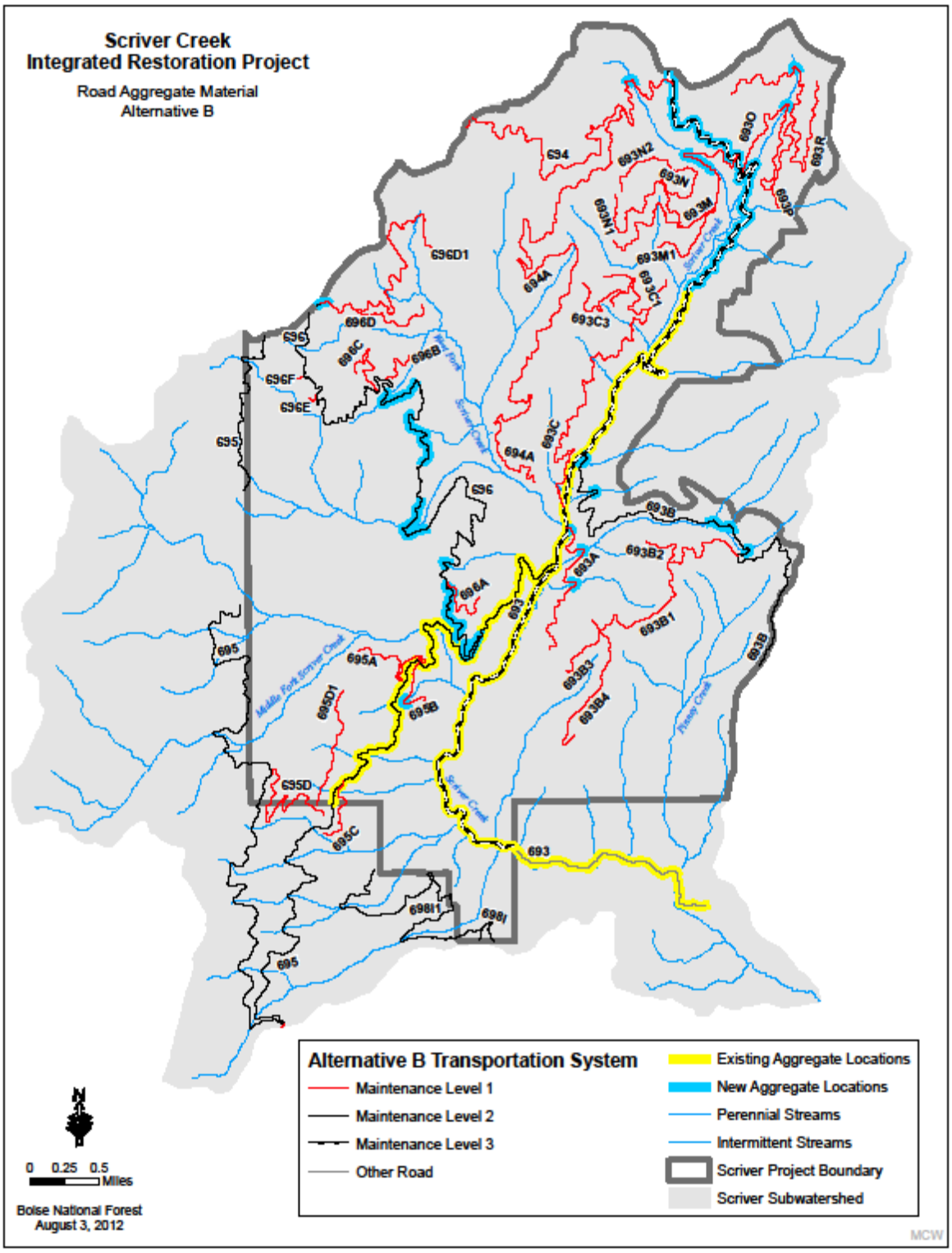

Figure 2-4. Proposed Aggregate Placement on National Forest System Roads for Alternative B, Proposed System Road Construction, Realignment and Decommissioning

2.4.3 Alternative C

Alternative C was developed based on public comments and to meet the Project's purpose and need presented in Chapter 1. The Alternative C would carry out the activities described below along with the project design features described in section 2.4.5.

Alternative C was specifically designed to address the following issues:

- *Issue 1:* All acres in need of restoration that are accessible from the proposed transportation system should be included in the Proposed Action. Commenters believed that including additional acres for commercial treatment that did not require additional road access may improve the economics of the project and more fully accomplish Purposes 1 and 3.
- *Issue 2:* All road-related restoration opportunities identified in the TAP should be carried forward into the Proposed Action regardless of whether funding would be generated from the project to complete the activity. Commenters believed that carrying all road-restoration opportunities through the NEPA process would allow these projects to be implemented whenever funding became available. They identified many cases where restoration funds became available but could not be used because the NEPA process could not be completed before the deadline. Commenters believed carrying these additional activities forward now would allow Purpose 2 to be more fully accomplished should unanticipated funds become available.
- *Issue 3:* Commercial treatments in units immediately adjacent to the Bear Wallow IRA could impact the visual quality and detract from the natural appearance of these areas as viewed from the IRA. While the Proposed Action includes mitigation to address this concern, commenters believe that not treating these areas could result in a more natural appearance than what would occur under the mitigated Proposed Action.

To accomplish Purpose 1, "Manage forest structure, density, and species composition to accelerate development of large tree size class and old forest habitat dominated by early seral tree species (e.g., ponderosa pine) that will contribute to achievement of Forest Plan desired vegetation and associated wildlife habitat conditions," and Issues 1 and 3, the following activities are proposed:

- Vegetation restoration involving commercial timber harvest activities would be conducted on about 3,575 acres, utilizing tractor/off-road jammer (1,582 acres), skyline (1,238 acres), and helicopter (755 acres) logging systems. In addition to the tractor/off-road jammer acres, mechanized feller bunchers (track mounted) would be used on acreage designated as skyline or helicopter yarding where ground slope is less than 35 percent (Figure 2-5).
- Thinning of noncommercial trees would occur on approximately 3,575 acres following commercial timber harvest activities (Figure 2-5).
- Noncommercial thinning of small diameter (typically <8 inches d.b.h. would occur on about 839 acres of existing plantations. Approximately 163 acres of these thinning activities would occur within RCAs (Figure 2-5).

The following activity fuel treatments would occur on approximately 4,414 acres identified in Figure 2-6:

  - Lopping of activity fuels on approximately 839 acres of noncommercially thinned plantations. Slash would be lopped to a depth of no greater than 36 inches;
  - Whole tree yarding (WTY) followed by prescribed underburning on about 488 acres, and
  - Lopping (LOP)of slash to a depth of no greater than 36 inches followed by prescribed underburning on about 462 acres;
  - Lopping of slash to a depth of no greater than 36 inches only on about 293 acres;
  - Whole tree yarding with haul back of some pole and top material back in to units deficit large CWD on about 1,241 acres; and
  - Whole tree yarding (WTY) with burning of landing piles on about 1,091 acres.
- Road activities on approximately 42.7 miles of NFS roads to facilitate commercial timber harvest. Road activities would include the following:
  - Construction of about 1.1 miles of new specified NFS road (Figure 2-5 and Appendix A)
  - Construction of approximately 4.2 mile of temporary road (Figure 2-5 and Appendix A)
  - Realignment of a segment of NFS road 696D. Realignment would use approximately 0.4 miles of an existing unauthorized road prism and require construction of about 0.1 miles of new road prism. Once construction is completed, approximately 0.1 miles of the relocated segment of NFS road 696D would be decommissioned (Figure 2-5 and Appendix A).
  - Road maintenance activities on about 38.3 miles of NFS roads to the approved road management objective. Road maintenance activities may include but are not limited to road prism blading, spot aggregate placement, drainage improvements, roadway clearing, and roadway ditch/culvert inlets cleaning.
- Use and/or develop of approximately 12 helicopter landings, including 1 existing landing and 11 new landings.

To accomplish Purpose 2, “Improve watershed conditions by reducing road-related impacts to wildlife, fish, soil, and water resources while providing for the transportation system necessary to meet long-term management needs,” and Issue 2, the following activities are proposed:

- Approximately 19.7 miles of road would be decommissioned, including designated NFS roads (16.4 miles) and unauthorized routes (3.3 miles). Road decommission methods may include one or more of the following activities: recontour or partially recontour sight distance from existing road junctions and/or portions of road segments where resource concerns exist, barricade road junctions, pull existing stream crossing structures and stabilize crossings, provide long-term drainage (e.g., waterbars and dips), scarify and/or rip road prism, and seed and mulch disturbed areas (Figure 2-5 and Appendix A).
- NFS road 696 would be realigned to provide long-term access and eliminate segments of the road within the RCA corridors. Realignment would use approximately 3.5 miles of existing NFS roads and require construction of about 4.3 miles of new road prism. Once

relocation construction is completed, approximately 3.7 miles of the relocated segments of NFS road 696 would be decommissioned (Figure 2-5 and Appendix A).

- Upon completion of vegetation restoration and activity fuels treatments, road closure devices such as gates, barrier rock, and/or berms, would be installed on the following ML1 NFS roads: 693A, 693D[21], 694, 695A, 695B, 695D1, 695E3[22], portion of NFS road 696[23], portion of NFS road 696B, portion of NFS road 696B[24], portion of the 696C[25], and 696C1[26]. ML1 roads opened to support vegetation management operations would not be available for public use (i.e., would not be added to the Emmett RD's MVUM during vegetation management operations).
- New surface aggregate would be placed on about 5.3 miles of NFS roads to upgrade the surface type.
- New aggregate would be placed for up to 300 feet on both sides of perennial stream crossings on all NFS road to be used for commercial harvest activities, excluding the roads proposed to be decommissioned (Figure 2-7).
- About 0.5 miles of the unauthorized road prism would be stabilized and gates would be placed on the unauthorized route 693X4 that accesses the snowmobile bridge to eliminate unauthorized motorized vehicle use during the snow-free season. Gates would be placed at the junction of NFS road 693 and unauthorized route 693X4 on the south side of Scriver Creek and on unauthorized route 693X4 at the Forest boundary on the south side of Scriver Creek (Figure 2-5). Stabilization activities may include but are not limited to road prism blading, drainage, and/or stream-crossing improvements.
- Road/stream crossing replacements would be completed between July 1 and September 30 at the following five road/stream crossings to provide aquatic organism passage:
  - NFS road 695 and Middle Fork Scriver Creek
  - NFS road 693A and Scriver Creek
  - NFS road 693 and Scriver Creek
  - NFS road 693 and West Fork Scriver Creek
  - NFS road 693B and Scriver Creek (Figure 2-5)

To accomplish Purpose 3, "Utilize wood products resulting from restoration treatments to support local and regional economies," the following activity is proposed:

- Provide approximately 24.8 million board feet (MMBF) as sawlogs to local and/or regional processing facilities.

[21] NFS Road 693D would be assigned road number 693B1 under this alternative.

[22] NFS Road 695E3 would be assigned road number 696A under this alternative.

[23] NFS Road 696 would be assigned road number 696D under this alternative.

[24] A portion of NFS Road 696B would be assigned road number 696C under this alternative.

[25] A portion of NFS Road 696C would be assigned road number 696E under this alternative.

[26] NFS Road 696C1 would be assigned road number 696F under this alternative.

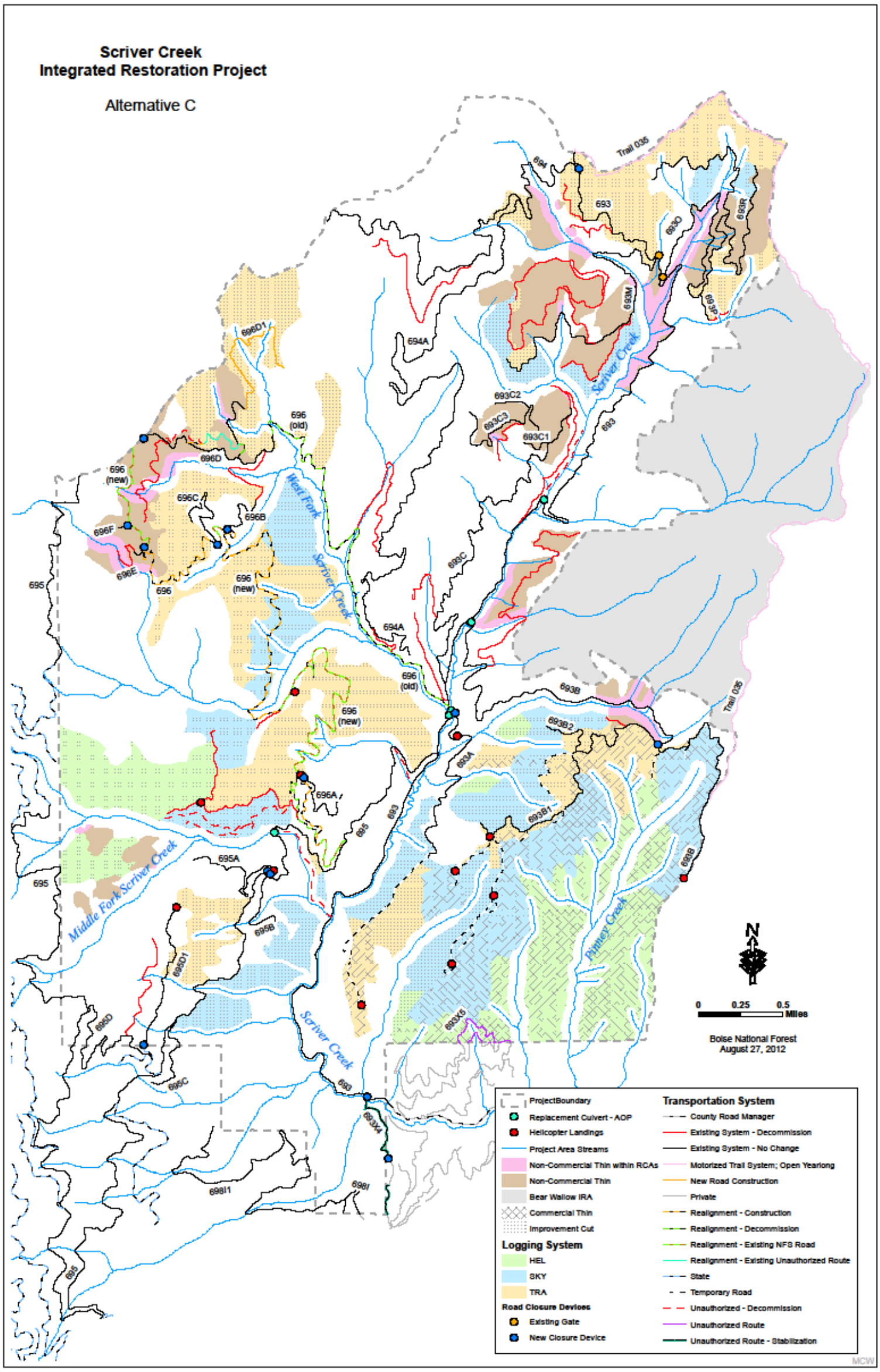

Figure 2-5. Alternative C Proposed Vegetation Treatments and Road Activities Map.

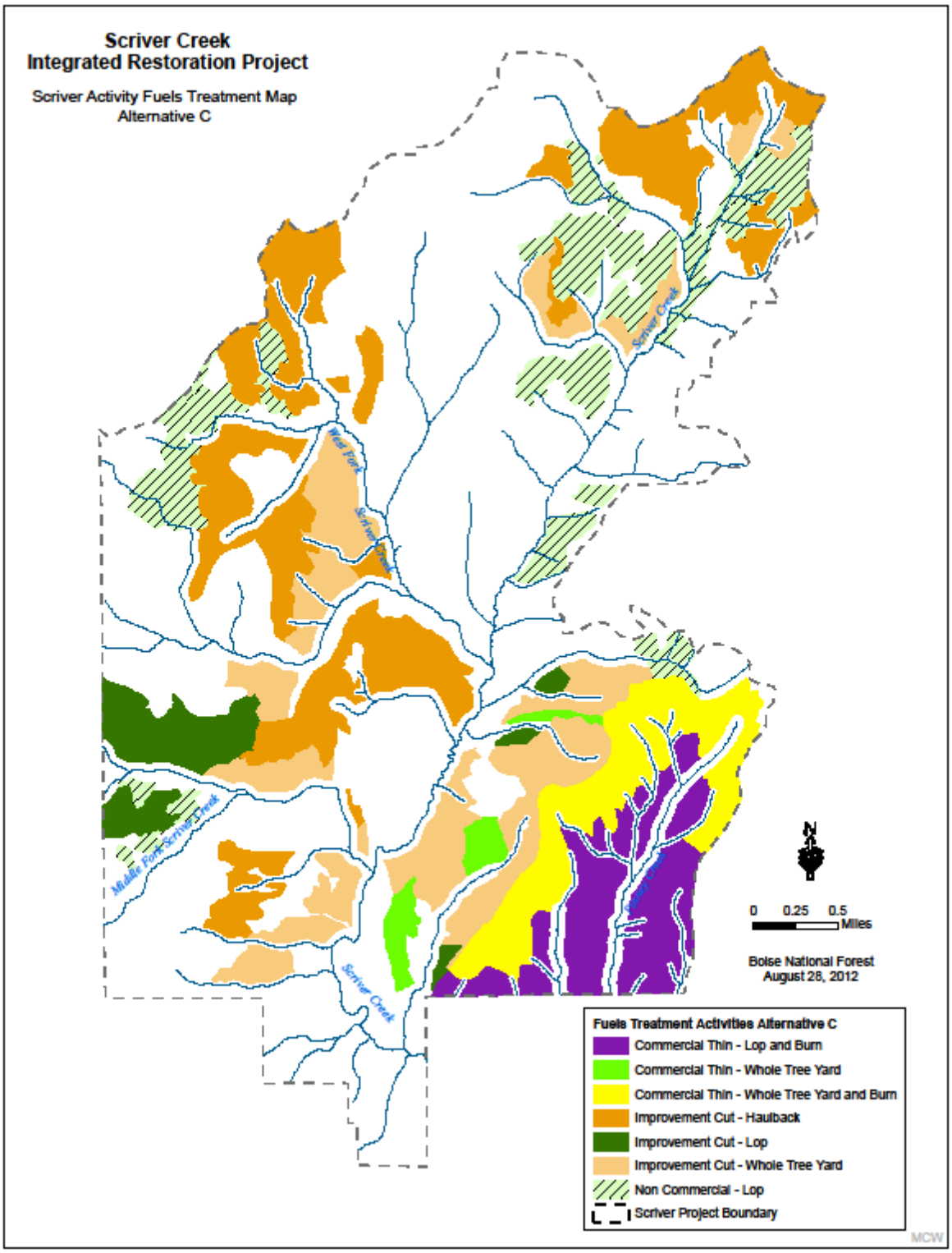

Figure 2-6. Alternatives C Proposed Fuels Treatment Map.

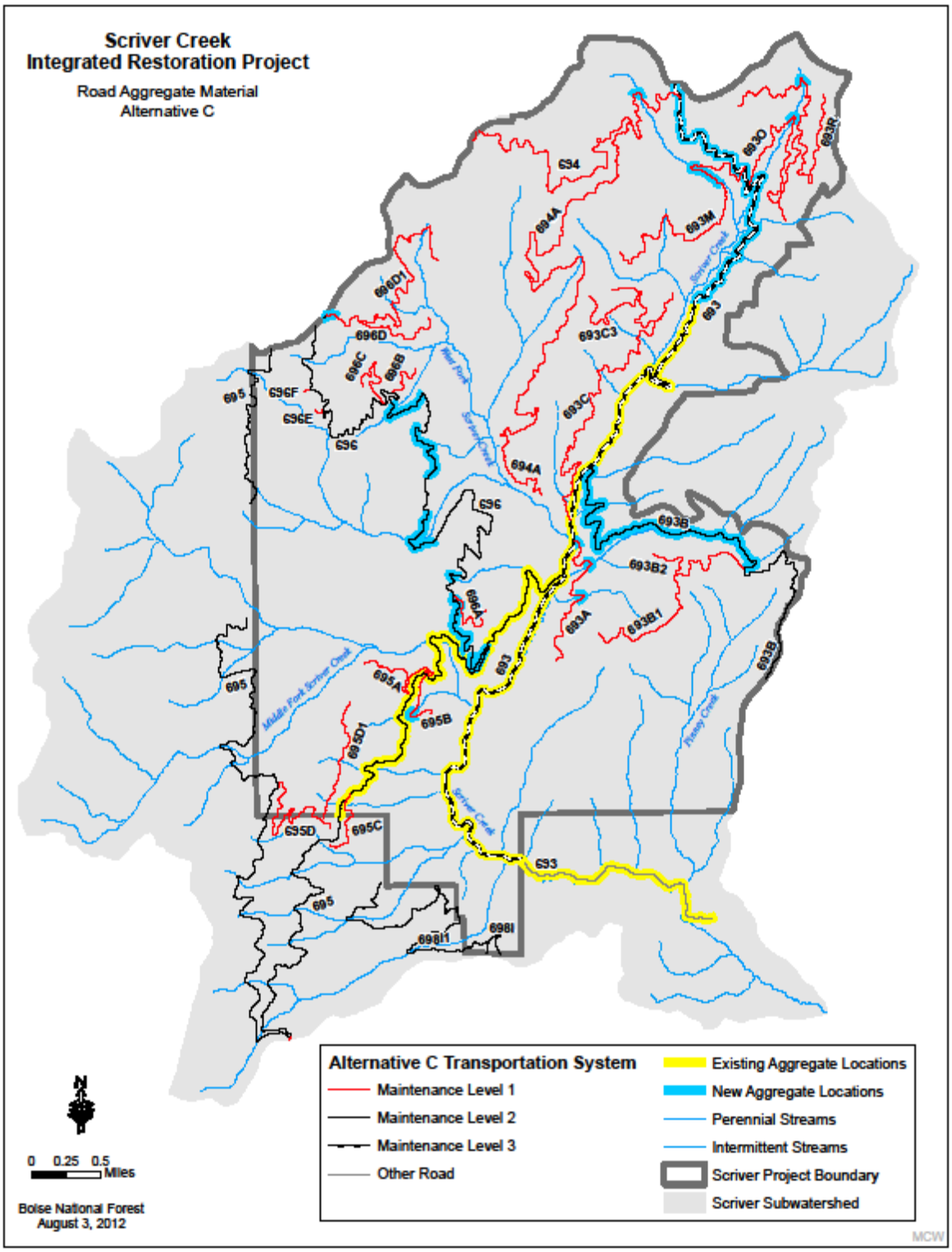

Figure 2-7. Proposed Aggregate Placement on National Forest System Roads for Alternative C, proposed system road construction, realignment and decommissioning

2.4.4 Alternative D

Alternative D was developed based on public comments and to meet the Project's Purpose and Need presented in Chapter 1. Alternative D would carry out the activities and Project design features described in section 2.4.5.

Specifically, Alternative D was designed to address the same issues as Alternative C (i.e., issues 1–3), as well as issue 4:

- *Issue 4:* The Proposed Action removes some large diameter trees important to the quality of habitat preferred by some terrestrial wildlife species. Some commenters believe that prohibiting the removal of any tree ≥20 inches d.b.h. would benefit some wildlife species. While the Proposed Action retains many of the large trees, there are cases where later seral large trees (e.g., grand fir) would be removed to facilitate retaining and regenerating early seral species such as ponderosa pine. Thus, while retaining and restoring early seral tree species in forests would benefit some wildlife species over time (e.g., flammulated owl), it would have tradeoffs to other wildlife species who prefer larger, later seral tree species (e.g., pileated woodpeckers).

To accomplish Purpose 1, "Manage forest structure, density, and species composition to accelerate development of large tree size class and old forest habitat dominated by early seral tree species (e.g., ponderosa pine) that will contribute to achievement of Forest Plan desired vegetation and associated wildlife habitat conditions," and Issues 1, 3, and 4, the following activities are proposed:

- Vegetation restoration using commercial timber harvest activities would be conducted on about 3,575 acres, utilizing tractor/off-road jammer (1,472 acres), skyline (1,238 acres), and helicopter (865 acres) logging systems. In addition to the tractor/off-road jammer acres, mechanized feller bunchers (track mounted) would be used on acreage designated as skyline or helicopter yarding where ground slope is less than 35 percent.
- As identified in Design Feature TH-9 (Table 2-1) all trees >20 inch d.b.h. would be retained in all treatment units except in those situations where they represent a safety hazard to operations (e.g., timber sale OSHA requirements, roadside hazard trees) and operational purposes such as landings or yarding trail/corridors and associated with road construction, reconstruction and maintenance.
- Thinning of noncommercial trees would occur on approximately 3,575 acres following commercial timber harvest activities (Figure 2-8).
- Noncommercial thinning of small diameter (typically <8 inches d.b.h.) would occur on about 839 acres of existing plantations. Approximately 163 acres of these thinning activities would occur within RCAs (Figure 2-8).
- The following activity fuel treatments would occur on approximately 4,414 acres identified in Figure 2-9
    - Lopping of activity fuels on approximately 839 acres of noncommercially thinned plantations. Slash would be lopped to a depth of no greater than 36 inches;
    - Whole tree yarding (WTY) followed by prescribed underburning on about 488 acres;
    - Lopping (LOP) of slash to a depth of no greater than 36 inches followed by prescribed underburning on about 462 acres;

    - Lopping of slash to a depth of no greater than 36 inches only on about 403 acres;
    - Whole tree yarding with haul back of some pole and top material back in to units deficit large CWD on about 1131 acres; and
    - Whole tree yarding (WTY) with burning of landing piles on about 1091 acres.
- Road activities on approximately 41.6 miles of NFS roads to facilitate commercial timber harvest. Road activities would include the following:
    - Construction of approximately 4.2 mile of temporary road (Figure 2-8 and Appendix A).
    - Realignment of a segment of NFS road 696D. Realignment would use approximately 0.4 miles of an existing unauthorized road prism and require constructing about 0.1 miles of new road prism. Once construction is completed, approximately 0.1 miles of the relocated segment of NFS road 696D would be decommissioned (Figure 2-8 and Appendix A).
    - Road maintenance activities on about 38.3 miles of NFS roads to the approved road management objective. Road maintenance activities may include but are not limited to road prism blading, spot aggregate placement, drainage improvements, roadway clearing, and roadway ditch/culvert inlets cleaning.
- Use and/or development of approximately 13 helicopter landings, including 1 existing landing and 12 new landings.

To accomplish Purpose 2, “Improve watershed conditions by reducing road-related impacts to wildlife, fish, soil, and water resources while providing for the transportation system necessary to meet long-term management needs,” and Issue 2, the following activities are proposed:

- Approximately 19.7 miles of road would be decommissioned, including designated NFS roads (16.4 miles) and unauthorized routes (3.3 miles). Road decommission methods may include one or more of the following activities: recontour or partially recontour sight distance from existing road junctions and/or portions of road segments where resource concerns exist, barricade road junctions, pull existing stream crossing structures and stabilize crossings, provide long-term drainage (e.g., waterbars and dips), scarify and/or rip road prism, and seed and mulch disturbed areas (Figure 2-8 and Appendix A)
- NFS road 696 would be realigned to provide long-term access and eliminate segments of the road within the RCA corridors. Realignment would use approximately 3.5 miles of existing NFS roads and require construction of about 4.3 miles of new road prism. Once relocation construction is completed, approximately 3.7 miles of the relocated segments of NFS road 696 would be decommissioned (Figure 2-8 and Appendix A).

- Upon completion of vegetation restoration and activity fuels treatments, road closure devices, such as gates, barrier rock and/or berms would be installed on the following ML1 NFS Roads: 693A, 693D[27], 694, 695A, 695B, 695D1, 695E3[28], portion of NFS road 696[29] , portion of NFS road 696B[30], portion of NFS road 696B, portion of the 696C[31] , and 696C1[32] . ML1 roads opened to support vegetation management operations would not be available for public use (i.e., would not be added to the Emmett RD's MVUM during vegetation management operations).
- New surface aggregate would be placed on about 5.3 miles of NFS roads to upgrade the road surface type.
- New aggregate would be placed for up to 300 feet on both sides of perennial stream crossings on all NFS road to be used for commercial harvest activities, excluding the roads proposed to be decommissioned (Figure 2-10).
- About 0.5 miles of the unauthorized road prism would be stabilized and gates would be placed on unauthorized route 693X4 that accesses the snowmobile bridge to eliminate unauthorized motorized vehicle use during the snow-free season. Gates would be placed at the junction of NFS road 693 and unauthorized route 693X4 on the north side of Scriver Creek and on unauthorized route 693X4 at the Forest boundary on the south side of Scriver Creek (Figure 2-8). Stabilization activities may include but are not limited to road prism blading, drainage, and/or stream-crossing improvements.
- Road/stream crossing replacements would be completed between July 1 and September 30 at the following five road/stream crossings to provide aquatic organism passage:
  - NFS road 695 and Middle Fork Scriver Creek
  - NFS road 693A and Scriver Creek
  - NFS road 693 and Scriver Creek
  - NFS road 693 and West Fork Scriver Creek
  - NFS road 693B and Scriver Creek (Figure 2-8)

To accomplish Purpose 3, "Utilize wood products resulting from restoration treatments to support local and regional economies," the following activity is proposed:

- Provide approximately 20.4 million board feet (MMBF) as sawlogs to local and/or regional processing facilities.

[27] NFS Road 693D would be assigned road number 693B1 under this alternative.

[28] NFS Road 695E3 would be assigned road number 696A under this alternative.

[29]NFS Road 696 would be assigned road number 696D under this alternative.

[30] A portion of NFS Road 696B would be assigned road number 696C under this alternative.

[31] A portion of NFS Road 696C would be assigned road number 696E under this alternative.

[32] NFS Road 696C1 would be assigned road number 696F under this alternative.

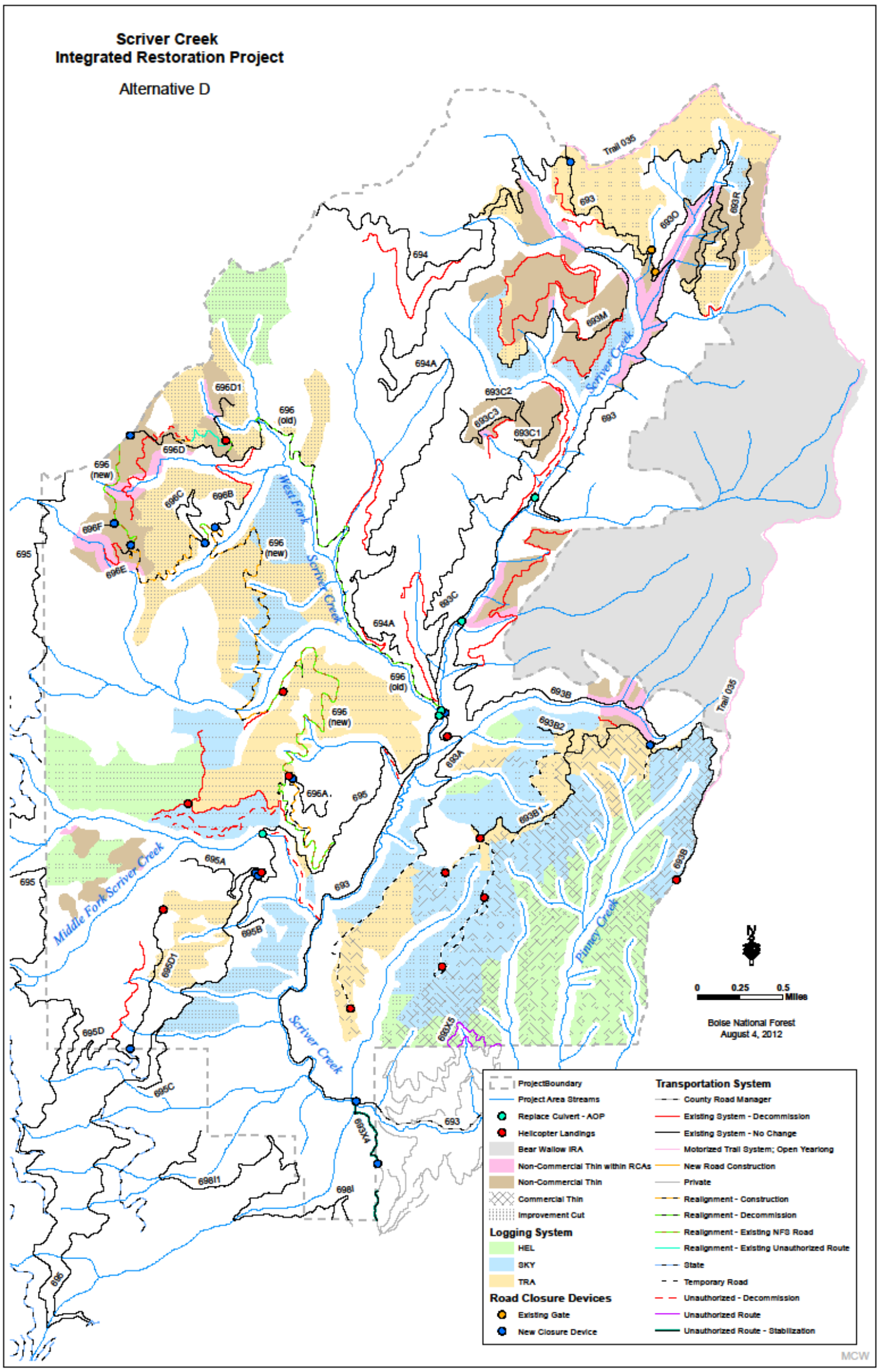

Figure 2-8. Alternative D Proposed Vegetation Treatments and Road Activities Map

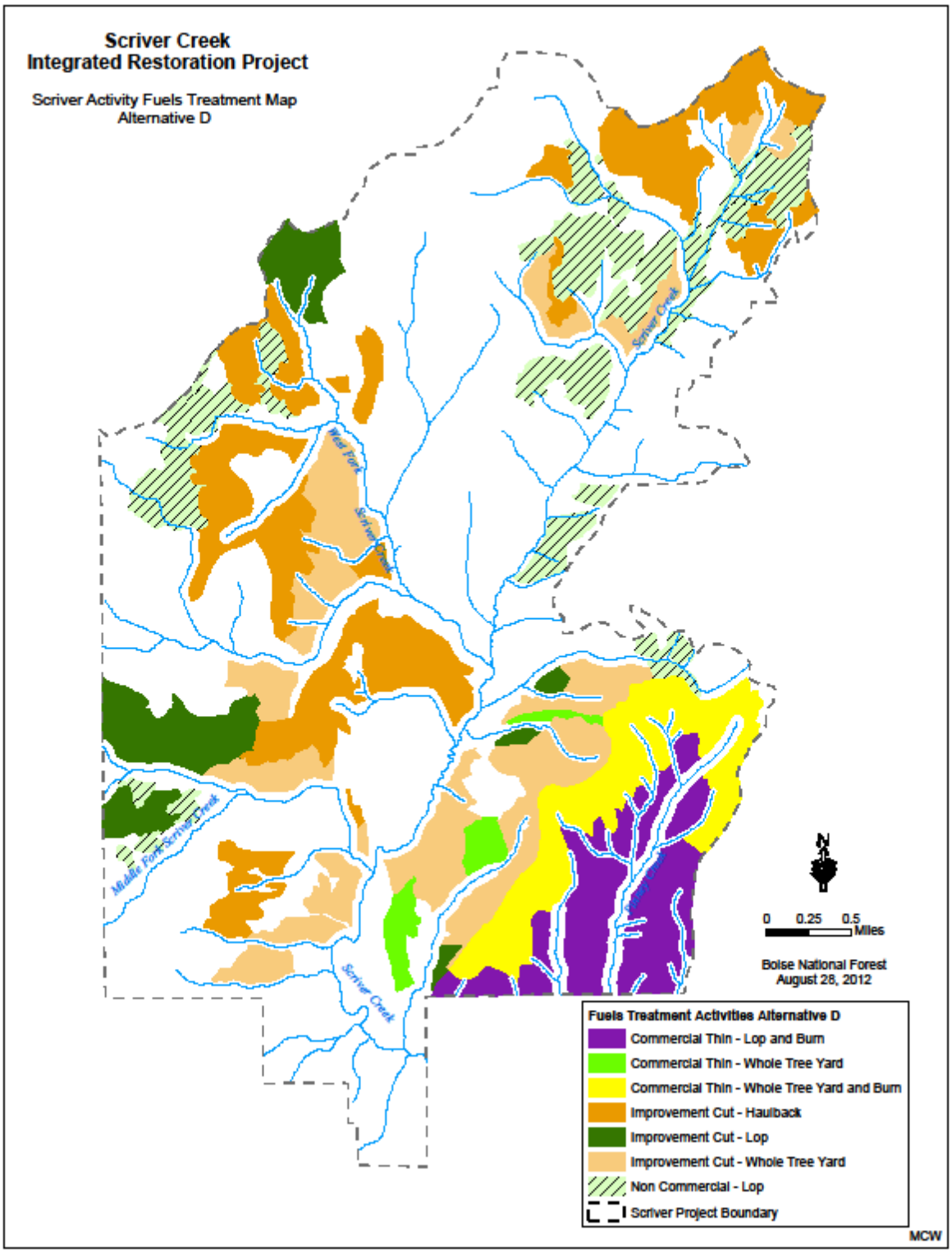

Figure 2-9. Alternatives D Proposed Fuels Treatment Map

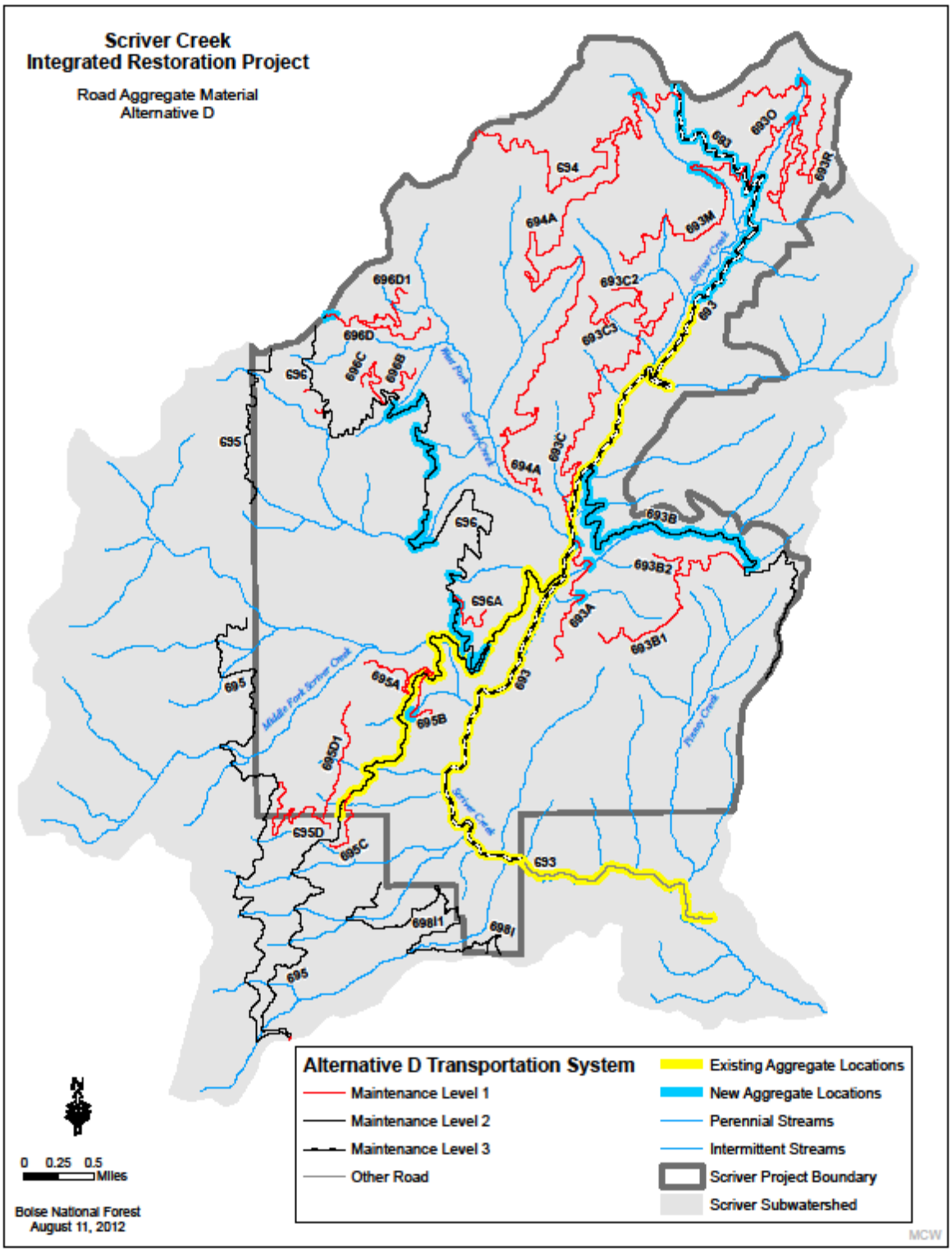

Figure 2-10. Proposed Aggregate Placement on National Forest System Roads for Alternative D, Proposed System Road Construction, Realignment and Decommissioning

2.4.5 Design Features

In addition to 2010 Forest Plan standards and guidelines designed to mitigate resource impacts, the IDT identified measures that would apply to the Proposed Action. These design features reduce or prevent undesirable effects resulting from proposed management activities and are listed below.

2.4.5.1 Range

RG-1—Notify the District Range Management Specialist of the timing of Project activities, including timber harvest, prescribed fire, precommercial thinning, and road activities. Inform permittee(s), through the allotment annual operating instructions (AOI), of pending Project activities to minimize the potential for conflicts and allow for modification of grazing practices where necessary.

2.4.5.2 Noxious Weeds

NX-1—Avoid or reduce the introduction of weed seeds and propagates by including provisions in all contracts to ensure appropriate off-road equipment is cleaned. All contractors and/or purchaser of any timber sale would be required to ensure that, prior to moving onto the sale area, all off-road equipment is free of soil, seeds, vegetative matter, or other debris that could contain seeds.

NX-2—Ensure seed mixes and/or plant materials used during restoration and soil erosion prevention activities shall be comprised of certified weed-free native or desirable non-native seed mixes and/or native cultivars, as recommended by the Forest or District botanist.

NX-3—Require all straw and/or hay, brought to the Project area for land management purposes, be certified weed-free.

NX-4—Evaluate aggregate source(s) for noxious weed presence under the direction of the Forest or District Noxious Weed Specialist. If noxious weeds are present at the aggregate source(s), treat noxious weeds, remove and set aside the material to a depth of 6 inches, and use aggregate from depths greater than 6 inches for Project activities.

NX-5—Report the identification of undocumented noxious weed populations in the Project area to the District Weed specialist for inclusion in noxious weed treatment plans.

2.4.5.3 Wildlife

WL-1—Include protective measures for Threatened, Endangered, and Regional 4 Sensitive (TES) Species against unforeseen events in the timber sale contracts and other project-related contracts (noncommercial thinning). Mandatory provisions of the timber sale contract (currently contract provision B(T)6.24) provide protective measures for any TES plant or animal species identified in the Project area during the entire period that the sale is under contract.

WL-2—Restrict vegetation treatment within a 650-foot radius of an active goshawk nest tree to retain vegetative structure around the nest site. In addition, no commercial harvest, noncommercial thinning, or roadwork activities would occur within a 1,500-foot buffer (Jones 1979) around active goshawk nest tree(s) from March 1 to August 15 to avoid disrupting nesting activities. Timing restrictions would only be required for active nest sites. Timing restrictions would not restrict planned road use patterns, public access, or log hauling. Because

goshawks commonly move to alternate nest sites within a territory, the nest site location will be re-identified annually.

WL-3—Retain all snags ≥10 inches d.b.h. and >15 feet tall to meet the desired range as identified in Appendix A of the Forest Plan (Forest Service 2003a, p. A-9) unless they pose safety hazards and have to be felled. Where snags have been determined to be a safety hazard (timber sale OSHA requirements, roadside hazard trees) and must be felled, live trees of sufficient diameter shall be left to provide for snag replacement as needed to achieve desired conditions.

WL-4—Provide snags, snag replacement trees, and CWD, including those with broken tops, cavities, lightning scars, and dead portions, in clusters if available rather than uniformly spaced. Priority should be given to large snags and trees for snag recruitment over smaller diameter snags and trees.

WL-5—In PVG 6 stands proposed for treatment, where canopy cover may be reduced to the low class (<40 percent), select 1 snag per 10 acres to receive an 83-foot no treatment buffer to maintain flammulated owl source habitat. This prescription would retain the structural diverse vegetative condition that currently exists around that snag.

WL-6—Sign up to 3 large snags (≥20 inches d.b.h.) per acre as wildlife habitat within the 600-foot corridor (i.e., 300 feet on each side) of the relocated segment of NFS road 696 to conserve large snags.

2.4.5.4 Fire and Fuels

FF-1—Construct no fireline and/or handline within RCAs.

FF-2—Store hazardous material utilized for burning activities away from RCAs.

FF-3—Post public notification in the form of newspaper articles and notices, and/or personal contacts to residents in Crouch, Garden Valley, and surrounding areas prior to implementing any prescribed burn activities, especially if fall burning would be conducted when hunters and woodcutters may be present in or near the Project area.

FF-4—Develop a burn plan according to the direction in the Interagency Prescribed Fire Management Handbook and Forest Service Manual 5140 to address prescribed fire mitigations for air quality, contingency, safety, and environmental effects (fire behavior). Requirements of the Montana/Idaho Airshed Group and the Forest Plan (Forest Service 2010a) would also be integrated. The burn plan would describe desired weather parameters to provide for fire behavior effects within a desired range.

FF-5—Restrict burning activities to early spring or fall to avoid nesting periods for ground-nesting birds. The District Wildlife Biologist would be consulted during development of the burn plan.

FF-6—Do not allow direct fire ignitions within RCAs. Allow prescribed fire to back into RCAs or adjacent stands, where they would either go out by themselves or be extinguished.

FF-7—Make landing slash piles created from harvest activities available for biomass utilization and/or firewood opportunities to the public for up to 1 year following commercial timber harvest completion if located on roads designated for motorized use on the Emmett RD's MVUM or as

allowed by the Forest fuelwood permit. Slash material left at landing sites would be burned as conditions allow.

2.4.5.5 Air Quality

AQ-1—Ensure atmospheric conditions are within prescription when a burn is ignited and smoke is monitored throughout ignition. If smoke threatens unacceptable impacts to transportation safety or communities, ignition would cease, provided control of the burn is not compromised.

AQ-2—Identify coordination needs with other federal, State and local governments, as well as public notification in potentially affected areas through the burn plan.

AQ-3—Post warning signs on primary routes accessing the area(s) to be burned to alert drivers of the potential for reduced visibility due to smoke.

2.4.5.6 Timber Harvesting

TH-1—Ensure that appropriate contract provision(s) are used to limit the potential buildup or spread of Ips in stands containing ponderosa pine.

TH-2—Prohibit log haul on weekends (all day Saturday and Sunday); all major holidays (New Years, Memorial Day, Independence Day, Labor Day, Thanksgiving and the day after, Christmas eve and Christmas day); and the opening day of deer, elk, and turkey general hunting seasons.

TH-3—Post warning and/or closure signs on authorized haul routes and adjacent to active logging operations to inform the public of logging operations and truck traffic hazards.

TH-4—Timber Sale Administrator shall approve skid trails prior to development and use to limit impacts to plantations and/or other resources.

TH-5—Retain all existing forested stands that meet the definition of large tree size class (Forest Service 2010a, Appendix A) or old forest habitat (Forest Service 2010a, Appendix E). Management actions may occur within these stands as long as they continue to meet the definitions of large tree size class and old forest habitat.

TH-6—Designate for retention during sale preparation, all ponderosa pine and western larch trees meeting the definition of a legacy tree consistent with the Forest's Legacy Tree Guide (Forest Service 2011). In addition, designate for retention trees of other late seral-to-climax conifer species (e.g., Douglas-fir and grand fir) that exhibit legacy-like characteristics (generally are the very large trees; Van Pelt 2008).

TH-7—Yard trees whole to the landing and manufacture them at the landing from tractor/jammer units to reduce compaction and aid in soil amelioration. After manufacturing, the tops/limbs/branches would be hauled back and utilized as slash material on skid trails. Upon completion of Project activities, all newly constructed skid trails and existing unauthorized routes used to implement Project activities would be reclaimed by blocking access at all access points; utilizing re-contouring of slope, earthen barriers, and/or placement of barriers such as rock or CWD; scarifying or ripping to a depth of 12 inches; scattering slash over scarified/ripped surface to achieve at least 30 percent coverage of the surface; and revegetating with certified weed free grasses, shrubs, and/or trees. Any material used for revegetation activities would meet requirements of Design Feature NX-2.

TH-8—Make provisions to include cull logs to also be hauled back into the unit if during the layout process, the large size class of course woody debris is determined to be lacking. If cull logs are encountered in skyline or helicopter units, they would be felled and left onsite.

TH-9—Retain all trees greater than or equal to the diameter at breast height displayed in Table 2-1 in forested stands proposed to be commercially harvested, except where removal is required for safety mitigation or operational purposes such as landings or yarding trails/corridors and associated with road construction, road reconstruction, and road maintenance. Refer to Appendix D for a map of strata locations within the Project area.

Table 2-1. Application Parameters for Design Feature TH-9 by Action Alternative

PVG	Strata	Tree Size Class	Acres	Ponderosa Pine Diameter Retention (inches at d.b.h.)			Douglas-fir Diameter Retention (inches at d.b.h.)			Other Species Diameter Retention (inches at d.b.h.)		
				Alt B	Alt C	Alt D	Alt B	Alt C	Alt D	Alt B	Alt C	Alt D
2	I	Large	196	20	20	20	—[a]	—	20	NA[b]	NA	NA
	J	Medium	873[c]	20	20	20	20	20	20	NA	NA	NA
Total			1,069									
6	A	Large	102	8	8	8	20	20	20	20	20	20
	B	Large	37	8	8	8	20	20	20	20	20	20
	C	Large	105	16	NT[d]	NT	—	NT	NT	—	NT	NT
	D[e]	Large	321	8	8	8	—	—	20	—	—	20
	E	Large	471	8	8	8	—	—	20	—	—	20
	F	Large	703	8	8	8	—	—	20	—	—	20
	G	Large	290	16	16	16	—	—	20	—	—	20
	H	Medium	166	16	16	16	20	20	20	—	—	20
	K	Large	254	NT	8	8	NT	—	20	NT	—	20
	L	Large	174	NT	8	8	NT	—	20	NT	—	20
Total			2,623									

[a]— = No limit on the size of tree remove. Size of tree removed is based on what is needed to meet restoration objectives and must be consistent with TH-6 and other applicable design features.
[b] NA = Not Applicable: other species not present
[c] Total acres in Strata J is 873 under Alternative A and B. However, under Alternatives C, and D, the 13 acres of Strata J are removed to address issue #3,. I.E., removes commercial treatment acres adjacent to the Bear Wallow Inventoried Roadless Area (IRA). This is not reflected in this Table.
[d] NT = Not Treated
[e] This strata includes 36 acres of PVG5

TH-10—If, during implementation of vegetation treatments, it is identified that an opportunity exists, augment existing ponderosa pine representation in areas that currently lack potential for natural recruitment (due to lack of existing seed source or late seral species dominance). Openings in the mixed1 fire regime stands may benefit from restoration augmentation of ponderosa pine. Augmentation would consist of planting ponderosa pine seedlings, most likely with a hoedad or dibble bar and would help ensure the persistence of the preferred species in stands where late seral species, primarily grand fir regeneration would proliferate. No mechanical site preparation would occur.

TH-11—Perform maintenance on about 1.7 miles of NFS road 693 located in the Scriver Creek subwatershed but outside of the Project area to reduce resource impacts on the timber sale haul route. Maintenance activities would include, but would not be limited to, road prism blading, spot aggregate placement, drainage improvements, roadway clearing, and roadway ditch/culvert inlets cleaning.

2.4.5.7 Road Management

RM-1—Road decommissioning may include, but is not limited to, some or all of the following activities: scarification of road bed, partial to full re-contour, removal of culverts and stabilization of stream crossings, elimination of access from connecting roads, and seed/mulch all disturbed areas with approved seed mixture (NX-2). In addition, to deter future use of these routes, access points may be recontoured or partially recontoured, and barrier devices, such as boulders, berms, slash material at access points, and/or some combination of barriers, may be used. All NFS roads proposed to be decommissioned from the Forest NFS Transportation System would be removed once decommissioning activities are complete. Determination of methods to be used would be completed on a site-by-site basis during Project implementation.

RM-2—On decommissioned roads, remove culverts with the objective of providing a stable, self-maintaining site. However, IDT analysis may determine if culverts may be left when risks and consequences are weighed against the costs of culvert removal (see Regional Policy on Treatment of Culverts for Decommissioned and Obliterated Roads, File Code 2520, letters of August 14 and December 13, 2000). Other site-specific actions would be performed to reduce risks.

RM-3—Install erosion control devices to minimize sediment delivery to streams from road management activities, including new roadbed construction, road maintenance, and/or road decommissioning activities where activities occur in RCAs. Erosion control devices may include, but are not limited to, certified weed-free straw waddles or bales, slash filter windrows, and/or biodegradable erosion cloth. The District Hydrologist or Fisheries Biologist would consult with the Engineering Representative/Timber Sale Contract Administrator in determining the most effective sediment control method. Erosion control materials would be allowed to deteriorate in place.

RM-4—Construct all road realignment segments prior to decommissioning the original routes in order to maintain motorized access.

RM-5—Build all new permanent or temporary roads to implement vegetation management activities; public motorized access would be restricted during activity implementation.

2.4.5.8 Soil, Water and Fisheries

SW-1—The following RCA definitions are applicable to all management activities. Commercial harvest activity within the RCAs is prohibited.

- **Perennial Streams and intermittent streams providing seasonal rearing and spawning habitat: The RCA would be the two site-potential tree heights.** The analysis completed for this project determined that the PVG 6 is the dominant PVG. Therefore, two site-potential tree height and RCA width equals 260 feet on each side of the stream.

- **Intermittent streams not providing seasonal rearing and spawning habitat: The RCA would be the one site-potential tree height.** The analysis completed for this project determined that the PVG 6 is the dominant PVG. Therefore, one site-potential tree height and RCA width equals 130 feet on each side of the stream.
- **Ponds, Lakes, Reservoirs, and Wetlands: The RCA would be one site-potential tree height.** The analysis completed for this project determined that PVG 6 is the dominant PVG. Therefore, one site-potential tree height and RCA width equals 130 feet around these water features.

SW-2—Allow thinning of noncommercial trees (i.e., <8 inches d.b.h.) within RCAs, except within 15 feet of perennial and intermittent streams, ponds, lakes, reservoirs, and wetlands. Trees felled as part of noncommercial thinning within RCAs would be left onsite.

SW-3—Prohibit commercial timber harvest or ground-based skidding within RCAs.

SW-4—Provide fish passage at all new and reconstructed stream crossings of existing and potential fish-bearing streams. Acceptable ranges for gradient, water flow velocity, jump/drop height, and other parameters would be based on the best scientific data available.

SW-5—Design new stream crossing structures to accommodate 100-year flow and associated debris. The District Hydrologist or Fisheries Biologist and the Forest Engineering staff would determine 100-year flow estimates and proper structure type and sizing during project implementation. New culvert installations and/or replacements would be completed during low stream flow periods.

SW-6—Review water drafting locations, methods, and timing by the fisheries biologist and/or hydrologist. Screen opening size for intake hoses shall be the standard 3/32 inch or smaller.

SW-7—Seed disturbed areas with an approved seed mixture (Design Feature NX-2). Erosion control devices, such as certified weed free straw waddles or bales, slash filter windrows, and biodegradable erosion cloth, would be maintained during all road management activities adjacent to streams to minimize delivery of sediment, and natural materials would be allowed to deteriorate in place.

SW-8—Store no fuel in RCAs. Refueling or servicing of vehicles or equipment would not take place within RCAs unless there is no other alternative. In the event there is no acceptable alternative site for these activities, refueling or servicing sites must be approved by Engineering Representative/Timber Sale Contract Administrator in consultation with District Hydrologist and/or Fish Biologist. All equipment shall be in good repair and free of leakage of lubricants, fuels, coolants, and hydraulic fluid.

SW-9—All log landings are currently designed to be located outside of RCAs. Consult the District Hydrologist or Fish Biologist and the Forest Archeologist, if site-specific circumstances necessitate a log landing to be located within the RCAs. For log landings located within the RCA, erosion control devices such as erosion cloth, biologs, and/or certified weed-seed-free straw bales would be installed between the landing and the stream to prevent delivery of sediment (Burroughs and King 1989). The District Hydrologist or Fisheries Biologist would assist the Timber Sale Contract Administrator in determining the most effective sediment control method. Soil erosion control measures would be allowed to deteriorate in place.

SW-10—Upon completion of harvest activities, reshape constructed landings used in association with this Project to provide adequate drainage. Landings would be ripped to a depth of 12–18 inches, slash would be spread over at least 30 percent of the landing area, and the area would be planted with a Forest Service approved seed mixture (Design Feature NX-2). All landings would be closed to public use.

SW-11—Use the SINMAP analysis results in addition to guidelines developed by Chatwin et al. (1994) during project implementation to field-verify or identify moderate- and high-hazard landslide prone areas where commercial timber harvest and road construction is proposed. Site-specific management measures or mitigations would be required where the proposed activities might initiate landslides.

2.4.5.9 Recreation and Scenic Resources

RR-1—Prohibit snow plowing on established groomed snow machine trails within the Project area and on all haul routes from December 15 to March 15.

RR-2—Post road closures 1 year in advance of implementation on all accessible roads. Decommissioning may occur immediately if accompanied by signing and a news release.

RR-3—Identify Project area designated trails in the timber sale contract. For the designated trails that fall within or immediately adjacent to harvest/thinning units, specific contract provisions would be included that protect National Forest improvements, maintain access or use, and address public safety to protect or minimize impacts to trail surfaces, trail heads, trail access, and recreation opportunities. Sale administrator shall designate all skid trails that cross the designated trails and shall consult with recreation staff on appropriate repair or reconstruction needs to return trail to its preexisting condition. Logging debris shall be cleared during the weekends and holidays and, if needed, as specified under the timber sale contract, signs or flaggers shall be used to address safety concerns.

RR-4—Address visual quality objectives associated with the scenic corridor adjacent to the NFS trail 035 by flush cutting stumps within site distance of trail (or 150 feet, whichever is greater) and mitigating visibility of slash by one or more of the following techniques: lopping to a low height, burning, physically removing material, and/or dispersing concentrations.

RR-5—To meet the Partial Retention visual quality objective in areas identified in Chapter 3, Scenic Environment, do the following:

1. If skyline systems are necessary in partial retention areas seen from travel routes open to motorized use on the MVUM map, design skyline corridors without linear edges by clearing the vegetation to promote meandering edges.

2. Openings and treatment units should not be symmetrical in shape. Straight lines and right angles should be avoided. Openings should resemble the shape of those found in the surrounding natural landscape.

3. Edges of vegetative treatment units should be shaped and/or feathered to avoid a shadowing effect in the cut unit.

4. Avoid widely spaced trees that are silhouetted along the skyline.

5. Treatment boundaries should extend up and over ridgelines to avoid the "Mohawk" look. This is especially important along ridgelines silhouetted against the sky from travel routes open to motorized use on the MVUM map.

6. Where new access roads and skid trails meet a primary travel route open to motorized use on the MVUM map, they should intersect at a right angle and, where practicable[33], curve after the junction to minimize the length of route seen from the primary travel route.

7. Cut and fill banks would be sloped to accommodate natural revegetation.

8. Ensure slash is abated near landings visible from primary travel routes open to motorized use on the MVUM map by scattering, chipping, burning or other techniques.

9. Pile burning in visible foreground of primary travel route open to motorized use on the MVUM map would be expected to occur as soon as weather and fuel conditions allow and should take priority over treating slash in other less visible areas.

2.4.5.10 Cultural Resources

CR-1—Avoid and protect all known historic properties during Project implementation.

CR-2—Design contracts implementing this Project to prevent adverse impacts to any unknown cultural sites discovered during Project implementation. In the event that new cultural sites are discovered, ground-disturbing activities in the area would stop until a qualified archaeologist is consulted.

2.4.6 Monitoring Elements for the Scriver Creek Integrated Restoration Project

2.4.6.1 Wildlife

Surveys for flammulated owls would occur during the first nesting season after the ROD is issued for this Project. Surveys would be conducted again within 2 years of completion of harvest activities (commercial, noncommercial, and activity fuels treatments). The focus of these efforts will be to assess flammulated owl use in the area for nesting and/or foraging activity. Surveys would occur during late May and June. Habitat surveys to evaluate the effectiveness of the no-treatment buffer around snags and the effectiveness of the prescriptions designed to maintain source habitat would also be conducted within 2 years of completion of harvest activities. The purpose of monitoring habitat is to evaluate whether the Project resulted in the anticipated outcomes ; the treatments were effective; and the habitat is still being used by this species (Design Feature WL-5). In addition to Project validation and effectiveness monitoring, results of this monitoring would be used to inform whether adjustments to habitat parameters for this species are needed.

[33] The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose. NWCG 2010

2.4.7 Prioritization Table of Restoration Activities, by Action Alternative

Table 2-2 refers to the prioritization of restorations activities to be paid for by available timber sale receipts. The timber sale receipts are not anticipated to be sufficient to pay for all restoration activities. This prioritization attempts to identify which activities would be paid for first and which activities require other funding mechanisms/sources.

Table 2-2. Prioritization of Restoration Activities by Action Alternative

Tracking ID[a]	Activity	Priority[b]		
		Alternative B	Alternative C	Alternative D
A	Realignment of NFS road 696	1	1	1
B	Road Maintenance	2	2	2
C	Road Decommissioning—RCA roads	3	3	3
D	Application of new surface aggregate at perennial road/stream crossings	4	4	4
E	Road Reconstruction—Upgrade road surface to aggregate	5	5	5
F	Road Decommissioning—Roads outside of RCAs	6	6	6
G	Installation of road closure devices on ML 1 roads	7	7	7
H	Noncommercial thinning of plantations	8	8	8
I	Thinning of noncommercial trees following commercial harvest	9	9	11
J	Activity Fuels Treatment (PVG 2)—Underburn	10	10	9
K	AOP Culvert—NFS road 693/Scriver Creek	11	12	12
L	AOP Culvert—NFS road 693A/Scriver Creek	12	13	13
M	AOP Culvert—NFS road 695/MF Scriver Creek	13	14	14
N	AOP Culvert—NFS road 693B/Scriver Creek	N/A	15	15
O	AOP Culvert—NFS road 693/WF Scriver Creek	N/A	16	16
P	Stabilization and gates on unauthorized route that accesses snowmobile bridge	N/A	11	10

[a] Tracking ID in this table corresponds with Table 3-80 in the Economic Assessment section 3.15.
[b] 1 is the highest priority to be paid for with timber receipts

2.4.8 Other Federal, State or Local Approvals Potentially Applicable to All Action Alternatives

Table 2-3 lists the other federal, State and local permits and/or approval that may be necessary for all the action Alternatives.

Table 2-3. Summary of Other Permits and Approvals that May be Necessary

Approval Type	Status/Comment
CWA Section 404 Permit from the U.S. Army Corps of Engineers	Obtain permit prior to undertaking activities that may result in discharge of dredge and fill material into waters of the United States
Stream Alteration Permit from the Idaho Department of Water Resources	Obtain a Stream Alteration Permit prior to undertaking activities that may impact perennial streams prior to crossing perennial streams
Water Quality Standards Short Term Activity Exemption from the Idaho Department of Environmental Quality	Obtain a short term exemption during the installation/removal of the culverts used for the roads at the stream crossings
CWA NPDES permit from the EPA	Obtain as identified by EPA for road activities
CWA Section 401 Certification from IDEQ	Obtain as needed from State per Section 404 or NPDES permit requirements
Conditional use permit and road maintenance agreement from affected County	Obtain as needed before activities subject to these permits are implemented
Other permits from Idaho Transportation Department and/or other entities	Obtain as required by Idaho Transportation Department

2.5 COMPARISON OF ALTERNATIVES

The following comparison of alternatives includes four distinct sections:

1. **Section 2.5.1 includes the following two tables:**
   a. Comparison of Alternatives by Proposed Vegetation and Fuels Management Activity
   b. Comparison of Alternatives by Proposed Road Management Activities
2. **Section 2.5.2 includes a comparison of alternatives as to how they meet the identified three identified project purposes identified in Chapter 1:**
   a. Purpose 1: Move toward restoration of 2010 Forest Plan desired vegetative conditions within PVGs 2, 5 and the drier habitat types of PVG 6 by changing the forest structure, density and species composition in order to accelerate development of large tree and old forest habitat dominated by early seral species.
   b. Purpose 2: Improve watershed conditions by reducing road-related impacts to wildlife, fish, soil and water resources while providing for the transportation system necessary to meet long-term management needs in the Project area as identified in the Scriver Creek Subwatershed Travel analysis Process (TAP) Report.
   c. Purpose 3: Utilize wood products resulting from restoration treatments to support local and regional economics.
3. **Section 2.5.3 includes a comparison of alternatives as to how they addressed each of the four issues identified in Chapter 1:**
   a. Issue #1: All acres in need of restoration that are accessible from the proposed transportation system should be included in the Proposed Action–Commenters believed that including additional acres for commercial treatment that did not require additional

road access may improve the economics of the project and more fully accomplish Purposes 1 and 3.

b. *Issue 2:* All road-related restoration opportunities identified in the TAP should be carried forward into the Proposed Action regardless of whether funding would be generated from the project to complete the activity. Commenters believed that carrying all road-restoration opportunities through the NEPA process would allow these projects to be implemented whenever funding became available. They identified many cases where restoration funds became available but could not be used because the NEPA process could not be completed before the deadline. Commenters believed carrying these additional activities forward now would allow Purpose 2 to be more fully accomplished should unanticipated funds become available.

c. *Issue 3:* Commercial treatments in units immediately adjacent to the Bear Wallow IRA could impact the visual quality and detract from the natural appearance of these areas as viewed from the IRA. While the Proposed Action includes mitigation to address this concern, commenters believe that not treating these areas could result in a more natural appearance than what would occur under the mitigated Proposed Action.

d. *Issue 4:* The Proposed Action removes some large diameter trees important to the quality of habitat preferred by some terrestrial wildlife species. Some commenters believe that prohibiting the removal of any tree ≥20 inches d.b.h. would benefit some wildlife species. While the Proposed Action retains many of the large trees, there are cases where later seral large trees (e.g., grand fir) would be removed to facilitate retaining and regenerating early seral species such as ponderosa pine. Thus, while retaining and restoring early seral tree species in forests would benefit some wildlife species over time (e.g., flammulated owl), it would have tradeoffs to other wildlife species who prefer larger, later seral tree species (e.g., pileated woodpeckers).

4. Section 2.5.4 includes a Table that displays summaries of some of the key indicators of effects for each resource addressed in detail in Chapter 3, including:

Forest Vegetation	Cultural Resources
Fire, Fuels and Air Quality	Socioeconomic Environment
Wildlife	Scenic Environment
Hydrology, Fisheries and Soils	Inventoried Roadless Area
Botanical Resources	Climate Change
Noxious Weeds	
Range	
Transportation Systems	
Recreation Resources	

2.5.1 Comparison of Alternatives by Proposed Activity

Table 2-4 displays a comparison of alternatives by proposed vegetation and fuels activity. Table 2-5 displays a comparison of alternatives by proposed road management activity.

Table 2-4. Comparison of Alternatives by Proposed Vegetation and Fuels Management Activity

Indicator		Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
VEGETATION MANAGEMENT ACTIVITIES					
Acres of Commercial Vegetation Treatments by Yarding System	Tractor	0	1,212	1,582	1,472
	Cable	0	969	1,238	1,238
	Helicopter	0	1,084	755	865
	TOTAL	0	3,265	3,575	3,575
Acres of commercial vegetation treatment adjacent to IRA	TOTAL	0	118	0	0
Acres of commercial treatment by silvicultural prescription	Commercial Thin	0	2,169	2,518	2,518
	Improvement Cut	0	1,069	1,057	1,057
	TOTAL	0	3,265	3,575	3,575
Acres of commercial treatment within each potential vegetation group (PVG)[34]	PVG 2	0	1,069	1,069	1,069
	PVG 5	0	36	36	36
	PVG 6	0	2,160	2,470	2,470
	TOTAL	0	3,265	3,575	3,575
Helicopter Landings	New	0	14	11	12
	Existing	0	1	1	1
	TOTAL	0	15	12	13
Total Volume MMbf	TOTAL	0	20.8	24.8	20.4
Acres of Noncommercial plantation treatments outside or within (RCA)	Outside RCA	0	676	676	676
	Within RCA	0	163	163	163
	TOTAL	0	839	839	839
FUELS TREATMENTS TIED TO COMMERCIAL VEGETATION ACTIVITIES					
Acres of Fuels treatments following commercial vegetation management treatments[35] *<u>NOTE</u> – All fuels treatment in noncommercial units is LOP*	WTY + RxBurn	0	500	488	488
	LOP + RxBurn	0	462	462	462
	LOP to 36 inch depth only	0	622	293	403
	WTY + Haul back in unit	0	1,011	1,241	1,131
	WTY + burn landing piles	0	670	1,091	1,091
	TOTAL		3,265	3,575	3,575

[34] PVG 2 = Warm Dry Douglas-fir, Moist Ponderosa Pine; PVG 5 = Dry Grand Fir; PVG 6 = Cool Moist Grand fir (refer to Appendix D for detailed discussions concerning PVGs, associated fire regimes and important seral tree species.

[35] *WTY* = Whole Tree Yard; *RxBurn* = Prescribed Fire; *LOP* = lop and scatter residual slash; *Haul back* = trees whole tree yarded to landing, some bole material hauled back as needed to meet coarse woody debris objectives.

Table 2-5. Comparison of Alternatives by Proposed Road Management Activity

Indicator		Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
ROAD MANAGEMENT ACTIVITIES					
Miles of road decommissioning *NOTE – realigned sections of NFS road 696 or 696D*	NFS road	0	12.8	16.4	16.4
	Realigned	0	3.3	3.3	3.3
	Unauthorized	0	3.8	3.8	3.8
	TOTAL	0	19.8	23.5	23.5
Miles of new temporary or specified (permanent) road construction	Temporary	0	1.0	4.2	4.2
	Specified Road	0	2.7	1.1	0
	TOTAL	0	3.7	5.3	4.2
Miles of Road Reconstruction	Rd 696 realign (new Prism)	0	4.3	4.3	4.3
	NFS rd 696 realign (existing Prism)	0	3.5	3.5	3.5
	Subtotal	0	7.8	7.8	7.8
	Rd 696d realign (new Prism)	0	0.1	0.1	0.1
	Rd 696d realign (existing Prism)	0	0.4	0.4	1.4
	Subtotal	0	0.5	0.5	0.5
	New Aggregate – Rd 693	0	2.8	2.8	2.8
	New Aggregate – Rd 693b	0	0	2.5	2.5
	Subtotal	0	2.8	5.3	5.3
	TOTAL	0	11.1	13.6	13.6
Road Maintenance	TOTAL	0	40.9	38.3	38.3
Road Stabilization	TOTAL	0	0	0.5	0.5
Final miles of road in Level 1, 2 or 3 maintenance status; Post-Project	Level 1	51.7	38.7	33.6	32.4
	Level 2	13.3	17.1	17.1	17.1
	Level 3	8.6	8.6	8.6	8.6
	TOTAL	73.6	64.4	59.3	58.1
Project area Road Density (miles/miles^2) Post-Project	Open to motorized use	1.2	1.4	1.4	1.4
	Closed	3.2	2.2	2.0	1.9
	TOTAL	4.4	3.6	3.4	3.3
Riparian Conservation Area (RCA) Road Density (miles/miles2) Post Project	Open to motorized use	2.6	2.4	2.4	2.4
	Closed	2.6	1.3	1.3	1.2
	TOTAL	5.2	3.7	3.7	3.6
Aquatic Organism Passage (AOP) culvert Replacements	Rd 695 at MF Scriver Crk	0	1	1	1
	Rd 693A at Scriver Crk	0	1	1	1
	Rd 693 at Scriver Crk	0	1	1	1
	Rd 693B at Scriver Crk	0	0	1	1
	Rd 693 at WF Scriver Crk	0	0	1	1
	TOTAL	0	3	5	5

2.5.2 Comparison of Alternatives by Purpose and Need

2.5.2.1 Purpose 1:

Move toward restoration of 2010 Forest Plan desired vegetation conditions within PVGs 2, 5, and the drier habitat types of PVG 6 by changing the forest structure, density, and species composition in order to accelerate development of large tree and old forest habitat dominated by early seral species.

Summary of Existing Condition: Large tree and old forest habitat occurs in the mid-seral, fire-maintained systems associated with fire regimes that were historically prevalent in central Idaho. In PVG 2, these systems were historically large diameter; open canopy landscapes dominated by ponderosa pine and maintained under a nonlethal fire regime. In the drier habitat types of PVG 6, vegetative communities were historically made up of stands in the medium or large tree size classes, in the moderate canopy cover class, dominated by ponderosa pine and Douglas-fir and smaller amounts of other species such as grand fir and maintained under a mixed1 fire regime.

Old forest habitat is an important source habitat condition that provides denning, nesting, foraging, and cover habitat for many wildlife species. Old forest habitats are distinguished by old trees and related structural attributes, which may include tree size, species compostition, signs of decadence, large snags and logs, canopy gaps, and understory patchiness (Forest Service 2003a, Van Pelt 2007 and 2008). In different forested habitat types, site quality, climate, and disturbance patterns, old forest habitats may vary extensively in tree sizes, age classes, and presence and abundance of structural elements (Helms 1998). Large tree habitat is an important foundational component of old forest habitat that has been identified at the scale of the Forest as being below desired quantities in nonlethal and mixed1 fire regimes. Large tree habitat can be a critical building block to restoration of old forest habitat when quantities and distribution of old forest habitat are not reflective of historic conditions and can provide foraging and breeding habitat for many wildlife species that also use old forest habitat.

Currently no one stand within the Project area meets all attributes that characterize old forest habitat as described in the 2010 Forest Plan. However, the large tree stands in the Project area contain attributes of both low elevation (Family 1) and broad elevation (Family 2) large tree and old forest habitat. The large tree size class provides important habitat for a variety of wildlife species even when not in an old forest habitat condition. Existing large tree and old forest habitat components (i.e., species compositions, legacy-like trees, large diameter snags, canopy cover, species composition, etc.) within large tree stands provide building blocks for developing stands to maintain desired large tree and old forest habitat components. Management actions can facilitate movement toward developing remaining components, such as species composition that are presently not within the desired conditions for low and broad elevation old forest.

Summary of Environmental Consequences: Immediately following treatment all action alternatives would make improvements in species composition compared to Alternative A, with the greatest gains made in Alternatives B and C in the non-lethal fire regime (Table 2-12). In the mixed1 fire regime Alternative C would improve the species composition the most followed by

Alternative B. However, gains in other components of old forest and large tree habitat[36] would not be measurably realized until 2030.

By 2030, more stands would be in the large tree size class under Alternatives B, C and D than Alternative A. All stands in PVGs 5 and 6 would be in the large tree size class but Alternative A would have three fewer large tree size class stands than Alternatives B, C and D in PVG 2. No stands would meet all old forest habitat attributes in combination but stand conditions would be progressing. Under Alternatives A and D, about the same number of stands would meet the large tree canopy cover of ≥ 30 percent which would be more under either Alternatives B and C. However, more stands would meet the desired mix of early seral species under Alternatives B and C compared to Alternatives A and D. This difference between alternatives reflects the trade-off between restoration approaches; i.e. emphasis on recruiting early seral species at the expense of maintaining large tree canopy cover versus maintaining large tree canopy cover at the expense of recruiting early seral species.

Under Alternatives A and D, the large snags and CWD that develop in the future would be from a greater proporion of later-seral tree species while large snags and CWD under Alternatives B and C would be from a greater mix of early- and late-seral tree species. Because some wildlife prefer snags of certain tree species, the restoration approach that results in different mixes of tree species is also a trade-off and effect to different wildlife species. Discussions concerning Issue #4 below discuss the trade-off to different wildlife species from recruiting early seral tree species versus retaining later seral tree species that meets the large tree canopy cover.

Finally, existing deficits in CWD would improve faster in the short-term under the action alternatives due to Design Feature TH-8 which would intentionally haul back or leave large CWD on-site in areas of large coarse wood deficits. The tons of CWD reflected in Table 2 12, Forest Vegetation section, does not reflect the potential benefits of CWD haul back. With haul back CWD deficits would improve in some areas.

2.5.2.2 Purpose 2:

Improve watershed conditions by reducing road-related impacts to wildlife, fish, soil, and water resources while providing for the transportation system necessary to meet long-term management needs in the Project area as identified in the Scriver Creek Subwatershed Travel Analysis Process (TAP) Report (Forest Service 2011b).

Transportation, soil and water quality and fisheries habitat are discussed below relative to accomplishment of purpose 2. Refer to discussions under Issue 4 for a summary concerning benefits to wildlife species as a result of reducing road related effects. Refer to section 3.4 for detailed discussions, by wildlife species, as to the benefits from reduced road related effects.

[36] Forest Plan Appendix E describes the following as key attributes in the definition of old forest habitat: (1) Stand falls within the large tree size class, (2) canopy cover represented by large tree is ≥30 percent, (3) total stand canopy of all tree size class (varies by potential vegetation group (PVG), (4) strong seral species composition consistent with the PVG, (5) number of large snags and tons of coarse woody debris, and (6) presence of legacy trees.

Transportation Management Needs

A detailed list of all changes in the transportation system is shown in Table 2-5, Proposed Road Management Activities. Table 2-6 below displays the final miles of road by maintenance level, total and RCA road density of open versus closed to public motorized use as displayed on the 2012 Emmett Ranger District Motor Vehicle Use Map (MVUM). The changes reflected in these numbers between the alternatives provides a relative comparison of choices made in each alternative to provide the transportation needs to support future vegetation management and dispersed recreation within the Project area versus balancing the needs to improve water quality, total soil resource commitments and reduce the effects to wildlife habitat. As displayed below in Table 2-6, Alternative A provides the greatest network of roads to support future vegetation management and dispersed recreation while maintaining a high level of risk to resources from road related impacts, followed by Alternative B, then C and then D. Alternatives C and D provide a similar balance between the need for a road network to support vegetation management and dispersed recreation in the future, while reducing risk and actual impacts to resources.

Table 2-6. Final Post Project Miles of Road by Maintenance Level, Total and Riparian Conservation Area (RCA) Road Density of Open Versus Closed to Public Motorized Use by Alternative

Indicator	Measure	Alt A	Alt B	Alt C	Alt D
Final miles of road in Level 1, 2 or 3 maintenance status; Post-Project	Maintenance Level 1[a]	51.7	38.7	33.6	32.4
	Maintenance Level 2[b]	13.3	17.1	17.1	17.1
	Maintenance Level 3[c]	8.6	8.6	8.6	8.6
	TOTAL	73.6	64.4	59.3	58.1
Project area Road Density (miles/miles^2 Post-project	Open to motorized use	1.2	1.4	1.4	1.4
	Closed	3.2	2.2	2.0	1.9
	TOTAL	4.4	3.6	3.4	3.3
RCA Road Density (miles/miles^2) Post-project	Open to motorized use	2.6	2.4	2.4	2.4
	Closed	2.6	1.3	1.3	1.2
	TOTAL	5.2	3.7	3.7	3.6

[a] Maintenance Level 1 = Assigned to intermittent service roads during the time they are closed to vehicular traffic. 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.
[b] Maintenance Level 2 = Assigned to roads open for public or permitted use by high clearance vehicles. Passenger car traffic is not a consideration.
[c] Maintenance Level 3 = Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience area not considered priorities.

Soil and Water Quality:

Summary of Existing Conditions: Water quality within the analysis area over the past 50 years demonstrates little evidence of increased fine soil sediment associated with natural events, such as landslides and/or wildfires. Management-induced sediment is generally associated with the existing transportation system, past timber harvest, recreation activities, and historical livestock grazing (see Appendix B for a map and list of past activities). Forest roads are sources of sediment (Megahan and Kidd 1972, Megahan 1983, Megahan and Bohn 1989, Ketcheson and Megahan 1996, Madej 2001). Roads may directly affect natural sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, hillslope stability, channel morphology, channel stability, substrate composition, stream temperatures, water

quality, and riparian conditions within a watershed (Quigley and Arbelbide 1997, p. 1103). Roads alter surface and subsurface water flow, concentrate water, expose and alter soil, increase the slope angle on cuts/fills, and decrease infiltration.

While all streams within Scriver Creek are designated as fully supporting beneficial uses in the 2010 State of Idaho Integrated Water Quality Report, the downstream receiving water body (i.e., the Middle Fork Payette River) has two TMDLs in place, one for temperature and one for sediment. These TMDLs call for a 76 percent reduction in instream fine sediment and a 16 percent reduction in stream temperature from solar loading in the Scriver Creek subwatershed to assist in achieving their goals.

Summary of Environmental Consequences: Implementing Alternative A would not reduce sediment or temperature loads within the Scriver Creek subwatershed as directed in the TMDL for the Middle Fork Payette River. All action alternatives show a measurable reduction in sediment compared to Alternative A (Table 2-7). Alternatives vary in the amount of reduction depending on the proposed amount of new road construction, temporary road, road reconstruction, road maintenance, road aggregate placement, and miles of roads decommissioned within and outside of riparian conservation areas (RCAs). Refer to Table 2-5 for detailed descriptions of road activities by alternative.

Table 2-7. Water Quality Improvements: Changes in Percent over Natural Sediment Yields (BOISED and Sediment Delivery [GRAIP])

Indicator	Measure	Alt A	Alt B	Alt C	Alt D
BOISED[a] modeled sediment yield by 2030 (NFS Roads and vegetation mgmt. activities in Scriver Creek subwatershed)	Percent over natural following implementation	23.3%	17.5%	15.4%	15.3%
	Tons/yr of sediment produced following implementation	359 tons/yr	269 tons/yr	237 tons/yr	236 tons/yr
GRAIP[b] modeled sediment yield by 2030 (Includes NFS roads + other roads with in Scriver Creek subwatershed).	Tons/yr of sediment produced following implementation	528 tons/yr	350 tons/yr (–34%)	340.5 tons/yr (–36%)	340.5 tons/yr (–36%)
TMDL goal: 76% sediment reduction in Scriver Creek suwatershed	Contribute to TMDL sediment reduction goal	No	Yes	Yes	Yes

[a] BOISED model (Forest Service 1991, 1995) was used to estimate current and predicted changes in percent over natural sediment yield associated with harvest, landings, prescribed fire, and road activities for each alternative.
[b] Geomorphic Road Analysis and Inventory Package (GRAIP; Prasad 2007) provides site-specific estimates of road related sediment production and sediment delivery based on a field evaluation of road segments, drain points and connection to stream channel. GRAIP sediment delivery amounts are modified based road management activities.

Alternatives C and D, compared to Alternative B, places an additional 2.5 miles of road surface aggregate on the NFS road 693B and decommissions more miles of road to further reduce road sediment production and potential delivery to streams. The primary difference between Alternatives D and C is that Alternative D proposes no new system road construction; Alternative C includes 1.1 miles of new construction, including 0.2 miles of RCA roads (NFS road 696D1).

Fisheries:

Summary of Existing Conditions: The degraded water quality discussed in the previous section directly and indirectly impacts fish habitat. In addition, the presence of migration barriers also prevents existing fish from migrating to more desirable locations as necessary for spawning and rearing. Based on the 2004 Forest culvert inventory survey, three known and surveyed migration barrier culverts fragment approximately 9.5 miles of available aquatic habitat within the Project area. Two additional migration barriers, for a total of five, fragmenting an additional 3 miles of habitat, were identified during the Project data collection.

Summary of Environmental Consequences: Improvements in water quality discussed in the previous section would be beneficial to fish habitat. In addition to the benefits to fish habitat resulting from improvements in water quality, replacing barriers to fish passage resulting from existing culverts at five road crossings would also improve habitat access conditions. As shown in Table 2-8, Alternatives C and D replace 5 of these culverts, Alternative B replaces 3 and Alternative A replaces done.

Table 2-8. Aquatic Organism/Fish Passage Culvert Replacements

Indicator	Measure	Alt A	Alt B	Alt C	Alt D
Aquatic Organism/Fish Passage (AOP) culvert Replacements	Rd 695 at MF Scriver Crk	0	1	1	1
	Rd 693A at Scriver Crk	0	1	1	1
	Rd 693 at Scriver Crk	0	1	1	1
	Rd 693B at Scriver Crk	0	0	1	1
	Rd 693 at WF Scriver Crk	0	0	1	1
	TOTAL	0	3	5	5

2.5.2.3 Purpose 3:

Utilize wood products resulting from restoration treatments to support local and regional economies.

Both jobs supported directly from removal and processing of wood products and those indirectly associated with this activities that are identified as other restoration activities (e.g., precommerical tree thinning, road management activity) are discussed below. Both contribute to support of local economies.

Summary of Existing Conditions: The Project area is located within Boise and Valley counties. Timber sales and their associated activities affect local communities within these counties and other nearby areas based on their impact to employment. The 2011 unemployment rate for Boise County was 9.6 percent and Valley County was 15.2 percent compared to the National rate of 8.9 percent.

Summary of Environmental Consequences: Under Alternative A, no new management activities would be implemented in the analysis area. No wood products would be removed from the analysis area, nor would submerchantable trees be thinned. Additionally, the transportation system would remain at its current level (section 3.11.2) and fire and fuels conditions would remain on current trajectory (section 3.4.2). This alternative would have no effect on employment opportunities in Boise and/or Valley County. No expenses would be incurred for

sale preparation, contract administration, thinning operations, prescribed burning activities, culvert replacement (AOP), or road decommissioning.

The action alternatives remove from 20.4 MMBF to an estimated 24.8 MMBF of wood products which would generate a potential net value (PNV) from $622,700 to $1,925,700 (Table 2-9). Wood products and work associated with implementation of restoration items under this alternative would help sustain economies in Boise and Valley counties and adjacent areas. Job creation and support under the action alternatives would directly and indirectly benefit local economies. According to Lippke and Mason (2005), the estimated direct annual employment rate for forest products is 7.84 jobs/MMBF; the indirect employment rate is 26.73 jobs/MMBF (Table 2-9). The estimate for job creation for the American Recovery and Reinvestment Act of 2009 was that $92,000 of government spending created 1 job/year; 64 percent of the jobs created was in direct or indirect effects (Table 2-9).

As displayed in Table 2-9, of the action alternatives, Alternative C would support the greatest number of jobs, followed by Alternative B and Alternative D.

Table 2-9. Summary Of Jobs Supported By Restoration Activities.

Indicator	Measure	Alt A	Alt B	Alt C	Alt D
Summary of *Wood Product* Volume, Appraised Value, and *Jobs Supported* (section 3.15.4)	Volume (MMBF)	0.0	20.8	24.8	20.4
	Potential Net Value	$0	$1,024,900	$1,925,700	$622,700
	Jobs Supported	0	720	858	706
Summary of Project Cost and *Job Support for Restoration Activities* other than commercial vegetation treatments (section 3.15.4)	Project Cost	$0	$1,828,700	$2,196,300	2,196,300
	Number of Activities	0	13	16	16
	Jobs Supported	0	12.1	14.6	14.6

2.5.3 Comparison of Alternatives by Issue

2.5.3.1 Issue 1:

All acres in need of restoration that are accessible from the proposed transportation system should be included in the Proposed Action. Commenters believed that including additional acres for commercial treatment that did not require additional road access may improve the economics of the project and more fully accomplish Purposes 1 and 3.

Alternatives C and D added an additional 310 acres that could be accessed by the existing road system, compared to Alternative B, Proposed Action. As to how this improved or reduced the economics of the project depended on several factors (Table 2-9). As shown in the PNVs for the alternatives (Table 2-9), adding acres in Alternative C improved the PNV compared to Alternative B, the Proposed Action. However, under Alternative D it actually reduced the PNV compared to Alternative B.

The lower potential net value displayed for Alternative D compared to Alternatives B and C is largely due:

1. Yarding cost differences. The alternative with the higher number of helicopter acres with lower volumes per acre removed, would contribute to a lower PNV (Table 2-10).
2. Lower volumes per acre with smaller log sizes due to diameter limits for all species under Alternative D, would increase cost due to the greater number of trips to pick-up the same amount of volume. For example, two 20 inch diameter trees that are 70 feet tall have about 100 cubic foot of volume. It would take 6-7 trees that are 12 inches in diameter by 70 feet tall to achieve an equivalent amount of volume (FSH 2209.22, Chapter 10). Depending on location of trees felled, it could take 2-3 trips more to pick-up the number of smaller size trees compared to the large size trees.
3. More acres would have to be covered to get the equivalent volume under Alternative D compared to B. While the total volumes are similar between Alternatives B and D, 310 more acres are being treated under Alternative D. Thus, your average costs/mmbf removed goes up because you have to cover more acres.

Table 2-10. Acres of Commercial Vegetation Treatment by Yarding System by Alternative

Indicator	Measure	Alt A	Alt B	Alt C	Alt D
Acres of Commercial Vegetation Treatments by Yarding System	Tractor	0	1,212	1,582	1,472
	Cable	0	969	1238	1238
	Helicopter	0	1084	755	865
	TOTAL	0	3265	3575	3575
MMBF		0	20.8	24.8	20.4
BF/Acre		0	6,370/acre	6,937/acre	5,706/acre

2.5.3.2 Issue 2:

All road-related restoration opportunities identified in the TAP should be carried forward into the Proposed Action regardless of whether funding would be generated from the project to complete the activity. Commenters believed that carrying all road-restoration opportunities through the NEPA process would allow these projects to be implemented whenever funding became available. They identified many cases where restoration funds became available but could not be used because the NEPA process could not be completed before the deadline. Commenters believed carrying these additional activities forward now would allow Purpose 2 to be more fully accomplished should unanticipated funds become available.

Alternatives C and D add more road decommissioning, road aggregate work and AOP/fish passage barrier culvert replacements that were identified in the TAP but not carried forward into Alternative B, the Proposed Action. As displayed above in Table 2-11, Alternatives C and D add to additional AOP/fish passage culvert replacements. As shown below in Table 2-11, Alternatives C and D both add an additional 3.7 miles of NFS road decommissioning and 2.5 miles of additional road aggregate work.

Table 2-11. Miles of Road Decommissioning and New Surface Aggregate Road Work by Alternative

Indicator	Measure	Alt A	Alt B	Alt C	Alt D
Miles of road decommissioning *NOTE–realigned sections of NFS road 696 or 696D*	NFS road	0	12.8	16.4	16.4
	Realigned	0	3.8	3.8	3.8
	Unauthorized	0	3.3	3.3	3.3
	TOTAL	0	19.8	23.5	23.5
New aggregate to road surface to reduce sedimentation.	Aggregate –Rd 693	0	2.8	2.8	2.8
	Aggregate-Rd 693b	0	0	2.5	2.5
	TOTAL	0	11.1	13.6	13.6

In addition, unlike Alternatives B or C, Alternative D eliminates all new permanent road construction, i.e. does not construct NFS road 696 D1 estimated to be 1 mile long. Also, Alternatives C and D, unlike Alternative B, stabilize approximately 0.5 miles of route in the south end of the project contributing sediment to streams.

2.5.3.3 Issue 3:

Commercial treatments in units immediately adjacent to the Bear Wallow IRA could impact the visual quality and detract from the natural appearance of these areas as viewed from the IRA. While the Proposed Action includes mitigation to address this concern, commenters believe that not treating these areas could result in a more natural appearance than what would occur under the mitigated Proposed Action.

Summary of Existing Condition: Inventoried roadless areas (IRA) are inventoried tracts of National Forest System land characterized as having an undeveloped character. The Bear Wallow IRA is one of 42 IRAs identified on the Forest. This IRA comprises approximately 9,133 acres of the total 1,108,500 IRA acres on the Forest (Forest Service, 2003b, Appendix H FEIS). The Bear Wallow IRA lies between the NFS road 698 (Middle Fork Payette River Road) and the eastern edge of the Project area.

On October 16, 2008 the Forest Service published a final rule (36 CFR 294) that adopted state specific management direction for designated roadless areas in the State of Idaho; i.e., the Idaho Roadless Rule. About 8,400 acres of Bear Wallow Roadless Area has been designated as Primitive and approximately 700 acres are designated as a Forest Plan Special Area under the Idaho Roadless Rule (36 CFR 294.29). The portions of the Bear Wallow Roadless Area adjacent to the Project area are designated as Primitive.

The Idaho Roadless Rule establishes permissions and prohibitions that govern the types of activities that may occur within IRAs. It does not establish management direction for areas adjacent to an IRA. Direction for management of areas adjacent to IRAs, such as the Scriver Creek Integrated Restoration Project area, is provided in the Forest Plan direction (Forest Service 2010). The Forest Plan allocates the adjacent area immediately west of the Bear Wallow IRA in which the Scriver project falls to Management Prescription Category (MPC) 5.1, *Restoration and Maintenance Emphasis within Forested Landscapes.*

As seen in section 3.16, the areas proposed for treatment under Alternative B that are immediately adjacent to the western boundary of the IRA have an established VQO of modification. Under a modification VQO management activities may visually dominate the original characteristic landscape; however, activities of vegetative and landform alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities such as structures and roads must remain visually subordinate to the proposed composition.

Summary of Environmental Consequences: Alternatives A, C and D do not propose any commercial treatments immediately adjacent to the western boundary of the Bear Wallow IRA, thus no management-induced changes to the scenic environment would occur from commercial treatments along the western boundary of the IRA. Over time, evidence of previous disturbances would continue to diminish as trees increase in size and density and line and form conditions from past road activity and cable corridors would also diminish in appearance. Absent an uncharacteristic disturbance event, subtle changes in the vegetative structure and composition from natural processes would generally be unnoticeable to forest visitors and would meet the assigned VQOs within the analysis area. Because no direct or indirect effects to the scenic environment would be expected with implementation of these alternatives, there would be no cumulative effects.

Alternative B proposes to treat 54 acres along the northern portion of the western boundary of the Bear Wallow IRA and 64 acres along the southern portion of the boundary. Helicopters would be used to log 100 acres of these units, thus minimizing ground disturbance on the majority of the area treated. Tractor skidding would be used on the remaining 18 acres.

Proposed improvement cut activities under Alternative B would result in a more open forested appearance on the 118 acres treated compared to Alternatives A, C or D where these acres would not be treated. As displayed in a modeled depiction of the change expected between the current condition and proposed treatments under Alternative B (Figure 2-11), the foreground landscape seen from viewpoints along the western boundary of the IRA where these treatments are proposed would continue to convey a predominantly natural appearing forested condition with varying ranges of tree densities within patches and configurations characteristic of the fire regime (Stand Basal Area and Canopy cover, sections 3.2.4.1.4 and 3.2.4.1.5, respectively).

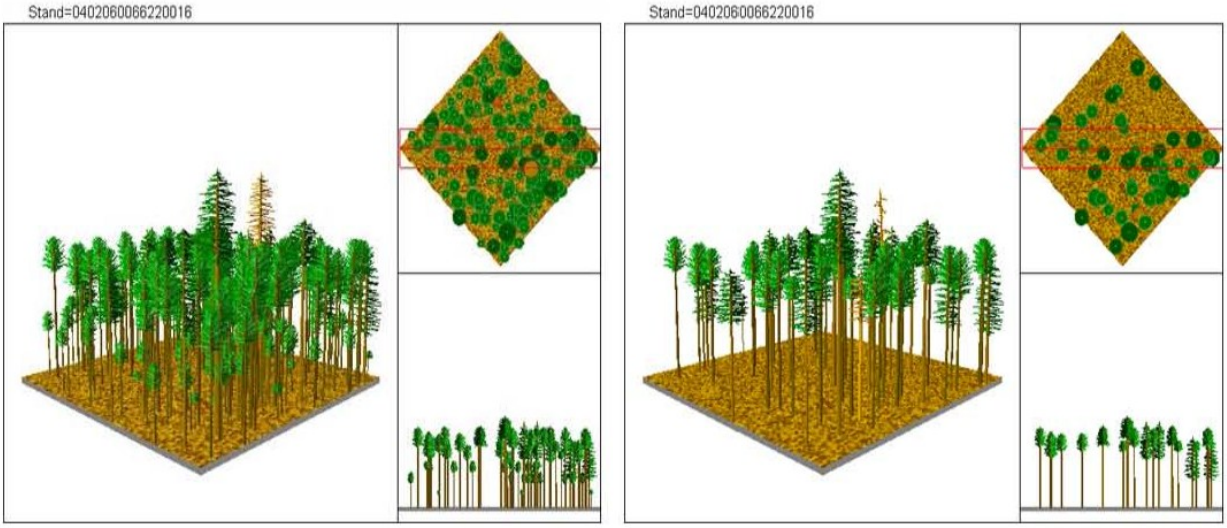

Figure 2-11. Illustration of Existing Stand Conditions in Unit 13 (Stand 6220016) in 2010 and Stand Conditions One Year Following Treatment

For the first 1-3 year period following implementation of Alternative B treatments there is likely to be evidence of harvest activity from ground and soil disturbance and harvest residues in the locations seen in the foreground of viewpoints along the western boundary of the IRA near these proposed harvest units. Harvest slash would generally be unnoticeable within 3-5 years as the material begins to blend with surrounding surface material. While evidence of treatment would be visible, whereas under Alternatives A, C and D there would be none, the proposed vegetation management activities under this alternative would meet the required modification VQO.

While visually different than no treatment, the appearance of a similar forest stand along the IRA boundary would be expected to be maintained with implementation of proposed activities under Alternative B given that the silvicultural prescription for these units would result in a residual density of about 80 square feet (ft^2) of basal area. With this prescription, it is anticipated there would not be a visible demarcation or edge effect between the IRA and the units/stands treated. Figure 2-11 illustrates the existing stand conditions for Unit 13 (Stand 6220016) as compared to what the stand conditions would likely look like one year following treatment in all units/stands treated adjacent to the Bear Wallow IRA.

While not specifically raised as a concern, the benefits of the 194 acres of precommercial thinning activities proposed near the IRA boundary under all action alternatives is worth noting. These treatments would be expected to put these forested stands on a trajectory toward vegetative desired conditions, creating more of a natural forest appearance. Overtime, the visual quality of these areas as viewed from the IRA should improve under all the action alternatives compared to Alternative A which would maintain a uniform tree pattern characteristic of a plantation environment that is not typical of the natural landscape. Thus, in the short- and long-term, precommerical thinning treatments would create a more natural forested appearance of the forested areas along the boundary of the Project area and Bear Wallow IRA.

In summary, while there would be a visual difference between not commercially treating areas adjacent to the IRA boundary under Alternatives A, C and D versus treating these areas under Alternative B, all alternatives would meet the identified VQO for the areas, blending at the IRA boundary. Commercial vegetation activities under Alternative B would borrow from naturally

established form, line, color, and texture (Figure 2-11) so that the visual characteristics following treatment would be those expected to occur naturally within the surrounding area, including within the IRA where change would generally occur more through natural disturbances. In addition, the precommecial treatments proposed in plantations adjacent to the IRA under all action alternatives would measurably improve the natural forest appearance of these areas compared to Alternative A. These plantation treatments would help blend these forested areas in with those in the adjacent IRA over time.

2.5.3.4 Issue 4:

The Proposed Action removes some large diameter trees important to the quality of habitat preferred by some terrestrial wildlife species. Some commenters believe that prohibiting the removal of any tree ≥20 inches d.b.h. would benefit some wildlife species. While the Proposed Action retains many of the large trees, there are cases where later seral large trees (e.g., grand fir) would be removed to facilitate retaining and regenerating early seral species such as ponderosa pine. Thus, while retaining and restoring early seral tree species in forests would benefit some wildlife species over time (e.g., flammulated owl), it would have tradeoffs to other wildlife species who prefer larger, later seral tree species (e.g., pileated woodpeckers).

Appendix E of the Forest Plan groups source habitats[37] for terrestrial wildlife species across the Forest. These source habitat groups fit into a hierarchical system of four broad suites of habitat: (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 source 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 13-14 are within Suite 4. Habitat families are a collection of species that share similarities in source habitats, which are arranged along major vegetative themes such as ecological communities, vegetative structure, and fire regime. Focal species are selected species within these habitat families that represent key environmental correlates and ecological functions that may be affected by management activities. Key environmental correlates are the biotic or abiotic habitat elements that species use on the landscape to survive and reproduce. Key ecological functions are the set of ecological roles performed by a species in its ecosystem (Marcot and Vander Heyden 2001). These ecological roles are the primary ways organisms use, influence, and alter their biotic and abiotic environments.

The analysis for this project focused on four families including Family 1—Low Elevation, Old Forest, Family 2—Broad Elevation, Old Forest, Family 5—Forest and Range Mosaic and Family 13—Riverine Riparian and Wetland. Six focal species from these four families (Table 3-34) were selected for this evaluation based on their use of key environmental correlates potentially affected by the action alternatives.

[37] 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).

2.5.3.4.1 Whiteheaded Woodpecker: (Chapter 3, section 3.4.3.1)

Summary of Existing Condition: This Scriver Creek subwatershed historically provided approximately 14,145 acres of source habitat for the white-headed woodpecker and was a substantial source of habitat for this species on the Forest. Source habitat in this subwatershed has declined by nearly 97 percent for the white-headed woodpecker, which is consistent with the current trends for Family 1 habitat across the Forest (Nutt et al. 2010).

Existing amounts and distribution of source habitat were also found to be limited within the Project area. The small amount of existing source habitat remaining would not likely contribute to a potential home range within the Project area or that went beyond the Project area boundary. The capability of the Project area to provide source habitat is greater than current conditions provide for.

Three occurrences of white-headed woodpeckers have been reported in the vicinity of the analysis area, ranging from 0.1 to 5.2 miles from the analysis area boundary (IFWIS 2011, NRIS 2011). The nearest was just over 0.1 mile from the east edge of the analysis area, a second was less than 1 mile from the southeastern boundary, and a third was more than 5 miles south of the analysis area within the Crouch watershed.

Summary of Environmental Consequences: Under Alternative A there would be a continued downward trend in source habitat for the white-headed woodpecker as changes to tree species composition trend toward shade-tolerant species and stand densities increase. Actions under Alternatives B, C or D would increase the amount of white-headed woodpecker source habitat immediately after harvest and into the long term in comparable amounts and average patch size. Alternatives C and D result in slightly less habitat compared to Alternative B due to the removal of commercial treatment units immediately adjacent to the Bear Wallow Inventoried Roadless Area to address Issue #3. However, all three action alternatives would create enough source habitat within PVG 2 habitat types to form a single potential home range. All three action alternatives would shift species composition toward desired species (ponderosa pine) and away from shade-tolerant species, essentially moving these stands back into HRV.

Total open road densities would decrease within source habitat following implementation of all three action alternatives, improving the quality of source habitat through reduced disturbance and snag removal through fuelwood harvest along open road corridors. Large snag densities would remain within desired ranges following harvest and would increase into the long term. As a result, while all three action alternatives would move habitat indicators in the right direction and result in more source habitat for the white-headed woodpecker, Alternatives B and C would have the largest gain in source habitat quantity and quality for this species.

2.5.3.4.2 Flammulated Owl: (Chapter 3, section 3.4.4.1)

Summary of Existing Condition: This watershed historically provided approximately 7,872 acres of source habitat. Source habitat in the watershed has increased by 59 percent for the flammulated owl, which is consistent with the current condition for Family 2 within the watershed (Nutt et al. 2010). Due to the area's overall mid- to low elevation and warm habitat types, a high percentage (70 percent) of source habitat capacity is susceptible to noxious weeds. Invasive weed species can affect prey availability through displacement of native plant species. Roads often facilitate the spread of invasive plant species. Road densities are also impacting source habitat quality as total road densities are within the high classification (>1.7 mi/mi^2).

Higher road densities increase the risk of the loss of snags to fuelwood collection over time. A portion of source habitat is suitable for range; 8,300 acres of the Middle Fork South S&G Allotment occurs within the Project area. Livestock grazing may also adversely impact the understory herb and shrub community, which can influence Lepidoptera prey abundance and diversity.

The analysis area for flammulated owl consists of the 11,510-acre Project area and will be used to assess impacts to the amount, distribution and quality of source habitat for this species. This analysis area was chosen because of the capability of the Project area to provide source habitat for this species and because potential direct and indirect impacts are not expected to go beyond the Project area boundary.

Surveys were conducted for flammulated owls within the analysis area in June of 2012, June of 2006 and June of 2010 using the ASC Flammulated Owl protocol. A total of 13 responses, some with multiple owls, were recorded in 2012; a total of six responses were solicited in 2010; and a total of four responses were solicited in 2006 (Survey Records available in Project Record). Detections were concentrated in the very northern part of the analysis area, as well as the southeast portion. The 2012 survey detected owls in the extreme southern section, which had not occurred in previous survey attempts, and expanded known owl locations in the southeastern section of the analysis area. No other anecdotal sightings have been documented within the analysis area (IFWIS 2011, NRIS 2011).

Three of the four PVGs capable of developing source habitat for flammulated owls are present in the analysis area, including PVGs 2, 5, and 6. These PVGs represent approximately 11,403 acres or 99 percent of the analysis area. The majority of these acres are in PVG 6 (82 percent).

Summary of Environmental Consequences: Alternative A would improve some habitat conditions for flammulated owls as stands in the large tree size class increase over time and the lack of disturbances allows some stands to move from low canopy cover class to moderate. However, stands would continue to trend away from desired species composition as shade tolerant species would continue to replace seral ponderosa pine, and other stands would move from moderate to high canopy cover, negating the gain in preferred large tree size class and moderate canopy cover classes. Total road densities would remain high and continue to degrade habitat through access for removal of snags for firewood. The effect of this alternative, when combined with the ongoing and foreseeable activities within the analysis area, would be a decreasing trend in source habitat quantity and quality within the analysis area into the short-and long-term.

Alternatives B, C or D would move vegetation toward its desired conditions within PVG 2, 5, and 6 habitat types, increasing source habitat within PVGs 5 and 6 (mixed1 fire regime) and reducing source habitat within PVG 2 (nonlethal fire regime). However, individual alternatives sometimes had different impacts on the four habitat indicators selected for this species. For example Alternative D results in the most source habitat immediately following harvest (1,874 acres), but Alternative C results in the largest total amount of source habitat in the long term (2,229 acres), The Alternative C long-term total is the same as under the No Action alternative. Alternatives B, C, and D would all initially move 625 acres in PVG 2 below the preferred 40 percent threshold for canopy cover (and back into HRV) immediately following harvest. However, Alternative C would result in the largest gain of source habitat in PVG 6 habitat types in the long term (558 acres). Alternative C also results in the largest improvement in species

composition, slightly more than Alternative B. All three action alternatives would reduce total road densities within flammulated owl source habitat. Alternative D results in the largest decrease in total road density into the long term, closely followed by Alternative C.

Altogether, habitat indicators show that Alternative C would result in the most source habitat in the long term, the largest gain in source habitat within PVG 6 habitat types, and the largest improvement in species composition. In addition, Alternative C would retain the second most home ranges immediately following implementation and would maintain the most home ranges into the long term. Alternative C would also result in the second most road density reduction throughout the modeling period compared to Alternative A

2.5.3.4.3 Northern Goshawk: (Chapter 3, section 3.4.4.2)

Summary of the Existing Condition: Source habitat in the watershed has increased by nearly 35 percent for the northern goshawk (Nutt et al. 2010). The abundance of goshawk source habitat within the watershed is a result of large portions of the PVG 2 habitat types being outside HRV, likely caused by fire suppression activities that allowed higher tree densities and favored shade tolerant species to develop within the stands. Similarly, there is likely an abundance of source habitat within the analysis area due to PVG 2 habitat types in the southeastern corner also being outside HRV with regard to canopy cover.

There are 9,246 acres of existing modeled source habitat within the analysis area, which equates to approximately 93 percent of source habitat capacity within the analysis area. The ratio of source habitat to source habitat capacity is high because of the large number of stands within PVG 2 that are currently outside HRV and are providing source habitat. The analysis area's large amount of PVG 5 and 6 within the mixed1 fire regime would suggest that this portion of the watershed would have historically provided the majority of source habitat within the watershed, as habitat types in the south half of the watershed are predominantly PVG 2 and would not have provided source habitat when within HRV.

Total road densities are high and the motorized access they facilitate are likely impacting source habitat quality. Higher road densities increase the risk of the loss of snags to fuelwood collection over time. A portion of source habitat is suitable for livestock grazing; 8,300 acres of the 46,800-acre Middle Fork South S&G Allotment occurs within the Project area. This watershed historically provided approximately 6,236 acres of source habitat for the goshawk, which equates to 16 percent of federally managed lands (37,848 acres) in the watershed. The prevalence of PVG 2 within the watershed is likely the reason less than 20 percent of the watershed historically provided source habitat.

Surveys were conducted in June of 2012 using the protocol from Northern Goshawk Inventory and Monitoring Technical Guide (Woodbridge and Hargis 2005). An active nest with one nestling was located within the analysis area in June of 2012, near the center of the analysis area (Project Record, Wildlife Survey Information, 2012). In addition, the survey crew located the historical nest that was found in 2005 (NRIS 2011). This nest site is likely an alternative nest site and is approximately 1.30 miles northwest of the active nest site. Three other sightings have occurred within the analysis area since 2002 (NRIS 2011). In addition to the surveys completed in 2012, earlier surveys had been completed within the analysis area in July of 2010, which resulted in no detections (Project Record, Wildlife Survey Information, 2010).

Environmental Consequences Summary: Alternatives B, C or D would reduce northern goshawk source habitat abundance within the analysis below what would be expected to occur under the No Action alternative, primarily from reductions in canopy cover that move densities under 60 percent for nesting and 40 percent for forage habitat. Nesting habitat would correspondingly decrease as well under all three alternatives. Most of the reductions in forage habitat were a result of stands in PVG 2 being moved back into HRV. While there were some losses of forage habitat within PVGs 5 and 6, stands that fell below canopy cover requirements for nesting habitat in these PVGs shifted to forage habitat. As a result, forage habitat remained generally unchanged under all three alternatives. Of the three action alternatives, Alternative D retains the most total northern goshawk source habitat (nesting and forage) through the modeling period. Alternative D also retains the most nesting habitat through 2030.

All three action alternatives would retain sufficient quantity and distribution of source habitat to support a home range, within the analysis area. In addition, all action alternatives would retain the important vegetation characteristics within the active nest stand as a result of Design Feature WL-2, would retain the quality of nesting habitat within the five other alternate/replacement nest stands, and would retain overall source habitat quality within the PFA. While the differences between the alternatives are relatively small with respect to effects within the home range, Alternative D would retain the most nesting habitat within the potential home range throughout the modeling period, and would retain more of the PFA above 60 percent canopy cover than Alternatives B and C, although there would be less actual harvest within Alternative B.

Average patch size would be less in Alternatives B, C or D than Alternative A throughout the modeling period for all action alternatives, although Alternative B would retain the largest average patch size. All three action alternatives would reduce total road densities compared to Alternative A. Alternative D results in the largest decrease in total road densities into the long term.

Overall the habitat indicators show that Alternative D would retain the most source habitat and the most nesting habitat throughout the modeling period, would retain the most nesting habitat within the home range, would maintain more of the PFA above the 60 percent canopy cover threshold, and would result in the largest long term reduction of total road density within source habitat. The quality and quantity of source habitat within the home range would be maintained closest to the existing condition under Alternative D.

2.5.3.4.4 Pileated Woodpecker: (Chapter 3, section 3.4.4.3)

Summary of the Existing Condition: Source habitat in the watershed has increased by nearly 53 percent for the pileated woodpecker (Nutt et al. 2010). The abundance of pileated source habitat within the watershed is likely a result of large portions of PVG 2 and 5 habitat types being outside HRV, likely caused by fire suppression activities that allowed higher tree densities and favored shade tolerant species to develop within the stands.

The analysis area's large amount of PVG 6 within the mixed1 fire regime would suggest that this portion of the watershed would have historically provided the majority of source habitat for pileated woodpeckers within the watershed, as habitat types in the south half of the watershed are predominantly PVG 2 and would have provided source habitat only when outside HRV.

There are 9,602 acres of existing modeled source habitat, which equates to approximately 96 percent of source habitat capacity within the analysis area. Of the existing modeled source habitat, 5,695 acres are nesting habitat and 3,907 acres are forage habitat. Similar to source habitat conditions in the watershed, there is a greater amount of source habitat within the analysis area than would be expected due to PVG 2 habitat types in the southeastern corner being outside HRV with regard to canopy cover. Patches of nesting habitat are somewhat concentrated on the west half of the analysis area, while modeled forage habitat is well distributed and connected.

Environmental Consequences Summary: Considering that there is an abundance of source habitat within the watershed, the overall effect of Alternatives B, C, and D, is that despite habitat reductions within the analysis area the overall trend for source habitat would be maintained and source habitat quantity and quality would remain abundant within the watershed.

Alternatives B, C, and D would reduce source habitat abundance within the analysis below what would be expected to occur under the No Action alternative, primarily from reductions in canopy cover that move densities under 60 percent for nesting and 30 percent for forage habitat. Nesting habitat would correspondingly decrease as well under all three alternatives. A significant portion of the reductions in forage habitat was a result of stands in PVG 2 being moved back into HRV. While there were some losses of forage habitat within PVGs 5 and 6, most stands that fell below canopy cover requirements for nesting habitat in these PVGs shifted to forage habitat. As a result, forage habitat generally increased under all three alternatives due to reductions in nesting habitat. Of the three action alternatives, Alternative D retains the most total source habitat (nesting and forage) through the modeling period.

Alternatives B, C, and D would maintain five potential home ranges with no modification, would maintain three with minor reconfiguration, and would result in the acceptable loss of one potential home range that occurred within PVG 2 habitat types. Alternative B would retain the most nesting habitat within the analysis area immediately following harvest, while Alternative D would retain the most nesting habitat into the long term.

Average patch size would be less than Alternative A throughout the modeling period for all action alternatives, although Alternative C would retain the largest average patch size. All three action alternatives would reduce total road densities compared to Alternative A. Alternative D results in the largest decrease in total road density within the analysis area throughout the modeling period.

Altogether the habitat indicators show that Alternative D would retain the most source habitat within the analysis area throughout the modeling period, the most nesting habitat into the long term, and would retain the most overall nesting habitat within the potential home ranges. While all three action alternatives would retain the same amount of existing potential home ranges, the quality and quantity of source habitat within the analysis area would be maintained closest to the existing condition under Alternative D.

2.5.4 Summary of Chapter Resource Effects, by Alternative

Table 2-12. Comparison of Alternatives by Chapter 3 Resource Effects

Indicator	Indicator Item or Time period	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
FORESTED VEGETATION–NON-LETHAL FIRE REGIME (1,069 acres commercially treated)					
Average Large Trees per Acre (TPA) Pre- and Post-harvest, by Alternative (section 3.2.4.1.3)	Existing	8.9 TPA	8.9	8.9	8.9
	Harvested	0.0 TPA	1.1	1.1	0.0
	Remaining in 2011[38]	8.9 TPA	7.8	7.8	8.9
	Projected in 2030	13.3 TPA	13.4	13.4	13.8
Ponderosa Pine Restoration Indicator: Large ponderosa pine vs. Large Douglas-fir (section 3.2.4.2.1) *(Projection Period = 2030)*	Number live large ponderosa pine *Existing = 6.1 TPA*	8.3 TPA	9.8	9.8	8.8
	Number live large Douglas-fir *Existing = 2.8 TPA*	5.0 TPA	3.6	3.6	4.6
	Percentage of large tree class in ponderosa pine (*Existing = 63%)*	62%	71%	71%	66%
Total Canopy and Canopy of Large Trees (parentheses) Existing, Post-treatment (2011) and Projected at 2030 in Percentage (*section 3.2.4.1.5*)	Existing	61% (8%)	61 (8)	61 (8)	61 (8)
	Remaining 2011	61% (8%)	36 (7)	36 (7)	35 (8)
	Projected in 2030	64% (13%)	45 (12)	45	45 (12)
Total Stand Basal Area (section 3.2.4.2.2)	Existing	112	112	112	112
	2011, post-treatment	112	60	60	60
Snags per acre ≥20 inch d.b.h. (snags/acre) (section 3.2.8.1)	Plan Desired Condition	0.4–3.0	0.4–3.0	0.4–3.0	0.4–3.0
	Existing Condition	0.54	0.54	0.54	0.54
	2011 post-treat	0.61	0.56	0.56	0.57
	2030 projection	2.00	1.27	1.27	1.32
Coarse Woody Debris (CWD) ≥12 inch d.b.h. (tons/ac) (section 3.2.8.1)	Plan Desired Condition	3–10.5	3–10.5	3–10.5	3–10.5
	Existing Condition	0.01	0.01	0.01	0.01
	2011 post-treat	0.01	0.01	0.01	0.01
	2030 projection	0.23	0.15	0.15	0.15

[38] The year 2011 was the projection year used in the model work started in 2009 to indicate immediately post-harvest. While treatment is not expected to occur in 2013, the two year difference would not measurably change the result.

Indicator	Indicator Item or Time period	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
FORESTED VEGETATION–MIXED1 FIRE REGIME (2,196 acres commercially treated Alternative B; 2,506 Alternatives C and D)					
Average large trees per acre (TPA) pre- and post-harvest, by Alternative (section 3.2.5.1.3.2)	Existing	6.8	6.8	6.8	6.8
	Harvested (*DF/GF only*)	0.0	3.1	3.9	0.0
	Remaining in 2011[23]	18.5	15.2	14.4	18.5
	Projected in 2030	24.1	19.3	18.2	22.2
Ponderosa Pine Restoration Indicator: Large Ponderosa Pine vs. Large Douglas-fir (section 3.2.5.2.1) *(Projection period = 2030)*	Number live large ponderosa pine *Existing = 6.1 TPA*	6.6	6.9	6.9	7.0
	Number Live Large Douglas-fir *Existing = 5.1 TPA*	7.8	5.6	5.5	6.8
	Number Live Large grand fir/other *Existing = 6.8 TPA*	9.7	6.8	5.8	8.3
	Percentage of Large Tree Class in ponderosa pine (*Existing = 34%)*	27%	36%	38%	32%
Total Canopy and Canopy of Large Trees (Parentheses) Existing, Post-treatment (2011) and Projected at 2030 (section 3.2.5.2.2 & 3.2.5.1.5)	Existing	81% (21%)	81 (21)	81 (21)	81 (21)
	Remaining 2011	82% (21%)	54 (18)	46 (17)	49 (21)
	Projected in 2030	83% (29%)	59 (24)	51 (23)	55 (27)
Total Stand Basal Area (section 3.2.5.2.2)	Existing	145 ft^2/acre	145	145	145
	2011, post-treatment	145 ft^2/acre	95	84	94
Snags per acre ≥ to 20 inch d.b.h. (snags/acre) (section 3.2.8.1)	Plan Desired Condition	0.2-3.5	0.2-3.5	0.2-3.5	0.2-3.5
	Existing Condition	1.90	1.90	1.90	1.90
	2011 post-treat	2.00	1.96	1.94	1.97
	2030 projection	4.03	2.91	2.63	3.04
Coarse Woody Debris (CWD) ≥ to 12 inch d.b.h. (tons/ac) (section 3.2.8.1)	Plan Desired Condition	2.6–9.1	2.6–9.1	2.6–9.1	2.6–9.1
	Existing Condition	0.03	0.03	0.03	0.03
	2011 post-treat	0.04	0.04	0.04	0.04
	2030 projection	0.55	0.47	0.44	0.46
FIRE and FUELS, and AIR QUALITY					
Crown Fire Hazard Rating Change in acres from existing condition to 2030 project year (section 3.3.3.1)	Low—Existing vs. 2030 (acres)	37 to 0	37 to 233	37 to 233	37 to 233
	Mod—Existing vs. 2030 (acres)	1,427 to 1,464	1,427 to 2,865	1,427 to 3,119	1,427 to 3,119
	High—Existing vs. 2030 (acres)	2,228 to 2,228	2,228 to 594	2,228 to 340	2,228 to 340
	TOTAL (acres)	3,692	3,692	3,692	3,692
Air Quality—$PM_{2.5}$ NAAQS standard met or not met. (section 3.5.3)	NAAQS = 35 µg/m^3 in a 24-hour period)	N/A—no activities propose	Met	Met	Met

Indicator	Indicator Item or Time period	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
WILDLIFE					
ESA—Threatened, Endangered, Proposed or Candidate Species (TEPC) Determination (section 3.4)	Canada Lynx (T)	N/A	No Effect	No Effect	No Effect
	Wolverine (C/S)	N/A	No Impact	No Impact	No Impact
	Greater Sage Grouse (C/S)	N/A	No Impact	No Impact	No Impact
	N. Idaho Ground Squirrel (T)	N/A	No Effect	No Effect	No Effect
	S. Idaho Ground Squirrel (C)	N/A	No Impact	No Impact	No Impact
	Yellow-billed Cuckoo (C/S)	N/A	No Impact	No Impact	No Impact
Intermountain Regionally Sensitive Species and Forest Plan MIS	Refer to summary discussion under ISSUE #4, Section 2.5.3.4, for discussions concerning Whiteheaded woodpecker, Flammulated Owl, Pileated Woodpecker and Northern Goshawk				
Old forest and large tree habitat	Refer to summary discussion under Purpose and Need #1, Section 2.5.2.1				
HYDROLOGY AND FISHERIES					
Water Quality BOISED modeled sediment reduction by 2030	Percent over natural	23.3%	17.5%	15.4%	15.3%
	Tons/yr of sediment	359 tons/yr	269 tons/yr	237 tons/yr	236 tons/yr
	Contribute to TMDL sediment reduction goal	No	Yes	Yes	Yes
Aquatic Organism/Fish Passage (AOP) culvert Replacements	Rd 695 at MF Scriver Crk	0	1	1	1
	Rd 693A at Scriver Crk	0	1	1	1
	Rd 693 at Scriver Crk	0	1	1	1
	Rd 693B at Scriver Crk	0	0	1	1
	Rd 693 at WF Scriver Crk	0	0	1	1
	TOTAL	0	3	5	5
ESA listed Threatened, Endangered, Candidate or Proposed Fish Species, Intermountain Sensitive Fish Species (*Sections 3.7.1 – 3.7.3*)	Bull Trout and Bull Trout Critical Habitat	N/A	No effect	No effect	No effect
	Snake River Spring/Summer Chinnok Salmon and Steelhead and proposed or designated critical habitat	N/A	No Effect	No Effect	No Effect
	West Slope Cutthroat Trout	N/A	No Impact	No Impact	No Impact

Indicator	Indicator Item or Time period	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
SOILS					
Total Soil Resource Commitment (TSRC) *(Plan Standard = do not exceed 5% of activity area)*	Direct/Indirect Effects (immediately post-treat)	2.8%	3.7%	3.8%	3.8%
	Cumulative Effects (5 yrs post-treat)	2.8%	2.7%	2.6%	2.6%
Detrimental Soil Disturbance (DD) *(Plan Standard = do not exceed 15% of activity area)*	Direct/Indirect—5 years post treatment (*Range for activity units*)	0.0-4.0%	1.3-7.1%	1.3-8.1%	1.3-8.1%
	Cumulative—10 years post treatment (*Range for activity units*)	0.0-4.0%	0.6-3.5%	0.6-4.0%	0.6-4.0%
BOTANICAL RESOURCES[39]					
Determinations for Region 4 Sensitive Plant Species (section 3.9.3) *MII – May Impact Individuals*	*Lewisia sacajaweana* Sacajawea's bitterroot	None	MII	MII	MII
	Phacelia minutissima Least phacelia	None	MII	MII	MII
Determinations for Risk to Population Viability for Boise Forest Watch List Plant Species Relative risk based on acres of disturbance … the greater the disturbance in an alternative, the greater the risk relative to another alternative.	*Allium validum* Tall swamp onion	None	Low	Low	Low
	Botrychium lineare Slender moonwort	None	Low	Low	Low
	Botrychium crenulatum Scalloped moonwort	None	Low	Low	Low
	Botrychium simplex Least moonwort	None	Low	Low	Low
	Relative Risk between alternatives	**None**	**Least**	**Most**	**Moderate**

[39] No ESA listed plant species would be affected by activities proposed under action alternatives, or no habitat for these species exist (section 3.9.3).

Indicator	Indicator Item or Time period	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
NOXIOUS WEEDS					
Leafy Spurge—susceptible disturbed by proposed activities Total acres susceptible in Project area = 2142	Helicopter logging (acres)	0	259	220	243
	Skyline/cable logging (acres)	0	242	358	358
	Tractor logging (acres)	0	153	246	223
	Noncommercial thin (acres)	0	358	358	358
	Prescribed fire (acres)	0	293	291	291
	Road construction, reconstruction, decomm (miles)	0	3.4	4.4	4.0
Rush Skeltonweed—susceptible acres disturbed by proposed activities Total acres susceptible in Project area = 6065	Helicopter logging[40] (acres)	0	615	422	482
	Skyline/cable logging (acres)	0	585	736	736
	Tractor logging (acres)	0	635	842	782
	Noncommercial thin (acres)	0	609	609	609
	Prescribed fire (acres)	0	639	630	630
	Road construction, reconstruction, decomm (miles)	0	13.4	16.7	16.0
Spotted Knapweed—susceptible disturbed by proposed activities Total acres susceptible in Project area = 1834	Helicopter logging (acres)	0	206	166	189
	Skyline/cable logging (acres)	0	242	358	358
	Tractor logging (acres)	0	153	246	223
	Noncommercial thin (acres)	0	302	302	302
	Prescribed fire	0	288	286	286
	Road construction, reconstruction, decomm (miles)	0	3.3	4.4	4.0

[40] Acres by logging system have been separated due to the varying levels of ground disturbance associated with each. The system with the greatest disturbance carries with it the greatest risk to weed susceptibility. Tractor logging results in the highest level of ground disturbance, followed by cable with the least from helicopter.

Indicator	Indicator Item or Time period	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
RANGE					
Displacement of livestock in areas of disturbance (e.g., vegetation management, road management, etc.) and the resulting change in grazing patterns within the allotment.	Duration of project implementation, likely 5 years.	No management-induced changes to the range resources would be expected to occur. Authorized livestock grazing would occur under the term grazing permit and AOI similar to that which is currently occurring.	Effects of all action alternatives would be similar. Each could result in temporary to short term effects (i.e., during implementation) due to displacement. This likely result in modifying grazing patterns in the allotment to exclude all or some portions of the 9,943 acres of Middle Fork South S&G Allotment that falls within the Project area. However, modifying the grazing patterns would not be expected to impact the livestock numbers and/or grazing season because of the overall size of the allotment which extends well outside the Project area and the ability to move livestock into portions of the allotment unaffected by the disturbance activity.		
TRANSPORTATION SYSTEMS					
Final miles of road in Level 1, 2, or 3 maintenance status	Level 1	51.7	38.7	33.6	32.4
	Level 2	13.3	17.1	17.1	17.1
	Level 3	8.6	8.6	8.6	8.6
	TOTAL	73.6	64.4	59.3	58.1
Project area Road Density (miles/miles$^{2)}$	Open to motorized use	1.2	1.4	1.4	1.4
	Closed	3.2	2.2	2.0	1.9
	TOTAL	4.4	3.6	3.4	3.3
RECREATION RESOURCES					
Impacts to both motorized and non-motorized access	Open to All Vehicles Yearlong (NFS roads 693, 693B. 695, and 696)	21.2 miles	25.0 miles	25.0 miles	25.0 miles
	NFS Trails Open to Vehicles ≤50 inches in width Yearlong (NFS trail 035)	1.7 miles	1.7 miles	1.7 miles	1.7 miles
	NFS Trails Open to Vehicles ≤50 inches in width Seasonally Closed (October 1 through June 30) (dual designation portions of NFS roads 693Q, 693L and 693L5 comprise NFS trail 448)	4.0 miles	4.0 miles	4.0 miles	4.0 miles
	NFS Roads Closed to motorized use, but open to non-motorized use	52.4 miles	39.4 miles	34.3 miles	33.1 miles
Consistency with current ROS classifications as defined in 2010 Forest Plan	Roaded Modified	11,471 acres	maintain	maintain	maintain
	Semi-primitive motorized	39 acres	maintain	maintain	maintain
CULTURAL RESOURCES					
Effects to historic properties	Within Area of Potential Affect (APE)	N/A—No Federal Action	No Effect	No Effect	No Effect

Indicator	Indicator Item or Time period	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D
ECONOMIC ASSESSMENT					
Summary of *Wood Product* Volume, Appraised Value, and *Jobs Supported* (section 3.15.4)	Volume (MMBF)	0.0	20.8	24.8	20.4
	Potential Net Value	$0	$1,024,900	$1,925,700	$622,700
	Jobs Supported[41]	0	720	858	706
Summary of Project Cost and *Job Support for Restoration Activities* other than commercial vegetation treatments (section 3.15.4)	Project Cost	$0	$1,828,700	$2,196,300	2,196,300
	Number of Activities	0	13	16	16
	Jobs Supported[42]	0	12.1	14.6	14.6
SCENIC ENVIRONMENT					
Forest Visual Quality Objectives (VQOs) for the Scriver Creek Integrated Restoration Project	Retention Acres	0 (existing)	maintain	maintain	maintain
	Partial Retention Acres	5,460 (existing)	maintain	maintain	maintain
	Modification Acres	4,330 (existing)	maintain	maintain	maintain
	Maximum Modification Acres	1,720 (existing)	maintain	maintain	maintain
VQOs from Forest Plan identified sensitive routes, NFS trail 035	Foreground –Partial Retention	N/A	maintain	maintain	maintain
	Middleground - Modification	N/A	maintain	maintain	maintain
	Background - Modification	N/A	maintain	maintain	maintain
INVENTORIED ROADLESS AREA					
Refer to summary discussion under ISSUE #2, Section 2.5.3.2, for discussions concerning effects of action alternatives on the Bear Wallow IRA compared to no action.					
CLIMATE CHANGE					
Resistance and Resilience to disturbance, including climate change	Adaptive Capacity	Continue to *Decline*—continued loss in seral species such as pine and landscape heterogeneity	*Improve*, but less than C because does not treat as many acres; more than D because increase pine composition improved landscape heterogeneity	*Improve*, more than B because treats more acres, and more than D because increase pine composition and improved landscape heterogeneity	*Improve*, but less than B or C because of reduced landscape heterogeneity and less improvements in pine composition

[41] According to Lippke and Mason (2005), the estimated direct annual employment rate for forest products is 7.84 jobs/MMBF; the indirect employment rate is 26.73 jobs/MMBF.

[42] Estimated job creation from American Recovery and Reinvestment Act of 2009; $92,000 of government spending = 1 job/year.

2.6 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The preferred alternative is Alternative C.

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 a ROD accompanying the Final EIS.

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Chapter 3—Affected Environment and Environmental Consequences

3.1 INTRODUCTION

3.1.1 Purpose and Content

Chapter 3 describes the physical and biological resources and socio-economic environment that may be affected by the alternatives presented in Chapter 2 and the effects the alternatives may have on them. 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:

- Section 3.1—Introduction
- Section 3.2—Forested Vegetation
- Section 3.3—Fire and Fuels
- Section 3.4—Wildlife
- Section 3.5—Air Quality
- Section 3.6—Hydrology
- Section 3.7—Fisheries
- Section 3.8—Soils
- Section 3.9—Botanical Resources
- Section 3.10—Noxious Weeds
- Section 3.11—Range
- Section 3.12—Transportation Systems
- Section 3.13—Recreation Resources
- Section 3.14—Cultural Resources
- Section 3.15—Economic Assessment
- Section 3.16—Scenic Environment
- Section 3.17—Inventoried Roadless Area
- Section 3.18—Climate Change
- Section 3.19—Resource Commitments

The chapter concludes with several required effects disclosures regarding potential resource commitments.

3.1.2 Changes to the Chapter 3 between Draft Environmental Impact Statement and Supplemental Draft Environmental Impact Statement

As identified in the June 18, 2012, Federal Register Notice of Intent to prepare a SDEIS, there have been modifications made to the Proposed Action (Alternative B) identified in the DEIS released December 30, 2011, concerning federal permits that may be required, road systems, logging systems, and watershed restoration opportunities as a result of updated field information. These updates did result in measurable changes in the effects disclosures from those displayed in the DEIS released December 30, 2011. In addition, two action alternatives, Alternatives C and D, were developed in response to comments received on the DEIS and, thus, their respective effects disclosures had not been provided in the DEIS. As identified in Chapter 1, the Responsible Official has determined that the purpose of the act (NEPA) would be furthered by issuing an SDEIS for additional review and comment prior to the final EIS.

3.1.3 Analysis Calculations

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

3.1.4 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 ecosystems' biological and physical resources and social/economic interests within the Project area are 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 was collected, compiled and analyzed to support effects disclosures (e.g., GRAIP Analysis, Vegetative Stand Exams, Cultural Resource surveys).
- Resource databases were used to compile and summarize information.
- Geographic information system (GIS) spatial analyses were used to link database information to geographic locations
- Expert science reviews of methodology and assumptions, such as those used in the development of the Forest Plan Wildlife Conservation Strategy (Forest Service 2010a), including using the six conservation principles to assess wildlife habitat families and associated species sustainability, were used and form the foundation for site-specific assessments such as those completed for this project.

- Information and analysis 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.

3.1.5 Resources Not Evaluated in this Chapter

There are two resource areas the IDT has determined would not be measurably affected by the action alternatives developed to address project Purpose and Need (section 1.4) and/or issues (section 1.11) because wither they do not exist within any of the analysis areas described in the resource sections in this chapter or the activities proposed would not affect them. Therefore, the analyses of effects of proposed alternatives on these resources are not discussed. The resources not discussed in detail include:

- Wilderness and recommended Wilderness
- Wild and Scenic Rivers

3.2 FORESTED VEGETATION

This section incorporates by reference the Vegetation Technical Report (available in the Project Record), which contains detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the impacts of each alternative on the forested vegetation landscape patch and pattern.

The indirect and direct effects of the alternatives on the measures and four indicators are described first, followed by a synthesis relative to landscape patch and pattern. Cumulative effects for each individual attribute are discussed together under the landscape patch and pattern section rather than individually under each attribute to provide the context needed to understand each attribute's role in achieving the desired conditions.

The underlying philosophy related to landscape patch and pattern is that restoring historical conditions and emulating natural disturbance processes contributes to species conservation (Noss 1987; Hunter et al. 1988; Haufler et al. 1996; Raphael et al. 2000; Wisdom et al. 2000; McComb and Duncan 2007). Landscape patches and patterns are key components of the conservation principles related to wildlife habitat presented in Appendix E (p. E-7 through E-13) of the 2010 Forest Plan (Forest Service 2010a):

- Contiguous patches of habitat are better than fragmented habitat.
- Large patches of habitat are better than small patches.
- Patches of habitat close together are better than patches far apart.
- Interconnected patches are better than isolated patches.

The arrangement of vegetative attributes constitutes the landscape patch and pattern. “Patch” is defined as a relatively homogeneous area that differs from its surroundings. Patches have a spatial configuration and are usually a similar tree size class, canopy cover, and tree species composition. Patches are the basic landscape unit that change and fluctuate over time through a process called “patch dynamics.”

Combinations of vegetation attributes are defined as the “macrovegetation.” Within landscape patches of macrovegetation, specific conditions exist that provide habitat for plant and animal species. The 2010 Forest Plan emphasizes restoration and maintenance of old forest habitat, which occurs within the large tree size class and is defined by canopy cover, tree species composition, and snags and large CWD occurring in combination (Forest Service 2010a, Appendix E, Table E-2).

Because fire was historically a major disturbance process, historical fire regimes help establish the context for desirable arrangement of macrovegetative attributes within a landscape (Wallin et al. 1996). Fire regimes are characterized by the effects of fire on the vegetation and the frequency, or “return interval,” of fires and are categorized as nonlethal, mixed1, mixed2, and lethal.

Landscape patch and pattern has been affected by changes in disturbance processes. Fire frequency and endemic insect cycles have been altered within the analysis area. Vegetative conditions have been altered by past timber harvesting, grazing, fuelwood collection, fire exclusion, and other activities. Vegetative conditions also vary between landowners.

The desired long-term (30–50 years) landscape patch and pattern for this Project area is to incrementally move toward developing source habitat conditions for Family 1 species, such as white-headed woodpecker, in the nonlethal fire regime and for Family 2 species associated with ponderosa pine, such as flammulated owls, in the mixed fire regimes. These wildlife species use a variety of source habitat conditions including old forest habitat attributes typical of the types of disturbance, including fire that historically occurred. The long-term objective for the treated areas is to develop large tree size class stands that range from 35 to 55 percent canopy cover with a preponderance of early seral species. In both the nonlethal and mixed1 fire regimes, early seral ponderosa pine is the emphasis. The objective of the proposed treatments is to create clumps and groups with a focus on early seral species and small openings that mimic the heterogeneity of historical conditions. Openings would be developed from the heterogeneity that currently exists in stands that are not plantations; in this situation, the intention is not to purposefully create openings but rather to manage those that currently exist. The openings that are managed in these stands would be used to increase the presence of early seral, shade-intolerant species like ponderosa pine. In plantations (i.e., areas previously planted to ponderosa pine), the treatment objective is to begin developing stand heterogeneity by creating groups, clumps, and openings.

Prescribed fire would be used to treat fuels (i.e., activity fuels) resulting from the mechanical treatments. In future years (approximately 20–30 years), nonlethal areas would be re-treated with prescribed fire to continue moving treated stands toward desired conditions and begin restoring fire as a disturbance process. Small wildfires will likely occur throughout the area. However, due to the risks of stand-replacing effects associated with wildfires, large wildfires would be undesirable until more acres of large tree and old forest habitat develop across the forest. The conditions created would help develop landscapes that would be less susceptible to large-scale, stand-replacing wildfire. Insect and disease cycles would continue within and adjacent to treated

stands. Restoration treatments and the smaller-scale wildfire and insect disturbances likely to occur across the Project area contribute to clumping, grouping, and patch dynamics that help create landscape heterogeneity and retention of early seral species. Untreated areas and areas not affected by wildfire would continue to develop multi-storied conditions with a greater preponderance of later seral to climax species.

3.2.1 Analysis Area, Indicators and Methodologies

3.2.1.1 Description of Analysis Area and Cumulative Effects Area

Direct Effects Analysis Area—The direct effects analysis area was determined by the acres that may be treated within the Project area under the action alternatives. In total, 4,532 acres within the Project area constitute the direct effects analysis area because this is the largest footprint that would be affected by the action alternatives in combination (Table 3-1). The analysis area includes 839 acres of noncommercial thinning in plantations, which does not vary by action alternative, and acres of commercial harvest that do vary by action alternative. The effects of the noncommercial treatment on the 839 acres of plantations will be described in the discussion about landscape patch and pattern.

Table 3-1. Direct Effects Analysis Area Acres and Number of Acres Proposed and Not Proposed for Treatment by Alternative in the Direct Effects Analysis Area

Activity	Alternative A	Alternative B	Alternative C	Alternative D
Total Proposed for Treatment	0	4,104	4,414	4,414
Commercial Harvest	0	3,265	3,575	3,575
Noncommercial thinning	0	839	839	839
Not Proposed for Treatment	4,532	428	118	118
Analysis Area	4,532	4,532	4,532	4,532

Activity Areas—Per 2010 Forest Plan Standard VEST01, snags and CWD would be assessed within activity areas that are defined in the 2010 Forest Plan glossary for snags and CWD as “the specific area affected by actions,” including “timber harvest…and prescribed fire”. In this report, the activity area(s) for snags and CWD will be the areas proposed for commercial harvest under each alternative.

Cumulative Effects Analysis Area—The landscape patch and pattern cumulative effects analysis area is based on combinations of watersheds (6th Hydrologic Units [HUs]) that capture the extent of the dominant fire regimes within and adjacent to the Project area. It includes most of the Scriver HU and a small portion of the Sixmile HU. This area, which is 13,021 acres, represents a logical ecological context within the landscape. Most acres within the landscape patch and pattern cumulative effects area are forested communities within the nonlethal and mixed1 fire regimes with minor amounts of other fire regimes.

3.2.1.2 Methodologies and Indicators

3.2.1.2.1 Stand Exam Data Methods

To meet site-specific analysis needs, the Project area was inventoried in 1996 using nationally consistent Common Stand Examination (CSE) protocols for acquiring terrestrial vegetation information. CSE protocols provide the procedures for describing vegetation composition, structure, and productivity within an ecological framework (Forest Service 2010e). In addition, field reconnaissance of a representative sample of stands inventoried in 1996 was completed in summer 2005 to validate initial stand examination data and determine the potential effects of tree growth and any mortality that had occurred. The original stand data were considered adequate for this assessment because they still reflect the existing conditions and represent the best available information.

However, several stands were not examined in 1996 either due to an oversight or because the stands were plantations. Plantations are normally inventoried separate from other types of stands at 5 years post planting to determine stocking. The planting dates for the plantations vary; some were planted in the 1970s and some as recently as 1998. Plantations older than 5 years were not included in the 1996 stand examination. Therefore, no plantations within the Project area proposed to be thinned (839 acres) have stand examination. In addition, another 274 acres of stands other than plantations, as well as about 15 acres of GIS slivers along the project boundary, also do not have stand examination. The 274 acres would not be treated. The slivers that occur are the result of a difference between what was drawn for the stand boundaries and what was digitized for the HUC6 boundary. The slivers will not be included in the analysis.

Stand data were collected based on a random plot sample and were averaged to represent stand conditions as a whole. For analysis purposes stands were tracked as the smallest analysis unit. Harvest unit boundaries were drawn to coincide with the stand boundaries with the exception of stream buffers for riparian conservation areas (RCA), which range from 130 feet wide to 260 feet wide on each side. Subsequently the total RCA area would be the stream length by 260 feet or 520 feet, respectively. As a consequence, there would be a difference between the stand acres analyzed (Vegetation Technical Report in the Project Record) and the stand acres that would be treated. Using Alternative B as an example, of the stands proposed for treatment 4,087 acres were analyzed although only 3,265 of these acres would be commercially harvested. The 822-acre difference between the total stand acres analyzed and the stand acres proposed for treatment are the stream buffers for the RCAs. Even though the effects were analyzed for the stands as a whole, all parts of stands that would not be treated under the action alternatives would remain “as is” and would mimic conditions under Alternative A.

Mid-scale (forest-wide) data were used for the landscape patch and pattern to display fire regimes based on PVG within the cumulative effects analysis area. The data was derived from the Raster Data Refresh of GIS Vegetation Layers to 2008 Conditions (PhotoScience 2008). At the mid-scale, PVGs were cross-walked to one fire regime even though across the forest, PVG 6 has some habitat types that fall into the mixed1 fire regime and some that fall into the mixed2 fire regime. This methodology was used because differentiating between mixed1 and mixed2 areas is not possible at the midscale. PVG 6 is assigned to the mixed1 fire regime at the mid-scale; therefore, all PVG 6 areas displayed for the landscape patch and pattern are displayed as mixed1.

3.2.1.2.2 Forest Vegetation Simulator Modeling Methods

Analysis of CSE data was conducted utilizing the Forest Vegetation Simulator (FVS) (Dixon 2002). The FVS is the standard model used by the Forest Service and other government agencies for predicting forest stand dynamics. Forest managers use FVS extensively to summarize current stand conditions, predict future stand conditions under various management alternatives, and update inventory statistics. This model was used to describe stand conditions for all vegetative indicators in 2010 (existing conditions), 2011 (post-treatment), and 2030. Twenty years (i.e., 2030) was chosen because this time period will show the overall effects after all treatments have been finished. This is also the time frame when we would likely consider additional intermediate treatments in some areas to continue to maintain stand trajectory toward the long-term goals for desired conditions.

Even though implementation, and therefore "post-treatment" and 20 years later, will be farther into the future than 2011, these were the years displayed in the DEIS and carried forward into this SDEIS. In the absence of a wildfire or other type of stand-altering disturbance, no measurable change would be expected to occur between what was reported in the DEIS as the year after implementation (2011) or the year after implementation in 2013 or 2014 and 20 years later.

The stands proposed for commercial harvest were grouped into 12 strata that represented similar current conditions (Appendix D). For the purposes of this analysis, vegetative conditions were modeled by stand and displayed for the strata using a weighted average based on the individual stand acres that comprise each stratam. However, though the strata were developed to reduce the variability of conditions across the fire regimes, the results represent the average of the range of conditions that occur between stands. Similar to the strata summaries, overall metrics for the fire regimes were developed based on a weighted average using the strata acres. Variability within the fire regime is represented in this document using the strata. See the Vegetation Technical Report (Project File) for the results of the detailed analysis for each stand and Appendix D for more detail regarding the strata.

Since no stand examination data were available for the plantations, effects of treatments or succession for these acres were determined based on professional judgment, resulting from the field knowledge of these forest types by the team Silviculturist and Forest Ecologist. The plantations are not included in the strata since these areas are not proposed to be treated with commercial harvest. Strata will also be used to develop strata-specific silvicultural prescriptions and marking guides for implementation (see FigureD-1 in Appendix D). The strata were also used to assign various modeling parameters, including criteria to represent Design Features TH-6 and TH-9, and strata-specific objectives based on the current conditions (Table 3-2). For the purposes of the modeling, because trees that would meet TH-6 cannot be specifically identified from the stand exam data, a diameter of 32 inches d.b.h was used to represent the legacy tree component. During implementation, the *Legacy Tree Guide for the Boise National Forest, Version 1.1* (Forest Service 2010f) will be used to identify legacy trees in the field, some of which may be smaller than 32 inches d.b.h. and others larger.

Table 3-2. Modeling Criteria for Alternatives B, C, and D

PVG	Strata	Tree Size Class	Acres	Ponderosa pine diameter retention (inches d.b.h)			Douglas-fir diameter retention (inches d.b.h)			Other species diameter retention (inches d.b.h)		
				Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D
2	I	Large	196	20	20	20	LEGT[c]	LEGT	20	NA[d]	NA	NA
	J	Medium	873	20	20	20	20	20	20	NA	NA	NA
Total			**1,069**									
6	A	Large	102	8	8	8	20	20	20	20	20	20
	B	Large	37	8	8	8	20	20	20	20	20	20
	C	Large	105	16	NT[b]	NT	LEGT	NT	NT	LEGT	NT	NT
	D[a]	Large	321	8	8	8	LEGT	LEGT	20	LEGT	LEGT	20
	E	Large	471	8	8	8	LEGT	LEGT	20	LEGT	LEGT	20
	F	Large	703	8	8	8	LEGT	LEGT	20	LEGT	LEGT	20
	G	Large	290	16	16	16	LEGT	LEGT	20	LEGT	LEGT	20
	H	Medium	166	16	16	16	20	20	20	LEGT	LEGT	20
	K	Large	254	NT	8	8	NT	LEGT	20	NT	LEGT	20
	L	Large	174	NT	8	8	NT	LEGT	20	NT	LEGT	20
Total			**2,623**									

[a]This strata includes 36 acres of PVG5
[b]NT = Not Treated
[c]LEGT = Legacy Tree
[d]NA = Not Applicable: other species not present

As with all models, the FVS has certain limitations. FVS outputs represent stand averages and, as such, do not capture the heterogeneity of vegetation that often occurs within stands. Another limitation is its ability to accurately represent stand conditions past 50 years. Modeling conditions out 200 years, or even 100 years, decreases the reliability of the model outputs due to compounding of assumptions, which in turn, increases potential inaccuracy in representing conditions on the ground. This limitation becomes important when modeling old forest habitat since it may be more than 50 years before stands begin to display the metrics that define old forest habitat (Erin Smith, FVS Staff, Forest Management Service Center, pers. comm. on February 9, 2011). Therefore it is important to bear in mind that the purpose of modeling past 50 years is not to predict what will occur on the ground but rather to compare the trajectory of different stand conditions and treatments based on model and alternative assumptions. Qualitative interpretations of model results attempt to provide perspective as to what is actually expected to occur in the field.

The decision was made not to “grow” the trees in FVS from the original stand examination dates of 1996 to 2010 based on the field reconnaissance (see above) because FVS often models greater levels of mortality than has been evident in the field. Based on the District Silviculturist’s and Forest Ecologist’s multiple years of professional experience with stand development on the Emmett RD, growing the stands forward would represent a greater skew of the existing condition then occurs using the 1996 data. Therefore, the FVS run dates were based on time since treatment relative to the 1996 conditions. That is, the data that was used to represent existing

conditions (2010) was summarized at 1997, and then grown out to 2017 to represent 2030. This method simulates the 20-year time period described above.

FVS also has limitations calculating stand canopy cover. Stand canopy cover is an important Indicator for a variety of resources but has often been difficult to estimate through modeling. FVS is a spatially independent tree growth model and, as such, cannot tell where one tree is relative to another. One output of the FVS model is the "uncorrected" canopy cover, which is the total stand canopy cover calculated individually for each tree, and then summed (Crookston and Stage 1999). A second option is the "corrected" canopy cover, which assumes some amount of random spatial patterning and, therefore, overlapping between individually modeled trees. Uncorrected canopy cover estimates are always greater than corrected for the same stand conditions. Choosing one option over the other partially depends on what the estimate is representing. For the purposes of comparing alternatives in this document, the uncorrected canopy cover will be used. This estimate was chosen because it is independent of assumptions about spatial pattern and, therefore, allows for a discussion of the effects of the alternatives on spatial pattern rather than having to interpret how it is defined by the "corrected" estimate.

The Fire and Fuels Extension of the Forest Vegetation Simulator (FVS-FFE) model (Reinhardt and Crookston 2003) was the primary tool used to assess existing and projected stand CWD conditions. However, FVS-FFE also has certain limitations. FVS-FFE assesses CWD at a stand level based on stand averages and, as such, does not represent the heterogeneous distributions of CWD that usually occur in the field. Another limitation of the FVS-FFE model is that the size class output for large CWD is not a one-to-one match to the desired conditions in the 2010 Forest Plan. The larger size class defined in the 2010 Forest Plan (≥15.0 inches) is a key component for desired conditions in Appendix A of the 2010 Forest Plan and for assessing old forest habitat as described in Appendix E of the 2010 Forest Plan. Therefore, the 12.0 inch size class output, which is the largest available from FVS-FFE, was used as a surrogate in this analysis. If enough CWD ≥12 inches is present, there will likely be enough CWD ≥15 inches.

Snag decay and fall-down rates assumed by the model appear to be higher than those observed in the field. The FVS-FFE model assumes 95 percent of the 10-inch snags will be on the ground within the 20 years and 95 percent of the 20-inch snags will be down after 30 years. In addition, the model assumes snags break down quicker and become shorter than the desired condition of 30 feet (Forest Service 2010a, Appendix A) at a relatively fast rate. The snag life-cycle defined by the FVS-FFE model appears to be much faster than has been observed in the Project area since snags of different sizes and heights, including snags that would meet the Forest Plan desired conditions, are common throughout the area as indicated by the existing condition. Snag estimates from the model would indicate that snags should be uncommon, particularly into the near future.

3.2.1.2.3 Indicators

The indicators identified below will be used to evaluate the measure of change between alternatives for the vegetation resources.

Indicator: Ponderosa Pine Restoration. This Indicator is used to evaluate how well the alternatives achieve the restoration of ponderosa pine.

Measure: Number of live trees per acre pre- and post-harvest
Measure: Large tree size class species composition

Indicator: Growing Space for Ponderosa Pine Regeneration. This Indicator is used to evaluate how well the alternatives provide growing space for establishing ponderosa pine regeneration.

Measure: Stand basal area
Measure: Total canopy cover, canopy cover of large trees, and canopy cover of understory

Indicator: Landscape Patch and Pattern Macrovegetation. This Indicator is used to evaluate spatial patch and pattern within landscapes.

Measure: Large tree size class species composition

Indicator: Ecological Disturbance Processes that Create Dead Wood Components. This Indicator is used to evaluate how well the alternatives provide for disturbance processes that develop snags and CWD.

Measure: Insect susceptibility rating
Measure: Number of snags relative to the desired conditions
Measure: Amount of CWD relative to the desired conditions

3.2.2 Silvicultural Prescriptions

In 2004, Idaho Partners in Flight (PIF) (Ritter 2000), a coalition of government agencies, conservation groups, academic institutions, private businesses, and everyday citizens dedicated to "keeping common birds common", commissioned an Idaho Department of Fish and Game project report called, *Preserving and Restoring the Old-Growth Ponderosa Pine Ecosystem in Idaho* (Mehl and Haufler 2004). This report concluded that the ponderosa pine ecosystem of the Northern Rocky Mountains is threatened by the loss of low density forested conditions, large diameter seral species (e.g., ponderosa pine), and alteration of ecological disturbance processes. The report states, "densities of younger trees and increasing fuel accumulations present a significant risk to the long-term survival" of these stands and to future restoration. The study also indicated not much time is left to restore these stands before they are lost to or impacted by uncharacteristic fire or competitive mortality from high tree densities.

The study identified ponderosa pine ecosystems using inventoried stand data, satellite imagery land classification, and field verification. The authors queried the data for field inventoried stands that contained a minimum of 5 trees ≥20 inches d.b.h. per acre. They felt stands meeting these conditions should be the highest priority to restore because, "…the ponderosa pine ecosystems are the most endangered ecosystems in Idaho and they are essential to maintaining the biodiversity of the State".

Stand examination data from the Scriver Creek area were queried to identify stands that met the PIF criteria described above. Many of the stands that met the criteria of 5 ponderosa pine trees ≥20 inches d.b.h. per acre were identified for restoration treatments. The PIF report concluded that the vegetative condition would improve as stand density (canopy cover) was reduced, tree size class was shifted to or maintained within the large tree size class, and species composition was modified to early seral. Restorative treatments for this project have been designed to reduce stand densities and, subsequently, canopy cover and increase seral ponderosa pine tree species composition back toward extents more representative of the desired conditions for the area. Conditions after treatment would maintain and enhance the ponderosa pine component in the

short term[43] while maintaining and trending stands toward desired wildlife habitat, including old forest habitat, in the long term[1].

The silvicultural treatments described below would be employed under the action alternatives.

3.2.2.1 Commercial Thin

This prescription has been proposed for medium-to-large tree size class and even- and uneven-aged stands in the nonlethal fire regime. The treatment would reduce stand densities, thereby reducing the stand canopy cover; retain or move stands toward the large tree size class if in medium tree size class, shift species composition to seral species with an emphasis on ponderosa pine, and facilitate the movement of stands toward desired wildlife and old forest habitat conditions. Trees would be marked to retain groups and clumps focused on ponderosa pine. Small openings would likely result from the emphasis to develop clumps and groups of seral species. All trees that meet the criteria described in Design Feature TH-9 would be retained. In Alternatives B and C, trees other than ponderosa pine that exhibit legacy-like characteristics (generally the very large trees) would remain as leave trees. Legacy-like trees refer to, “those that survived the previous stand initiating disturbance event in lethal fire regimes, or survived numerous low to moderate intensity disturbance events in the other fire regimes” (Forest Service 2010b). Even though the *Legacy Tree Guide for the Boise National Forest* does not include Douglas-fir and grand fir, the same type of characteristics for these species would define legacy-like trees (Van Pelt 2008).

Noncommercial thinning from below of all trees <8 inches d.b.h. would occur after the commercial thin. This treatment would be applied to keep clumps or groups of smaller tree size classes of ponderosa pine. Thinning provides the trees that are retained onsite (leave trees) with increased access to water, sunlight, and nutrients by removing trees that are competing with leave trees for resources.

Generally, proposed treatments would result in a single-storied appearance in the large tree size class with a preponderance of ponderosa pine situated in clumps and groups interspersed with openings. Many of the ponderosa pine would likely meet the legacy tree definition. Greater amounts of Douglas-fir would occur on moister aspects, particularly at higher elevations (unpublished data, found in project record). Some shrubs would exist over graminoids. Large tree snags would also occur. CWD would exist but mostly in the smaller size classes. Large tree snags would supplement future CWD levels. A small amount of ponderosa pine sapling groups would be scattered throughout. The objective is to develop the large ponderosa pine “park-like” conditions that occurred historically. Appendix B of the Vegetation Technical Report (Project Record) contains stand visualization of existing, post cutting, and future conditions for an example stand in the nonlethal fire regime.

3.2.2.2 Improvement Cut

An improvement cut is harvesting conducted to regulate the composition of tree species in older stands (Smith 1962). This prescription has been proposed for medium-to-large tree size class and even and uneven-aged stands containing ponderosa pine, Douglas-fir, grand fir, lodgepole pine,

[43] Short term = 3–15 years; long term = >15 years

Engelmann spruce, and subalpine fir, or a combination thereof, in PVG 6. Treatment would reduce stand densities, thereby reducing the stand canopy cover; retain or move stands toward the large tree size class if in the medium tree size class, shift species composition to seral species with an emphasis on ponderosa pine, and facilitate the movement of stands toward desired wildlife and old forest habitat conditions. Trees would be marked to retain groups and clumps of ponderosa pine and Douglas-fir. Small openings would likely result from the emphasis to develop clumps and groups of seral species. To maintain the presence of early-seral ponderosa pine within the stands in PVG 6, "restoration augmentation" would occur in larger openings. Restoration augmentation would consist of planting ponderosa pine seedlings. All trees that meet the criteria described in Design Feature TH-9 would be retained. In Alternatives B and C, trees other than ponderosa pine that exhibit legacy-like characteristics (generally the very large trees) would remain as leave trees.

Noncommercial thinning from below of all trees <8 inches d.b.h. would occur after the improvement cut. This treatment would be applied to keep clumps or groups of smaller tree size classes of desired species. Thinning provides the trees that are retained onsite (leave trees) with increased access to water, sunlight, and nutrients by removing trees that are competing with leave trees for resources.

Generally, the mixed1 stands selected for treatment represent the drier extreme, where ponderosa pine historically was common, within the range of PVG 6 habitat types. Section 3.3.3 (Fire Regimes) explains the relationship between the habitat types, PVGs, and fire regimes. Following treatment, ponderosa pine would be prominent in the area though Douglas-fir; grand fir; and, to a lesser extent, Engelmann spruce would also occur. Several size classes of ponderosa pine, ranging from sapling to large, would be present and mixed in with Douglas-fir and grand fir. Even-aged saplings would occur in groups in the understory. Clumps and groups of the large tree size class would comprise the overstory with many ponderosa pine trees meeting the legacy tree criteria. Large trees of other species would occur with ponderosa pine or in separate groups. A significant shrub component and conspicuous herb layer would exist. These groups would have a strong ponderosa pine component with openings scattered throughout. Creating these openings would allow ponderosa pine to regenerate, which is important for the long-term retention of this species in these forested areas. Copious amounts of CWD would exist across the forested stands, and snags would dot the area. Appendix B of the Vegetation Technical Report (Project Record) contains stand visualization of existing, post cutting, and future conditions for an example stand in the mixed1 fire regime.

Both the commercial thin and the improvement cut prescriptions would be implemented using thinning from below, which has been identified by Fitzgerald (2005) as an appropriate restoration tool. In the nonlethal fire regime, thinning from below removes trees in the subordinate lower crown classes, leaving the larger, more vigorous trees. It removes ladder fuels; reduces canopy bulk density; and leaves trees that have higher crowns, thicker bark, and better ability to survive fire. In the mixed1 fire regime, thinning from below should leave the more fire-resistant species, such as ponderosa pine, western larch, and Douglas-fir. Thinning from below can also benefit large, "old growth" ponderosa pine trees in stands that have developed a dense understory and are under increasing competitive pressure. It also reduces ladder fuels; reduces stand density, which increases tree vigor; and reduces insect outbreak risk. Thinning from below to restore and maintain existing "old growth" forests can better ensure their survival over the long term.

3.2.2.3 Noncommercial Thin

This prescription has been proposed for small tree size class and even-aged stands of previously planted ponderosa pine. Roughly 839 acres of plantations would be noncommercially thinned. Of these acres, 163 occur in RCAs. Plantation ages in the Project area vary. Roughly 575 acres of plantations are approximately 30–40 years old. These stands have an average size of 8–9 inches d.b.h. and are approximately 20–25 feet tall. Recently planted trees (1998) are approximately 2–4 inches d.b.h. and 10–12 feet tall. These plantations total around 264 acres. In these younger plantations, about 10–15 percent of the area was planted to western larch. For both size classes, about 25–30 percent of the plantation trees would be removed. Western larch in the younger plantations would be the preferred leave species. Methodology for this thinning would be to keep clumps or groupings of the smaller tree size class of desired species. Thinning provides the trees that are retained onsite (leave trees) with increased access to water, sunlight, and nutrients by removing trees that are competing with leave trees for these resources. Thinning results in accelerated diameter growth of the leave trees, which, over time, results in the production of larger trees compared to an unthinned stand. Attaining larger trees more quickly in RCAs provides improved shade, and trees would be available for long-term CWD recruitment on the hillslopes and large woody debris recruitment in the stream channels. Leave trees may be marked or prescribed in a way that clumps and groups would be left to attain variable, heterogenic spacing throughout the plantations. Work would be accomplished by chain saw. Slash would be lopped to no more than 36 inches from the ground and all boles and large limbs would lie flat on the ground. All material would be left onsite.

3.2.3 Potential Vegetation Groups and Fire Regimes

Several forested habitat types occur within the Scriver Project area. Habitat types are grouped into PVGs based on their similar environmental characteristics, site productivities, and disturbance regimes. Section 3.3.3 (Fire Regimes) provides greater detail about the PVGs, habitat types, and cross-walk for the Project area. Table 3-3 summarizes the PVGs and the assigned fire regimes for the direct and indirect effects analysis area. For the purposes of the analysis, effects will be presented by fire regime.

Table 3-3. Potential Vegetation Groups (PVGs) and Fire Regimes within the Direct Effects Analysis Area

PVG	Fire Regime	Acres	Percent of Analysis Area (%)
PVG 2 Warm Dry Douglas-fir, Moist Ponderosa Pine	Nonlethal	1,069	23
PVG 5 Dry Grand Fir	Mixed1	36[a]	1
PVG 6 Cool Moist Grand Fir		3,427[a]	76
Total	—	4,532	100

[a]For the purposes of analysis, these acres will be combined

3.2.4 Nonlethal Fire Regime

3.2.4.1 Measures for Indicators

The following section will describe the measures for the indicators displayed in section 3.2.1.2.2. The change by alternative will also be presented in this section. The analysis relative to the indicators and the interpretation of effects will be presented in section 3.2.4.2, "Discussion of Indicators".

3.2.4.1.1 Summary of Existing Condition Metrics for Strata

A variety of common metrics are used to describe stand conditions. These same metrics are generally used by specialists to develop modeling parameters and for describing silvicultural prescriptions and marking guides for treatment implementation to meet management objectives. Table 3-4 displays the current conditions in terms of trees per acre, basal area, total canopy cover, and large tree canopy cover for the two strata in the nonlethal fire regime. The basal area metrics for each species in Table 3-4 are based on the trees that would be retained under the most restrictive alternative per TH-9. In this case, that would be any trees ≥20 inches d.b.h. for all species under Alternative D; this same restriction does not apply to Strata I under Alternatives B and C. Under Alternatives B and C, some portion of the basal area shown may be retained in trees ≥20 inches at d.b.h. per TH-6.

Table 3-4. Current Condition Metrics for Strata in the Nonlethal Fire Regime within the Direct Effects Analysis Area

Strata	Total Average Trees Per Acre	Total Average Stand Basal Area In Trees ≥8 inches d.b.h. (ft^2 per acre)	Stand Basal Area in Trees ≥20 inches d.b.h. (ft^2 per acre)	Stand Basal Area in Trees ≤20 inches d.b.h. (ft^2 per acre)	Average Total Percentage Stand Canopy Cover (%)	Percent of Stand Canopy Cover in Trees ≥20 inches d.b.h. (%)	Percent of Stand Canopy Cover in Trees ≤ 20 inches d.b.h. (%)	Ponderosa Pine			Douglas-fir		
								Percent of Total Trees per Acre ≥20 inches d.b.h. (%)	Percent of Total Trees per Acre ≤20 inches d.b.h. (%)	Percent of Total Basal Area in Trees ≥20 inches d.b.h. (%)	Percent of Total Trees per Acre ≥20 inches d.b.h. (%)	Percent of Total Trees per Acre ≤20 inches d.b.h. (%)	Percent of Total Basal Area in Trees ≥20 inches d.b.h. (%)
I	257	137	59	78	59	15	44	5	48	29	3	44	14
J	367	107	22	85	62	6	56	1	48	16	1	50	6
Overall	347	112	29	84	61	8	54	2	48	18	1	49	7

Table 3-2 illustrates that even though one stratum is in the medium tree size class and the other is in the large tree size class (section 3.2.1.2), overall, the majority of the trees per acre, basal area, and canopy cover are in trees <20 inches d.b.h. In addition, the proportion of total trees per acre is about half ponderosa pine and half Douglas-fir. Figure 3-1 shows the stand conditions that are common across the area.

Figure 3-1. Example of a Current Stand Conditions in the Nonlethal Fire Regime within the Scriver Project Area

3.2.4.1.2 Tree Size Class

3.2.4.1.2.1 Description of Tree Size Class Measure

Tree size class reflects the physical developmental stage of a forest stand and is based on the largest diameter at breast height of trees present in the stand (Forest Service 2010a, Appendix A, p. A-6 and A-7) that have 10 percent or greater non-overlapping canopy cover. Table 3-5 defines the tree size classes. For example, if the total non-overlapping canopy cover of trees ≥20 inches d.b.h. is ≥10 percent, then the strata would be considered to be in the large tree size class regardless of the density of smaller trees below this size class. In the Direct Effects Analysis Area there are about 873 acres of medium tree size class and 196 acres of large tree size class in the nonlethal fire regime (Table 3-6).

Table 3-5. Tree Size Class Definitions

Tree Size Class	Diameter at Breast Height (Inches)	Total Non-overlapping Canopy Cover of Trees (%)
Large	≥20.0	≥10
Medium	≥12.0	≥10
Small	≥5.0	≥10
Sapling	≥0.1	≥10

Source: Forest Service 2010a, Appendix A, Table A-3, p. A-6

Table 3-6. Summary of Existing Tree Size Class Acres and percent of Fire Regime (in parentheses) within the Direct Effects Analysis Area

Tree Size Class	Acres of Nonlethal Fire Regime	Strata
Grass/Forb/Shrub/Seedling (GFSS) (<0.1 inch d.b.h.)	—-	—
Sapling (≥0.1 inch d.b.h.)	—-	—
Small Tree (≥5 inches d.b.h.)	—-	—
Medium Tree (≥12 inches d.b.h.)	873 (82%)	Strata J
Large Tree (≥20 inches d.b.h.)	196 (18%)	Strata I

3.2.4.1.2.2 Change in Tree Size Class Measure by Alternative

Over time, the medium tree size class stands would gradually shift to large tree size class as conifers put on additional growth. By 2030, Strata J, which is currently in the medium tree size class, would shift into the large tree size class for all alternatives (Table 3-7). Strata I is currently in the large tree size class and would remain there under all alternatives. However, though the weighted average for Strata J falls into the large tree size class, not all the stands move from medium to large. In Alternative A, 44 percent of the Strata J acres stay in the medium tree size class compared to 19 percent under Alternatives B, C, and D. This would be a difference of 25 percent between Alternative A and the action alternatives. Fewer stands would move into the large tree size class under Alternative A due to higher stand densities and subsequently slower growth.

Table 3-7. Acres of Tree Size Class and percent of Strata Acres in the Class (in parentheses) for the Existing Condition and by Alternative Post-treatment (2011) and in 2030 within the Direct Effects Analysis Area

Tree Size Class	Strata	Nonlethal Fire Regime								
		Existing Condition	Alternative A		Alternative B		Alternative C		Alternative D	
		2010	2011	2030	2011	2030	2011	2030	2011	2030
Large	I	196	196	196	196	196	196	196	196	196
Medium	J	873	873	0	873	0	873	0	873	0
Large		0	0	873[a]	0	873[b]	0	873[b]	0	873[b]

[a]Though strata averages are large, 44 percent of the acres remain in medium tree size class
[b]Though strata averages are large, 19 percent of the acres remain in medium tree size class

3.2.4.1.3 Number of Live Trees per Acre Pre- and Post-Harvest

3.2.4.1.3.1 Description of Number of Live Trees per Acre Pre- and Post-Harvest

Trees ≥20 inches d.b.h. (large trees) currently comprise about 7 percent of the total trees per acre in Strata I and about 2 percent in Strata J (Table 3-4), which equates to about 18.5 large trees per acre in Strata I and about 6.7 large trees per acre in Strata J (Table 3-8). In both strata, the number of large ponderosa pine exceeds that of Douglas-fir. Strata J does not have enough large trees to comprise ≥10 percent canopy cover, which is why this strata, though it contains large trees, is not assigned to the large tree size class (Table 3-7).

Table 3-8. Existing Large Trees (≥20 inches d.b.h.) per Acre and Range across the Stands by Species in the Two Strata within the Direct Effects Analysis Area

Large Trees Per Acre	Strata	Acres	Nonlethal Fire Regime		
			Total	Ponderosa Pine	Douglas-fir/other species
Existing	I	196	18.5	11.7	6.8
Range			18–24	11–16	7–8
Existing	J	873	6.7	4.8	1.9
Range			0–9	0–7	0–2
Existing	Overall	1,069	8.9	6.1	2.8
Range			3–12	2–9	1–3

The number of large live trees per acre in the Project area is a result of stand development and past timber management activities. Stands in the nonlethal fire regime have been harvested in the past, and the trees that remain were those left after those activities and trees that have grown into that size since. Fire exclusion and past timber management activities are believed to have altered the current total number of large trees per acre in stands in the Project area, as well as forest-wide. As a result, the abundance and distribution of shade-tolerant (later seral) species, such as Douglas-fir, has increased relative to forest-wide desired conditions, and the abundance of shade-intolerant, early seral species, such as ponderosa pine, has decreased. This change is particularly evident across the forest in stands classified as large tree size class. The 2010 Forest Plan acknowledges the decline of seral species, such as ponderosa pine, and encourages their

restoration, in part because of their contribution to vegetative diversity and as an important wildlife habitat component.

3.2.4.1.3.2 Change in Number of Live Trees per Acre Pre- and Post-Harvest

All of the existing large trees, regardless of species, would remain under all alternatives in Strata J as described in TH-9. All alternatives would result in the same number of live large trees in 2011 in this stratum (Table 3-9) because desired conditions for the area are to increase the acres of large tree size class and removing large trees, regardless of species, would hinder this goal. Trees removed under the action alternatives would be <20 inches d.b.h. with an emphasis on Douglas-fir. However, by 2030, all alternatives would result in more large Douglas-fir than currently exist. The number of large ponderosa pine would be the same for the action alternatives, all of which would produce more large ponderosa pine than Alternative A.

Table 3-9. Number of Live Large Trees per Acre Currently Modeled to be Harvested in 2010 and in the Year after Treatment by Strata and Alternative within the Direct Effects Analysis Area

Large Trees Per Acre	Strata	Nonlethal Fire Regime							
		Ponderosa Pine				Douglas-fir and other species			
		Alt A	Alt B	Alt C	Alt D	Alt A	Alt B	Alt C	Alt D
Strata I									
Existing	I	11.7				6.8			
Harvested		0.0	0.0	0.0	0.0	0.0	5.8	5.8	0.0
2011[a]		12.1	12.7	12.7	12.7	6.8	1.0	1.0	6.8
2030		14.8	16.7	16.7	11.7	8.6	0.9	0.9	6.4
Strata J									
Existing	J	4.8				1.9			
Harvested		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011		4.8	4.8	4.8	4.8	1.9	1.9	1.9	1.9
2030		6.8	8.2	8.2	8.2	4.2	4.2	4.2	4.2
Overall									
Existing	Overall	6.1				2.8			
Harvested		0.0	0.0	0.0	0.0	0.0	1.1	1.1	0.0
2011		6.1	6.1	6.1	6.1	2.8	1.7	1.7	2.8
2030		8.3	9.8	9.8	8.8	5.0	3.6	3.6	5.0

[a]See discussion in section 3.2.1.2.2 under FVS modeling for an explanation of the timeframes

In Strata I, all large ponderosa pine would be retained as described by TH-9; some Douglas-fir that do not exhibit legacy characteristics (TH-6) would be removed to meet stand-specific objectives. In this strata in 2011, Alternatives A and D would result in the same number of large live Douglas-fir while Alternatives B and C would result in fewer. Treatment in the understory would be similar to that described for Strata J. By 2030, Alternatives B and C would produce more large ponderosa pine than Alternatives A and D and Alternative A would produce more than Alternative D.

Overall, by 2030 Alternatives B and C would produce more large ponderosa pine and fewer large Douglas-fir than Alternatives A and D. Alternatives A and D would result in the same number of large Douglas-fir, but the number of large ponderosa pine would be slightly greater under Alternative D.

3.2.4.1.4 Stand Basal Area

3.2.4.1.4.1 Description of Stand Basal Area

Basal area is the cumulative area of the cross section of a tree stem in square feet commonly measured at breast height (4.5 feet) inclusive of bark. It is a representation of site occupancy. Stand basal area information presented in this analysis is based on the weighted average, using stand acres of commercial sized trees (trees ≥8 inches d.b.h.). Additional basal area in trees <8 inches will not be included in this analysis.

The basal area of Strata I in commercial sized trees (≥8 inches d.b.h.) is currently about 137 ft^2/acre; Strata J is at about 107 ft^2/acre. The overall basal area for the direct effects analysis area is about 112 f ft^2/acre (Table 3-4). In Strata I and J, the majority of the basal area is in trees <20 inches d.b.h. (Figure 3-2), even though Strata I classifies as large tree size class. Of the large trees, ponderosa pine comprises the greatest amount of basal area in both strata.

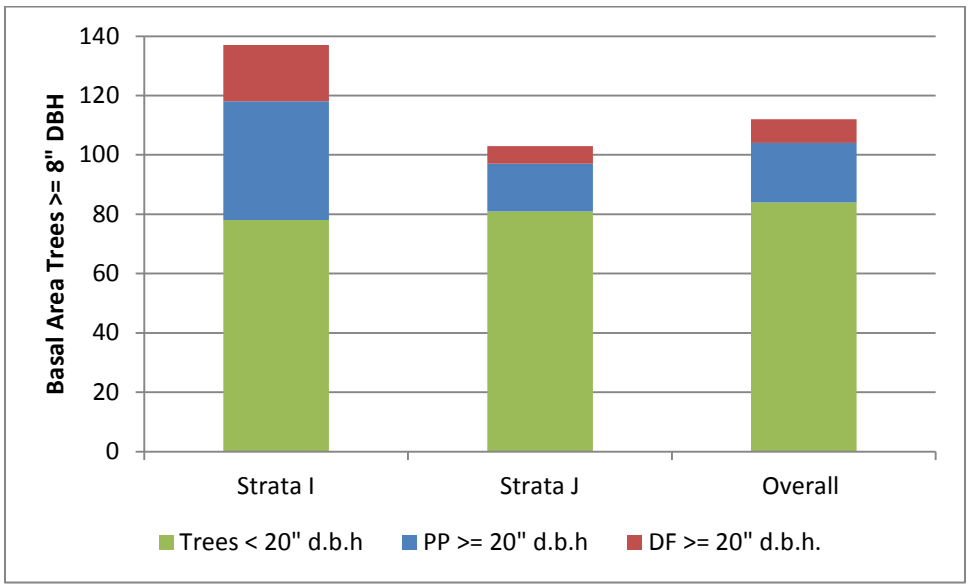

Figure 3-2. Current Basal Area in Commercial-Sized Trees (≥8 inches d.b.h.) for Ponderosa Pine and Douglas-fir ≥20 inches d.b.h., and All Species <20 but ≥8 inches d.b.h. by Strata in the Nonlethal Fire Regime

3.2.4.1.4.2 Change in Stand Basal Area

For Strata I, Alternative A would not change the basal area in 2011 (Table 3-10). Though the total basal area would be reduced for all action alternatives, the basal area in trees ≥20 inches d.b.h. would be the same for Alternative D as Alternative A due to TH-9. The total basal area for Alternatives B and C would be slightly less than Alternative D from the removal of some large Douglas-fir. Currently, no Douglas-fir meet the modeling criteria for legacy trees, which is why

Alternatives B and C show no basal area retained for this species from TH-6. However, trees likely exist that meet legacy characteristics; these would be retained during implementation and other large Douglas-fir would remain (Table 3-9) to meet overall stand objectives, including development of groups and clumps. The basal area in ≥20 inch d.b.h. ponderosa pine would be the same for all alternatives since TH-9 retains all large ponderosa pine, thereby resulting in the same basal area as Alternative A. In Strata J, though the total basal area would be less under the action alternatives compared to Alternative A, the basal area of all ≥20 inch d.b.h. trees is the same for all alternatives (Table 3-10).

Table 3-10. Basal Area in Commercial Sized Trees (≥8 inches d.b.h.) for the Existing Condition (EC), Total, and By Species for Strata and Alternatives Retained by Either TH-6 and/or TH-9 Immediately after Treatment within the Direct Effects Analysis Area

Basal Area	Nonlethal Fire Regime												
	Total					Ponderosa Pine				Douglas-fir			
	EC	Alternatives				Alternatives				Alternatives			
		A	B	C	D	A	B	C	D	A	B	C	D
Strata I													
Total	137	137	60	60	60								
≥20 inches d.b.h.	59	59				40				19			
≥8 and <20 inches d.b.h.	78	78											
Basal Area Retained by TH-6 and/or TH-9			40	40	59		40	40	40		0	0	19
Strata J													
Total	107	107	60	60	60								
≥20 inches d.b.h.	22	22				16				6			
≥8 and <20 inches d.b.h.	85	85											
Basal Area Retained by TH-6 and/or TH-9			22	22	22		16	16	16		6	6	6
Overall													
Total	112	112	60	60	60								
≥20 inches d.b.h.	28	28	25	25	28	20				8			
≥8 and <20 inches d.b.h.	84	84	35	35	32								
BA Retained by TH-6 and/or TH-9			25	25	28		20	20	20		5	5	8

3.2.4.1.5 Total Canopy Cover and Canopy Cover of Large Trees

3.2.4.1.5.1 Description of Total Canopy Cover and Canopy Cover of Large Trees

The total canopy cover is based on an FVS algorithm that calculates the crown area of individual trees in square feet per acre, which is then converted to percent of an acre and summed to determine the total. The FVS output used in this analysis is based on the “uncorrected” canopy cover estimate (see section 3.2.1.2.2). Canopy cover of large trees is determined using the same process except that the sum is only for trees ≥20 inches d.b.h. Canopy cover for the “understory” (trees <20 inches d.b.h.) is the difference between the total canopy cover and the canopy cover of large trees. The total canopy cover and canopy cover of large trees, which is expressed in percent, is a per acre average.

Table 3-11 summarizes the existing distribution of total canopy cover and the canopy cover of large trees. The total canopy cover of Strata I is 59 percent of which 15 percent is comprised of large trees. Therefore, 44 percent of the canopy cover is in the understory. Strata J has about 6 percent large tree canopy cover, which is below the 10 percent canopy cover needed to assign the strata to the large tree size class. The total canopy cover is 62 percent; therefore, 56 of the cover is in the understory. Overall, the total canopy cover is 61 percent, 8 percent of which is in large tree canopy cover and 53 percent of which is in the understory.

Table 3-11. Existing Total Canopy Cover and Canopy Cover of Large Trees (in parentheses) within the Direct Effects Analysis Area for the Nonlethal Fire Regime

Strata	Acres		
		Total Canopy Cover (%)	Canopy Cover of Large Trees (%)
I	196	59	15
J	873	62	6
Overall	1,069	61	8

Stands in the nonlethal fire regime are generally multi-storied (Figure 3-3) with large ponderosa pine and Douglas-fir in the overstory and small-to-medium sized trees of predominately Douglas-fir in the understory. These understory trees would likely act as ladder fuels based on their continuity in the stands. Desired conditions for these historically nonlethal fire regimes are single-storied with small openings containing groups of smaller tree size classes. These groups in openings would create a discontinuous fuel condition such that smaller trees would not serve as ladder fuels.

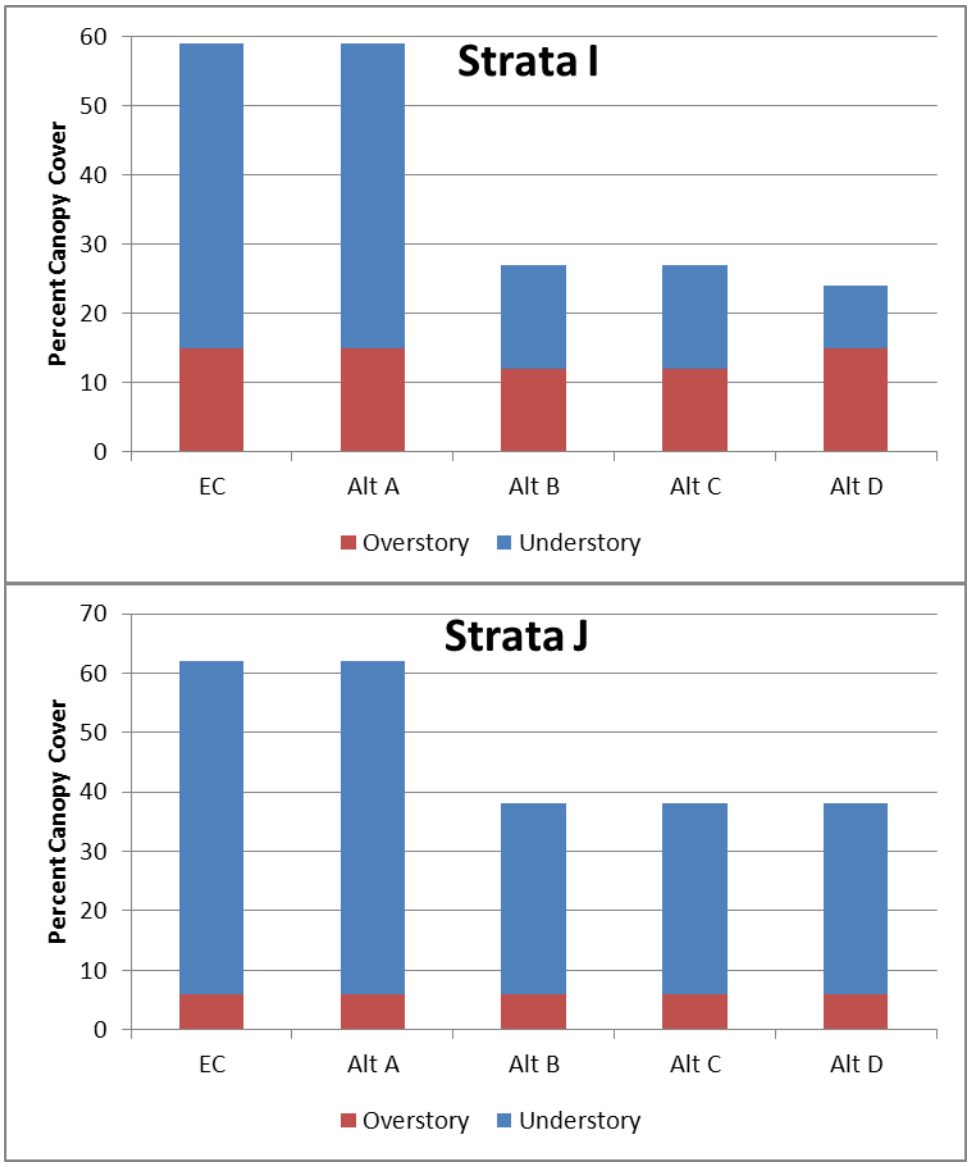

Figure 3-3. Canopy Cover (in percent) of Overstory (Trees ≥20 inches d.b.h.) and Understory (Trees <20 inches d.b.h.) for the Existing Condition (EC) and by Alternative Post-treatment (2011) within the Direct Effects Analysis Area

3.2.4.1.5.2 Change in Total Canopy Cover and Canopy Cover of Large Trees

Overall, total canopy cover would be lowest in 2011 under Alternative D (Table 3-12 and Figure 3-3). However, the amount of large tree canopy cover would be the same for Alternative D as Alternative A, even though the total canopy cover would be greater under Alternative A. These two alternatives would both produce more large tree canopy cover than Alternatives B and C. Results for Strata J would be similar between the action alternatives for the total canopy cover, which for all three alternatives would be lower than Alternative A. However, canopy cover of large trees would be the same for all alternatives due to TH-9. By 2030, the overall total canopy cover would be similar for the action alternatives; all three action alternatives would continue to maintain lower total canopy cover than Alternative A. However, total canopy cover in Strata I would be the lowest under Alternative D though the large tree

canopy cover would be the same as Alternatives B and C. Strata J, which would move into the large tree size class by 2030, would be similar between Alternatives B, C, and D. Overall, the total canopy cover would be greatest under Alternative A though the amount of large tree canopy cover would be only slightly more than the action alternatives.

Table 3-12. Total Canopy Cover and Canopy Cover of Large Trees (in parentheses) for the Existing Condition (EC) and by Alternative Post-treatment (2011) and in 2030 within the Direct Effects Analysis Area for the Nonlethal Fire Regime

Strata	Acres	Canopy Cover	EC	Alternative A		Alternative B		Alternative C		Alternative D	
				2011	2030	2011	2030	2011	2030	2011	2030
I	196	Total (Large Tree) (%)	59 (15)	59 (15)	60 (22)	27 (12)	32 (16)	27 (12)	32 (16)	24 (15)	29 (16)
J	873	Total (Large Tree) (%)	62 (6)	62 (6)	65 (11)	38 (6)	48 (11)	38 (6)	48 (11)	38 (6)	48 (11)
Overall		Total (%) (Large Tree) (%)	61 (8)	61 (8)	64 (13)	36 (7)	45 (12)	36 (7)	45 (12)	35 (8)	45 (12)

3.2.4.1.6 Large Tree Size Class Species Composition

3.2.4.1.6.1 Description of Large Tree Size Class Species Composition

Table 3-13 displays the current percent species composition for the large tree size class stands based on a weighted average of the number of large trees (≥20 inches d.b.h.) per acre. The species composition of large trees in Strata I is about 63 percent ponderosa pine and 37 percent Douglas-fir. No species composition is displayed for Strata J since it is in the medium tree size class.

Table 3-13. Existing Large Tree Species Composition of Large Trees (≥20 inches d.b.h.) in the Large Tree Size Class within the Direct Effects Analysis Area for the Nonlethal Fire Regime

Species	Percent Species Composition (%)
Strata I	
Ponderosa pine	63
Douglas-fir/other species	37
Strata J	
Ponderosa pine	N/A
Douglas-fir/other species	

3.2.4.1.6.2 Change in the Large Tree Size Class Species Composition

Alternatives A and D would result in little change in the large tree species composition in the large tree size class in 2011 and 2030 in Strata I (Table 3-14). In contrast, the relative abundance of large, early seral ponderosa pine would increase under Alternatives B and C. By 2030, these two alternatives would result in a difference of about 32 percent more ponderosa pine than

Alternative A and about 30 percent more than Alternative D. In Strata J, which moves into the large tree size class by 2030, the action alternatives would result in a slightly greater proportion of large ponderosa pine than Alternative A by this time (Table 3-14). All three action alternatives would result in 4 percent more ponderosa pine than Alternative A, which would occur from treatments to trees <20 inches d.b.h. that would increase the proportion of ponderosa pine relative to Douglas-fir. Over time, as these smaller trees move into the overstory, the proportion of ponderosa pine would increase. However, in comparison to Strata I, the shift in species composition would be slower since all large trees, regardless of species, would remain under all alternatives, while in Strata I, large Douglas-fir in addition to smaller Douglas-fir would be removed under Alternatives B and C.

Within-stand conditions would begin to take on a clumpy nature with openings that would be intended to imitate natural disturbances expected in these forested areas under historical fire regimes. Methodology for this thinning would be to keep clumps or groupings of the smaller tree size class of desired species with an emphasis on ponderosa pine. Over time, treated stands would begin to take on a more heterogeneous, irregular, and clumpy nature indicative of historical disturbances and conditions.

Table 3-14. Species Composition of Large Trees in the Large Tree Size Class (in percent of Total Large Live Trees) by Strata and Alternatives for the Existing Condition (EC), Post-treatment (2011) and in 2030 within the Direct Effects Analysis Area

Large Tree Size Class Species Composition	Nonlethal Fire Regime								
	EC	Alternative A		Alternative B		Alternative C		Alternative D	
	2010	2011	2030	2011	2030	2011	2030	2011	2030
Strata I									
Ponderosa pine (%)	63	63	63	93	95	93	95	65	65
Douglas-fir (%)	37	37	37	7	5	7	5	35	35
Strata J									
Ponderosa pine (%)	N/A	N/A	62	N/A	66	N/A	66	N/A	66
Douglas-fir (%)			38		34		34		34
Overall									
Ponderosa pine (%)	63	63	62	93	71	93	71	65	66
Douglas-fir (%)	37	37	38	7	29	7	29	35	34

3.2.4.2 Discussion of Indicators

3.2.4.2.1 Indicator: Ponderosa Pine Restoration

3.2.4.2.1.1 Affected Environment

The 2010 Forest Plan emphasizes the restoration of low elevation ponderosa pine communities (Forest Service 2010a). Restoration focuses on establishing the composition, arrangement, pattern, and ecological processes necessary to facilitate sustainability and resilience (FSM 2020, Fitzgerald 2005). Long and Shaw (2010) noted that more attention is often focused on the influence of structure rather than species on ecological relationships. However, the restoration of composition (i.e., re-establishing often under-represented early seral species like ponderosa pine) is often the first step towards restoring conditions that are structurally resilient to ecological processes (Arno 1988, Fitzgerald 2005). Graham and Jain (2005) stated that compositional changes in dry (nonlethal) forests in the overstory (i.e., the increase of Douglas-fir versus ponderosa pine) has impacts not only to the tree conditions but also to the composition of organisms, such as ectomycorrhizae, and nutrient distribution that occurs in the soil profile tied to differences in rooting structures exhibited between species. Ectomycorrhizal activities associated with ponderosa pine occur deeper in the mineral soil than with true firs where activity occurs higher in the soil profile. Distribution of substrates for nitrogen storage and cycling also shifts from mineral layers in pine-dominated forests to surface layers in fir forests due to differences in root structure. Also, the chemical composition of ponderosa pine litter is different than Douglas-fir. Over time, departures in conditions above the soil surface result in departures in conditions below the soil surface.

3.2.4.2.1.2 Current Conditions

The measures for this Indicator are the number of live trees pre- and post-harvest and the large tree size class species composition for ponderosa pine. The desired condition for the treated area in the nonlethal fire regime would be to increase the overall proportion of ponderosa pine such that the species composition of the large trees in large tree size class stands is 80 percent or greater ponderosa pine. This desired condition falls within the range described for PVG 2 in Appendix A of the 2010 Forest Plan and would provide stands within the Project area where ponderosa pine would be the dominant species (Forest Service 2010a). These areas would contrast untreated areas and PVG 6 stands that comprise a greater proportion of the Project area, contributing to landscape diversity.

The species composition for ponderosa pine is below desired conditions for the nonlethal fire regime in that, for the large tree size class, only about 63 percent of the large trees are ponderosa pine (Table 3-15). On average, this is about 11.7 large ponderosa pine trees per acre for Strata I, which is in the large tree size class. In addition, the species composition of the understory (trees ≤ 20 inches d.b.h.) in this strata is skewed in that about 52 percent is ponderosa pine and 48 percent is Douglas-fir (Table 3-4). Over time, the species composition of the overstory would continue to depart as large trees develop.

Table 3-15. Measures for Ponderosa Pine Restoration Indicator for the Existing Condition (EC), by Alternative, and by Strata and Overall within the Nonlethal Fire Regime in 2030

Measure	EC	Alternative A	Alternative B	Alternative C	Alternative D
Strata I					
Number of Live Large Ponderosa Pine per Acre	11.7	14.8	16.7	16.7	11.7
Number of Live Large Douglas-fir per Acre	6.8	8.6	0.9	0.9	6.4
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine (%)	63	63	95	95	65
Strata J					
Number of Live Large Ponderosa Pine per Acre	4.8	6.8	8.2	8.2	8.2
Number of Live Large Douglas-fir per Acre	1.9	4.2	4.2	4.2	4.2
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine (%)	N/A	62	66	66	66
Overall					
Number of Live Large Ponderosa Pine per Acre	6.1	8.3	9.8	9.8	8.8
Number of Live Large Douglas-fir per Acre	2.8	5.0	3.6	3.6	4.6
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine (%)	63	62	71	71	66

3.2.4.2.1.3 Summary of Direct and Indirect Effects

This section summarizes the overall results for the alternatives. Results for the individual strata are described in Appendix D. The 2030 results of the measures are used to describe the restoration of ponderosa pine under each alternative (Table 3-15). Though no alternative would achieve the desired condition, Alternatives B and C would provide the greatest opportunity to restore ponderosa pine across the nonlethal fire regime. Alternatives B and C would increase the number of large ponderosa pine per acre and would improve the species composition in the large tree size class. Alternative D would result in some gains relative to Alternative A, but not to the same extent as Alternatives B and C. Fewer large ponderosa pine would result in 2030 under Alternative D due to treatments in the understory (see section 3.2.4.1.6.2). The greatest contribution overall to the restoration of ponderosa pine under these alternatives is in the 196 acres that comprise Strata I since the 873 acres of Strata J result in similar outcomes for Alternatives B, C, and D.

Direct and Indirect Effects of Alternative A

Overall, Alternative A would result in a greater number of large ponderosa pine per acre in 2030 than are currently present. However, the species composition would trend away (become more departed) from desired conditions for the large tree size class in that the proportion of ponderosa pine would decline and Douglas-fir would increase (Table 3-15). Though the two strata are in different tree size classes, by 2030 they would become more similar to each other, resulting in a relatively homogenous condition across the fire regime. Over time, these strata would continue to blend in with surrounding untreated areas, moving successionally toward conditions that contain proportionally higher amounts of later seral Douglas-fir.

Direct and Indirect Effects of Alternative B

All silvicultural prescriptions applied under Alternative B, including Design Feature TH-9, would favor retention of ponderosa pine. As such, treatments would discriminate against shade-tolerant, later seral Douglas-fir. Consequently, treatments under Alternative B would increase the amount of ponderosa pine (Table 3-15) compared to the existing condition by focusing on preserving this species relative to other species in the overstory as well as the understory. Therefore, it would help maintain the long-term prominence of ponderosa pine. This result is indicated by Strata I results, which would substantially improve the large tree size class species composition by 2030 (Table 3-15). This alternative would also produce a slightly greater number of large ponderosa pine than Alternative A. Strata J does not achieve the desired species composition by 2030, but this alternative would make more progress than Alternative A.

Though Strata I and Strata J are in different tree size classes, by 2030 Strata J would move into the large tree size class. Within the nonlethal fire regime, Strata I would provide the greatest proportion of large tree size class that would move toward the desired conditions for ponderosa pine. Strata J, which abuts Strata I, would be intermediate to Strata I and surrounding untreated areas, primarily in the RCAs. While this result for the strata in combination creates greater diversity across the fire regime than would have occurred historically, the alternative would provide some area that meets the desired condition for species composition and some area that, though it does not meet the desired condition, contains a greater proportion of ponderosa pine than adjacent areas that would continue to advance successionally into a later seral condition in the absence of disturbance.

Direct and Indirect Effects of Alternative C

The effects for Alternative C would be the same as those described for Alternative B above.

Direct and Indirect Effects of Alternative D

For Alternative D, TH-9 retains all large ponderosa pine and Douglas-fir. Consequently, the results in 2011 for large trees for Alternative D are similar to those for Alternative A. While the overall number of large ponderosa pine per acre would increase by 2030 and the species composition would improve compared to the existing condition and Alternative A, the gains would be less than Alternatives B and C (Table 3-15).

Similar as described for Alternative A, Strata I and Strata J would blend into each other over time, particularly in the overstory. However, unlike Alternative A, due to the treatments in the understory, these strata would develop a greater proportion of ponderosa pine into the future than the surrounding untreated areas.

3.2.4.2.1.4 Cumulative Effects

Cumulative effects on the Indicator for the alternatives are discussed under section 3.2.6, "Landscape Patch and Pattern". Incorporating this discussion in this section provides the necessary context to show how changes in vegetative conditions contribute to achieving integrated desired conditions for forested vegetation within the landscape. Though the structural components of the measures and indicators are described here in separate sections, the forest vegetative desired conditions are defined by the integration of these attributes and how they contribute to processes and functions, including resiliency to future disturbance and achievement of desirable plant and wildlife habitat conditions.

3.2.4.2.2 Indicator: Growing Space for Ponderosa Pine Regeneration

3.2.4.2.2.1 Affected Environment

Arno and Fiedler (2005) stated that the basic physiological needs of tree species, including reproduction, growth, and the ability to resist damage, must be acknowledged and incorporated into treatment designs. They emphasized that treatments focused on restoring shade-intolerant species, such as ponderosa pine, should reduce the composition of shade-tolerant species, reduce stand density, and provide seedbed for germination and adequate sunlight for regeneration growth and, subsequently, survival. They describe restoration not as an action that creates a "snap-shot" of a condition in time but rather as an action that develops conditions over time to promote self-perpetuating, ecologically sustainable communities.

O'Hara (2005) and Triepke et al. (2011) stated that managing stand density is central to achieving multi-aged forests because density affects stand structure, potential for regeneration, and stand sustainability, particularly for early seral, shade-intolerant species like ponderosa pine. Youngblood (2005) emphasized that if treatment activities continue to be generally restricted to small-diameter trees only, it is likely that little effort would be devoted to creating complex stand structures through spatial and structural diversity.

Basal area and canopy cover are metrics often used to prescribe stand conditions that meet density sensitive objectives. Graham and Jain (2005) reported historical stand basal areas in ponderosa pine communities in the Boise Basin Experimental Forest (located within the Forest) averaged 70 ft^2/acre, a third of which was in clumps (defined by Graham and Jain [2005] as trees with overlapping crowns).

Basal area recommendations for forests that contain ponderosa pine, Douglas-fir, and true firs (e.g., grand fir) range from 40 to 90 ft^2/acre (Fiedler 2000, Fiedler et al. 2010). Fiedler (2000) recommends ranges less than 50 ft^2/acre for ponderosa pine communities in drier environments that support ponderosa pine and Douglas-fir but are too dry for true firs. Arno and Fielder (2005) investigated ponderosa pine restoration treatments that prescribed basal areas ranging from 40 to 60 ft^2/acre and concluded that while basal areas 60 ft^2/acre and greater were adequate for recruiting germinants, they may be too high to promote seedling growth. They also found that in some cases, openings were of sufficient size to regenerate shade-tolerant species of Douglas-fir and grand fir but were too small to regenerate shade-intolerant species like ponderosa pine and western larch.

The basal area desired condition for stands in the Project area in the nonlethal fire regime is to average about 60 ft^2/acre. This average represents conditions of clumps, groups, and openings that range from 0 (in openings) to120 ft^2/acre in denser groups, particularly those with clumps. This basal area desired condition was chosen because it will provide growing space for ponderosa pine regeneration while developing the resilience and resistance of stands to uncharacteristic disturbance from agents such as wildfire. Fitzgerald (2005) stated that the open, groupy nature of "old growth" ponderosa pine forests affords fire resistance because the canopy is broken up by gaps between different sized and aged trees, leaving stands less vulnerable to crown fire.

3.2.4.2.2.2 Current Conditions

The measures for this Indicator are stand basal area, total canopy cover, canopy cover of large trees, and canopy cover of understory. The overall stand basal area is 112 ft^2/acre (Table 3-16), which is 52 ft^2/acre over the objective. The total canopy cover is 61 percent of which 8 percent is in trees ≥20 inches d.b.h. Therefore, 53 percent of the canopy cover is in the understory (Table 3-16).

Table 3-16. Measures for Growing Space for Ponderosa Pine Indicator for the Existing Condition (EC), by Alternative, and by Strata and Overall within the Nonlethal Fire Regime in 2011

Measure	EC	Alternatives			
		A	B	C	D
Strata I					
Total Stand Basal Area (ft^2/acre)	137	137	60	60	62
Total Canopy Cover (%)	59	59	27	27	24
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	15	15	12	12	15
Canopy Cover of Understory (<20 inches d.b.h.) (%)	44	44	15	15	9
Strata J					
Total Stand Basal Area (ft^2/acre)	107	107	60	60	60
Total Canopy Cover (%)	62	62	38	38	38
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	6	6	6	6	6
Canopy Cover of Understory (<20 inches d.b.h.) (%)	56	56	32	32	32
Overall					
Total Stand Basal Area (ft^2/acre)	112	112	60	60	60
Total Canopy Cover (%)	61	61	36	36	35
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	8	8	7	7	8
Canopy Cover of Understory (<20 inches d.b.h.) (%)	53	53	29	29	27

3.2.4.2.2.3 Summary of Direct and Indirect Effects

This section summarizes the overall results of the alternatives. Results for the individual strata are described in Appendix D. Measures for the Indicator are based on year 2011 and are used to describe the potential for providing growing space for ponderosa pine regeneration under each alternative (Table 3-16).

All three action alternatives would provide growing space for ponderosa pine regeneration; Alternative A would not. In Strata I, Alternative D would retain a slightly greater basal area than Alternatives B and C due to TH-9; for Strata J, all three action alternatives would result in the same outcome for the basal area (Table 3-16). The difference would occur in Strata I because the current basal area in trees ≥20 inches d.b.h. is more than 60 ft^2/acre and, therefore, retaining these trees under Alternative D would exceed the basal area objective. As a result, stand conditions, including the recruitment of trees into the overstory, and future species composition would be different under Alternative D compared to Alternatives B and C. In the short term, more trees would be available to recruit into the overstory under Alternatives B and C compared to Alternative D as indicated by the canopy cover of trees <20 inches d.b.h. However, trees recruited into the overstory under all action alternatives would be a proportionally greater mix of ponderosa pine due to treatments that would reduce existing Douglas-fir in favor of ponderosa pine. The composition of regeneration under Alternatives B and C would also be different than Alternative D in that Alternative D would retain a greater proportion of seed-bearing Douglas-fir than Alternatives B and C. Alternatives B and C would likely produce compositionally more ponderosa pine regeneration than Alternative D, which would likely produce a greater mix of ponderosa pine and Douglas-fir.

Alternative A does not improve opportunities for regenerating ponderosa pine because conditions would remain similar to the existing condition (Figure 3-1). The differences between the three action alternatives occurs in Strata I. These differences include the species composition of seed-producing trees (primarily the ≥20 inch d.b.h.); the amount of canopy cover in trees <20 inches d.b.h.; and the within-stand composition and arrangement of groups. Because Alternative D would retain more basal area in trees ≥20 inches d.b.h., Alternative D would result in the least amount of canopy cover in the understory (Table 3-16). Fewer or smaller groups would be produced, indicating fewer trees would be available to recruit into the overstory in the near future. Triepke et al. (2011) concluded this same finding when they noted that imposed diameter caps, such as those described by TH-9, often eliminate small- to mid-sized diameter trees due to the tradeoff forced between achieving desirable stand structure and objectives related to density management. Treatments under Alternatives B and C would develop a greater mix of overstory and understory groups, including groups with a variety of small- and mid-sized diameter trees. Alternative D would develop a more single-storied structure with larger, more continuous groups in the overstory and smaller, less diverse groups in the understory. However, under all alternatives, understory treatments, which would focus on retaining ponderosa pine and removing Douglas-fir, would improve the species composition of the overstory as smaller trees grow into this size class. Under Alternatives B and C, species composition improvement occurs at a faster pace than Alternative D (Table 3-15). Over longer timeframes though, due to the mix of seed-producing ponderosa pine and Douglas-fir in the overstory, regeneration would likely be a mix of these two species, which would again skew the species composition of the understory.

Direct and Indirect Effects of Alternative A

Growing space conditions remain unchanged under Alternative A (Figure 3-1). Any openings produced over time would likely be the result of tree mortality from insects which, given the current stand conditions, may be more extensive than would have occurred under historical fire and insect disturbances. Seed-producing trees would be a mix of ponderosa pine and Douglas-fir. However, seedbeds that would develop in the openings would be more conducive to regenerating Douglas-fir than ponderosa pine since ponderosa pine generally requires a greater extent of mineral soil seedbeds than Douglas-fir, which germinates well on litter-covered seedbeds in addition to mineral soil (Hatch and Lotan 1969, Ryker 1975). Over time, regeneration would likely be predominately Douglas-fir. Also, because Douglas-fir is more shade-tolerant than ponderosa pine, Douglas-fir seedlings would continue to establish within and between existing groups and clumps. More canopy cover currently exists in the understory than overstory (Table 3-16), and the additional regeneration that would establish in the understory would, over time, contribute to the continuity of ladder fuels present in the stands. Structural conditions under this alternative would be multi-storied with a relatively continuous understory. Overtime, this structure would be maintained with the overstory continuing to develop greater numbers of later seral Douglas-fir and less early seral ponderosa pine.

Direct and Indirect Effects of Alternative B

Alternative B would achieve the basal area objective, reduce the overstory and understory canopy cover, and produce openings that could support the regeneration of ponderosa pine. Scarification from treatments would provide the mineral soil seedbed this species requires for germination. In Strata I, seed-producing trees would be a much greater proportion of ponderosa pine than Douglas-fir, likely resulting in a greater mix of ponderosa pine than Douglas-fir regeneration. The results would be ponderosa pine regeneration in groups which, over time, would contribute to the structural diversity of other older groups developed from the treatment. In Strata J, though all large, seed-producing trees of both ponderosa pine and Douglas-fir would be retained, the proportion of ponderosa pine would increase compared to Alternative A, providing greater seed source for ponderosa pine regeneration (Table 3-15). Treatments would re-pattern smaller tree size classes into groups, clumps, and openings, thereby reducing the hazard associated with ladder fuels. Groups would be a variety of tree size classes contributing to structural diversity in the short and long term. Treatments, in combination with the subsequent regeneration, would result in a combination of overstory and understory groups of varying numbers and sizes.

Direct and Indirect Effects of Alternative C

Results for Alternative C would be the same as Alternative B.

Direct and Indirect Effects of Alternative D

Alternative D would produce openings that support the regeneration of ponderosa pine. However, the distribution and spatial location of openings may be constrained due TH-9. Abella et al. (2006) noted that across-the-board diameter retention requirements may create openings and structural conditions different than historical conditions, which may impact herbaceous community development. Abella et al. (2006) and Triepke et al. (2011) also concluded that constraining the arrangement of groups and openings may impact certain wildlife species that depend on a structural complexity similar to historical conditions.

Scarification from treatments would provide the mineral soil seedbed this species requires for germination. However, in Strata I, seed-producing trees would be a mix of ponderosa pine and Douglas-fir, likely resulting in a combination of ponderosa pine and Douglas-fir regeneration in openings and Douglas-fir regeneration under overstory groups and clumps. To achieve the basal area objective, and because most of the basal area would be in trees ≥20 inches d.b.h., there would be few groups of understory trees as most of the tree cover would be in the overstory. This condition would limit structural diversity initially and over time (Triepke et al. 2011). Understory groups would be fewer and smaller with less variety of tree size classes and a less diverse structure. Large tree development would be slower than under Alternatives B and C due to a lack of understory trees. Structural diversity would improve as regeneration groups aged, but Douglas-fir regeneration within the overstory groups would develop future ladder fuels in the absence of disturbance. Results for Strata J would the same as those described for Alternative B.

3.2.4.2.2.4 Cumulative Effects

See section 3.2.6 for a discussion of cumulative effects.

3.2.5 Mixed1 Fire Regime

3.2.5.1 Measures for Indicators

The following section describes the measures for the indicators displayed in section 3.2.1.2.3. The change by alternative is also presented in this section. The analysis relative to the indicators and the interpretation of effects will be presented in section 3.2.1.2, “Analysis of Indicators.”

3.2.5.1.1 Summary of Existing Condition Metrics for Strata

As described in section 3.2.4.1.1, a variety of common metrics are used to describe stand conditions. Table 3-17 displays the trees per acre, basal area, and canopy cover current conditions for the mixed1 fire regime strata. The basal area metrics for each species in Table 3-17 are based on the trees that would be retained under the most restrictive alternative per TH-9. In this case, that would be the design features for Alternative D for all strata except Strata C, which does not carry forward into Alternative D. Table 3-17 displays the basal area for ponderosa pine 8 or 16 inches d.b.h. and greater, depending on the strata and Douglas-fir and grand fir ≥20 inches d.b.h., even though the ≥ 20 inches d.b.h. for Douglas-fir and grand fir do not apply to Strata D, E, F, and G under Alternatives B and C. Under Alternatives B and C, some portion of the basal area shown may be retained in trees ≥20 inches at d.b.h. per TH-6 rather than TH-9. For Strata C, the basal area displayed is for ponderosa pine ≥16 inches d.b.h. and Douglas-fir and grand fir basal area modeled to represent TH-6.

Table 3-17 shows that the majority of the trees per acre by species are in trees <20 inches d.b.h., including Strata H, which is medium tree size class (Table 3-2) and all the other strata, which are large tree size class. Canopy cover in the understory ranges from 17 to 86 percent while the canopy cover of trees ≥20 inches d.b.h. ranges from 8 to 30 percent (Table 3-17). Though the percentage of total trees per acre in trees ≥20 inches d.b.h. are about the same for ponderosa pine, Douglas-fir, and grand fir, grand fir dominates the understory (trees <20 inches d.b.h.) in all but Strata B and Strata C. Ponderosa pine dominates the understory in Strata B and Douglas-fir dominates in Strata C, but these two strata comprise only 142 acres. In addition, the 839 acres of plantations, which are not described in Table 3-17, are predominately ponderosa pine. Figure 3-4 displays an example of the current conditions for strata in the mixed1 fire regime.

Table 3-17. Current Condition Metrics for Strata in the Mixed1 Fire Regime

Strata	Total Average Trees Per Acre	Total Average Stand Basal Area (ft^2 per acre) In Trees ≥8 inches d.b.h.	Stand Basal Area in Trees ≥8, 16 or 20 inch d.b.h. as Defined by TH-9	Stand Basal Area in Trees ≤8, 16 or 20 inch d.b.h. Not Defined by TH-9	Total Average Stand Canopy Cover (%)	Stand Canopy Cover in Trees ≥20 inches d.b.h. (%)	Stand Canopy Cover in Trees ≤ 20 inches d.b.h. (%)	Ponderosa Pine				Douglas-fir			Grand fir and other species		
								Percent of Total Trees per Acre ≥20 inches d.b.h. (%)	Percent of Total Trees per Acre ≤20 inches d.b.h. (%)	Percent of Total Basal Area in Trees ≥8 inches d.b.h. per TH-9 (%)	Percent of Total Basal Area in Trees ≥16 inches d.b.h. per TH-9 (%)	Percent of Total Trees per Acre ≥20 inches d.b.h. (%)	Percent of Total Trees per Acre ≤20 inches d.b.h. (%)	Percent of Total Basal Area in Trees ≥20 inches d.b.h. (%)	Percent of Total Trees per Acre ≥20 inches d.b.h. (%)	Percent of Total Trees per Acre ≤20 inches d.b.h. (%)	Percent of Total Basal Area in Trees ≥20 inches d.b.h. (%)
A	143	154	100	54	73	26	47	6	4	34	N/A	6	37	17	3	43	14
B	208	88	64	24	34	17	17	3	45	39	N/A	1	4	3	4	43	30
C	221	148	60	88	63	17	46	6	14	N/A	41	2	55	3	0	22	2
D	163	94	54	40	47	15	32	4	12	37	N/A	2	39	11	2	41	9
E	377	184	106	78	107	29	78	1	2	18	N/A	1	10	9	3	82	29
F	290	134	79	55	78	20	58	3	15	31	N/A	1	12	11	2	67	16
G	333	144	79	65	70	20	50	2	8	N/A	27	3	32	16	1	54	12
H	258	118	29	89	70	8	62	1	17	N/A	13	1	35	6	1	45	5
K	525	182	112	70	105	30	75	<1	<1	9	N/A	1	3	10	3	92	42
L	431	163	58	105	103	17	86	1	17	12	N/A	2	10	14	1	69	10
Overall	315	145	79	66	81	21	60	2	10	17	5	2	20	11	2	63	18

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Figure 3-4. Example of a Current Stand Condition in the Mixed1 Fire Regime within the Scriver Creek Project Area

3.2.5.1.2 Tree Size Class

3.2.5.1.2.1 Description of Tree Size Class Measure

See section 3.2.4.1.2.1 for an explanation of the tree size class measure. In the mixed1 fire regime in the direct effects analysis area, the 839 acres of plantations are currently in the sapling and small tree size class. Strata H, which is about 166 acres, is classified as medium tree size class (Table 3-18). Of the 3,462 acres of mixed1 fire regime in the direct effects analysis area, most (70 percent) is in the large tree size class.

Table 3-18. Summary of Existing Tree Size Class Acres and percent of Fire Regime (in parentheses) within the Direct Effects Analysis Area

Tree Size Class	Mixed1 Fire Regime Acres (%)
Grass/Forb/Shrub/Seedling (GFSS) (<0.1 inch d.b.h.)	—
Sapling (≥0.1 inch d.b.h.)	264[a] (8)
Small Tree (≥5 inches d.b.h.)	575[a] (17)
Medium Tree (≥12 inches d.b.h.)	166[b] (5)
Large Tree (≥20 inches d.b.h.)	2,457[c] (70)

[a]Plantations
[b]Strata H
[d]Strata A, B, C, D, E, F, G, K and L

3.2.5.1.2.2 Change in Tree Size Class Measure by Alternative

By year 2030, plantations currently in the sapling tree size class and those in the small tree size class would move to the next tree size class as conifers put on additional growth (Table 3-19). The one stratum currently in medium tree size class would shift to large tree size class (Strata H). Strata C, which is currently assigned to the large tree size class based on the weighted average, has one stand that is in the medium tree size class. However, by 2030 all of the stands in this stratum would move into the large tree size class under all alternatives. Therefore, by 2030 no sapling tree size class would be present in the area and 8 percent would be in small tree size class, 17 percent in medium, and 75 percent in large for all alternatives. However, though all alternatives would result in the same acres of tree size classes over time, the conditions within the stands would be different in Alternative A compared to Alternatives B, C, and D. In the plantations, Alternative A would continue to develop more homogenous conditions reflective of the uniform spacing created by the way the trees were originally planted. This uniform spacing of trees is not consistent with the more heterogeneous, irregular spaced and clumpy nature of historical conditions that would have developed from disturbance. This heterogeneity would also not be present in stands outside of the plantations under Alternative A where a more continuous understory dominated by grand fir would continue to develop. On acres treated under Alternatives B, C, and D, strata and the plantations would have greater diversity of clumping, grouping, and openings with less grand fir and more seral ponderosa pine and Douglas-fir.

Table 3-19. Acres of Tree Size Class and percent of Strata Acres in the Class (in parentheses where not equal to 100) by Strata and Overall for the Existing Condition (EC) and by Alternative Post-treatment (2011) and in 2030 within the Direct Effects Analysis Area

Mixed1 Fire Regime										
Tree Size Class	Strata	EC	Alternative A		Alternative B		Alternative C		Alternative D	
		2010	2011	2030	2011	2030	2011	2030	2011	2030
Sapling	Plantations	264	264	0	264	0	264	0	264	0
Small	Plantations	575	575	264	575	264	575	264	575	264
Medium	Plantations	0	0	575	0	575	0	575	0	575
Medium	H	166	166	0	166	0	166	0	166	0
Large	H	0	0	166	0	166	0	166	0	166
Large	A	102	102	102	102	102	102	102	102	102
Large	B	37	37	37	37	37	37	37	37	37
Large	C	105	105	105	105	105	105	105	105	105
Large	D	321	321	321	321	321	321	321	321	321
Large	E	471	471	471	471	471	471	471	471	471
Large	F	703	703	703	703	703	703	703	703	703
Large	G	290	290	290	290	290	290	290	290	290
Large	K	254	254	254	254	254	254	254	254	254
Large	L	174	174	174	174	174	174	174	174	174
Sapling	Overall	264	264	0	264	0	264	0	264	0
Small	Overall	575	575	264	575	264	575	264	575	264
Medium	Overall	166	166	575	166	575	166	575	166	575
Large	Overall	2,457	2,457	2,623	2,457	2,623	2,457	2,623	2,457	2,623
Percent of Direct Effects Analysis Area										
Sapling	Overall	8%	8%	0%	8%	0%	8%	0%	8%	0%
Small	Overall	17%	17%	8%	17%	8%	17%	8%	17%	8%
Medium	Overall	5%	5%	17%	5%	17%	5%	17%	5%	17%
Large	Overall	70%	70%	75%	70%	75%	70%	75%	70%	75%

3.2.5.1.3 Number of Live Trees per Acre Pre- and Post-Harvest

3.2.5.1.3.1 Description of Number of Live Trees per Acre Pre- and Post-Harvest

Trees ≥20 inches d.b.h. (large trees) represent about 6 percent of the total trees per acre overall (Table 3-17). Table 3-20 displays the number of large trees per acre. The overall averages to about 18.0 large trees per acre, ranging from 7.4 in Strata H to 23.8 in Strata E. Of this, the number of grand fir is greater than ponderosa pine. Douglas-fir comprises the fewest large trees per acre. However, the relationship of grand fir to ponderosa pine and Douglas-fir varies between the strata. For Strata C, D, F, and H, which comprise 49 percent of the overall acres, the number of large ponderosa pine exceeds the number of large Douglas-fir and large grand fir. For Strata A, G, and L, which comprise 22 percent of the overall acres, the number of large Douglas-fir is greater than that of the other two species. And for Strata B, E, and K, which comprise 29 percent of the overall acres, the number of large grand fir is the greatest. However, as described in section 3.2.5.1.1, over 95 percent of the understory is dominated by grand fir even though grand fir is the predominant large tree on only 29 percent of the acres.

Table 3-20. Existing Large Trees (≥20 inches d.b.h.) per Acre and Range across the Stands and Overall with the Range Across the Strata by Species in the Mixed1 Fire Regime within the Direct Effects Analysis Area

Large Trees Per Acre	Acres	Mixed1 Fire Regime			
		Total	Ponderosa Pine	Douglas-fir	Grand fir and other species
Strata A[a]					
Existing	102	22.5	8.6	9.2	4.7
Range		17–26	8–9	6–11	3–6
Strata B[a]					
Existing	37	13.6	5.8	1.0	6.8
Range		N/A[b]	N/A	N/A	N/A
Strata C[a]					
Existing	105	18.1	12.4	5.1	0.6
Range		5–33	5–20	0–12	0–1
Strata D[a]					
Existing	321	12.4	6.3	3.2	2.9
Range		5–36	5–24	0–6	0–6
Strata E[a]					
Existing	471	23.8	5.7	5.6	12.5
Range		10–35	3–7	2–9	5–19
Strata F[a]					
Existing	703	16.3	7.3	3.9	5.1
Range		2–50	0–18	0–16	2–16
Strata G[a]					
Existing	290	20.4	7.2	8.4	4.8
Range		5–50	5–10	0–32	0–8
Strata H[c]					
Existing	166	7.4	3.3	2.5	1.6
Range		0–15	0–6	0–6	0–3
Strata K[a]					
Existing	254	23.0	1.9	5.7	15.4
Range		12–36	1–3	2–8	9–25
Strata L[a]					
Existing	174	17.6	4.4	7.3	5.9
Range		10–24	4–5	2–12	4–7
Overall					
Existing	2,623	18.0	6.1	5.1	6.8
Range		7–23	2–12	1–9	1–15

[a]Strata in the large tree size class
[b]Strata B made up of only one stand
[c]Strata in the medium tree size class

Fire exclusion and past timber management activities are believed to have altered the current total number of large trees per acre in stands as well as the tree species composition across the Forest. As a result, the abundance and distribution of shade-tolerant (later seral) species (e.g., grand fir and in some cases, Douglas-fir) has increased relative to forest-wide desired conditions, and the abundance of shade-intolerant, early-seral species (e.g., ponderosa pine) has decreased. In the Project area, stands selected for treatment were built around those that met the PIF criteria of 5 large (≥20 inches d.b.h.) ponderosa pine per acre. From that initial screening, additional stands were included to develop logical ecological strata patches. The focus on building from stands with existing high numbers of ponderosa pine partly explains why the number of large ponderosa pine appears relatively high within the direct effects analysis area compared to what has been described for this species forest wide. However, within the context of the larger landscape (section 3.2.6), stands dominated by ponderosa pine comprise only a small proportion of the area.

3.2.5.1.3.2 Change in Number of Live Trees per Acre Pre- and Post-Harvest

All of the existing large (≥20 inches d.b.h.) trees, regardless of species, would remain under all alternatives in Strata A and B per TH-9 (Table 3-21). All large ponderosa pine would also be retained under all alternatives across all strata. Douglas-fir and grand fir exhibiting legacy characteristics would be retained in all strata other than A and B under Alternatives B and C per TH-6. Under Alternative D, all large Douglas-fir and grand fir would be retained per TH-9. Therefore, for 2011, the number of large ponderosa pine per acre would be nearly identical for all alternatives, and the number of large Douglas-fir and grand fir would be nearly identical for Alternatives A and D (the variation between the existing number of trees and the number of trees in 2011 results from model assumptions about growth and mortality in addition to any harvest). Alternatives B and C would result in fewer large Douglas-fir and grand fir than Alternatives A and D. Under Alternative B, about 1.5 large Douglas-fir and 1.6 large grand fir per acre would be removed. Alternative C would remove about 1.7 large Douglas-fir and 2.2 large grand fir per acre (Table 3-21). The differences between Alternative B and C for these two species would result from strata that are treated under one alternative but not treated under the other, including Strata C, K, and L. These three strata in combination comprise about 20 percent of the analysis area. See Appendix D for a more detailed discussion of the effects for the individual strata.

Table 3-21. Summary of Number of Live Large Trees per Acre (Range in Parentheses) for the Existing Condition (EC) and Modeled to be Harvested in the Areas Proposed for Commercial Harvest by Alternative and Strata. Shaded Boxes Denote Strata that are within the Direct Effects Analysis Area but are Not Treated (NT) Under the Alternative. Results for these Strata are the same as Alternative A.

Large Trees Per Acre	Mixed1 Fire Regime											
	Ponderosa Pine				Douglas-fir				Grand fir and other species			
	Alt A	Alt B	Alt C	Alt D	Alt A	Alt B	Alt C	Alt D	Alt A	Alt B	Alt C	Alt D
Strata A												
EC	8.6				9.2				4.7			
Harvested	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	8.5	8.5	8.5	8.5	9.1	9.1	9.1	9.1	4.7	4.7	4.7	4.7
2030	7.4	7.8	7.8	7.8	8.8	8.5	8.5	8.5	6.5	4.5	4.5	4.5
Strata B												
EC	5.8				1.0				6.8			
Harvested	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	5.8	5.8	5.8	5.8	1.0	1.0	1.0	1.0	6.8	6.8	6.8	6.8
2030	5.5	5.5	5.5	5.5	1.0	1.0	1.0	1.0	12.6	12.5	12.5	12.6
Strata C												
EC	12.4				5.1				0.6			
Harvested	0.0	0.0	NT	NT	0.0	3.1	NT	NT	0.0	0.1	NT	NT
2011	12.3	13.1	NT	NT	5.2	2.2	NT	NT	0.6	0.5	NT	NT
2030	14.8	15.9	NT	NT	8.3	5.1	NT	NT	1.9	0.4	NT	NT
Strata D												
EC	6.3				3.2				2.9			
Harvested	0.0	0.0	0.0	0.0	0.0.	0.2	0.2	0.0	0.0	0.6	0.6	0.0
2011	6.5	6.5	6.5	6.5	3.8	3.6	3.6	3.8	3.2	2.6	2.6	3.2
2030	7.1	7.2	7.2	7.3	8.7	8.4	8.4	8.5	7.5	6.1	6.1	7.7
Strata E												
EC	5.7				5.6				12.5			
Harvested	0.0	0.0	0.0	0.0	0.0	3.9	3.9	0.0	0.0	6.0	6.0	0.0
2011	5.7	5.7	5.7	5.7	5.6	1.6	1.6	5.5	13.3	6.3	6.3	12.4
2030	5.8	6.5	6.5	6.2	6.6	1.5	1.5	5.0	14.8	6.2	6.2	11.6
Strata F												
EC	7.3				3.9				5.1			
Harvested	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.6	0.6	0.0
2011	7.5	7.5	7.5	7.5	4.0	2.2	2.2	4.1	5.1	4.5	4.5	5.1
2030	8.3	8.2	8.2	8.7	6.0	3.3	3.3	5.0	8.6	6.4	6.4	6.5

Large Trees Per Acre	Mixed1 Fire Regime											
	Ponderosa Pine				Douglas-fir				Grand fir and other species			
	Alt A	Alt B	Alt C	Alt D	Alt A	Alt B	Alt C	Alt D	Alt A	Alt B	Alt C	Alt D
Strata G												
EC	7.2				8.4				4.8			
Harvested	0.0	0.0	0.0	0.0	0.0	1.3	1.3	0.0	0.0	2.6	2.6	0.0
2011	7.1	7.1	7.1	7.1	8.8	7.5	7.5	8.8	4.8	2.1	2.1	4.8
2030	7.7	8.3	8.3	8.3	12.8	8.4	8.4	9.2	6.0	2.1	2.1	5.4
Strata H												
EC	3.3				2.5				1.6			
Harvested	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	3.3	3.3	3.3	3.3	2.5	2.5	2.5	2.5	1.6	1.6	1.6	1.6
2030	4.4	4.6	4.6	4.6	13.0	14.5	14.5	14.5	4.4	4.0	4.0	4.0
Strata K												
EC	1.9				5.7				15.4			
Harvested	0.0	NT	0.0	0.0	0.0	NT	3.0	0.0	0.0	NT	5.7	0.0
2011	1.9	NT	1.9	1.9	5.6	NT	2.7	5.6	15.5	NT	9.6	15.3
2030	1.7	NT	1.9	1.8	5.0	NT	2.5	5.2	15.4	NT	9.2	14.3
Strata L												
EC	4.4				7.3				5.9			
Harvested	0.0	NT	0.0	0.0	0.0	NT	0.0	0.0	0.0	NT	1.0	0.0
2011	4.4	NT	4.4	4.4	7.2	NT	7.2	7.2	5.8	NT	4.8	5.8
2030	3.7	NT	4.0	4.0	8.6	NT	9.0	7.3	13.6	NT	6.3	12.7
Overall												
EC	6.1				5.1				6.8			
Harvested	0.0	0.0	0.0	0.0	0.0	1.5	1.7	0.0	0.0	1.6	2.2	0.0
2011	6.2	6.2	6.2	6.2	5.3	3.8	3.6	5.3	7.0	5.2	4.6	6.9
2030	6.6	6.9	6.9	7.0	7.8	5.6	5.5	6.9	9.7	6.8	5.8	8.3

3.2.5.1.4 Stand Basal Area

3.2.5.1.4.1 Description of Stand Basal Area

See section 3.2.4.1.4.1 for an explanation of the stand basal area measure. The overall basal area for the direct effects analysis area is 145 ft^2/acre with a low of 87 ft^2/acre for Strata B and a high of 184 ft^2/acre for Strata E and K (Figure 3-5). Grand fir, Douglas-fir, and ponderosa pine <16 inches d.b.h. (displayed as "Other" in Figure 3-5) comprise the most basal area in all strata except Strata B and K. In Strata B, ponderosa pine ≥8 inches d.b.h. comprises more basal area than the other categories, and in Strata K, grand fir ≥20 inches d.b.h. comprises the greatest amount of basal area (Figure 3-5).

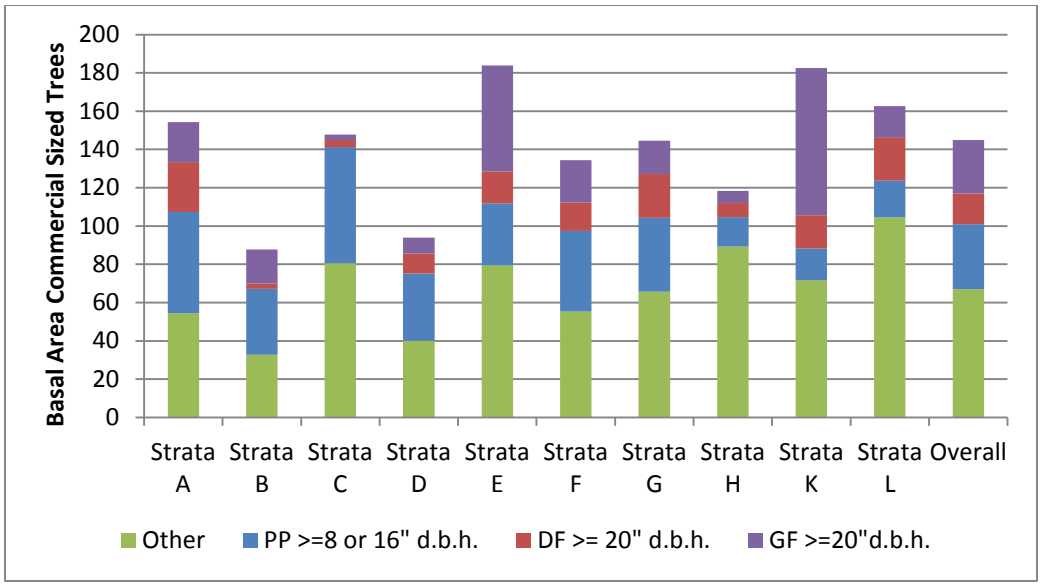

Figure 3-5. Current Basal Area in Commercial-Sized Trees (≥8 inches d.b.h.) for Ponderosa Pine and Douglas-fir ≥20 inches d.b.h., and All Species <20 but ≥8 inches at d.b.h. by Strata in the Mixed1 Fire Regime

3.2.5.1.4.2 Change in Stand Basal Area

The combination of strata treated and not treated and variations between the alternatives related to the combination of TH-6 and/or TH-9 would result in different basal area metrics in 2011 within the direct effects analysis area. Treatments under the action alternatives would result in an average basal area for Alternatives B and D that would be about 50 ft^2/acre less than Alternative A (Table 3-22). Alternative C would be about 61 ft^2/acre less. Results for the individual alternatives would occur due to the amount of basal area retained by TH-6 and/or TH-9 and the basal area of trees ≥8, ≥16, or ≥20 inches d.b.h. (in Figure 3-5 this is labeled as PP≥ 8 or 16 inch d.b.h., DF≥ 20 inch d.b.h. and GF ≥ 20 inch d.b.h.). Currently, the overall basal area of ponderosa pine, Douglas-fir, or grand fir ≥8, ≥16, or ≥20 inches d.b.h. is 78 ft^2/acre. Alternative A would not change the overall basal area. After treatment, the basal area of this category under Alternative B would be about 57 ft^2/acre of which 43 ft^2/acre would be the result of TH-6 and/or TH-9. The difference between the 43 ft^2/acre and the 78 ft^2/acre would occur because Strata K and Strata L would not be treated under Alternative B and would maintain the

same basal area as under Alternative A. After treatment, the basal area of this category under Alternative C would be about 48 ft^2/acre of which 46 ft^2/acre would be from TH-6 and/or TH-9. Alternative D would result in 78 ft^2/acre of which 75 ft^2/acre would be from TH-6 and/or TH-9 (Table 3-22). Unlike Alternative B, Alternatives C and D would treat Strata K and Strata L but not Strata C, resulting in the difference in the basal area between the category and the basal area retained by TH-6 and TH-9.

Some strata would result in greater basal area differences between the action alternatives than other strata. However, all action alternatives would result in the same basal area for ponderosa pine (Table 3-22). Therefore, the greatest differences between the alternatives would be in the basal area of Douglas-fir and grand fir. For example, in Strata E, the difference in basal area for Alternatives B and C compared to Alternative D would be 17 ft^2/acre for Douglas-fir and 28 ft^2/acre for grand fir. For Strata K the difference between Alternative C and Alternative D for Douglas-fir would be 14 ft^2/acre and for grand fir it would be 34 ft^2/acre. Other strata would result in much less difference between alternatives. For example, Strata A and Strata B would produce the same outcomes for Douglas-fir and grand fir between all three action alternatives due to TH-9.

Table 3-22. Basal Area in Commercial-Sized Trees (≥8 inches d.b.h.) for the Existing Condition (EC), Total, and By Species for Strata and Alternatives Retained by Either TH-6 and/or TH-9 Immediately after Treatment within the Direct Effects Analysis Area

Basal Area	Mixed1 Fire Regime																
	Total					Ponderosa Pine				Douglas-fir				Grand fir/Other			
	EC	Alternatives				Alternatives				Alternatives				Alternatives			
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Strata A																	
Total	154	154	100	100	100												
Basal Area Affected by TH-6 and/or TH-9	100	100				53				26				21			
Basal Area Not Affected by TH-6 and/or TH-9	54	54															
Basal Area Retained by TH-6 and/or TH-9			100	100	100		53	53	53		26	26	26		21	21	21
Strata B																	
Total	88	88	80	80	80												
Basal Area Affected by TH-6 and/or TH-9	55	55				34				3				18			
Basal Area Not Affected by TH-6 and/or TH-9	33	33															
Basal Area Retained by TH-6 and/or TH-9			55	55	55		34	34	34		3	3	3		18	18	18
Strata C																	
Total	148	148	86	NT	NT												
Basal Area Affected by TH-6 and/or TH-9	68	68				61				4				3			
Basal Area Not Affected by TH-6 and/or TH-9	80	80															
BA Retained by TH-6 and/or TH-9			68	NT	NT		61	NT	NT		4	NT	NT		3	NT	NT

Basal Area	Mixed1 Fire Regime																
	Total					Ponderosa Pine				Douglas-fir				Grand fir/Other			
	EC	Alternatives				Alternatives				Alternatives				Alternatives			
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Strata D																	
Total	94	94	80	80	82												
Basal Area Affected by TH-6 and/or TH-9	53	53				35				10				8			
Basal Area Not Affected by TH-6 and/or TH-9	41	41															
BA Retained by TH-6 and/or TH-9			38	38	53		35	35	35		2	2	10		1	1	8
Strata E																	
Total	184	184	80	80	109												
Basal Area Affected by TH-6 and/or TH-9	105	105				34				18				53			
Basal Area Not Affected by TH-6 and/or TH-9	79	79															
BA Retained by TH-6 and/or TH-9			60	60	105		34	34	34		1	1	18		25	25	53
Strata F																	
Total	134	134	80	80	88												
Basal Area Affected by TH-6 and/or TH-9	79	79				42				15				22			
Basal Area Not Affected by TH-6 and/or TH-9	55	55															
Basal area retained by TH-6 and/or TH-9			54	54	79		42	42	42		4	4	15		8	8	22
Strata G																	
Total	144	144	80	80	82												
Basal Area Affected by TH-6 and/or TH-9	74	74				34				23				17			
Basal Area Not Affected by TH-6 and/or TH-9	70	70															
BA Retained by TH-6 and/or TH-9			39	39	74		34	34	34		1	1	23		4	4	17
Strata H																	
Total	118	118	80	80	80												
Basal Area Affected by TH-6 and/or TH-9	29	29				15				7				7			
Basal Area Not Affected by TH-6 and/or TH-9	89	89															
BA Retained by TH-6 and/or TH-9			23	23	29		15	15	15		7	7	7		1	1	7

Basal Area	Mixed1 Fire Regime																
	Total					Ponderosa Pine				Douglas-fir				Grand fir/Other			
	EC	Alternatives				Alternatives				Alternatives				Alternatives			
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Strata K																	
Total	182	182	NT	84	109												
Basal Area Affected by TH-6 and/or TH-9	108	108				15				20				73			
Basal Area Not Affected by TH-6 and/or TH-9	74	74															
BA Retained by TH-6 and/or TH-9			NT	60	108		NT	15	15		NT	6	20		NT	39	73
Strata L																	
Total	163	163	NT	80	80												
Basal Area Affected by TH-6 and/or TH-9	57	57				18				22				17			
Basal Area Not Affected by TH-6 and/or TH-9	106	106															
BA Retained by TH-6 and/or TH-9			NT	18	57		NT	18	18		NT	0	22		NT	0	17
Overall																	
Total	145	145	95	84	94												
Basal Area Affected by TH-6 and/or TH-9	78	78	57	48	78	34	34	34	34	16	6	4	16	28	17	10	28
Basal Area Not Affected by TH-6 and/or TH-9	67	67	38	36	16												
BA Retained by TH-6 and/or TH-9			43	46	75		31	32	32		3	4	16		8	10	28

Note: Shaded boxes denote strata that are within the direct effects analysis area but are not treated (NT) under the alternative; results for these strata are the same as Alternative A.

3.2.5.1.5 Total Canopy Cover and Canopy Cover of Large Trees

3.2.5.1.5.1 Description of Total Canopy Cover and Canopy Cover of Large Trees

See section 3.2.4.1.5.1 for an explanation of the total canopy cover, canopy cover of large trees, and the canopy cover of understory measure. Table 3-23 summarizes the existing distribution of total canopy cover for the strata in the mixed1 fire regime. The overall total canopy cover is 81 percent, 21 percent of which is large trees and 60 percent of which is understory. In all strata except Strata B, the amount of canopy cover in the understory exceeds that of the large trees (Table 3-23). In Strata B, the understory accounts for half of the total canopy cover. For most strata, however, about two-thirds to three-quarters of the total canopy cover is in the understory. Strata H, followed by Strata L, have proportionally the highest amount of canopy cover in understory trees.

Table 3-23. Existing Total Canopy Cover and Canopy Cover of Large Trees (in parentheses) within the Direct Effects Analysis Area

Strata	Acres	Mixed1 Fire Regime		
		Total Canopy Cover (%)	Canopy Cover of Large Trees (%)	Ratio of Understory to Total Canopy Cover
A	102	73	26	0.64
B	37	34	17	0.50
C	105	63	17	0.73
D	321	47	15	0.68
E	471	107	29	0.73
F	703	78	20	0.74
G	290	70	20	0.71
H	166	70	8	0.89
K	254	105	30	0.71
L	174	103	17	0.83
Overall		81	21	0.74

Stands in the mixed1 fire regime (Figure 3-6) have large ponderosa pine, Douglas-fir, and grand fir in the overstory and small-to-medium sized grand fir, with some Douglas-fir and less often ponderosa pine, in the understory. Stand conditions are multi-storied, which is the desired structure for some of the groups in this fire regime. However, though the desired structure is multi-storied, much of the species composition in the smaller trees is grand fir with little ponderosa pine. In addition, due to past-harvest and/or fire exclusion, desired within-stand diversity from grouping and clumping is rare. Smaller tree size classes are more uniform throughout the stands than would have occurred based on the mixed1 fire regimes, likely acting as a more continuous ladder fuel component than would have occurred historically. Desired conditions for these historically mixed1 fire regimes are a diversity of groups ranging from some that are multi-storied and some that are single-storied interspersed with openings created by disturbance. The distribution of these various groups would create a discontinuous fuel condition such that when fire occurred, the result would be mixed across stands. In addition, openings

would be the primary mechanism for regenerating shade-intolerant species such as ponderosa pine, and to a lesser extent Douglas-fir, which can also establish under some shade.

3.2.5.1.5.2 Change in Total Canopy Cover and Canopy Cover of Large Trees

For the direct effects analysis area as a whole, Alternatives B, C, and D would produce less total canopy cover than Alternative A in 2011 and 2030 (Table 3-24 and Figure 3-6). Of the action alternatives, Alternative C would result in the lowest overall total canopy cover (46 percent) and Alternative B the highest (54 percent). Alternative D would fall in between. Alternative B would produce more total canopy cover than Alternatives C and D due to Strata K and L, which would not be treated under this alternative. Therefore, canopy cover for these strata would be similar to Alternative A. The relationship of the alternatives would be the same in 2030.

Large tree canopy cover would be the same between Alternatives A and D in 2011. Alternatives B and C would produce less large tree canopy cover than Alternatives A and D with Alternative C slightly less than Alternative B. By 2030, the large tree canopy cover would be highest under Alternative A, followed by Alternative D, Alternative B, and then Alternative C. Alternative A would produce the most understory canopy cover and Alternative D the least. Alternatives B and C would fall in between with Alternative B producing more understory canopy cover than Alternative C (Table 3-24).

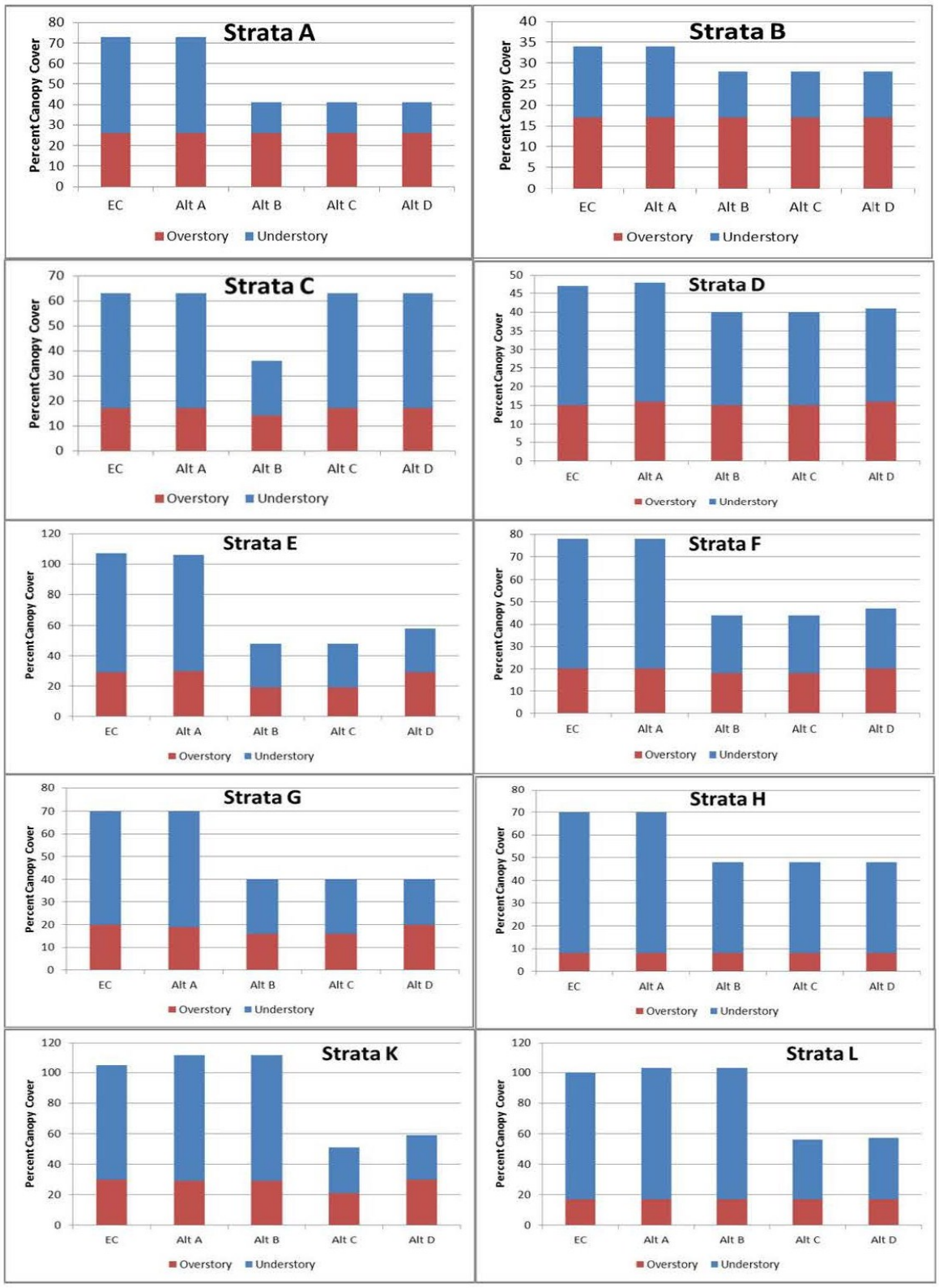

Figure 3-6. Canopy Cover (in percent) of Overstory (Trees ≥20 inches at d.b.h.) and Understory (Trees <20 inches at d.b.h.) for the Existing Condition (EC) and by Alternative Post-treatment (2011) within the Direct Effects Analysis Area

Table 3-24. Total Canopy Cover for the Large Tree Size Class and Canopy Cover of Large Trees (in percent) for the Existing Condition (EC) by Strata and by Alternative Post-treatment (2011) and in 2030 within the Direct Effects Analysis Area in the Mixed1 Fire Regime

Strata		EC	Alternative							
			A		B		C		D	
			2011	2030	2011	2030	2011	2030	2011	2030
A	Total (%)	73	73	76	41	44	41	44	41	44
	Large Tree (%)	26	26	29	26	28	26	28	26	28
B	Total (%)	34	34	45	28	36	28	36	27	36
	Large Tree (%)	17	17	24	17	25	17	25	17	25
C	Total (%)	63	63	66	36	42	NT	NT	NT	NT
	Large Tree (%)	17	17	24	14	20				
D	Total (%)	47	48	58	40	50	40	50	40	50
	Large Tree (%)	15	16	28	15	27	15	27	16	29
E	Total (%)	107	106	100	48	52	48	52	58	60
	Large Tree (%)	29	30	34	19	20	19	20	29	31
F	Total (%)	78	78	80	44	47	44	47	47	52
	Large Tree (%)	20	20	28	18	23	18	23	20	26
G	Total (%)	70	70	74	40	47	40	47	40	48
	Large Tree (%)	20	19	27	16	19	16	19	20	24
H	Total (%)	70	70	79	48	59	48	59	48	59
	Large Tree (%)	8	8	24	8	25	8	25	8	25
K	Total (%)	105	112	111	NT	NT	51	53	59	59
	Large Tree (%)	30	29	36			21	22	30	31
L	Total (%)	103	103	105	NT	NT	56	66	57	67
	Large Tree (%)	17	17	27			17	21	17	27
Overall	Total (%)	81	82	83	54	59	46	51	49	55
	Large Tree (%)	21	21	29	18	24	17	23	21	27
Ratio of Understory to Total Canopy Cover		0.74	0.74	0.65	0.67	0.59	0.63	0.55	0.57	0.51

Note: Shaded boxes denote strata that are within the direct effects analysis area but are not treated (NT) under the alternative; results for these strata are the same as Alternative A

3.2.5.1.6 Large Tree Size Class Species Composition

3.2.5.1.6.1 Description of Large Tree Size Class Species Composition

Table 3-25 displays the current percent species composition in the mixed1 fire regime for the large tree size class stands. The species composition in large tree size class is outside the forest-wide desired conditions given that stands exhibit a higher percentage of late seral grand fir and in some areas, too much Douglas-fir. The species composition of large trees in the large tree size class in the direct effects analysis area is 34 percent ponderosa pine, 28 percent Douglas-fir, and 38 percent grand fir (Table 3-25). However, conditions vary across strata: Strata C has the greatest amount of ponderosa pine and the lowest amount of grand fir and Strata K has the lowest amount of ponderosa pine and the greatest amount of grand fir. The desired condition for the area would be to increase the overall proportion of ponderosa pine in the mixed1 fire regime, particularly in strata where the amount is currently low. This increase would occur by adjusting the amount of later seral species in some stands.

Table 3-25. Existing Tree Species Composition of Large Trees (≥20 inches d.b.h.) in the Large Tree Size Class within the Direct Effects Analysis Area for the Mixed1 Fire Regime

Strata	Ponderosa Pine (%)	Douglas-fir (%)	Grand Fir (%)
A	38	41	21
B	43	7	50
C	69	28	3
D	48	28	24
E	24	24	52
F	45	24	31
G	35	41	24
H	N/A	N/A	N/A
K	8	25	67
L	25	41	34
Overall	34	28	38

3.2.5.1.6.2 Change in the Large Tree Size Class Species Composition

Alternatives A and D would change species composition in 2011 very little for the large tree size class compared to the existing conditions (Table 3-26). However, in 2030, Alternative D would have a greater proportion of large ponderosa pine than grand fir when compared to Alternative A. In contrast, the relative abundance of large early seral ponderosa pine would increase under Alternatives B and C compared to Alternatives A and D, and grand fir would decline. Of the four alternatives, Alternative C would result in the greatest proportion of ponderosa pine and the lowest proportion of grand fir in 2030. In 2011, Alternatives B and C would result in about 7 percent more ponderosa pine than Alternatives A and D. By 2030, though the species composition of ponderosa pine would decline slightly for all alternatives compared to 2011, all three action alternatives would improve the species composition over Alternative A. This improvement would occur from treating trees <20 inches d.b.h., which would increase the proportion of ponderosa pine and Douglas-fir relative to grand fir that succeed into the overstory. As these smaller trees grow, the proportion of earlier seral species in the overstory would

increase. By 2030, the species composition of grand fir would be lower than the existing condition under Alternatives B and C and greater than the existing conditions under Alternatives A and D. Under all alternatives, the species composition of Douglas-fir would increase (Table 3-26).

Table 3-26. Species Composition of Large Trees in the Large Tree Size Class (in Percent of Total Large Live Trees) by Strata and Alternatives for the Existing Condition (EC), Post-treatment (2011) and in 2030 within the Direct Effects Analysis Area.

Species	EC	Alternative A		Alternative B		Alternative C		Alternative D	
	2010	2011	2030	2011	2030	2011	2030	2011	2030
Strata A									
Ponderosa pine	38%	38%	33%	38%	38%	38%	38%	38%	38%
Douglas-fir	41%	41%	39%	41%	41%	41%	41%	41%	41%
Grand fir	21%	21%	29%	21%	22%	21%	22%	21%	22%
Strata B									
Ponderosa pine	43%	43%	29%	43%	29%	43%	29%	43%	29%
Douglas-fir	7%	7%	5%	7%	5%	7%	5%	7%	5%
Grand fir	50%	50%	66%	50%	66%	50%	66%	50%	66%
Strata C									
Ponderosa pine	69%	68%	59%	83%	74%	NT	NT	NT	NT
Douglas-fir	28%	29%	33%	14%	24%				
Grand fir	3%	3%	8%	3%	2%				
Strata D									
Ponderosa pine	48%	48%	30%	51%	33%	51%	33%	48%	31%
Douglas-fir	28%	28%	37%	28%	39%	28%	39%	28%	26%
Grand fir	24%	24%	32%	21%	28%	21%	28%	24%	33%
Strata E									
Ponderosa pine	24%	23%	21%	42%	46%	42%	46%	24%	27%
Douglas-fir	24%	23%	24%	12%	11%	12%	11%	23%	22%
Grand fir	52%	54%	54%	46%	44%	46%	44%	53%	51%
Strata F									
Ponderosa pine	45%	45%	36%	53%	46%	53%	46%	45%	43%
Douglas-fir	24%	24%	26%	15%	18%	15%	18%	25%	25%
Grand fir	31%	31%	38%	32%	36%	32%	36%	31%	32%
Strata G									
Ponderosa pine	35%	34%	29%	43%	44%	43%	44%	34%	36%
Douglas-fir	41%	43%	48%	45%	45%	45%	45%	43%	40%
Grand fir	24%	23%	23%	13%	11%	13%	11%	23%	24%
Strata H									
Ponderosa pine	N/A	N/A	20%	N/A	20%	N/A	20%	N/A	20%
Douglas-fir			60%		63%		63%		57%
Grand fir			20%		17%		17%		22%

Species	EC	Alternative A		Alternative B		Alternative C		Alternative D	
	2010	2011	2030	2011	2030	2011	2030	2011	2030
Strata K									
Ponderosa pine	8%	8%	8%	NT	NT	13%	14%	8%	8%
Douglas-fir	25%	24%	23%			19%	18%	25%	24%
Grand fir	67%	67%	70%			68%	68%	67%	67%
Strata L									
Ponderosa pine	25%	25%	14%	NT	NT	27%	21%	25%	17%
Douglas-fir	41%	41%	33%			44%	47%	41%	30%
Grand fir	34%	34%	53%			29%	33%	34%	53%
Overall									
Ponderosa pine	34%	36%	27%	43%	37%	43%	38%	36%	32%
Douglas-fir	28%	28%	32%	24%	29%	24%	28%	28%	29%
Grand fir	38%	36%	40%	33%	35%	33%	34%	36%	39%

Note: Shaded boxes denote strata that are within the direct effects analysis area but are not treated (NT) under the alternative; results for these strata are the same as Alternative A.

3.2.5.2 Discussion of Indicators

3.2.5.2.1 Indicator: Ponderosa Pine Restoration

3.2.5.2.1.1 Affected Environment

See section 3.2.4.2.1.1 for a discussion of the affected environment for this indicator.

3.2.5.2.1.2 Current Conditions

The measures for this Indicator are the number of live trees pre- and post-harvest and the large tree size class species composition for ponderosa pine. The desired condition for the treated areas in the mixed1 fire regime is to have 60 percent or more of the large trees in the large tree size class in ponderosa pine, 25 percent or less in Douglas-fir, and 15 percent or less in grand fir and other species. This desired condition falls within the range described for PVG 6 in Appendix A of the 2010 Forest Plan (Forest Service 2010a) for Douglas-fir and grand fir and for early-seral species (additive of the range for ponderosa pine and western larch, which is rare in the Scriver Creek drainage) and is consistent with the habitat types that comprise the mixed1 fire regime in this area (see section 3.3.1.3).

The species composition for ponderosa pine is below desired conditions for the mixed1 fire regime in that only about 34 percent of the large trees in the large tree size class are ponderosa pine (Table 3-27). On average, this percentage correlates to about 6.1 large ponderosa pine trees per acre. The species composition for Douglas-fir is about 28 percent, which is approximately 5.1 large trees per acre. Grand fir comprises 38 percent of the large tree species composition, averaging about 6.8 large trees per acre.

Table 3-27. Measures for Ponderosa Pine Restoration Indicator by Alternative and by Strata and Overall within the Mixed1 Fire Regime in 2030

Measure	EC	Alt A	Alt B	Alt C	Alt D
Strata A					
Number of Live Large Ponderosa Pine per Acre	8.6	7.4	7.8	7.8	8.8
Number of Live Large Douglas-fir per Acre	9.2	8.8	8.5	8.5	8.5
Number of Live Large Grand Fir and Other Species per Acre	4.7	6.5	4.5	4.5	4.5
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	38%	33%	38%	38%	38%
Strata B					
Number of Live Large Ponderosa Pine per Acre	5.8	5.5	5.5	5.5	5.5
Number of Live Large Douglas-fir per Acre	1.0	1.0	1.0	1.0	1.0
Number of Live Large Grand Fir and Other Species per Acre	6.8	12.6	12.5	12.5	12.6
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	43%	29%	29%	29%	29%
Strata C					
Number of Live Large Ponderosa Pine per Acre	12.4	14.8	15.9	NT	NT
Number of Live Large Douglas-fir per Acre	5.1	8.3	5.1	NT	NT
Number of Live Large Grand Fir and Other Species per Acre	0.6	1.9	0.4	NT	NT
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	69%	59%	74%	NT	NT
Strata D					
Number of Live Large Ponderosa Pine per Acre	6.3	7.1	7.2	7.2	7.3
Number of Live Large Douglas-fir per Acre	3.2	8.7	8.4	8.4	8.5
Number of Live Large Grand Fir and Other Species per Acre	2.9	7.5	6.1	6.1	7.7
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	48%	30%	33%	33%	31%
Strata E					
Number of Live Large Ponderosa Pine per Acre	5.7	5.8	6.5	6.5	6.2
Number of Live Large Douglas-fir per Acre	5.6	6.6	1.5	1.5	5.0
Number of Live Large Grand Fir and Other Species per Acre	12.5	14.8	6.2	6.2	11.6
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	24%	21%	46%	46%	27%

Measure	EC	Alt A	Alt B	Alt C	Alt D
Strata F					
Number of Live Large Ponderosa Pine per Acre	7.3	8.3	8.2	8.2	8.7
Number of Live Large Douglas-fir per Acre	3.9	6.0	3.3	3.3	5.0
Number of Live Large Grand Fir and Other Species per Acre	5.1	8.6	6.4	6.4	6.5
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	45%	36%	46%	46%	43%
Strata G					
Number of Live Large Ponderosa Pine per Acre	7.2	7.7	8.3	8.3	8.3
Number of Live Large Douglas-fir per Acre	8.4	12.8	8.4	8.4	9.2
Number of Live Large Grand Fir and Other Species per Acre	4.8	6.0	2.1	2.1	5.4
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	35%	29%	44%	44%	36%
Strata H					
Number of Live Large Ponderosa Pine per Acre	3.3	4.4	4.6	4.6	5.0
Number of Live Large Douglas-fir per Acre	2.5	13.0	14.5	14.5	13.6
Number of Live Large Grand Fir and Other Species per Acre	1.6	4.4	4.0	4.0	5.2
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	N/A	20%	20%	20%	20%
Strata K					
Number of Live Large Ponderosa Pine per Acre	1.9	1.7	NT	1.9	1.8
Number of Live Large Douglas-fir per Acre	5.7	5.0	NT	2.5	5.2
Number of Live Large Grand Fir and Other Species per Acre	15.4	15.4	NT	9.2	14.3
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	8%	8%	NT	14%	8%
Strata L					
Number of Live Large Ponderosa Pine per Acre	4.4	3.7	NT	4.0	4.0
Number of Live Large Douglas-fir per Acre	7.3	8.6	NT	9.0	7.3
Number of Live Large Grand Fir and Other Species per Acre	5.9	13.6	NT	6.3	12.7
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	25%	14%	NT	21%	17%
Overall					
Number of Live Large Ponderosa Pine per Acre	6.1	6.6	6.9	6.9	7.0
Number of Live Large Douglas-fir per Acre	5.1	7.8	5.6	5.5	6.8
Number of Live Large Grand Fir and Other Species per Acre	6.8	9.7	6.8	5.8	8.3
Percent of Large Tree Size Class Species Composition in Large Ponderosa Pine	34%	27%	36%	38%	32%

3.2.5.2.1.3 Summary of Direct and Indirect Effects

This section summarizes the overall results of the alternatives. Results for the individual strata are described in Appendix D.

The 2030 results of the measures are used to describe the restoration of ponderosa pine under each alternative (Table 3-27). Though no alternative would achieve the desired condition, Alternative C would get closer than the other alternatives. All three action alternatives would provide better opportunities to restore ponderosa pine than Alternative A. Though all alternatives increase the number of large ponderosa pine per acre from the existing condition, the action alternatives would produce only slightly more large ponderosa pine per acre than Alternative A. The number of large ponderosa pine would be similar between the action alternatives. However, species composition of large tree size class stands would stay the same or improve compared to the existing conditions on more acres under Alternative C than Alternatives A, B, and D. Alternatives B and C would improve the species composition condition by reducing the number of large Douglas-fir and grand fir and altering the species composition of the understory. Under Alternative D, the change in large tree size class species composition would result from altering the species composition of the understory. By 2030, relative to the existing conditions, the species composition for Alternative A would stay the same or improve on 10 percent of the acres, which is in contrast to 74 percent of the acres under Alternative C, 68 percent of the acres under Alternative B, and 45 percent of the acres under Alternative D.

Direct and Indirect Effects of Alternative A

No treatments would occur within any of the 10 strata in the direct effects analysis area under Alternative A. Though this alternative would result in a slightly greater number of large ponderosa pine per acre in 2030 than are currently present, the species composition would trend away from desired conditions in the large tree size class as the proportion of ponderosa pine declined. The proportion of ponderosa pine would decline because the number of large Douglas-fir and grand fir would increase much more than the number of large ponderosa pine: ponderosa pine would increase by 0.5 trees per acre, Douglas-fir would increase by 2.7 trees per acre, and grand fir would increase by 2.9 trees per acre. By 2030 only 10 percent of the acres would stay the same or improve from the existing condition. Under Alternative A, most acres would become more similar to each other, resulting in a relatively homogenous, but departed, condition across the fire regime. Most strata would blend in with surrounding untreated areas, moving successionally toward conditions that contain proportionally higher amounts of mid-to-later seral Douglas-fir and grand fir.

Direct and Indirect Effects of Alternative B

Treatments would occur within 8 of the 10 strata in the direct effects analysis area under Alternative B. All silvicultural prescriptions applied under this alternative, including TH-9, would favor retaining ponderosa pine. As such, treatments would discriminate against shade-tolerant, later seral grand fir and, to a lesser extent, mid-seral Douglas-fir. Consequently, treatments under Alternative B would increase the amount of ponderosa pine (Table 3-27) compared to the existing condition by preserving this species relative to other species in the overstory and understory. The number of large ponderosa pine would increase by 0.8 trees per acre, which is more than would occur under Alternative A. However, unlike Alternative A, which would produce an even greater increase in Douglas-fir and grand fir, Alternative B would result in an increase of only 0.5 Douglas-fir per acre (compared to 2.7 under Alternative A) and

would hold steady for grand fir (compared to an increase of 2.9 grand fir per acre under Alternative A). Subsequently, the species composition of large trees would stay the same or improve relative to the existing condition on 68 percent of the strata acres in the analysis area. Alternative B would help maintain the long-term prominence of ponderosa pine, particularly in some individual strata. Treatments under this alternative would produce a greater diversity of stand conditions across the area than currently exists. Improving the extent of early seral ponderosa pine throughout the area would improve long-term resiliency to future disturbances. Of the 68 percent of the strata acres that would stay the same or improve, 4 percent would maintain a species composition similar to the existing condition and 64 percent would increase the species composition of ponderosa pine, which would create some area that would contrast surrounding untreated areas, moving successionally toward mid-to-later seral conditions.

Direct and Indirect Effects of Alternative C

Treatments would occur within 9 of the 10 strata in the direct effects analysis area under Alternative C. All silvicultural prescriptions applied under this alternative, including TH-9, would favor retaining ponderosa pine. As such, treatments would discriminate against shade-tolerant, later seral grand fir and, to a lesser extent, mid-seral Douglas-fir. Consequently, treatments under Alternative C would increase the amount of ponderosa pine (Table 3-27) compared to the existing condition by preserving this species relative to other species in the overstory and understory. The number of large ponderosa pine would increase by 0.8 trees per acre, which is more than would occur under Alternative A. However, unlike Alternative A, which would produce an even greater increase in Douglas-fir and grand fir, Alternative C would result in an increase of only 0.4 Douglas-fir per acre and the number of large grand fir per acre would decline by 1.0 tree per acre. Subsequently, the species composition of large trees would stay the same or improve relative to the existing condition on 74 percent of the strata acres in the analysis area. Alternative C would help maintain the long-term prominence of ponderosa pine, particularly in some individual strata. Treatments under this alternative would produce a greater diversity of stand conditions across the area than currently exists. Improving the extent of early seral ponderosa pine throughout the area would improve long-term resiliency to future disturbances. Of the 74 percent of the strata acres that would stay the same or improve, 4 percent would maintain a species composition similar to the existing condition and 70 percent would increase the species composition of ponderosa pine, which would create some area that would contrast surrounding untreated areas, moving successionally toward mid-to-later seral conditions.

Direct and Indirect Effects of Alternative D

Treatments would occur within 9 of the 10 strata in the direct effects analysis area under Alternative D. Similar to Alternatives B and C, all silvicultural prescriptions applied to the understory under Alternative D would favor retaining ponderosa pine. However, unlike Alternatives B and C, all large ponderosa pine, as well as large Douglas-fir and grand fir, would be retained per TH-9. Initially, the results in the overstory would be similar to Alternative A. However, by 2030 Alternative D would result in conditions slightly different from Alternative A as trees from the understory moved into the overstory. The number of large ponderosa pine would increase by 0.9 trees per acre, which is more than would occur under Alternatives A, B, and C. However, unlike Alternative A, which would produce an even greater increase in Douglas-fir and grand fir, Alternative D would result in an increase of only 1.7 large Douglas-fir trees per acre (compared to 2.7 for Alternative A) and 1.5 large grand fir per acre (compared to 2.9 under Alternative A). Overall, the species composition of ponderosa pine would be greater

than Alternative A but less than Alternatives B and C. The species composition of large trees would stay the same or improve on 45 percent of the acres. Of the 45 percent, 14 percent would maintain a species composition similar to the existing condition and 31 percent would increase the species composition of ponderosa pine, which would create a few areas that would contrast surrounding untreated areas. Most of the acres would be somewhat similar in the overstory to surrounding areas, but the understory species composition would contrast adjacent areas.

3.2.5.2.1.4 Cumulative Effects

See section 3.2.6 for the cumulative effects discussion.

3.2.5.2.2 Indicator: Growing Space for Ponderosa Pine Regeneration

3.2.5.2.2.1 Affected Environment

See section 3.2.4.2.2.1 for additional detail regarding the affected environment for this indicator.

Basal area objectives for stands in the Project area in the mixed1 fire regime are to average about 80 ft^2/acre. This average represents conditions of clumps, groups, and openings that range from 0 (in openings) to160 ft^2/acre in groups. This basal area was chosen because it will provide growing space for ponderosa pine regeneration while developing the resilience of stands to uncharacteristic disturbance from agents such as wildfire.

3.2.5.2.2.2 Current Conditions

The measures for this Indicator are stand basal area, total canopy cover, canopy cover of large trees and canopy cover of understory. The average total stand basal area is 145 ft^2/acre, (Table 3-28) which is 65 ft^2/acre over the objective. The overall total canopy cover is 81 percent with 21 percent in the large tree size class (Table 3-24) and 60 percent in understory.

Table 3-28. Measures for Growing Space for Ponderosa Pine Indicator by Alternative and by Strata and Overall within the Nonlethal Fire Regime in 2011

Measure	EC	Alt A	Alt B	Alt C	Alt D
Strata A					
Total Stand Basal Area (ft^2/acre)	154	154	100	100	100
Total Canopy Cover (%)	73	73	41	41	41
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	26	26	26	26	26
Canopy Cover of Understory (<20 inches d.b.h.) (%)	47	47	15	15	15
Strata B					
Total Stand Basal Area (ft^2/acre)	88	88	80	80	80
Total Canopy Cover (%)	34	34	28	28	27
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	17	17	17	17	17
Canopy Cover of Understory (<20 inches d.b.h.) (%)	17	17	11	11	10
Strata C					
Total Stand Basal Area (ft^2/acre)	148	148	88	NT	NT
Total Canopy Cover (%)	63	63	36	NT	NT
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	17	17	14	NT	NT
Canopy Cover of Understory (<20 inches d.b.h.) (%)	46	46	22	NT	NT
Strata D					
Total Stand Basal Area (ft^2/acre)	94	94	80	80	82
Total Canopy Cover (%)	47	48	40	40	40
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	15	16	15	15	16
Canopy Cover of Understory (<20 inches d.b.h.) (%)	32	32	25	25	24
Strata E					
Total Stand Basal Area (ft^2/acre)	184	184	80	80	109
Total Canopy Cover (%)	107	106	48	48	58
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	29	30	19	19	29
Canopy Cover of Understory (<20 inches d.b.h.) (%)	78	76	29	29	29

Measure	EC	Alt A	Alt B	Alt C	Alt D
Strata F					
Total Stand Basal Area (ft^2/acre)	134	134	80	80	88
Total Canopy Cover (%)	78	78	44	44	47
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	20	20	18	18	20
Canopy Cover of Understory (<20 inches d.b.h.) (%)	58	58	26	26	27
Strata G					
Total Stand Basal Area (ft^2/acre)	144	144	80	80	82
Total Canopy Cover (%)	70	70	40	40	40
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	20	20	16	16	20
Canopy Cover of Understory (<20 inches d.b.h.) (%)	50	50	24	24	20
Strata H					
Total Stand Basal Area (ft^2/acre)	118	118	80	80	80
Total Canopy Cover (%)	70	70	48	48	48
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	8	8	8	8	8
Canopy Cover of Understory (<20 inches d.b.h.) (%)	62	62	40	40	40
Strata K					
Total Stand Basal Area (ft^2/acre)	182	182	NT	84	109
Total Canopy Cover (%)	105	112	NT	51	59
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	30	29	NT	26	30
Canopy Cover of Understory (<20 inches d.b.h.) (%)	75	83	NT	25	29
Strata L					
Total Stand Basal Area (ft^2/acre)	163	163	NT	80	80
Total Canopy Cover (%)	103	103	NT	56	57
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	17	17	NT	17	17
Canopy Cover of Understory (<20 inches d.b.h.) (%)	86	86	NT	39	40
Overall					
Total Stand Basal Area (ft^2/acre)	145	145	95	84	94
Total Canopy Cover (%)	81	82	54	46	49
Canopy Cover of Large Trees (≥20 inches d.b.h.) (%)	21	21	18	17	21
Canopy Cover of Understory (<20 inches d.b.h.) (%)	60	61	36	29	28

3.2.5.2.2.3 Summary of Direct and Indirect Effects

This section summarizes the overall results of the alternatives. Results for the individual strata are described in Appendix D. Measures for the Indicator are based on the year 2011. These measures are used to describe the potential for providing growing space for ponderosa pine regeneration under each alternative (Table 3-28).

All three action alternatives would provide growing space in some strata for ponderosa pine regeneration; Alternative A would not. No alternative achieves the basal area objective though Alternative C would get closest with 84 ft^2/acre. Under Alternative C, 7 of the 10 strata (82 percent of the direct effects analysis area) would achieve the 80 ft^2/acre objective. Alternatives B and D would result in similar basal areas: 95 ft^2/acre for Alternative B and 94 ft^2/acre for Alternative D. The numerical similarity between Alternatives B and D is a combination of the strata treated and not treated, and for those strata treated by both alternatives, how they would be affected by TH-9. Though the basal areas would be similar, compositional and structural conditions would differ. For Alternative B, 6 of the 10 strata (76 percent of the direct effects analysis area) would achieve the basal area objective. Under Alternative D, only 3 of the 10 strata (14 percent of the direct effects analysis area) would. The difference between Alternative D and Alternatives B and C for the same strata would occur because the current basal area in trees retained by TH-9 is more than the objective of 80 ft^2/acre so retaining these trees per the design feature would exceed the basal area objective. As a result, stand conditions, including the recruitment of trees into the overstory, and the future species composition would be different under Alternative D than Alternatives B and C for the commonly treated strata. This difference would occur because the majority of the basal area retained under Alternative D would be in the overstory. In the short term, fewer trees would available to recruit into the overstory under Alternative D compared to Alternatives B and C as indicated by the canopy cover of trees <20 inches d.b.h. However, trees recruited into the overstory under all action alternatives would be a proportionally greater mix of ponderosa pine due to treatments that would reduce existing grand fir in favor of ponderosa pine and in some cases Douglas-fir. The composition of regeneration under Alternatives B and C would also be different than Alternative D in that Alternative D would retain a greater proportion of seed-bearing Douglas-fir and grand fir than Alternatives B and C. Though the basal area of ponderosa pine would be similar between the action alternatives (Table 3-22), the basal area of Douglas-fir retained under Alternative D by TH-9 would be 5.3 times greater than Alternative B and 4.0 times greater than Alternative C. The basal area of grand fir retained by TH-9 would be 3.5 times greater under Alternative D than Alternative B and 2.8 times greater than Alternative C.

Alternative A does not improve opportunities for regenerating ponderosa pine in that conditions would remain similar to the existing condition (Figure 3-6). The primary differences between the three action alternatives are due to TH-9, which would result in differences between the species composition of seed-producing trees (primarily the ≥20 inch d.b.h.) and the within-stand composition and arrangement of clumps, groups, and openings. Because Alternative D would retain more basal area in trees ≥20 inches d.b.h., Alternative D would result in overstory canopy cover similar to Alternative A but with the least amount of canopy cover in the understory compared to the other action alternatives (Table 3-28). Fewer or smaller understory groups would be produced, indicating that fewer trees would be available to recruit into the overstory in the near future. In some cases, the amount of overstory shade would likely promote regeneration of shade-tolerant grand fir and, to a lesser extent, Douglas-fir rather than shade-intolerant

ponderosa pine. However, augmentation of openings with ponderosa pine seedlings would increase the presence of ponderosa pine over what may occur from natural regeneration. Smaller openings that would be produced under Alternative D though, may reduce the growth rate of planted ponderosa pine from shading, which would increase the risk that natural Douglas-fir and grand fir would overtop the ponderosa pine over time.

Alternative C provides the best opportunity for securing ponderosa pine regeneration. This alternative would get closest to the basal area objective and would develop a variety of overstory/understory conditions that would create a diversity of different sized clumps, groups, and openings. Larger openings in combination with fewer seed-bearing grand fir would likely increase opportunities for openings to become dominated by natural ponderosa pine. Any ponderosa pine planted under TH-10 would likely maintain height growth similar to natural Douglas-fir and grand fir as openings would be larger and, therefore, less shaded. Alternative B would result in the same outcome as Alternative C for the strata in common so the difference between Alternative B and C would be the strata treated and not treated.

All three action alternatives would develop variable spacing, including groups and openings, in the plantations proposed for treatment. This spacing would begin developing future regeneration openings in addition to creating near term within-stand heterogeneity.

Direct and Indirect Effects of Alternative A

Under Alternative A, growing space conditions would remain the same as the existing condition (Figure 3-4). Any openings produced over time would likely be the result of tree mortality from insects which, given the current stand conditions, may be more extensive than would have occurred under historical fire and insect disturbances (see section 3.2.7.1.4.1). Seed-producing trees would be a mix of ponderosa pine, Douglas-fir, and grand fir. However, seedbeds that would develop in the openings would be more conducive to the regeneration of grand fir and Douglas-fir than ponderosa pine since ponderosa pine generally requires a greater extent of mineral soil seedbeds than grand fir and Douglas-fir, which can both germinate well on litter-covered seedbeds in addition to mineral soil (Hatch and Lotan 1969, Ryker 1975). Regeneration would likely be predominately grand fir and Douglas-fir. Also, because grand fir and Douglas-fir are more shade-tolerant than ponderosa pine, grand fir and Douglas-fir seedlings would continue to establish within and between existing groups and clumps. Currently, more canopy cover exists in the understory than overstory (Table 3-24), and the additional regeneration that would establish in the understory would contribute to the continuity of ladder fuels present in the stands. Alternative A would not begin developing within-stand openings and other structural diversity in plantations. These areas would continue to retain their uniform appearance into the future.

Direct and Indirect Effects of Alternative B

While Alternative B would not achieve the basal area objective, 6 of the 10 strata (76 percent of the direct effects analysis area) would. The combination of results for strata that are treated and those that are not would result in an overall basal area that would be 15 ft^2/acre greater than the objective (Table 3-28). For those strata that do achieve the basal area objective, re-patterning of the overstory and understory would produce openings that could support the regeneration of ponderosa pine. Treatments would re-pattern smaller tree size classes into groups, clumps, and openings, reducing the hazard associated with ladder fuels. Treatments in combination with the subsequent regeneration would result in a combination of overstory and understory groups of

varying numbers and sizes. Scarification from treatments would provide the mineral soil seedbed ponderosa pine requires for germination. Species composition would shift to a greater proportion of large ponderosa pine and less Douglas-fir and grand fir than the existing condition (Table 3-26), which would likely result in a greater mix of natural ponderosa pine than grand fir and Douglas-fir regeneration. Seedlings planted in openings per TH-10 would likely maintain growth similar to naturally regenerated Douglas-fir and grand fir as openings would be larger and less shaded than the smaller openings that currently exist. The results would be ponderosa pine regeneration in groups which would contribute to the structural diversity of other older groups developed from the treatment. Results for those strata that are not treated under this alternative would be the same as Alternative A. Alternative B would develop variable spacing, including groups and openings in the plantations proposed for treatment. This spacing would begin developing future regeneration openings in addition to creating near term within-stand heterogeneity.

Direct and Indirect Effects of Alternative C

Alternative C would not achieve the basal area objective but, of the three action alternatives, it would get closest to the objective (Table 3-28). Under Alternative C, 7 of the 10 strata (82 percent of the direct effects analysis area) would achieve the basal area objective. Results for those strata that are treated would be the same as Alternative B. The combination of results for strata that are treated and those that are not would result in an overall basal area that would be 4 ft^2/acre greater than the objective. For those strata that are treated, the effects described for Alternative B would be the same for this alternative. Results for those strata that are not treated under this alternative would be the same as Alternative A. Treatment of plantations would be the same as described for Alternative B.

Direct and Indirect Effects of Alternative D

At 94 ft^2/acre (14 ft^2/acre greater than the objective) Alternative D would not achieve the overall basal area objective; however, it would achieve an overall basal area that is similar to Alternative B (15 ft^2/acre greater than the objective) (Table 3-28). However, under this alterative, only 3 of 10 strata (14 percent of the direct effects analysis area) would achieve the basal area objective. So few strata would achieve the objective because the basal area in trees retained through TH-9 is more than 80 ft^2/acre in the strata that would not achieve the basal area objective and, therefore, retaining these trees under the design feature would exceed the basal area objective. Because Alternative D would retain more basal area in trees ≥20 inches d.b.h., this alternative would result in a large tree canopy cover similar to Alternative A but with less canopy cover in the understory compared to the other alternatives (Table 3-28). The distribution and spatial location of openings may be constrained due to the overstory cover retained by TH-9. Abella et al. (2006) noted that across-the-board diameter retention requirements that maintain existing overstory may create openings and structural conditions different than historical conditions. Therefore, Alternative D would potentially produce fewer or smaller understory groups and openings, indicating that fewer trees would be available to recruit into the overstory in the near future. Abella et al. (2006) and Triepke et al. (2011) concluded constraining the arrangement of groups and openings may impact certain wildlife species that depend on structural complexity that is similar to historical conditions.

Scarification would develop mineral soil seedbeds for germination of ponderosa pine, but the amount of overstory shade that would be retained and potentially the smaller-sized openings that

could result may reduce the growth and development of ponderosa pine regeneration (Arno and Fiedler 2005). Regeneration groups under this alternative may contain a higher proportion of grand fir and Douglas-fir than ponderosa pine. Though ponderosa pine seedlings may be planted as described under TH-10, growth may not keep up with that of Douglas-fir and/or grand fir due to shade. However, overall structural diversity would improve as regeneration groups, regardless of species composition, age.

Treatment of plantations would be the same as described for Alternative B.

3.2.5.2.2.4 Cumulative Effects

See section 3.2.6 for a cumulative effects discussion.

3.2.6 Indicator: Landscape Patch and Pattern Macrovegetation

3.2.6.1 Affected Environment

Recognizing the temporal and spatial nature of landscape patterns and the agents responsible for their creation (e.g., biotic processes, disturbance regimes, and environmental constraints) is crucial to resource planning. It has been suggested that if existing landscape patterns and disturbance regimes emulate historic conditions, then biodiversity, long-term site productivity, and habitat for wildlife species would be conserved. Landscape patches and patterns, as discussed here, reflect the pattern of tree size class, stand canopy cover, tree species composition and snags and CWD within a given fire regime. Landscape patch and pattern is important, in part because of the relationship of these patches to habitat for terrestrial wildlife species and the ability of ecological disturbance processes to operate similar to historical conditions. The underlying philosophy of the *Vegetation and Wildlife Habitat Restoration Strategy* associated with the 2010 Forest Plan is that restoration of historic vegetative conditions that would allow natural disturbance processes to operate characteristically would contribute to wildlife species conservation (Noss 1987, Hunter et al. 1988, Haufler et al. 1996, Raphael et al. 2000, Wisdom et al. 2000, McComb and Duncan 2007). As discussed in section 3.2.2, an understanding of landscape patches and patterns is key to implementing the conservation principles presented in Appendix E of the 2010 Forest Plan (Forest Service 2010a, Appendix E, p. E-7 through E-13) and were developed under the following assumptions:

- Contiguous patches of habitat are better than fragmented habitat.
- Large patches of habitat are better than small patches.
- Patches of habitat close together are better than patches far apart.
- Interconnected patches are better than isolated patches.

Fire regimes (section 3.5.1.2) were used to represent distribution and arrangement of landscape patches and patterns. The landscape patch and pattern analysis area is displayed in Figure 3-7. This area was assumed to be large enough to capture the range of patch sizes that would have occurred under the historical fire regime (Forest Service 2010a, Appendix A, Table A-1, p. A-3), which allows for a reasonable consideration of the effects of proposed activities under the action alternatives. The fire regime display for the landscape patch and pattern analysis area is described in section 3.2.1.2.1.

For the direct and indirect effects analysis, the Indicator for landscape patch and patterns is based on two measures of macrovegetation: large tree size class and large tree size class species

composition. For the nonlethal fire regime, desired patches are those containing macrovegetative units of large tree size class dominated by ponderosa pine. For the mixed1 fire regime, desired patches contain macrovegetative units of large tree size class dominated by ponderosa pine with Douglas-fir and, to a lesser extent, grand fir. Consistent with direction in the 2010 Forest Plan and this project's objectives, this analysis will focus on the alternatives' effects on restoration of patches of large tree size class stands that reflect desired conditions relative to species composition and structural conditions reflective of the fire regime (see sections 3.2.4.2.1.2 and 3.2.5.2.1.2). The large tree patches that meet the species composition were assumed to provide the conditions for maintaining ponderosa pine as described in Chapter 1 (section 1.5).

Historically, patches in the nonlethal fire regime were primarily large tree size class dominated by ponderosa pine with generally small (<1.0 acre) groups of smaller tree size classes (Forest Service 2010a, Appendix A, Table A-1, p. A-3). For the nonlethal fire regime, the desired structure would be groups and clumps dominated by ponderosa pine in the overstory and various sized understory clumps and groups with ponderosa pine regeneration in openings. Stands would be multi-storied but primarily in groups that are horizontally and vertically discontinuous. Some Douglas-fir would also be present but at much lower levels than ponderosa pine. The mixed1 fire regime, like the nonlethal fire regime, was historically extensive patches of large tree size class comprised primarily of ponderosa pine and Douglas-fir and, to a lesser extent, grand fir. A variety of different sized overstory and understory groups would have been present within or surrounding the large tree patches. Due to the variety of nonlethal to mixed fire that would have occurred historically, groups would have in some cases would have been distinct from each other while in other cases, they would have been more continuous. Stand structure would have been diverse with various sized overstory groups containing large ponderosa pine and Douglas-fir and grand fir trees with a wide diversity of different sized understory groups and openings. Conditions within stands would range from dense multi-storied groups to openings. Multi-storied groups would vary in size and would be both continuous and discontinuous from understory groups.

For the cumulative effects analysis, vegetative conditions were assessed using the strata (section 3.2.1.2.1 and Appendix D). Strata for the landscape patch and pattern discussion will be referred to in aggregates following the organization in Appendix D. The south-most stands in Strata C, and all of the stands in Strata G, H, I, and J make up the southeastern aggregate; Strata A, B, and D and the northern-most stands in Strata C comprise the northern aggregate; and Strata E, F, K, and L comprise the western aggregate. These aggregates will be discussed in how they relate to each other and how they relate to the patch and pattern of the cumulative effects analysis area.

Figure 3-7 displays the landscape patch and pattern of the fire regimes in the analysis area and the dominating species composition of the stands that are in the large tree size class. Although Figure 3-7 does not display all large tree size class stands, approximately 75 percent of the area outside of the Project area are projected to be in the large tree size class. The majority of the stands outside of the Project area fall into the mixed1 fire regime.

3.2.6.2 Current Conditions

The measure for this Indicator is large tree size class species composition. Large tree stands within the nonlethal fire regime are dominated by ponderosa pine and Douglas-fir. As described in sections 3.2.4.1.6 and 3.2.5.1.6, ponderosa pine is under-represented in the large tree size

class. In addition, the majority of the nonlethal area is in medium size tree class and, therefore, the species composition for an extensive portion of the area is not displayed in the figure. Patches and groups are smaller than would have occurred historically or contain a greater component of Douglas-fir and have a higher amount of continuous understory, which often acts as ladder fuels.

In many areas of the mixed1 fire regime, the conditions within the large tree size class are not within the desired condition because the species composition is dominated by grand fir, particularly in the understory, rather than ponderosa pine and Douglas-fir (Table 3-26). Ponderosa pine occurs in the proposed treatment areas but not in the amounts desired. Of the strata aggregates, the large tree size class stands in the northern and southeastern aggregates have the highest species composition of ponderosa pine while the large tree size class stands in the western aggregate have the lowest. While group and patch sizes in the aggregates, which historically ranged from 1 to 600 acres, are similar to historical size, the species mix within the patches is not within desired conditions. In addition, multi-storied conditions are more extensive and therefore groups and openings are less diverse (section 3.2.5.2.1.2).

None of the plantations are yet, nor will be, classified as large tree size class within the timeframe chosen for the indirect effects analysis (i.e., 2030). All of the plantations are composed of the early seral species important to achieving the desired landscape condition. However, within-stand structure is relatively homogeneous due to the way the trees were planted. Treatments proposed under the action alternatives would improve within-stand diversity through development of desired groups and openings more consistent with the historical fire regimes as the plantations progress into the large tree size class.

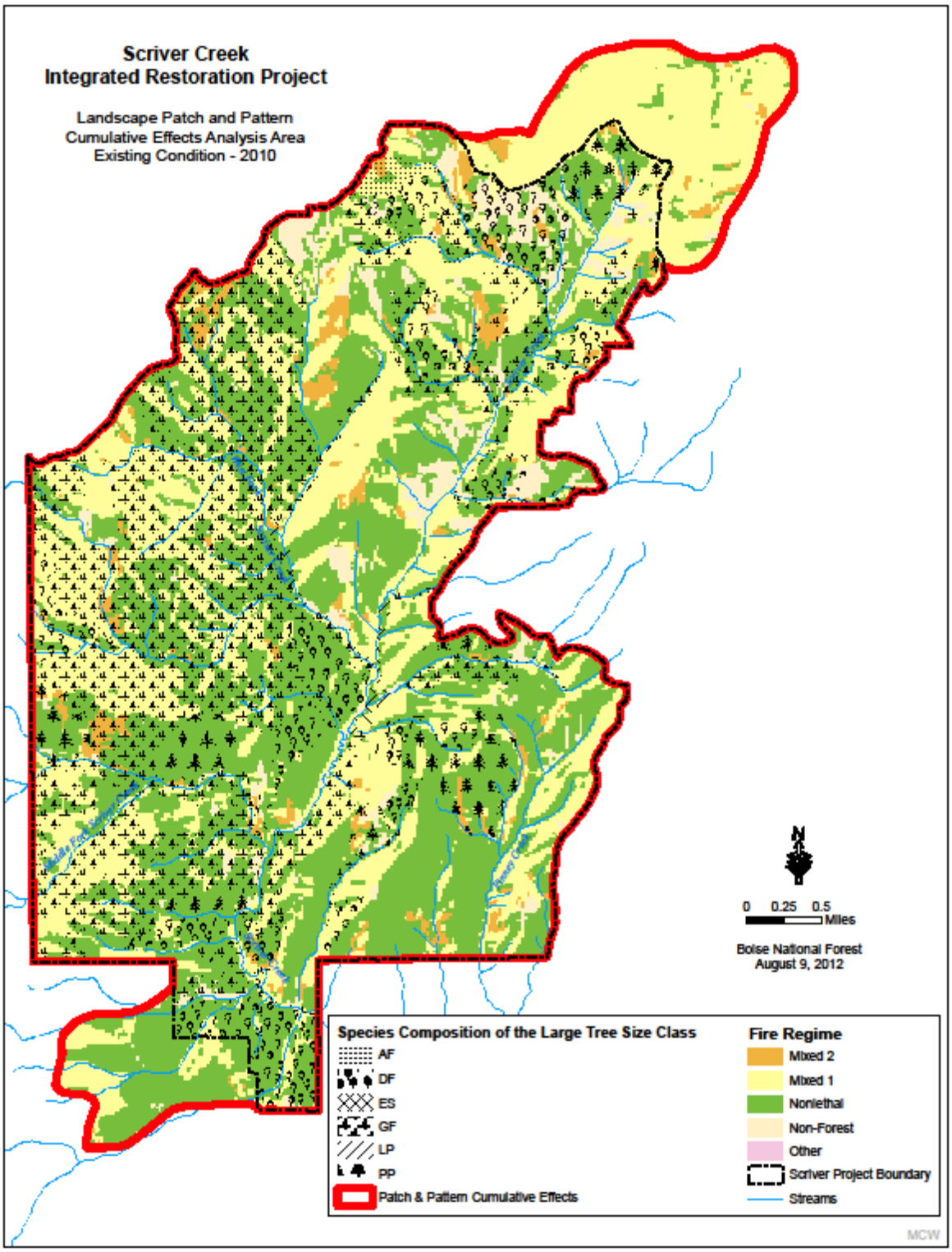

Figure 3-7. Landscape Patches by Fire Regime in 2010 Current Condition

3.2.6.3 Direct and Indirect Effects

3.2.6.3.1 Direct and Indirect Effects of Alternative A

Implementing this alternative would have no direct effect on the overall extent of landscape patches within the landscape patch and pattern analysis area. Over time, the various landscape patches present would continue to trend away from desired species composition in the absence of disturbance. Figure 3-8 displays the dominating species for those stands that are in, or will have moved into, the large tree size class by 2030. The relative abundance of seral ponderosa pine in large tree size class patches would be lowest under this alternative. In the nonlethal fire regime, lack of large ponderosa pine would occur because fewer acres would move into the large tree size class (Table 3-7) and the species composition of ponderosa pine areas that would move into large tree size class would be lowest under this alternative (Table 3-26). In the mixed1 fire regime, the number of large tree size class acres would the same for all alternatives (Table 3-19), but the species composition of ponderosa pine–dominated stands would again be lower under this alternative (Table 3-26). In the mixed1 fire regime within the direct effects analysis area, only 21 percent of the acres in the large tree size class would be dominated by ponderosa pine; more than half would be dominated by grand fir.

Structural conditions of the stands in the analysis area would be different than historical conditions. In the nonlethal fire regime, Douglas-fir regeneration would increase as the overstory canopy cover increased. Clumps and groups dominated by Douglas-fir would become more continuous. Due to high densities, ponderosa pine, both the larger and legacy trees, would succumb to insects, creating many snags (Table 3-29 and Table 3-30). Openings would fill in with ponderosa pine and Douglas-fir regeneration, adding to ladder fuels throughout the stands and increasing the risk of uncharacteristic, stand-replacing wildfire. In the mixed1 fire regime, grand fir would continue to dominate the understory. In the overstory, ponderosa pine would decline and become rarer, particularly in the western aggregate where ponderosa pine is the most under-represented. Stand conditions would continue to move successionally toward later seral and climax conditions; patches dominated by early seral species would become smaller. As grand fir increases in the understory, stands would continue to become more susceptible to insect epidemics and uncharacteristic, stand-replacing wildfire. Insect epidemics and stand-replacing wildfire could result in larger and more extensive patches of stand-replacing disturbance across the fire regimes than would have occurred historically.

The patch and pattern diversity that would have occurred historically due to the intermix of nonlethal and mixed1 fire regime patches would be simplified, creating an uncharacteristic patch condition. In addition, the large ponderosa pine currently present and those stands identified by the PIF as priorities for restoration would substantially decline or be lost.

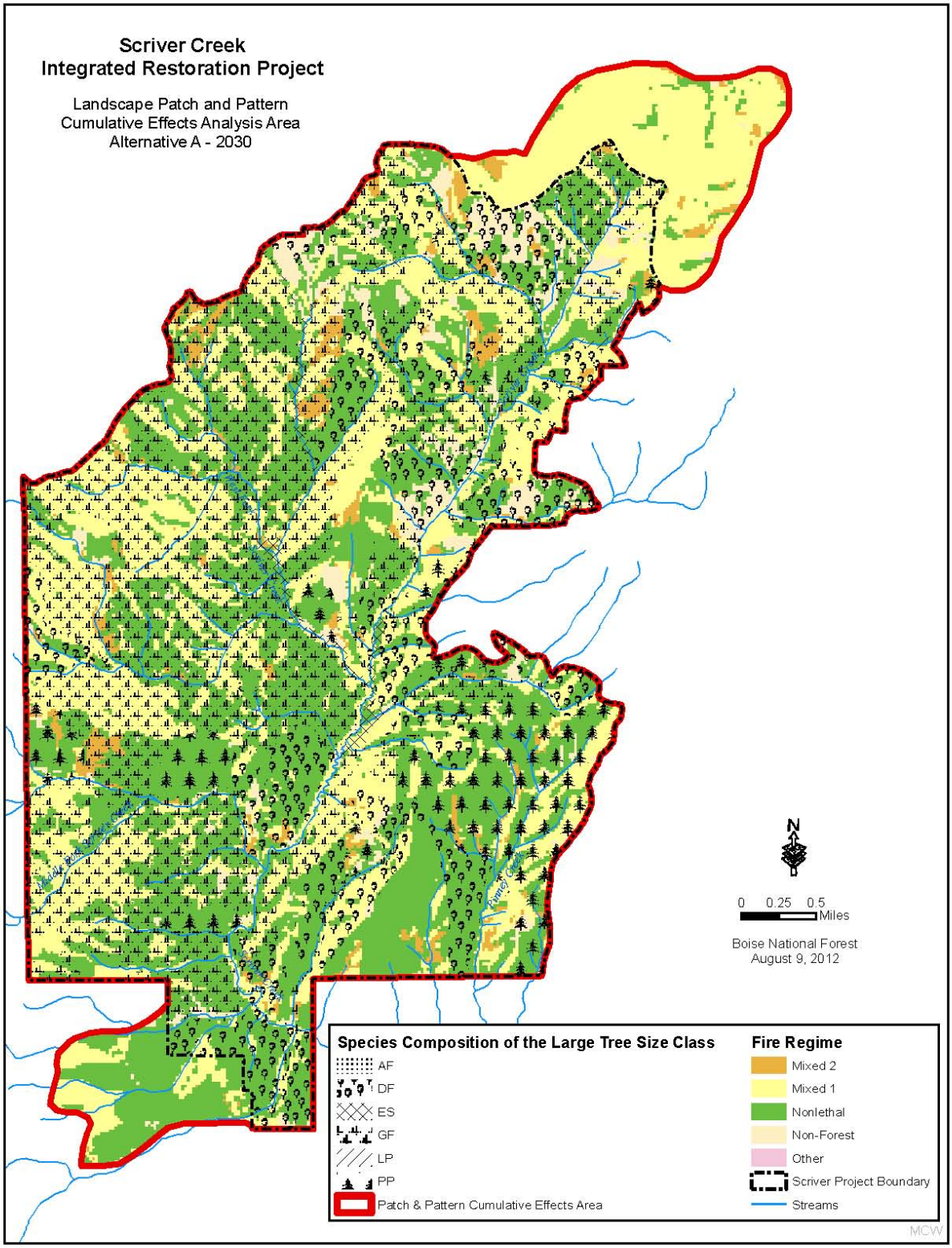

Figure 3-8. Landscape Patches by Fire Regime in 2030 Alternative A

3.2.6.3.2 Cumulative Effects of Alternative A

The most recent data available (Appendix B, Table B.1) were used to identify the existing baseline conditions within the cumulative effects area, thereby, reflecting the incremental impacts of those past disturbances and any increments of recovery that have occurred. The several past timber sales in the area resulted in somewhat less dense conditions (basal area and canopy cover) and in some stands, larger tree size classes. The past harvests did not, however, shift species composition to the desired condition across much of the area with the exception of some stands in northern portions of the cumulative effects analysis area. Past timber harvest also resulted in many plantations, most with relatively uniform spacing due to past planting practices, dotting the cumulative effects analysis area.

A present action is occurring to the northeast called the Frontier Timber Sale. This action may cumulatively impact the landscape patch and pattern attributes by creating small openings, reducing ladder fuels, and increasing tree size class of certain stands within the landscape. The Frontier Timber Sale will affect approximately 103 acres of the cumulative effects analysis area. However, this area, which connects geographically with the northern aggregate, would create a different patch condition than what would occur under Alternative A. While the risk of uncharacteristic insect epidemics and stand-replacing wildfire would be lower in the 103 acres affected by the Frontier Timber Sale, the risks would remain high in the northern aggregate as well as across the other strata under Alternative A (see sections 3.7 and 3.3.2.2), potentially increasing the risk that insect epidemics and wildfire would result in uncharacteristic effects to patches and patterns across this landscape. Stands would shift from the existing condition into the large tree size class, but species composition would not be as desired. Within the cumulative effects analysis area, large tree size class stands dominated by Douglas-fir or grand fir would be the primary constituent of the patches except in a few small areas.

3.2.6.4 Summary of Direct and Indirect Effects of Alternative B

3.2.6.4.1 Direct and Indirect Effects of Alternative B

Alternative B would improve the extent of desirable landscape patches in the fire regimes in the analysis area. When compared to Alternative A, Alternative B would develop larger, more extensive and connected patches of desired conditions within the fire regimes (Figure 3-9). In the nonlethal fire regime, more acres would be in the large tree size class in 2030 under Alternative B than under Alternative A (Table 3-7) and ponderosa pine would be dominant, particularly in Strata I (Table 3-16). By 2030, Strata J would move into the large tree size class with a species composition of ponderosa pine that would be greater than for Alternative A. In combination, Strata I and Strata J would develop a large tree patch that would be closer to the desired condition than the current condition and what would develop under Alternative A. In the mixed1 fire regime, though the number of acres of large tree size class would be the same as Alternative A, Alternative B would produce an overall higher species composition of ponderosa pine and a lower species composition of grand fir. Large tree patches, though overall not at the desired species composition, would move closer to desired conditions than under Alternative A. In addition, though ponderosa pine would still not dominate, the presence of ponderosa pine would be greater under Alternative B in some strata (e.g., Strata E and F in the western aggregate) where the species composition of ponderosa pine is currently lowest of all the aggregates. However, the species composition of Strata K and L, which also occur in the western aggregate, would be the same as Alternative A because these two strata would not be treated

under Alternative B. Figure 3-9 illustrates that the relative abundance of ponderosa pine would increase on treated acres under this alternative which would, therefore, increase the presence of seral species within patches. Alternative B treatments would develop patch conditions (Figure 3-9) that would be more resilient to insect epidemics and uncharacteristic, stand-replacing wildfire. In this case, the extent and severity from disturbance would be more consistent with that expected historically (section 3.3).

In the nonlethal fire regime under Alternative B, species composition of the seed-bearing trees in the overstory in Strata I would be primarily ponderosa pine. Therefore, species composition of the regeneration under Alternative B would likely be predominately ponderosa pine. In the mixed1 fire regime, Alternative B would produce a greater diversity of overstory and understory groups containing different sized trees and a greater diversity of different sizes and arrangements of groups and openings. The succession of groups into larger tree size classes would more likely occur under Alternative B where openings would be large and competition with natural grand fir and Douglas-fir would be lower. Larger openings would facilitate the growth and development of ponderosa pine groups over time. Alternative B would retain fewer seed-bearing grand fir and, in some areas, seed-bearing Douglas-fir, potentially resulting in a greater presence of ponderosa pine regeneration in the understory than Douglas-fir and grand fir.

Alternative B would improve the trend for landscape patches and patterns by altering stand conditions such that insect epidemics and wildfire disturbances would be more likely to result in changes that are consistent with that expected historically. In the mixed1 fire regime, the treated stands would tend to look more like they did historically: large ponderosa pine–dominated groups and clumps with larger openings. Groups and clumps of Douglas-fir and grand fir would also exist, but they would be less common and extensive than under Alternative A. Restoration augmentation may occur in some openings to maintain or increase ponderosa pine regeneration in the understory with an emphasis on strata, such as Strata E, where ponderosa pine is currently rare. The nonlethal fire regime would also result in changes that would be consistent with that expected historically. Groups and clumps of ponderosa pine would dominate with interspersed groups of Douglas-fir. Larger openings would occur where ponderosa pine would regenerate naturally.

All of the plantations are composed of the early seral species important to achieving the desired condition of landscape patches with the desired mix of tree size class and early seral species. Treatments proposed under the action alternatives would improve within-stand diversity through development of desired groups, clumps, and openings consistent with the fire regimes. These conditions would carry forward as the stands progress into the large tree size class.

3.2.6.4.2 Cumulative Effects of Alternative B

The most recent data available (Appendix B Table B.1) were used to identify the existing baseline conditions within the cumulative effects area, thereby reflecting the incremental impacts of those past disturbances and any increments of recovery that have occurred. The several past timber sales in the area resulted in somewhat less dense conditions (basal area and canopy cover) and for the most part, larger tree size classes, particularly in the northern aggregate. However, past timber harvest had different effects on strata in the western aggregate where basal areas and canopy covers are the highest of all the strata. Past timber harvests also did not shift species composition to the desired condition though the species composition of ponderosa pine in Strata A, B, C, and D in the northern aggregate is higher than in Strata E, K, and L in the western

aggregate (Table 3-25 and Appendix D). The past timber sales also resulted in many plantations dotting the cumulative effects analysis area.

Under Alternative B, treated areas would contrast with the untreated areas within the cumulative effects analysis area. The treated areas in the cumulative effects analysis area would be closer to the desired condition of a preponderance of ponderosa pine with structural conditions more similar to historic conditions. This alternative would result in a beneficial cumulative effect on the overall extent and connectivity of patches within the two fire regimes (Figure 3-9.). Large tree patches would be more extensive in 2030 under Alternative B than Alternative A and more of these patches would be dominated by ponderosa pine and Douglas-fir. This difference would be most striking in the nonlethal fire regime area in the southeastern aggregate where more acres would move into the large tree size class by 2030 than under Alternative A. In the northern aggregate, grand fir patches would be smaller. In the western aggregate, though the shift in species composition would not be enough that ponderosa pine would dominate, the species composition of ponderosa pine would increase in Strata E and F but not in Strata K and L since these would not be treated.

As described in section 3.2.6.3.2, the Frontier Timber Sale will affect approximately 103 acres near the northern aggregate. In combination with treatments proposed under Alternative B, the northern portion of the cumulative effects analysis area would develop a larger patch of desired conditions by increasing the presence of early seral ponderosa pine and creating a structure of various sized and configured groups and openings. The area surrounding the northern aggregate not currently proposed for treatment includes the Bear Wallow II timber sale harvested in 1996. There are several plantations in which the proposed treatments would begin development of desired groups and openings consistent with the fire regimes. These areas would blend structurally with the understory of large tree stands in the northern aggregate, creating a larger patch of similar conditions than currently exists or would occur under Alternative A. Following treatments, the remainder of the northern aggregate would blend in with stands to the north but would contrast untreated areas to the north and east. The risk of uncharacteristic insect epidemics and stand-replacing wildfire would be lower in the 103 acres affected by the Frontier Timber Sale as well as the strata treated in this aggregate when compared to Alternative A (see sections 3.7 and 3.3.2.2). Therefore, the risk that insect epidemics and wildfire would result in uncharacteristic effects to forest patches and patterns across this landscape would be lower under this alternative than Alternative A.

Areas adjacent to the western aggregate not proposed for treatment are mostly large tree size class with composition and structure similar to Strata E and F. Strata K and L, because they would not be treated, would therefore continue to develop conditions similar to those described for Alternative A. Of the four strata in this area, Strata K and L comprise 33 percent of the acres. Treated areas under Alternative B would develop overstory species composition that would contrast with areas not proposed for treatment. In addition, Alternative B would develop structural diversity of groups and openings that would appear different from untreated areas. In Strata E and F, overstory and understory groups developed from the treatments would create a greater diversity of structural conditions than would be found in adjacent untreated areas. These treated areas would contribute a diversity of spatial pattern across large tree patches that is currently lacking due to the continuity of similar stand conditions across the area. Strata F, of which most of the 703 acres occur in one large block, would develop a relatively large patch within the area. Strata E, which is about 471 acres, is comprised of four noncontiguous blocks

that would contribute overall to the landscape diversity, but patches would be smaller. Even with the diversity developed by treatments, landscape patch and pattern would continue to be departed from historical conditions throughout the western portion of the cumulative effects analysis area. Throughout the untreated areas, ponderosa pine and Douglas-fir would continue to be under-represented, groups would be more homogenous over extensive portions of the area, and openings that would regenerate to seral species such as ponderosa pine would be smaller and fewer. The risk of insect epidemics and stand-replacing wildfire would be lower in the treated strata (see sections 3.7 and 3.3.2.2). However, due to the juxtaposition and arrangement of treated areas to untreated, insect epidemics or stand-replacing wildfire that originate in surrounding untreated areas could overwhelm the treated patches, resulting in similar effects across the treated and untreated acres. Effects from insect epidemics or wildfire would therefore likely create extensive areas of mortality, which, though potentially less than Alternative A, would not be desirable across the area.

The strata in the southeastern aggregate (Strata C, G, and H) comprise an ecotone between the nonlethal fire regime to the east and the mixed1 fire regime to the west (Appendix D). This ecotonal area exhibits influences of both the nonlethal and mixed1 fire regimes. This southeastern aggregate would blend in with adjacent treated areas (Strata I and J) and untreated areas, primarily in RCAs, and create a large, contiguous patch of similar desired species composition and structural conditions. All the strata in the southeastern aggregate would contribute to the large tree size class with areas where ponderosa pine would be the featured species (Strata I and C); areas where ponderosa pine and Douglas-fir would intermix (Strata J and G); and areas where Douglas-fir would dominate (Strata H). Structural conditions would be clumps, groups, and openings. Overall, the patch would be highly diverse with a variety of groups dominated by a mix of different species combinations interspersed with openings. Regeneration would be primarily ponderosa pine though Douglas-fir would be common in some areas. The risk of insect epidemics and stand-replacing wildfire would be lower under Alternative B compared to Alternative A (see sections 3.7 and 3.3.2.2). Therefore, even though conditions would not be at desired conditions by 2030, insect activity and the effects of wildfire would be closer to historical conditions than would occur under Alternative A.

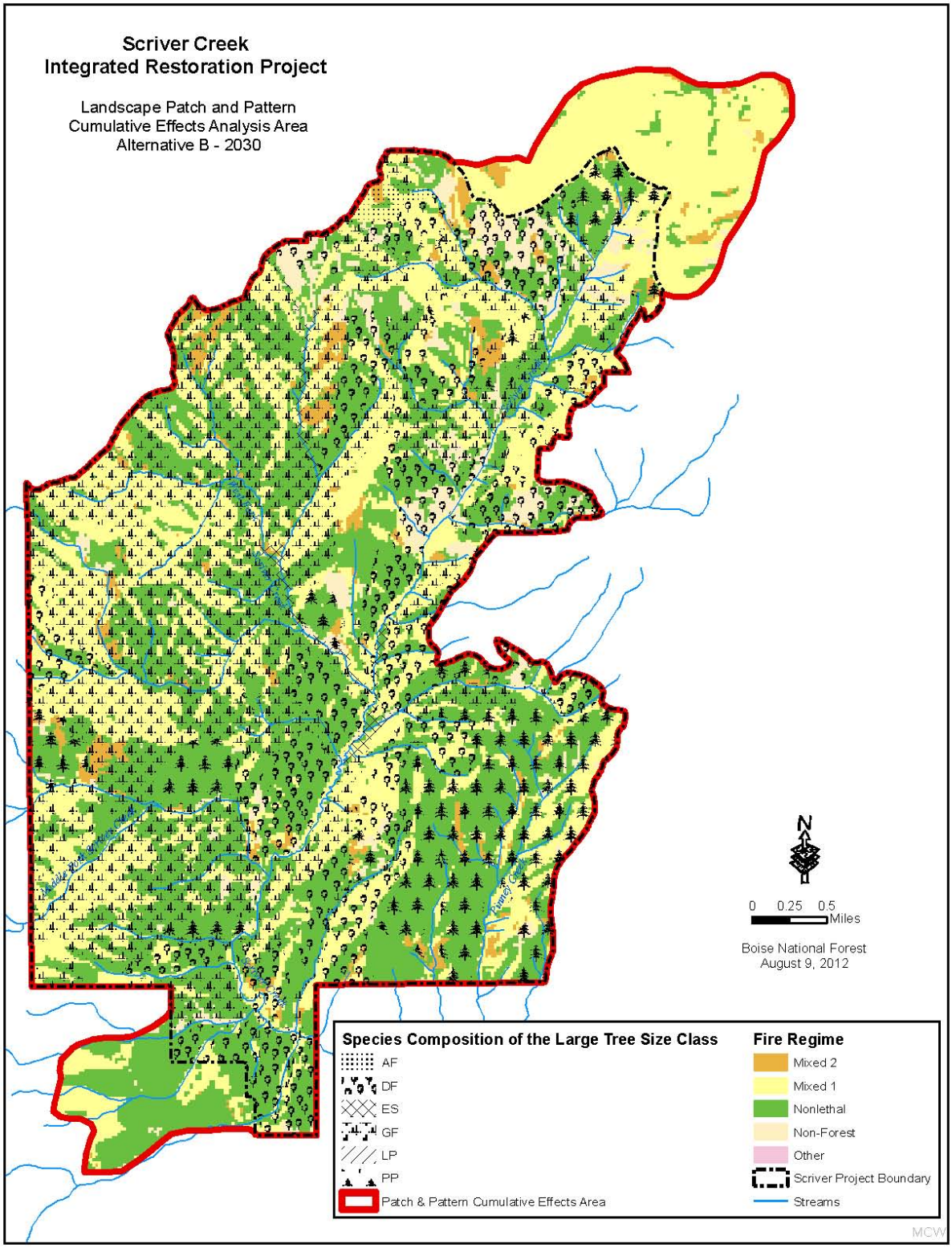

Figure 3-9. Landscape Patterns by Fire Regime for Alternative B in 2030

3.2.6.5 Summary of Direct and Indirect Effects of Alternative C

3.2.6.5.1 Direct and Indirect Effects of Alternative C

Alternative C would be the same as Alternative B for the strata in common (Strata A, B, D, E, F, G, and H). The differences under this alternative would be in Strata C, which would not be treated under Alternative C, and Strata K and L, which would be treated under Alternative C but not under Alternative B. The primary difference between Alternative B and Alternative C would be the patches that would develop in the western aggregate, which is where Strata K and L are located (Figure 3-10). These two strata comprise 33 percent of the strata acres in this aggregate. Treatments would be similar to those described for Alternative B and would result in large tree patches that, though not dominated by ponderosa pine, would contain a greater species composition of ponderosa pine than would occur under Alternatives A and B (Table 3-26). The greatest improvement in ponderosa pine species composition would occur in Strata K; under Strata L ponderosa pine would not improve as much, but Douglas-fir would become more dominant than under Alternatives A and B. These two strata are adjacent, connected, or near Strata E and F and, in combination, would develop larger patches of conditions more similar to desired conditions.

Strata C, which is comprised of stands in the northern and southeastern aggregate, would still be dominated by ponderosa pine under Alternative C, but the species composition would be less than under Alternative B. Under Alternative C, this strata would not be treated and therefore would look the same as described for Alternative A. Under Alternative B, this 105-acre stratum would have had the highest species composition of the strata in the mixed1 fire regime and, as such, would have contributed to species diversity across this ecotonal area (Table 3-26). Under Alternative C, Strata C would appear more similar to surrounding untreated areas though it would maintain a relatively high proportion of ponderosa pine species composition through time.

3.2.6.5.2 Cumulative Effects of Alternative C

As described in section 3.2.6.5.1, Alternative C is the same as Alternative B except for Strata C, K, and L. Strata C would blend in with adjacent untreated areas that are structurally similar. Although this stratum has a relatively high ponderosa pine species composition in the overstory, the species composition of Douglas-fir would increase as smaller Douglas-fir grow into the overstory. Structurally, groups and openings would be fewer, and the continuity of ladder fuels would be greater. In the event of wildfire throughout the area, the effects within these stands would likely be stand-replacing. However, within the context of the landscape, the size of the effect would likely not be outside of historical effects if patches to the south experienced less lethal fire. However, if these stands, in combination with stands to the north, all experienced stand-replacing wildfire at the same time, the effect would be a much larger lethal patch than would be desirable across the area.

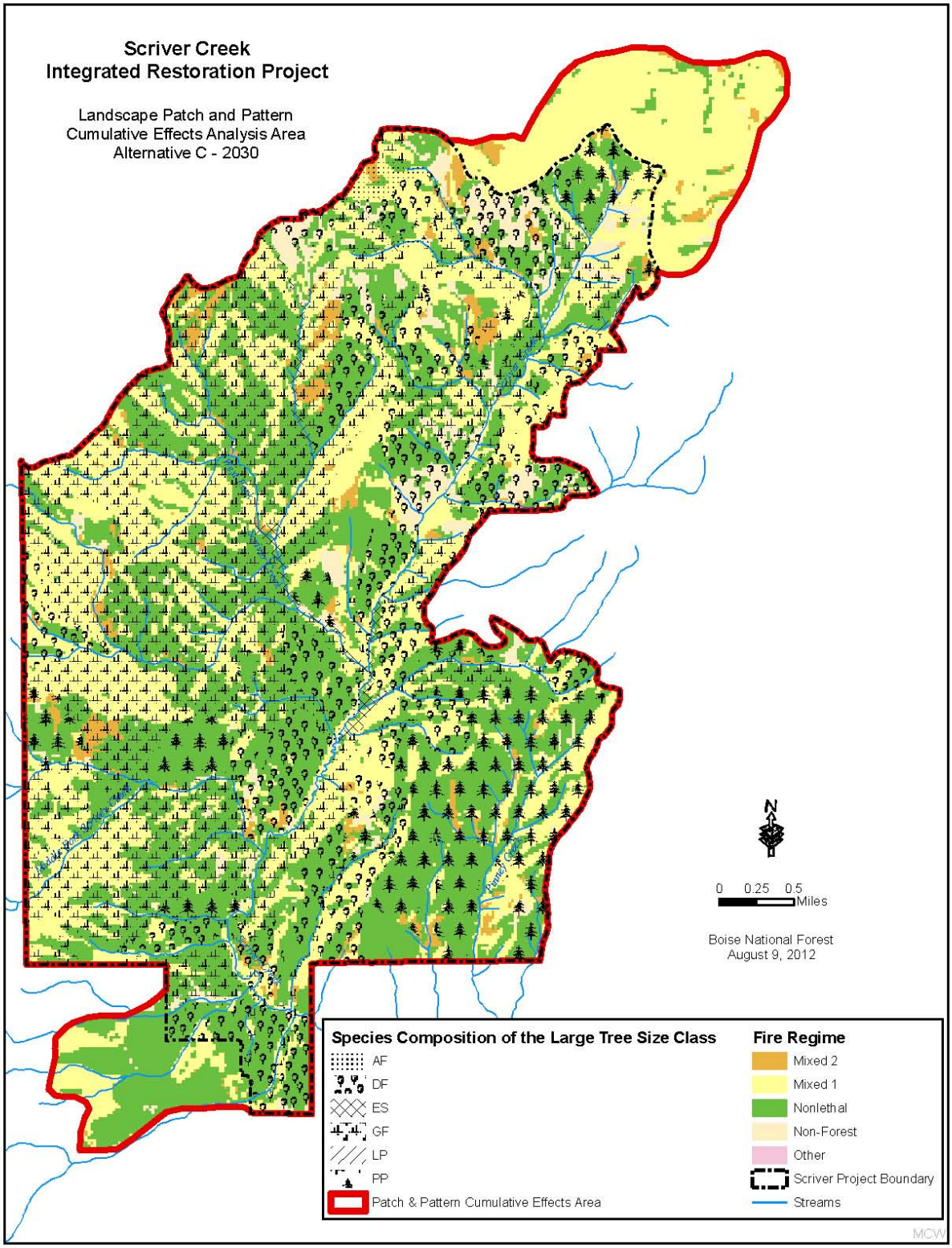

Figure 3-10. Landscape Patterns by Fire Regime for Alternative C in 2030

In the western aggregate, the risk of insect epidemics and stand-replacing wildfire would be lower in the treated strata (see sections 3.7 and 3.3.2.2). In comparison to Alternative B, the juxtaposition and arrangement of Strata K and L in combination with Strata E and F and adjacent untreated areas would likely result in different effects than under Alternative B in the event of insect epidemics or stand-replacing wildfire that may originate in surrounding, untreated areas. Because Alternative C would, in some cases, create larger patches or would break up current conditions across the western portion of the cumulative effects analysis area, the effects from insect epidemics or stand-replacing wildfire that originate outside the treated strata would likely be less similar across treated and untreated areas. This dissimilarity could result in a greater diversity of smaller groups or patches and less extensively affected areas than would occur under Alternative B. In this case, effects from insect epidemics or wildfire would potentially be more desirable than Alternatives A and B.

The effects in the southeastern aggregate are the same as those described for Alternative B.

3.2.6.6 Summary of Direct and Indirect Effects of Alternative D

3.2.6.6.1 Direct and Indirect Effects of Alternative D

Alternatives C and D would treat the same strata. For Strata C, which would not be treated by either alternative, the effects would be the same as Alternative A. The effects on other strata that would be treated under both alternatives would, in some cases, vary between the alternatives. In the northern aggregate, Strata A and B would be treated the same under Alternatives C and D (Table 3-2). Though the treatments would vary slightly in Strata D between Alternative C and D due to TH-9, the results relative to species composition of ponderosa pine and grand fir would be similar, although Alternative D would produce a lower species composition of Douglas-fir by 2030 than Alternative C (Table 3-26). Structurally, Strata D would produce slightly more canopy cover in the overstory than understory under Alternative D compared to Alternative C, but the difference would likely be small (Table 3-24). Therefore, for the northern aggregate, the effects within the analysis area would be very similar between Alternatives C and D (Figure 3-11). In addition, effects to the plantations proposed for treatment in this area would be the same as under Alternative C.

In the southeastern aggregate, treatments for Strata J would be the same for Alternatives C and D. However, for Strata I, G, and H, treatments under Alternative D would be different than Alternative C. In Strata I and G, the species composition of ponderosa pine in large tree size class stands would be lower than Alternative C (Table 3-26) and for Strata I, the number of large ponderosa pine would be less than Alternatives A, B, and C at 2030 (Table 3-9). In addition, Alternative D would not produce a variety of understory clumps and groups like those that would be produced by Alternatives B and C due to the amount of overstory maintained by TH-9. Groups and openings that would be created would likely be fewer and smaller (Youngblood 2005, Triepke et al. 2011). This difference would result in a different recruitment rate for ponderosa pine into the overstory as illustrated by Strata I where the lack of understory groups would reduce the recruitment of large ponderosa pine by 2030. The size and arrangement of overstory groups and clumps would be different under Alternative D compared to Alternative C. Under Alternative D, overstory groups would be more continuous and have a higher proportion of Douglas-fir in Strata I. Across the nonlethal fire regime and ecotonal area that comprise the aggregate, overstory species composition would be a relatively uniform mix of ponderosa pine and Douglas-fir in the nonlethal area and ponderosa pine, Douglas-fir, and grand in the mixed1

area. Unlike Alterative C, no areas would occur where ponderosa pine would be featured (like Strata I under Alternatives B and C), or would be co-dominant (like Strata G under Alternatives B and C). Within-stand structural conditions would be similar between the action alternatives by 2030 for Strata J and H as these strata are in the medium tree size class and would be treated in a similar manner. Under Alternative D, Strata I and G would produce fewer understory groups and smaller openings than Alternatives B and C. The spatial patterning, rather than blending across the strata from the nonlethal fire regime through the ecotonal areas, would potentially be more diverse than historical conditions.

The greatest difference between Alternative D and Alternative C would be in the western aggregate. These two alternatives would both treat the same strata, but the results would be very different between them. Under Alternative D, about 50 percent of the acres proposed for treatment would be dominated by grand fir in 2030 while under Alternative C, about 37 percent would be grand fir. Under Alternative C, 32 percent of the acres proposed for treatment would be dominated by ponderosa pine; under Alternative C, 42 percent would. This aggregate has the lowest species composition of ponderosa pine compared to the other aggregates. Treatments under Alternative D would produce fewer stands dominated by ponderosa pine than Alternative C. In addition, Alternative D would produce different stand conditions than Alternative C. Under Alternative D, only Strata L would achieve the basal area objective; Strata E and K would both exceed the basal area objective by 36 percent due to TH-9, which would retain a large proportion of basal area in the overstory. Strata F would retain 10 percent more basal area than the objective. Under Alternative C, Strata E, F, and L would all achieve the basal area objective; Strata K would retain about 5 percent more than the objective. The result would be very different structural conditions between Alternative C and Alternative D. Under Alternative C, the size and arrangement of clumps, groups, and openings would be more diverse with a greater variety of understory groups and larger openings. Under Alternative D, in all the strata except Strata L, overstory groups would be larger and more continuous, understory groups would be smaller and fewer and more distinct, and the arrangement of openings would be constrained. Even though augmentation would focus on this aggregate, due to the smaller, and potentially more shaded openings, regeneration would likely be a greater mix of shade-tolerant grand fir and Douglas-fir with lesser amounts of shade-intolerant ponderosa pine.

3.2.6.6.2 Cumulative Effects of Alternative D

The overstory of Alternative D would remain similar to surrounding untreated areas. When blended with the untreated stands in the cumulative effects analysis area, Alternative D would show little to no effect for the overstory initially though over time, as understory trees get larger, the presence of ponderosa pine would increase relative to untreated areas and Alternative A. In the nonlethal fire regime, strata in the southeastern aggregate would blend in with adjacent treated and untreated areas (primarily RCAs) in the overstory. As understory groups age, Strata J would contribute to large tree size class with a greater mix of ponderosa pine and Douglas-fir in the overstory. The overstory species composition would blend in with adjacent untreated and other treated strata that maintain a greater mix of ponderosa pine and Douglas-fir in the overstory. This blending would create a large, contiguous patch of similar large tree size class, but not with the desired species composition. Unlike Alternative C, no area in the aggregate would exist where ponderosa pine would be featured in the overstory; instead species composition would be more homogenous across the area. The understory would contrast untreated areas that would maintain a continuity of ladder fuels. Strata H and J would produce a

greater variety, size, and arrangement of clumps, groups, and openings while in Strata I and G, overstory groups would be larger and understory groups and openings smaller. Regeneration would likely be a mix of shade-intolerant ponderosa pine and more shade-tolerant Douglas-fir and grand fir due to the seed-bearing trees in the overstory and depending on the size of openings. The risk of insect epidemics and stand-replacing wildfire would be lower under this alternative than Alternative A (see sections 3.7 and 3.3.2.2). However, though the risk of stand-replacing wildfire would be lower, the effects of wildfire would potentially be different than historically in the mixed1 areas in Strata G. Since fewer groups would exist in the understory, the potential for mixed1 type effects would be lower. Effects in this stratum would be similar to what would occur in the nonlethal fire regime due to the lack of understory fuels.

Effects within the northern aggregate would be similar to those described for Alternative C. The only difference would be for Strata D, but the effects would be subtle. The species composition of ponderosa pine would be slightly lower under Alternative D than Alternative C and Alternative D would retain about 3 percent more basal area than Alternative C, resulting in a slightly different arrangement of overstory and understory groups and openings. However, these differences would be minor and therefore effects in the northern portion of the cumulative effects analysis area would be almost identical between Alternatives C and D.

Unlike the northern portion of the cumulative effects analysis area, the western aggregate would produce the most striking differences between Alternative D and Alternative C. Under Alternative D, species composition of ponderosa pine in the overstory would be greater than surrounding untreated areas and Alternative A but lower than Alternative C. Grand fir would continue to dominate the large tree patches and in many areas, there would be little difference in the overstory across treated and untreated areas. Structurally, Alternative D would retain more canopy cover in the overstory and less in the understory, which would produce smaller understory groups and openings. Because of the high basal areas that would be retained under Alternative D and the presence of seed-bearing grand fir throughout the area, regeneration would be predominately grand fir even with ponderosa pine augmentation. Over time, the treated areas would become compositionally similar to the untreated areas. However, Alternative D would, in some cases, break up the continuity of current conditions across the western portion of the cumulative effects area and, therefore, effects from insect epidemics or stand-replacing wildfires that originate outside the treated strata would likely be less similar across treated and untreated areas. Unlike Alternative C though, effects from wildfire, like described for Strata G, would likely be different than historically due to fewer and smaller understory groups and multi-storied areas. The risk of spruce budworm damage, though less than untreated areas and Alternative A would be highest under this alternative because of the amount of grand fir that would be maintained (section 3.2.7).

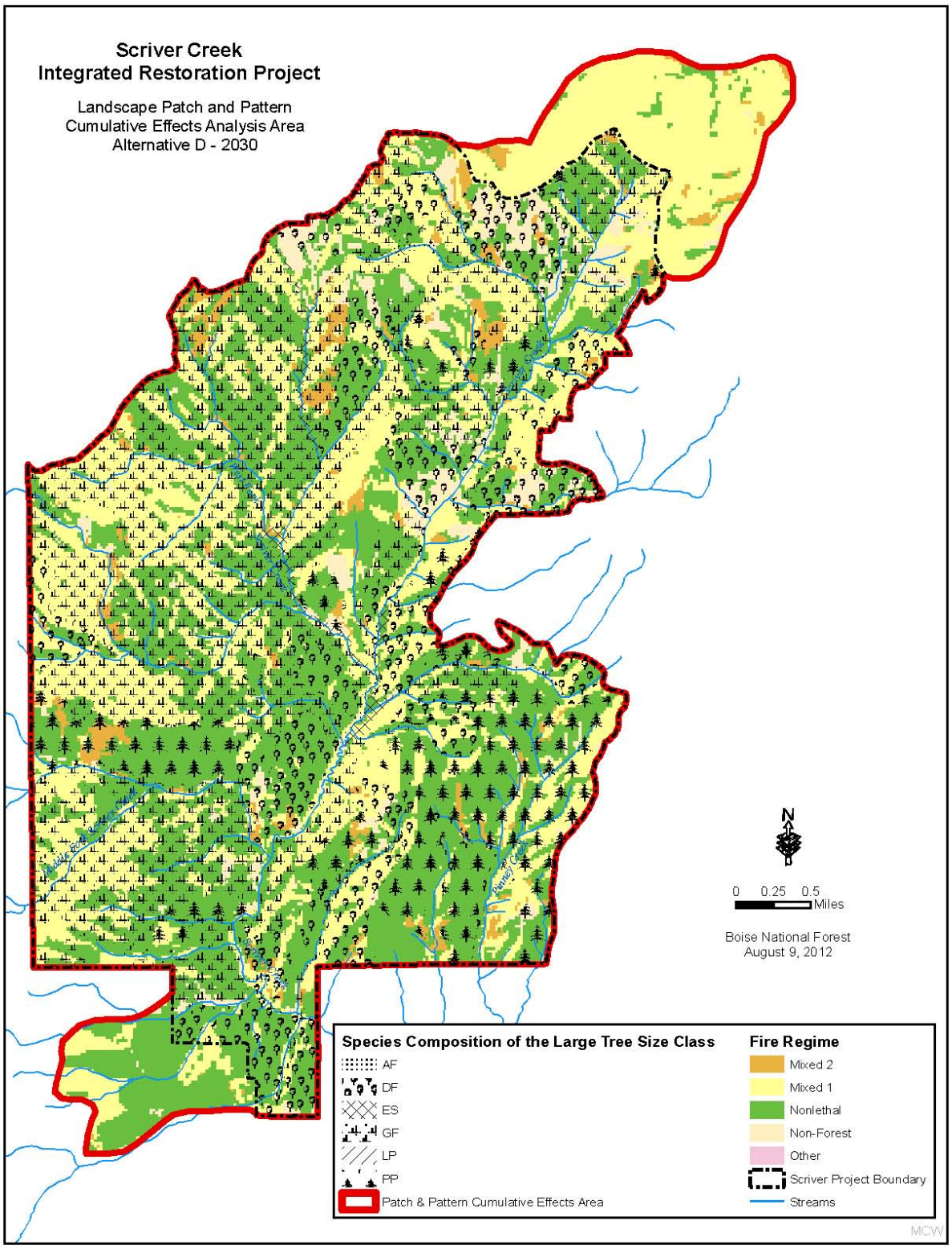

Figure 3-11. Landscape Patterns by Fire Regime for Alternative D in 2030

3.2.7 Indicator: Ecological Disturbance Processes that Create Dead Wood Components

3.2.7.1 Affected Environment

The measures for this Indicator as insect susceptibility rating, number of snags relative to the desired conditions, and amount of CWD.

A variety of forest insects exist within the Scriver Creek Project. For this assessment, western spruce budworm (*Choristoneura occidentalis*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), and western pine beetle (*Dendroctonus brevicomis*) are the insects of interest that are most likely to occur (Lazarus 2011). An automated rating system, the Stand Susceptibility Rating System Central Idaho Forests (SSRP) (Roberts 2011), was used to assess the current conditions associated with these insects within the analysis area. The susceptibility rating does not predict outbreaks or quantify occurrence but rather provides a relative measure of predisposing conditions for damage from the insects based on stand conditions.

Western Spruce Budworm—This insect attacks a variety of tree species, including grand fir, subalpine fir, Douglas-fir, Engelmann spruce, and western larch. Outbreaks of this defoliating insect often occur when favorable weather conditions, such as warm dry springs, coincide with highly susceptible stand conditions. Dense, multi-storied stands of host species, which describes the majority of stands within the analysis area, are highly susceptible because they provide a high concentration of food and therefore dispersing (dropping) larvae are more likely to contact palatable foliage. Dense stands also reduce the likelihood of larvae predation by birds and other insects. Repeated defoliation can cause reduced annual growth, kill tree tops, and in some cases kill the entire tree (Lazarus 2011).

The most recent western spruce budworm epidemic peaked in the mid-1980s. Historically, epidemics have occurred at 25- to 30-year intervals. Reconnaissance of the analysis area in summer 2010 indicates that populations of this insect are increasing with evidence of defoliation prevalent throughout the area.

Douglas-fir Beetle—This insect attacks and kills Douglas-fir. Typically it attacks down, damaged, diseased, defoliated, or drought-stressed, larger, older trees. Douglas-fir beetle can build up rapidly in areas of extensive windthrow, after large fires, or after consecutive years of drought. High populations of Douglas-fir beetle can result in large areas of infested trees, but typically outbreaks subside after a few years. This beetle typically attacks the largest available host species first, continuing to the smaller diameter host trees as epidemics progress.

Western Pine Beetle—This member of the bark beetle family can aggressively attack ponderosa pine of all ages and vigor classes that are ≥6 inches d.b.h. However, the beetle typically attacks trees in the large tree size class. Group killing of trees is common in dense stands of pure, even-aged, young ponderosa pine but also occurs among dense clumps of ponderosa pine in mixed conifer stands.

3.2.7.1.1 Current Condition in the Nonlethal Fire Regime

The nonlethal fire regime consists of two strata: Strata I and J (see Appendix D for description of strata). Based on modeling with the SSRP, approximately 50 percent of the nonlethal fire regime area has a moderate susceptibility to damage from western spruce budworm, 14 percent of the stands in the area are considered to have a moderate susceptibility to damage from the Douglas-

fir beetle, and 29 percent of the stands in the area are considered to have a high susceptibility to damage from western pine beetle.

3.2.7.1.2 Summary of Effects in the Nonlethal Fire Regime

In the nonlethal fire regime, modeling with the SSRP for western spruce bud worm susceptibility produced similar effects across all action alternatives in 2030. Currently, about 50 percent of the area is rated moderate; treatments under the action alternative reduce the amount of area assigned a moderate rating to around 7 percent. Under Alternative A, the amount of area with a moderate rating would increase to 64 percent in 2030. Currently, about 14 percent of the stands have a moderate rating for Douglas-fir beetle. Under Alternative A, the number of stands with a moderate rating would increase to 50 percent. However, with the action alternatives, all stands would be assigned a low rating; therefore, the area of moderate rating would drop to 0 in 2030. The pattern for western pine beetle is the same. The existing condition indicates that 29 percent of the stands have a high rating for the western pine beetle. Applying the action alternatives would drop the rate from 29 percent to between 14 percent under Alternative D and 17 percent under Alternatives B and C in 2030. Therefore, it appears the action alternatives would decrease the risk of insect damage relative to the existing condition and Alternative A, and Alternative D would do slightly better than Alternatives B and C.

3.2.7.1.2.1 Direct and Indirect Effects of Alternative A

Under Alternative A, potential for natural disturbance regimes, such as insect epidemics and stand-replacing wildfire, could result in larger and more extensive patches of stand-replacing disturbance in the nonlethal fire regime than would have occurred historically due to increased stand densities. Susceptibility to these three main insects would increase over time. Based on modeling with the SSRP, in year 2030, 64 percent of the stands in the area would rate moderate susceptibility for western spruce budworm, 50 percent of the stands in the nonlethal fire regime area would increase to moderate ratings for Douglas-fir beetle, and 57 percent of the stands would have a high rating for western pine beetle.

3.2.7.1.2.2 Direct and Indirect Effects of Alternative B

Alternative B treatments would produce stands that would be more resilient to natural disturbance, thus reducing the risk of insect epidemics. Instead, the extent and severity from disturbance would be more consistent with that expected historically. Based on projections of post-implementation stand conditions, this alternative would reduce the susceptibility rating of insects in the area. Western spruce budworm's susceptibility rating would drop to moderate over 7 percent of the stands with no high rating in the area. Proposed activities would reduce stand density (as indicated by changes in basal area and canopy cover). The abundance of host species on treated acres would also be reduced by increasing the potential for the early seral ponderosa pine. All of the stands where Douglas-fir may currently be susceptible to the Douglas-fir beetle would be assigned to a low rating. Removing less vigorous Douglas-fir trees and reducing stand densities would directly reduce susceptibility of stands to this insect. The susceptibility rating for stands in the analysis area for western pine beetle would decline from 29 to 17 percent assigned a high rating. Reducing densities of ponderosa pine and stands of ponderosa pine and Douglas-fir would greatly reduce susceptibility to this insect. In addition, removing trees infested at the time of implementation would directly reduce the beetle population and the amount of mortality in potential host trees.

3.2.7.1.2.3 Direct and Indirect Effects of Alternative C

The results for Alternative C would be the same as those described for Alternative B.

3.2.7.1.2.4 Direct and Indirect Effects of Alternative D

Vegetative treatments included in Alternative D would develop ratings similar to Alternatives B and C for the Douglas-fir beetle and western spruce budworm. However, western pine beetle susceptibility would decrease more under this alternative than under Alternatives B and C. Western pine beetle susceptibility would decrease from 29 to 14 percent of the stands with a high rating compared to a decrease from 29 to 17 percent for Alternatives B and C. This greater reduction could be due to leaving more large trees of different species instead of leaving large trees with the majority being ponderosa pine. In addition, Alternative D would produce fewer large ponderosa pine over time (Table 3-14), which would reduce the susceptibility rating. There would be fewer ponderosa pine than Alternative A, but higher stand densities and, therefore, greater stress would produce a higher rating for western pine beetle under Alternative A.

3.2.7.1.2.5 Cumulative Effects of Alternatives A, B, C, and D

The indirect effects of any alternative on susceptibility to forest insects would be limited to the cumulative effects analysis area. Therefore, the area used to assess cumulative effects consists of the 13,021 acre cumulative effects analysis area.

In the past, an estimated 13 timber sales have been implemented within the cumulative effects analysis area. Although the specific effects cannot be quantified, the existing conditions disclosed above reflect the impacts of those past activities as well as any vegetative recovery that has occurred since those actions. Due to past harvest activities, the vertical structure of the stands may have increased susceptibility to the insect species of concern. These harvest areas also included numerous reforestation efforts. Roughly 550 acres of plantations have been precommercially thinned in past years. These thinnings may have benefitted plantations by maintaining insects at endemic levels. There are ongoing activities within the cumulative effects area, namely the Frontier Timber Sale that may beneficially affect the susceptibility of the stands in the cumulative effects analysis area by reducing density (basal area and canopy cover) and shifting the species composition toward increased early seral ponderosa pine. Reasonable or foreseeable activities that may affect the susceptibility of the stands to insects in the cumulative effects analysis area may be activities on State and private land adjacent to the Forest boundary. The Rocky Canyon prescribed burn may scorch trees adjacent to the cumulative effects analysis area. These prescribed burns might lead to increased insect occurrences from the adjacent area into the cumulative effects analysis area.

The indirect effects of Alternative A would be a higher potential for uncharacteristic wildfire in the area than would have occurred historically, thereby increasing the potential for epidemic insect outbreaks. And conversely, if an insect epidemic were to occur, the extent and intensity and severity of an uncharacteristic wildfire would potentially be greater. Implementing Alternatives B, C, or D in combination with past management activities would improve the overall condition of the stands within the area and reduce stand susceptibility to insects. The cumulative effect of any one alternative, in comparison to Alternative A, would be a larger percentage of the area’s species composition, structure, and density with conditions that would be more conducive to endemic levels of western spruce budworm, Douglas-fir beetle, and western pine beetle.

3.2.7.1.3 Current Condition in the Mixed1 Fire Regime

The mixed1 fire regime consists of 10 strata (see Appendix D for the strata descriptions). Based on modeling with the SSRP, approximately 42 percent of the mixed1 area has a high susceptibility to damage from the western spruce budworm, approximately 26 percent of the stands have a moderate-to-high susceptibility to damage from Douglas-fir beetle, and 21 percent of the stands have a high susceptibility to damage from western pine beetle.

3.2.7.1.4 Summary of Effects in the Mixed1 Fire Regime

In the mixed1 fire regime, susceptibility to damage from insects would decrease under all action alternatives though there would be slight variations between the alternatives. However, overall susceptibility would decline for the action alternatives and would increase for Alternative A. For western spruce budworm, the existing conditions indicate that 43 percent of the stands have a high susceptibility rating. By 2030, the susceptibility rating under Alternative A would decrease to 38 percent. However, under the action alternatives, the susceptibility rating would drop to between 5 and 13 percent. For Douglas-fir beetle, the existing condition is at about a 26 percent moderate-to-high rating. For Alternative A, the rating would increase to 38 percent of the stands assigned a moderate-to-high rating. The action alternatives would decrease the moderate-to-high susceptibility rating to between 8 and 13 percent in 2030. About 21 percent assigned are assigned a high susceptibility rating for western pine beetle. No change would occur under Alternative A. Alternatives B and C would drop the rating slightly and Alternative D would increase the rating slightly. The action alternatives would result in a minor decrease by 2030.

3.2.7.1.4.1 Direct and Indirect Effects of Alternative A

Under Alternative A, potential insect epidemics and wildfire would result in larger and more extensive patches of stand-replacing disturbance in the mixed1 fire regime than would have occurred historically due to increased stand densities. Susceptibility to the three insects described above would increase over time. The SSRP high susceptibility rating for western spruce budworm would increase to 38 percent by 2030. Douglas-fir beetle moderate-to-high susceptibility rating would escalate to over 38 percent in the same timeframe. Western pine beetle would remain at a high susceptibility rating of 20 percent.

3.2.7.1.4.2 Direct and Indirect Effects of Alternative B

Alternative B treatments would produce stands that would be more resilient to disturbance, such as insect epidemics. Under this alternative, the extent and severity from insects would be more consistent with that expected historically. Based on projections of post-implementation stand conditions, this alternative would reduce the susceptibility rating of for the insects of interest. Western spruce budworm’s susceptibility rating would decrease from a high rating for 42 percent of the stands to 5 percent of the stands. Proposed activities would reduce stand density (basal area and canopy cover). The abundance of host species on treated acres would also be reduced by increasing the potential for the early seral ponderosa pine. The percent of stands with moderate-to-high susceptibility to the Douglas-fir beetle would fall from 26 percent to 13 percent. Removing less vigorous Douglas-fir trees and reducing stand densities would decrease stand susceptibility to this insect. Stands in the analysis area with a high susceptibility rating for western pine beetle are 21 percent. Removing tress infested at the time of

implementation would directly reduce the beetle population and tree mortality in potential host trees.

3.2.7.1.4.3 Direct and Indirect Effects of Alternative C

Treatments included in Alternative C are the same as Alternative B on the acres that are treated. The main difference between Alternatives C and D compared to Alternative B are the additional acres that would be treated. Alternative C activities would also produce stands that are more resilient to natural disturbance, thus reducing the risk of insect epidemics. The extent and severity from insect disturbance would be more consistent with that expected historically. Based on projections of post-implementation stand conditions, this alternative would reduce the susceptibility rating to insects. Western spruce budworm's rating would drop from a high rating for 42 percent of the stands to 10 percent of the stands. Proposed activities would reduce stand density (basal area and canopy cover). The abundance of host species on treated acres would also be reduced by increasing the potential for the early seral ponderosa pine. The percent of stands with moderate-to-high susceptibility to the Douglas-fir beetle would be reduced from 26 to 13 percent in 2030. Removing less vigorous Douglas-fir trees and reducing stand densities would decrease susceptibility to this insect. Stands in the analysis area with a high susceptibility rating for western pine beetle would decline from 21 to 18 percent. Reduced densities of ponderosa pine and mixes of ponderosa pine and Douglas-fir would greatly reduce the susceptibility to this insect. In addition, removing tress infested at the time of implementation would directly reduce the beetle population and tree mortality in potential host trees.

3.2.7.1.4.4 Direct and Indirect Effects of Alternative D

Vegetative treatments included in Alternative D do not vary much from Alternatives B and C. Under this alternative, the western spruce budworm rating over the area would drop to 13 percent with a high susceptibility rating. Moderate-to-high Douglas-fir beetle susceptibility would decline to 8 percent in 2030. Western pine beetle susceptibility would increase slightly in that 22 percent of the stands would have a high rating. This increase may be due to the retention of all large trees (trees ≥20 inches d.b.h.), regardless of species, under TH-9, which may increase tree stress for growing space and thereby increase risk to western pine beetle damage.

3.2.7.1.4.5 Cumulative Effects of Alternatives B, C, and D

The indirect effects of any alternative on susceptibility to forest insects would be limited to the cumulative effects area. Therefore, the area used to assess cumulative effects consists of the 13,021 acre indirect/cumulative effects area.

In the past, an estimated 13 timber sales have been implemented within the cumulative effects area. Although the specific effects cannot be quantified, the existing conditions disclosed above reflect the impacts of those past activities as well as any vegetative recovery that has occurred since those actions. Due to past harvest activities, the vertical structure of the stands may have increased susceptibility to the insect species of concern. These harvest areas also included numerous reforestation efforts. Roughly 550 acres of plantations have been precommercially thinned in past years. These thinnings may have benefitted the plantations to keep insect activity to an endemic level. Ongoing activities within the cumulative effects area, namely the Frontier Timber Sale, may beneficially affect the susceptibility of the stands in the cumulative effects area by reducing density (canopy cover) and shifting the species composition toward increased

early seral ponderosa pine. Reasonable or foreseeable activities that may affect the susceptibility of the stand in the cumulative effects area to insects may be activities on state and private land adjacent to the Forest boundary. The Rocky Canyon prescribed burn may scorch trees adjacent to the cumulative effects area. These prescribed burns might lead to increased insect occurrences from the adjacent area into the cumulative effects area.

The indirect effects of Alternative A may be a higher probability of uncharacteristic wildfire in the area than would have occurred historically, thereby increasing the potential for insect outbreaks. And conversely, if an insect epidemic were to occur, the extent, intensity, and severity of an uncharacteristic wildfire would potentially be greater. Implementing Alternatives B, C, or D in combination with past management activities would improve the overall condition of the stands within the area and reduce stand susceptibility to insects. The cumulative effect of this alternative, in comparison to Alternative A, would be a larger percentage of the area's species composition, structure, and density would reflect conditions resilient to damage from western spruce budworm, Douglas-fir beetle, and western pine beetle.

3.2.8 Number of Snags Relative to the Desired Conditions

3.2.8.1 Nonlethal Fire Regime

3.2.8.1.1 Affected Environment

A snag is defined as a standing dead tree (Forest Service 2010a, p. GL-45). Snags are an important component of the environment, providing not only habitat for a variety of birds and terrestrial species, but also serving as a source of CWD, which plays an important role in soil productivity. Snags are known to fluctuate both spatially and temporally and are often found in clumps or groups for a variety of reasons, including insects, diseases, and/or wildfire. Appendix A of the 2010 Forest Plan discloses desired ranges of snags for individual PVGs and explains that those desired ranges are not meant to provide an even distribution of snags 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[44] (Forest Service 2010a Appendix A, p A-12). The activity areas for this analysis are the strata that are being commercially harvested.

The maintenance and restoration of nutrient cycling, decomposition processes, and a nutrient supply from vegetation are important for sustaining soil productivity and depend, in part, on having a sufficient amount of CWD onsite. Nutrient cycling depends on a variety of sizes of CWD and finer organics on the soil surface and within the soil. Nutrient cycling is also influenced by the degree of material decay. Typically, a full range of decay levels on the site provide for a slow, continual release of nutrients. CWD onsite also provides for moisture retention and an environment that supports bacteria and microbes important to the nutrient cycling process. Large CWD (logs) is also an important habitat component for some wildlife species or their prey.

[44] Snag Activity Area—The activity area for snags is specific site affected by actions, such as timber harvest, site preparation reforestation, timber stand improvement, and prescribed fire, whether effects are positive or negative (USDA Forest Service 2010a, p. GL1).

The following discussions compare the existing condition of the activity area with the desired conditions for snags and CWD as defined in the 2010 Forest Plan (Forest Service 2010a, Appendix A, Tables A-6 and A-7. p. A-11). The numbers presented in the tables were derived from stand examination data and modeled with the FVS-FFE; they are only reflective of the stands in the largest extent analysis area, not including plantations, which is approximately 3,575 acres (see section 3.2.1.2.1 for more detail about the modeling). Appendix A describes the desired condition of coarse wood ≥15 inches as a percentage of the total tons. For comparison purposes, these values are presented as actual ranges of tons per acre. Snags will certainly contribute to CWD levels in the future, however, only that material on the ground and in decay Class I or II was considered in describing the existing conditions.

The number of snags per acre represents snags >30 feet tall. The stands were grouped into strata that represent similar current conditions (Appendix D). For purposes of the analysis, conditions were modeled by stand and are displayed for the strata using a weighted average of the acres of the stands that comprise each stratum. Though the strata were developed to reduce the variability of conditions across the area, the results represent the average of the range of conditions that occur between stands. An overall condition is also presented that uses the weighted averages by strata and weights by total acres for the nonlethal fire regime.

3.2.8.1.2 Current Conditions

Table 3-29 shows the desired range of conditions from Appendix A (Forest Service 2010a) for the existing condition compared to the desired condition range. Currently, overall snags between 10 and 20 inches d.b.h. exceed the desired range. Snags >20 inches d.b.h. are within the desired conditions though at the low end due to Strata J. CWD meets the desired ranges for material >3 inches. Large CWD is currently well below desired conditions.

Table 3-29 Summary of Desired Condition (DC) Ranges, Existing Condition (EC), and Snags and Coarse Woody Debris (Post-treatment (2011) and in 2030 by Strata and Alternative in the Nonlethal Fire Regime

Snags and Coarse Woody Debris	DC	EC	Alternative A		Alternative B		Alternative C		Alternative D	
			2011	2030	2011	2030	2011	2030	2011	2030
Strata I										
Snags 10–20 inch d.b.h. (per acre)	1.8-2.7	5.74	6.21	15.99	5.72	4.97	5.72	4.97	5.68	4.45
Snags ≥20 inch d.b.h. (per acre)	0.4-3.0	1.57	1.70	4.28	1.61	2.59	1.61	2.59	1.64	2.86
CWD >3 inch d.b.h. (tons/acre)	4-14	3.77	3.78	4.65	3.89	4.19	3.89	4.19	3.99	4.23
CWD >12 inch d.b.h.(tons/acre)	3-10.5	0.01	0.02	0.32	0.01	0.19	0.01	0.19	0.01	0.19
Strata J										
Snags 10–20 inch d.b.h. (per acre)	1.8-2.7	2.09	2.64	14.44	2.21	4.27	2.21	4.27	2.21	4.27
Snags ≥20 inch d.b.h. (per acre)	0.4-3.0	0.31	0.37	1.49	0.33	0.98	0.33	0.98	0.33	0.98
CWD >3 inch d.b.h. (tons/acre)	4-14	4.17	4.17	4.81	4.23	4.41	4.23	4.41	4.23	4.41
CWD >12 inch d.b.h.(tons/acre)	3-10.5	0.01	0.01	0.21	0.01	0.14	0.01	0.14	0.01	0.14
Overall										
Snags 10–20 inch d.b.h. (per acre)	1.8-2.7	2.76	3.29	14.72	2.85	4.39	2.85	4.39	2.84	4.30
Snags ≥20 inch d.b.h. (per acre)	0.4-3.0	0.54	0.61	2.00	0.56	1.27	0.56	1.27	0.57	1.32
CWD >3 inch d.b.h. (tons/acre)	4-14	4.09	4.09	4.78	4.16	4.36	4.16	4.36	4.18	4.37
CWD >12 inch d.b.h.(tons/acre)	3-10.5	0.01	0.01	0.23	0.01	0.15	0.01	0.15	0.01	0.15

3.2.8.1.3 Summary of Direct and Indirect Effects

With implementing all action alternatives, snags in the 10 to 20 inch d.b.h. would exceed the desired condition ranges by 2030 (Table 3-29). For snags ≥20 inches d.b.h., for all action alternatives, the result would be similar and would meet the desired range. Implementing all action alternatives would increase CWD >3 inches diameter over existing. This outcome meets the desired range of conditions for all action alternatives. However, CWD would still be well below the desired condition for the 15 inch diameter (>12 inch) group by 2030. Design Feature TH-8 (section 2.4.2.1) would attempt to reduce the deficit of large CWD by stating "if during the timber sale layout process it is determined that the large size class of CWD is lacking, provisions would be made to leave cull logs, which are generally large diameter, in the stand in order to increase CWD levels." This retention would be accomplished by hauling cull logs back into tractor/jammer units or leaving cull logs, if encountered, onsite in skyline and helicopter units. This activity would help contribute to CWD of the large size class in the analysis area.

3.2.8.1.4 Direct and Indirect Effects of Alternative A

Under Alternative A, snag numbers would be expected to remain similar to existing conditions or increase by 2030 due to recruitment and loss of snags over time through natural processes. Alternative A would exceed the desired condition ranges for snags in 2030 based on the numbers of snags per acre in the 10- to 20-inch-diameter group. This exceedance would likely be due to insect and disease mortality spurred by high tree densities. However, the species composition of the snags per acre under Alternative A would likely not be as desired as reflected by the species of the live trees (sections 3.2.4.1.6.2 and 3.2.5.1.6.2). Vegetation guideline VEGU10 states that retaining large snags of seral species is consistent with the species composition desired condition to increase longevity of stand snags (Forest Service 2010a, p. III-33). In other words, snag numbers may be within desired ranges but tree species composition of those snags would not. Therefore the likelihood that snags of desired species would continue to be deficient in the future.

Some recruitment and loss of CWD would occur over time through natural processes. CWD levels would be expected to remain similar to the existing conditions for small-diameter CWD. Small-diameter CWD is within desired conditions and is projected to remain within desired conditions under Alternative A. Large CWD is well below desired conditions and would likely stay well below the desired condition for 2030. This pattern may be partly due to the 20-year timeframe used to model CWD recruitment as it is unlikely long enough to effectively show recruitment of snags to CWD.

3.2.8.1.5 Direct and Indirect Effects of Alternative B

Under Alternative B, the snags per acre would be expected to meet or exceed the desired ranges for both strata in 2030 (Table 3-29). Recruitment and loss of snags would continue to occur over time through natural processes. Vegetation guideline VEGU10 states that retaining large snags of seral species is consistent with the desired species composition to increase longevity of standing snags (Forest Service 2010a, p. III-33). Although this alternative would have fewer snags per acre overall, particularly in the small diameter group (10 to 20 inches), than Alternative A, the snags would generally be larger and more representative of the desired tree species due to the adjustment of the live tree species composition. Additionally, Alternative B would have fewer small snags per acre than Alternative A due to treatment objectives to reduce ladder fuels and

overall density of trees in the understory. Endemic insect levels could also contribute to snag recruitment of large ponderosa pine snags over time due to the number of large ponderosa pine retained in the stands. Furthermore, Design Feature WL-3 associated with this alternative requires that all existing snags ≥10 inches d.b.h. not posing a safety hazard to logging or post-harvest activities be retained within proposed harvest units, and if felled, retained onsite (section 2.4.2.1). While a certain number of snags could be felled for safety reasons, the number of snags affected would be minimal.

Proposed activities for this alternative include underburning approximately 962 acres to treat activity fuels. These burning activities could result in mortality of live trees retained within harvest units, particularly if those trees are relatively small in diameter or thin-barked tree species such as Douglas-fir. However, prescribed fire is expected to have little effect on snags densities or distribution in the preferred diameter groups of 10 to 20 inches and ≥20 inches. The proposed low-to-moderate intensity prescribed fire would occur in PVG 2 only and mortality of retained live trees >8 inches d.b.h. would not be expected since retained trees in this PVG would primarily be large-diameter ponderosa pine, which are more resistant to fire. While it is possible that proposed burning activities may consume a small number of existing snags, any loss would likely be offset by the addition of thin-barked species (e.g., Douglas-fir) snags scattered across affected acres that may succumb to a low or moderate intensity fire or to endemic insect populations.

Under this alternative, there would be a potential for snags to be removed by public fuelwood gathering activities. Though road decommissioning is proposed within the Project area under this alternative, all roads proposed to be decommissioned are not open to motor vehicle use on the current Emmett RD MVUM. Therefore, no impact to snag densities from public fuelwood gathering would be expected from the proposed decommissioning.

Under Alternative B, some recruitment and loss of CWD would occur over time through natural processes. CWD levels in the nonlethal fire regime would be expected to remain similar to the existing condition for small CWD. Small-diameter CWD is within desired conditions and is projected to remain within desired conditions under Alternative B. Large CWD remains well below desired conditions. Modeling illustrates that by 2030 Alternative B would result in an increase in large-diameter CWD but would not meet desired conditions for these strata. Although the trends of Alternative A and Alternative B are similar, the modeling results indicate Alternative B would have slightly less CWD than Alternative A. Due to density reductions in both the small and large tree size classes, a similar reduction in CWD would be expected. The assumption was also made that the majority of slash would be removed from the harvest sites. Approximately 962 acres of low-to-moderate intensity prescribed fire would minimize consumption of CWD between 3 and 6 inches in diameter while still meeting 2010 Forest Plan Vegetation Guideline VEGU03. This guideline states when CWD in the larger size classes (>15 inches diameter) is not available for retention in an activity area, smaller size classes may be utilized to meet desired tonnage conditions describe in Appendix A. However, these smaller size classes should only be utilized where the resulting fire hazard risk would remain within defined fuels management objectives. Fire hazard risk as it relates to both the activity area and adjacent areas should be considered. Fire intensity and severity would be controlled by fuel moisture conditions. Consequently, material >6 inched d.b.h. would not be expected to be consumed. Burning may also result in the recruitment of smaller diameter CWD as small, non-merchantable, thinned barked species (e.g., Douglas-fir) may succumb. Regardless of the effects

on existing coarse wood or snags, sufficient live trees would be present after implementation to provide ample sources of future CWD recruitment.

Alternative B would include silvicultural treatments on 1,069 acres (Table 3-2). However, it would not require nor permit removing logs currently on the ground. Therefore, proposed harvest activity in the commercially thinned area would have no effect on existing CWD levels. Design Feature TH-8 (section 2.4.2.1) states that, if during the timber sale layout process it is determined that the large size class of CWD is lacking, provisions would be made to leave cull logs, which are generally large diameter, in the stand in order to increase CWD levels. This design feature would be accomplished by hauling cull logs back into tractor/jammer units or leaving cull logs, if encountered, onsite in skyline and helicopter units. This activity would help contribute to CWD of the large size class in the analysis area. Cull logs are not represented in Table 3-29 as there is no estimate of how many would occur.

3.2.8.1.6 Direct and Indirect Effects of Alternative C

Alternative C would employ the same silvicultural prescriptions for the commercially harvested units as Alternative B. Therefore, the effects for Alternative C are the same as Alternative B.

3.2.8.1.7 Direct and Indirect Effects of Alternative D

For Alternative D, TH-9 retains all large trees of any species. The treatment areas for commercial harvest and prescribed fire would be as described in Alternative C above. However, retaining all tree species >20 inches d.b.h. would have little effect on snags or CWD. The main influence on snags and CWD would be from smaller sized trees. Alternative D would produce fewer 10- to 20-inch snags in Strata I due to understory treatments (see section 3.2.4.2.2). However, effects for Alternative D would generally be similar to those described for Alternative B above.

3.2.8.1.8 Cumulative Effects

The most recent data available (Appendix B) were used to identify the existing baseline conditions within the cumulative effects area, thereby reflecting the incremental impacts of those past disturbances and any increments of change that have occurred.

Appendix B of this document outlines the past, ongoing, and reasonably foreseeable actions evaluated for inclusion in this analysis. Based on the review of this appendix, past projects may have impacted the dead tree vegetation components of snags and CWD in the analysis area. A current action in the cumulative effects analysis area to the northeast is called the Frontier Timber Sale. This activity would likely cumulatively impact snags and CWD. The units being treated in the Frontier Timber Sale occur in the mixed1 fire regime. Snags are not being felled in this timber sale and would likely react as the snags outlined above in the “Direct and Indirect Effects” section. CWD would also simulate effects as described in that section. However, Design Feature TH-8 is not being implemented in the Frontier Timber Sale and, therefore, the results of the design feature as described for Alternatives B, C, and D would not be realized in that area. Another ongoing and/or foreseeable future activity that could incrementally impact snags and/or CWD within the cumulative effects analysis area is personal use fuelwood cutting. This activity could potentially reduce future snags and CWD since roads remain open to motorized vehicles in all alternatives. The action alternatives would increase miles of road open to motorized vehicles following implementation, thereby increasing the potential for increased personal fuelwood

cutting and potentially negatively impacting snags and CWD in the analysis area. Design Feature WL-6 has been designed to mitigate effects of fuelwood gatherers; however, WL-6 is not being implemented on the Frontier Timber Sale and the effects as described for the action alternatives would not be realized within the cumulative effects area.

3.2.8.2 Mixed1 Fire Regime

3.2.8.2.1 Affected Environment

The Affected Environment for snags and CWD is described above in section 3.2.8.1.1.

3.2.8.2.2 Current Conditions

Table 3-30 shows the desired range of conditions from Appendix A (Forest Service 2010a) for the existing condition compared to the desired condition range. As was the case for the nonlethal fire regime, snags between 10 and 20 inches slightly exceed the desired condition ranges. Snags per acre for the ≥20 inch d.b.h. group are within the desired range. CWD >3 inches is also within the desired range. And again, the CWD for the 15 inch diameter size class is still well below the desired condition.

Table 3-30 Summary of Desired Condition (DC) Ranges, Existing Condition (EC), and Snags and Coarse Woody Debris (CWD) (Post-treatment [2011] and in 2030 by Strata and Alternative in the Mixed1 Fire Regime)

Snags and Coarse Woody Debris	DC	EC	Alternative A		Alternative B		Alternative C		Alternative D	
			2011	2030	2011	2030	2011	2030	2011	2030
Strata A										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	0.44	0.86	8.57	0.50	1.11	0.50	1.11	0.50	1.11
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	1.86	2.01	4.60	1.94	3.37	1.94	3.37	1.94	3.37
CWD >3 inches d.b.h. (tons/acre)	4-14	5.49	5.46	5.82	5.46	5.38	5.46	5.38	5.46	5.83
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.01	0.02	0.34	0.02	0.23	0.02	0.02	0.02	0.23
Strata B										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	0.06	0.12	2.37	0.09	1.49	0.09	1.49	0.09	1.50
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	0.04	0.08	1.08	0.08	0.86	0.08	0.86	0.08	0.87
CWD >3 inches d.b.h. (tons/acre)	4-14	2.41	2.40	2.42	2.41	2.50	2.41	2.50	2.40	2.38
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.01	0.01	0.14	0.02	0.24	0.02	0.24	0.01	0.13
Strata C										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	2.76	3.25	11.28	2.82	3.31	NT[a]	NT	NT	NT
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	0.65	0.78	3.62	0.71	2.27	NT	NT	NT	NT
CWD >3 inches d.b.h. (tons/acre)	4-14	4.66	4.63	4.77	4.65	4.33	NT	NT	NT	NT
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.01	0.02	0.34	0.02	0.21	NT	NT	NT	NT
Strata D										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	0.82	0.96	4.05	0.91	2.75	0.91	2.75	0.89	2.44
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	0.47	0.51	1.62	0.50	1.41	0.50	1.41	0.51	1.47
CWD >3 inches d.b.h. (tons/acre)	4-14	4.77	4.72	4.18	4.72	4.09	4.72	4.09	4.72	4.10
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.01	0.01	0.10	0.01	0.08	0.01	0.08	0.01	0.08

Snags and Coarse Woody Debris	DC	EC	Alternative A		Alternative B		Alternative C		Alternative D	
			2011	2030	2011	2030	2011	2030	2011	2030
Strata E										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	9.34	9.98	18.25	9.30	5.78	9.30	5.78	9.16	5.89
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	2.07	2.24	5.32	2.11	2.50	2.11	2.50	2.19	3.61
CWD >3 inches d.b.h. (tons/acre)	4-14	13.64	13.51	12.73	13.53	11.97	13.53	11.97	13.52	12.08
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.04	0.06	0.75	0.05	0.58	0.05	0.58	0.06	0.62
Strata F										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	5.61	5.93	12.47	5.61	5.41	5.61	5.41	5.61	5.46
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	1.64	1.71	3.38	1.67	2.27	1.67	2.27	1.68	2.57
CWD >3 inches d.b.h. (tons/acre)	4-14	8.87	8.80	8.62	8.80	8.23	8.80	8.23	8.80	8.26
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.03	0.04	0.50	0.04	0.42	0.04	0.42	0.04	0.43
Strata G										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	5.18	5.63	14.07	5.21	5.42	5.21	5.42	5.16	4.55
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	2.30	2.41	4.65	2.35	3.21	2.35	3.21	2.36	3.51
CWD >3 inches d.b.h. (tons/acre)	4-14	8.51	8.45	8.30	8.47	7.82	8.47	7.82	8.46	7.80
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.03	0.04	0.60	0.04	0.48	0.04	0.48	0.04	0.48
Strata H										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	6.44	6.91	16.04	6.56	8.82	6.56	8.82	6.55	8.61
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	2.15	2.18	2.66	2.16	2.24	2.16	2.24	2.16	2.24
CWD >3 inches d.b.h. (tons/acre)	4-14	5.76	5.74	6.37	5.75	6.08	5.75	6.08	5.74	6.08
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.03	0.05	0.54	0.04	0.46	0.04	0.46	0.04	0.46

Snags and Coarse Woody Debris	DC	EC	Alternative A		Alternative B		Alternative C		Alternative D	
			2011	2030	2011	2030	2011	2030	2011	2030
Strata K										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	11.00	11.59	15.84	NT	NT	10.88	4.37	10.88	4.38
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	4.45	4.58	6.46	NT	NT	4.47	4.27	4.51	5.07
CWD >3 inches d.b.h. (tons/acre)	4-14	13.50	13.37	13.30	NT	NT	13.38	12.61	13.37	12.69
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.04	0.07	1.08	NT	NT	0.06	0.92	0.06	0.95
Strata L										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	3.05	3.79	16.99	NT	NT	3.11	3.94	3.08	3.26
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	1.71	1.86	4.92	NT	NT	1.77	3.08	1.78	3.20
CWD >3 inches d.b.h. (tons/acre)	4-14	11.68	11.55	10.75	NT	NT	11.54	9.98	11.55	9.97
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.03	0.04	0.55	NT	NT	0.04	0.36	0.04	0.36
Overall										
Snags 10–20 inch d.b.h. (per acre)	1.8-5.5	5.66	6.10	13.16	5.78	6.84	5.69	5.18	5.65	5.02
Snags ≥20 inches d.b.h. (per acre)	0.2-3.5	1.90	2.00	4.03	1.96	2.91	1.94	2.63	1.97	3.04
CWD >3 inches d.b.h. (tons/acre)	4-14	9.23	9.15	8.88	9.16	8.52	9.16	8.42	9.15	8.47
CWD >12 inches d.b.h. (tons/acre)	2.6-9.1	0.03	0.04	0.55	0.04	0.47	0.04	0.44	0.04	0.46

[a]NT = Not Treated

3.2.8.2.3 Summary of Direct and Indirect Effects

Snags in the 10 to 20 inches d.b.h. would be within the desired condition range by 2030 by implementing all of the action alternatives (Table 3-30). For snags ≥20 inches d.b.h., the result would be similar and would meet the desired range under all action alternatives. Alternative A would exceed the high end of the range for snags 10 to 20 inches d.b.h. and snags ≥20 inches. Implementing all action alternatives would increase CWD >3 inches diameter over. This outcome meets the desired range of conditions for all action alternatives. However, CWD would still be well below the desired condition for the 15-inch diameter group by 2030.

3.2.8.2.4 Direct and Indirect Effects of Alternative A

Under Alternative A, snag numbers would be expected to remain similar to existing conditions or increase by 2030 due to recruitment and loss of snags over time through natural processes. Alternative A would exceed the desired condition ranges for snags in 2030 likely due to insect and disease mortality spurred by high tree densities. However, the species composition of the snags per acre under Alternative A would likely not be as desired as reflected by the species of

the live trees (section 3.2.5.1.6). Vegetation guideline VEGU10 states that retaining large snags of seral species should be consistent with the desired condition for species composition to increase longevity of stand snags (Forest Service 2010a, p. III-33). In other words, snag numbers may be within desired ranges but tree species composition of those snags would not under Alternative A. Therefore, it would be likely that snags of desired species would continue to be deficient in the future.

Some recruitment and loss of CWD would occur over time through natural processes under Alternative A. CWD levels would be expected to remain similar to the existing conditions for small-diameter CWD. Small-diameter CWD is within desired conditions and is projected to remain within desired conditions under Alternative A. Large CWD is well below desired conditions, and stays well below the desired condition for 2030 under Alternative A, partly because the 20-year timeframe used to model CWD recruitment is unlikely to be long enough to effectively show recruitment of snags to CWD.

3.2.8.2.5 Direct and Indirect Effects of Alternative B

Under Alternative B, the snags per acre would be expected to meet desired ranges in 2030. Recruitment and loss of snags would continue to occur over time through natural processes. Vegetation guideline VEGU10 states that retaining large snags of seral species consistent with the desired species composition would increase longevity of standing snags (Forest Service 2010a, p. III-33). Although this alternative would have fewer snags per acre overall, particularly in the small diameter group (10 to 20 inches) than Alternative A, the snags would generally be larger and more representative of the desired tree species due to the adjustment of the species composition of the live trees. Additionally, Alternative B has fewer small snags per acre than Alternative A due to treatment objectives to reduce ladder fuels and overall density of trees in the understory. Endemic insect levels could also contribute to snag recruitment of large ponderosa pine snags over time due to the number of large ponderosa pine retained in the stands. Furthermore, Design Feature WL-3 associated with this alternative requires that all existing snags ≥10 inches d.b.h. not posing a safety hazard to logging or post-harvest activities be retained within proposed harvest units, and if felled, retained onsite (section 2.4.2.1). While a certain number of snags could be felled for safety reasons, the number of snags affected would be minimal.

Under this alternative, there is potential to have snags removed by public fuelwood gathering activities since the alternative would increase the number of road miles open to all motorized vehicles and displayed on the Emmett RD MVUM from about 21.2 miles to 25.0 miles. This increase primarily results from realigning NFS road 696 (section 3.11.1.3). Design Feature WL-6 has been designed to mitigate effects of fuelwood gatherers by signing three large snags per acre within a 600 foot buffer (300 feet either side) along the new realignment section of NFS road 696. Although road decommissioning is proposed within the Project area under this alternative, all roads proposed to be decommissioned are currently not open to motor vehicle use on the Emmett RD MVUM. Therefore, no impact to snag densities from public fuelwood gathering would be expected from decommissioning these roads.

Under Alternative B, some recruitment and loss of CWD would occur over time through natural processes. CWD levels in the mixed1 fire regime would be expected to remain similar to the existing condition for small-diameter CWD. Small-diameter CWD is within desired conditions and would remain within desired condition under Alternative B. Large CWD would remain well

below desired conditions. By 2030, Alternative B would result in an increase in large diameter CWD but would not meet desired conditions for the strata. Although the trends of Alternative A and Alternative B would be similar, the modeling results indicate Alternative B would have slightly less CWD than Alternative A. Due to density reductions in both the small and large tree size classes, a similar reduction in CWD would be expected. The assumption was also made that the majority of slash would be removed from areas that would be commercially harvested. Regardless of the effects on existing coarse wood or snags, sufficient live trees would be present after implementation to provide ample sources of future CWD recruitment.

Alternative B would include silvicultural treatments on 3034 acres: 2,195 acres of commercial thinning and 839 acres of noncommercial thinning of plantations in this fire regime. However, it would not require or permit removing logs currently on the ground; therefore, proposed harvest activity in the commercially thinned area would have no effect on existing CWD levels. In the noncommercial thinning units, all tree boles and limbs would remain on the ground after treatment. Design Feature TH-8 (section 2.4.2.1) states that if during the timber sale layout process it is determined that the large size class of CWD is lacking, provisions would be made to leave cull logs, which are generally large diameter, in the stand, in order to increase CWD levels. This design feature would be accomplished by hauling cull logs back into tractor/jammer units or leaving cull logs, if encountered, onsite in skyline and helicopter units. This activity would help contribute to CWD of the large size class in the analysis area. Cull logs are not represented in Table 3-30 as there is no estimate of how many would occur. Regardless of the effects on existing coarse wood or snags, sufficient live trees would be present after implementation to provide ample sources of CWD recruitment in the future.

3.2.8.2.6 Direct and Indirect Effects of Alternative C

Alternative C would employ the same silvicultural prescriptions for the commercially treated units as Alternative B. The chief difference between Alternative C and Alternative B would be more treatment acres: 2,506 of commercial harvest and 839 acres of noncommercial thinning. The effects for Alternative C would be the same as those described for Alternative B on the acres that are treated.

3.2.8.2.7 Direct and Indirect Effects of Alternative D

For Alternative D, TH-9 retains all large trees of any species. The treatment areas for commercial harvest would be as described in Alternative C above. However, retaining all tree species >20 inches d.b.h. has little effect on snags or CWD. The main influence on snags and CWD in the FVS model is mortality. Therefore, results appear to be quite similar for Alternative D when compared to the other action alternatives. The effects for Alternative D would be the same as those described for Alternative B above.

3.2.8.2.8 Cumulative Effects

The most recent data available (Appendix B) were used to identify the existing baseline conditions within the cumulative effects area, thereby reflecting the incremental impacts of those past disturbances and any increments of change that have occurred.

Appendix B of this document outlines the past, ongoing, and reasonably foreseeable actions evaluated for inclusion in this analysis. Based on the review of this appendix, past projects may have impacted the dead tree vegetation components of snags and CWD in the analysis area. A

current action in the cumulative effects analysis area to the northeast is called the Frontier Timber Sale. This activity would likely cumulatively impact snags and CWD. The units being treated in the Frontier Timber Sale occur in the mixed1 fire regime in PVG 6. Snags are not being felled in this timber sale and would likely react as the snags outlined above in the "Direct Effects to Alternatives B, C, and D" section. CWD would also simulate effects as described in the "Direct Effects on Coarse Woody Debris to Alternative B, C, and D" section. However, Design Feature TH-8 is not being implemented in the Frontier Timber Sale and, therefore, the results of the design feature as described for Alternative B, C, and D would not be realized. Another ongoing and/or foreseeable future activity that could incrementally impact snags and/or CWD within the cumulative effects analysis area is personal use fuelwood cutting. There is potential for this activity to reduce future snags and CWD since roads remain open to motorized vehicles in Alternatives A, B, C, and D. Alternative B, C, and D would increase miles of road open to motorized vehicles following implementation, thereby increasing the potential for increased personal fuelwood cutting and negatively impacting snags and CWD in the analysis area. This increase is a result of realigning NFS road 696 from the riparian area to a new route higher on the slope. This realignment would open up an area previously inaccessible to fuelwood cutting and would have an effect on snags and CWD, especially large-diameter snags and CWD within sight distance of the road. Snag and CWD recruited into the riparian area along the original road are expected to remain onsite if roaded access is no longer available. Design Feature WL-6 has been designed to mitigate effects of fuelwood gatherers; however, WL-6 is not being implemented on the Frontier Timber Sale and the effects as described for the action alternatives would not be realized within the cumulative effects area.

3.3 FIRE AND FUELS

This section incorporates by reference the Fuels and Air Quality Specialist's Report (available in the Project Record), which contains detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on the fire and fuel resources.

The analysis area for direct effects to fire and fuel resources is the approximately 4,414 acres proposed for vegetation management treatments in the combined action alternatives, including activity fuel treatments. This area was selected as the analysis area since it is the largest extent that would be directly impacted by proposed activities in one or more of the action alternatives. The analysis area for indirect and cumulative effects is approximately 13,021 acres and is the same area as identified for the vegetation landscape patch and pattern analysis described in sections 3.2.1.2.1 and 3.26. The landscape patch and pattern cumulative effects analysis area is based on combinations of watersheds (6th HUCs) or portions of watersheds that capture the extent of the dominant fire regimes within and adjacent to the Project area. This area is believed to encompass the largest extent that could be influenced by the indirect and cumulative effects of acres treated by the proposed activities. Most acres within the landscape patch and pattern analysis area are forested communities within the nonlethal and mixed1 fire regimes.

3.3.1 Fire and Fuels Indicator

For the purpose of this analysis, crown fire behavior will be used to measure differences between alternatives for the fire and fuels resource in the analysis area. The Fire and Fuels Extension of the Forest Vegetation Simulator (FVS-FFE) was developed by Crookston et al. (2003) and

computes several fire hazard indices. FVS-FFE was used to compute crowning index (CI), which was used to measure crown fire behavior. This measurement was chosen to evaluate the crown fire behavior Indicator for this Project because the model is able to display crown fire risk over the landscape and quantify wildfire hazard using stand exam data.

Measurement: CI is described as the 20-foot wind speed necessary to sustain an active crown fire and is a function of the canopy bulk density, slope steepness, and surface fuel moisture. . This measurement was selected because crown fires typically move faster, are more destructive, produce more smoke, and are more difficult to suppress than surface fires. The crowing index is divided into 3 categories, low, moderate and high. A high rating would equal a low wind speed as it would take less wind to create a crown fire from a surface fire. Higher wind speeds would indicate a lower rating as stronger winds would be needed to take the fire from the surface to the crowns and maintain a crown fire. The high rating is less than or equal to 25 miles per hour wind speed; the moderate rating is between 25–50 miles per hour and the low rating is 50 miles per hour or greater.

3.3.2 Analysis Methodology

An analysis of CSE data was conducted utilizing the FVS (Dixon 2002), Version 6.21, (9/14/2009). FVS was used to describe current stand conditions (2010), post treatment (2011), and future stand conditions 20 years later. Please see section 3.2.1.2.1, “Vegetation Management,” for information on FVS modeling methodologies.

The methodology used to complete the analysis for the fire and fuels resource was to use the CI from the FVS-FFE to determine crown fire hazard of each alternative. FVS-FFE models tree growth of the stand data and can predict changes in stand and fuel characteristics over time along with the fire behavior and impacts of fire to those stands. FVS-FFE was the selected model for this Project for its ability to predict potential fire behavior over time under user-defined conditions as a measure of fire hazard of the stand and fuel conditions over the landscape. This model does not predict the probability of fire or the spread of fire between stands.

The user-defined conditions used in FFE for this analysis are surface fuel moisture content, wind, and temperature. These inputs were collected from the Little Anderson Remote Automated Weather Station (RAWS). This RAWS is representative of the vegetation type located within the Project. Fire Family Plus version 4.0 (Bradshaw and McCormick 2000) was used to validate the 95th percentile weather data from the Little Anderson RAWS for the month of August over a 5-day period when fire potential on the forest is most likely to occur based on historical fire records.

3.3.3 Affected Environment

3.3.3.1 Fire Occurrence and History

Fire history information for the analysis area was developed from a review of the Forest’s geographical information system (GIS) data of historical fire starts. Since 2000, over 17 percent of the Forest has been affected by wildfire. Of that area, half occurred in the nonlethal fire regimes (i.e., PVG 2), historically dominated by ponderosa pine.

Many of these fires across the Forest burned at uncharacteristically high intensities due to increased fuel loadings, including uncharacteristically dense ladder fuels. Conditions that resulted in these uncharacteristic wildfire events appear to have developed from fire exclusion

(i.e., actively suppressing wildfire) and various management actions, such as historical timber harvest.

Although the probability of ignition is unpredictable, records show that approximately 36 fire starts have occurred within the Project area since the early 1900s, affecting approximately 0.2 percent of the Project area. Generally, these fires remained small due to aggressive fire suppression and averaged in size from about 0.1 acres (a spot fire) to 5.0 acres. Several larger fires have started outside and burned into the Project area, burning approximately 50 acres or 0.4 percent of the Project area. Since 1900 approximately 0.6 percent of the Project area has burned. The 1986 Anderson Creek Fire Complex (18,000 acres) is the most recent large fire that started outside the Project area and burned within and adjacent to the Project area.

Once an ignition source is provided, the likelihood of a wildfire becoming a stand-replacing fire depends on numerous factors, such as fuel moisture content, weather conditions, topography, fuel loading, stand density, and the presence of multiple vegetation layers that act as ladder fuels. Management actions can alter the last three factors and greatly influence fire severity and intensity should a wildfire occur. Aggressive fire suppression has led to fire exclusion where surface fuels and understory vegetation were once periodically removed through light surface fires. With fire exclusion, surface fuels continue to accumulate over time and understory vegetation continues to grow into the overstory, leading to uncharacteristically dense stand conditions. This condition increases the probability of experiencing torching and crowning under lower wind speeds. The *Forest-Wide Risk Assessment for Management of the Boise National Forest* (Forest Service 2000b) classifies the Scriver Creek watershed as having a moderate/high fire hazard rating and a moderate/high fire occurrence for both lightning- and human-caused fires due to local weather patterns and good public access into the Project area.

3.3.3.2 Fire Regimes

The forests of the Northern Rocky Mountains have been heavily influenced by fire. Fire may change ecosystems or community composition and structure by affecting all but the fire resistant species, or fire may alter site conditions to the degree where an entirely different vegetative community may reoccupy an area (Agee 1993). Fire regimes are a generalized description of fire characteristics, including intensity, severity, size, and frequency. Table 3-31 describes the fire regimes and associated fire return interval, intensity, and vegetation patterns. The classification of fire regimes is largely focused on what happens to the dominant overstory trees and its associated understory shrub and herbaceous vegetation. If most of the dominant overstory tree canopy is expected to survive a fire event, it is considered a nonlethal fire regime (Forest Service 2010a, Appendix A, Table A-1, p. A-3). By contrast, a fire event that consumes or kills 90 percent 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.

Nonlethal Fire Regime—Estimates of the historical fire return intervals range from 5-25 years (Agee 1998). Fires were frequent enough to establish and maintain relatively open stands of ponderosa pine by thinning the smaller, understory trees and removing patches of seedlings (Crane and Fisher 1986). Tree mortality in the overstory was generally <10 percent. This fire regime historically developed relatively homogenous patches of large trees with small groups generally <1 acre of different seral stages, densities, and compositions that regenerated in openings resulting from overstory mortality. Fires in this regime consume small-diameter woody debris and the needle layer. The duff surface may be charred and little or no soil heating occurs.

Periodic fires inhibited the development of fuel ladders of saplings or pole-sized trees that could carry wildfire into the crowns of larger, mature trees.

Mixed1 Fire Regime—Estimates of the historical fire return intervals range from 5-300+ years (Agee 1998). The PVG 5 habitat types and the warmer and drier habitat types in PVG 6 (Cool, Moist Grand Fir) that support ponderosa pine are associated with this fire regime. Sites within this fire regime historically had relatively frequent surface fires that would have maintained early serial species, such as ponderosa pine and Douglas-fir, and would have killed <50 percent of the dominant overstory, creating openings in the stand that would have allowed ponderosa pine to regenerate (Forest Service 2010B, Appendix A). This fire regime historically developed relatively homogenous patches within stand groups of different seral stages, densities, and compositions.

Table 3-31. Fire Regime Definitions

Fire Regime	Fire Interval	Fire Intensity	Vegetation Patterns (Agee 1998)
Nonlethal	5–25 years	<10% mortality	Relatively homogenous with small patches generally <1 acre of different seral stages, densities, and compositions created from mortality.
Mixed1	5–70 years	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	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	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.

Stands within the analysis area were categorized into the appropriate fire regime(s) based on their habitat types and the presence of existing vegetative species. The habitat types in the analysis area, particularly in PVG 6, are at the drier, warmer end of the environmental range of this PVG (Steele and Geier-Hayes 1987). PVG 6 spans a broad environmental range from the mixed1 to mixed2 fire regimes due to differences in habitat types. This environmental difference represents warmer, drier conditions in the mixed1 and cooler, wetter conditions in the mixed2 portions of the range (Crane and Fischer 1986). At the warmer, drier end of the environmental range of PVG 6 stands are warm enough to support ponderosa pine and Douglas-fir but wet enough to support grand fir. Grand fir is the climax species and could be present on these sites through all stages of succession.

Mehl et al. (1998) described PVG 6 as a group that historically experienced either under-burning or stand-replacing fire, depending on site conditions (habitat types). They labeled this PVG, which they state represents the transition zone between dry, low elevation and moist, high elevation vegetative communities, a “mixed” fire regime. Mehl et al. (1998) state that in the early seral stages of PVG 6, ponderosa pine is common in the warmer extremes and western larch and lodgepole pine are generally present in the cooler extremes. They noted warmer sites historically

experienced frequent nonlethal fire, prolonging the dominance of early seral species like ponderosa pine. However, cooler sites were historically more often dominated by western larch and lodgepole pine, which are early seral species better adapted to a lethal fire regime. They concluded it is not likely, based on physiology, which ponderosa pine would occur in areas with a predominately lethal fire regime. Therefore, based on the habitat types; the description of PVG 6 by Mehl et al. (1998); and Crane and Fisher's (1986) identification of a fire regime for "warm, dry" grand fir habitat types that is different than the fire regime for "cool, moist" grand fir habitat types, areas in the analysis area with ponderosa pine were classified as historically a mixed1 fire regime and areas that support more western larch, lodgepole pine (and also Engelmann spruce and subalpine fir) were classified as historically a mixed2 fire regime.

The habitat types in the PVG 6 areas proposed for treatment are at the drier, warmer end of the environmental range (Steele and Geier-Hayes 1987). Within the analysis area, most of the PVG 6 stands are grand fir/mountain maple habitat type, ninebark phase and grand fir/mountain maple habitat type, mountain maple phase. The PVG 2 stands range from Douglas-fir/white spirea habitat type, ponderosa pine phase to Douglas-fir/ninebark habitat type, ponderosa pine phase. Seven stands in the analysis area are classified as grand fir/blue huckleberry habitat type. This habitat type is considered a "cool, moist" habitat type within PVG 6. However, because the stands classified to this habitat type in the Project area support ponderosa pine, they were also assigned to a mixed1 fire regime (Steele and Geier-Hayes 1987, p. 6). There are 36 acres of PVG 5 (Warm, Dry Grand Fir) assigned to the mixed1 fire regime based on the strata into which these stands were grouped. A small amount (<1 percent) of the Project area is in PVG 7 (Warm, Dry Subalpine Fir), PVG 8 (Warm, Moist Subalpine Fir), and PVG 9 (Hydric Subalpine Fir) that would be in the mixed2 and lethal fire regimes. No treatments are proposed in these PVGs. Because they occupy only a small portion of the Project area and because none are proposed for treatment, they will not be discussed in this document. Figure 3-12 provides a simplistic visualization of the landscape patch and pattern associated with each fire regime.

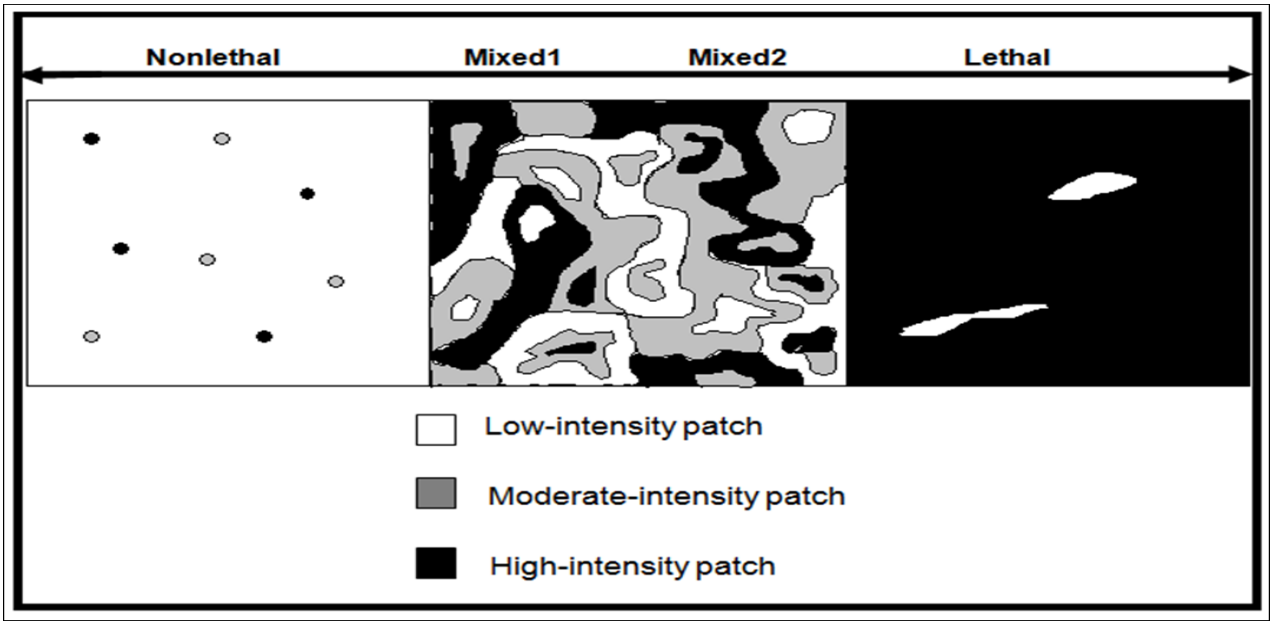

Figure 3-12. Patch and Pattern Associated with Fire Regimes

3.3.3.3 Crown Fire Hazard

Table 3-32 below describes a summary of the wildfire hazard rating based on Crowning Index for vegetation in the Project area. The vegetation data was summarized by strata. A summary description of vegetation strata conditions for the Project area can be found in Appendix D. CI was modeled for each stratum, and the results are displayed as a weighted average. There are 12 vegetative strata for this project. Two (Strata I and Strata J) are within the nonlethal fire regime, and the rest fall within the mixed1 fire regime.

Table 3-32. Summary of Crown Fire Hazard Rating Based on Crowning Index (wind speed) by Fire Regime and Alternative in the Direct Effects Analysis Area

Strata	Stand Acres	Existing Condition—2010 (CI/mph)	Alternatives—2030 (CI/mph)			
			A	B	C	D
Nonlethal (PVG 2)						
I	196	Mod/31.3	Mod/33.4	Low/62.7	Low/62.7	Low/56.9
J	873	High/23.9	High/25.0	Mod/49.6	Mod/49.6	Mod/46.3
Total	1,069					
Mixed1 (PVG 6)						
A	102	Mod/32.6	Mod/27.1	Mod/41.4	Mod/41.4	Mod/41.4
B	37	Low/51.5	Mod/41.6	Low/50.1	Low/50.1	Low/50.1
C	105	Mod/27.7	Mod/29.2	Mod/40.2	NT[a]	NT[a]
D	321	Mod/43.9	Mod/32.7	Mod/38.4	Mod//38.4	Mod/36.3
E	471	High/20.8	High/21.5	Mod/27.1	Mod/27.1	Mod/27.8
F	703	Mod/29.2	Mod/27.5	Mod/41.1	Mod/41.1	Mod/38.3
G	290	High/22.8	High/24.2	Mod/34.4	Mod/34.4	Mod/35.0
H	166	High/8.0	High/8.4	High/12.8	High/12.8	High/13.1
K	254	High/19.9	High/25.0	NT[a]	Mod/28.9	Mod/29.9
L	174	High/16.4	High/18.7	NT[a]	High/19.9	High/21.1
Total	2,623					

Note: Crowning Index (CI) wind speeds (miles per hour [mph]) = High (<25 mph), Moderate (25–50 mph), Low (>50 mph)
[a] NT—No Treatment

3.3.3.4 Fuels, Wildfire Effects and Behavior

For purposes of this assessment, wildfire hazard is based on the current fire behavior compared to what would have occurred historically as defined by the historical fire regimes. As applied, the wildfire hazard represents a departure in the vegetative conditions that occur on the landscape relative to how fire historically operated within that fire regime. For example, in the absence of fire in nonlethal and mixed1 fire regimes, forest canopy cover increases, ladder fuels become more abundant and continuous, and risk of uncharacteristic fire events (i.e., lethal effects to more trees and/or greater extent of resulting patches) is much greater than would have been expected historically. These changes occur because there is a greater probability of surface fires moving

from the ground into the crowns of trees, facilitating rapid and, in many cases, lethal fire movement throughout the area (Crane and Fisher 1986).

Existing stand conditions were validated through Emmett RD stand exams (1996) and field reconnaissance (2006 and 2009) by fuels specialists. The existing conditions are assumed to be year 2010. Existing surface fuel loadings are based on fuels transects completed in 2006 and 2009. These transects verified the results obtained from the FVS-FFE.

Existing conditions for the 0- to 3-inch size class outside of plantations were determined through transects completed by the Emmett RD fuels specialists in 2006 and 2009. These data indicated that 0- to 3-inch material averaged 2.0 tons per acre in the nonlethal fire regime and 6.0 tons per acre in the mixed1 fire regime. Approximately 839 acres of plantations of varying age occur within the Project area. About 575 acres of plantations are approximately 30–40 years old with an average of 8–9 inches diameter at breast height (d.b.h). Approximately 264 acres of trees planted in 1998 (14 years old) are an average of 2-4 inches d.b.h. More information about these plantations can be found within sections 3.2.1.2.1 and 3.2.2. The 30- to 40-year old plantations average about 2.5 tons per acre or less in the 0- to 3-inch size class (Anderson 1982, IDT Fuels specialist professional judgment based on field reviews of comparable areas). In the 14-year-old plantations, the 0- to 3-inch size class has similar or lower tons per acre than the older plantations. Surface fuel loadings in all PVGs, including plantations, are within characteristic levels as defined by the fire regimes as correlated to fuel models.

Although surface fuel loadings in the nonlethal and mixed1 fire regimes and within plantations are within characteristic levels, high stand densities, abundant ladder fuels, low canopy base heights, and a dense shrub component substantially increases the potential for a surface fire to transition into the tree crowns. This uncharacteristic stand condition in the nonlethal fire regime creates a condition that could support lethal fires that have the potential to burn at a high intensity and severity over a large area of the Project area. Similar stand conditions exist in the mixed1 fire regime and though small patches of moderate-to-high intensity and severity effects would be characteristic of the mixed1 fire regime, the uncharacteristic stand condition increases the risk that wildfire would result in landscape patches and patterns not consistent with that historically expected in the area.

Crowing Index indicates that the wildfire hazard across the Project area is moderate to high (except in Strata B) (Table 3-32). The current multi-layered canopies and the existing ladder fuels in all fire regimes in the analysis area increase the potential that a wildfire will transition from a surface fire into a crown fire more often than would be expected historically, resulting in larger patches of mixed and lethal fire effects across the area.

3.3.4 Environmental Consequences of Alternative A—No Action

3.3.4.1 Direct and Indirect Effects of Alternative A

Under the No Action Alternative, no direct effects to the wildfire hazard and fuel resources would be expected because no management activities are proposed, and current fire management strategies in the analysis area would be expected to continue. Indirect effects of this alternative include the continued departure of vegetative conditions from desired conditions. Tree growth and mortality would potentially increase surface fuel loadings and continue to contribute to ladder fuels in the analysis area, increasing the risk that wildfire could transition from a surface fire to a crown fire.

For the purpose of this analysis, wildfire hazard was determined for the year 2030. Table 3-32 and Figure 3-13 illustrates that the CI would remain constant in the nonlethal fire regime and would shift slightly in the mixed1 fire regime from a moderate hazard to a higher hazard under Alternative A. Based on the assessment of CI, if a wildfire were to occur, stand replacing type fire behavior would likely result and potentially increase over time due to the continued departure of vegetative conditions from desired conditions. The risk of lethal fire, which is an uncharacteristic event in the nonlethal fire regime, would continue to increase. While some lethal fire would be expected historically in a mixed1 fire regime, under the No Action Alternative, the percentage of overstory tree mortality would likely exceed 50 percent for reasons discussed earlier, which would be uncharacteristic for this fire regime.

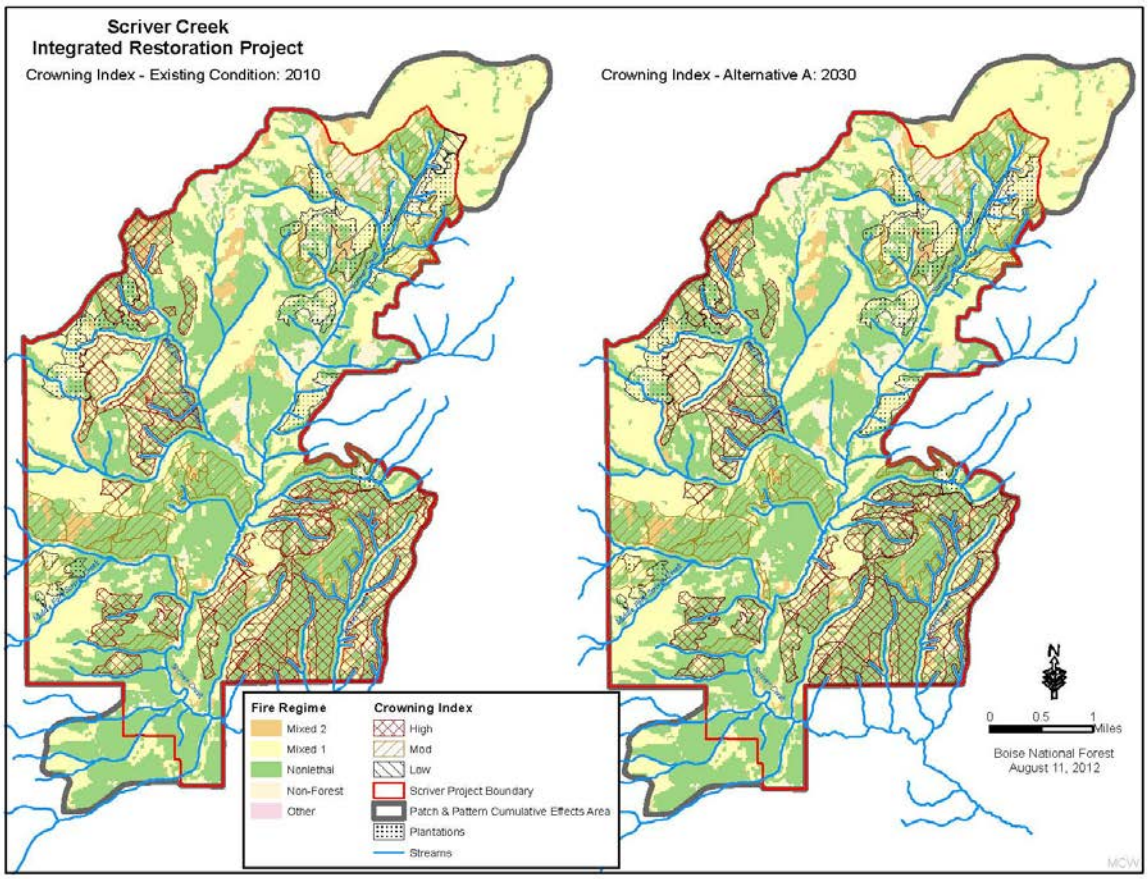

Figure 3-13. Crowning Index Existing map for Alternative A

In conclusion, under Alternative A, were a wildfire to start within the Project area, flexibility in the use of suppression tactics would decrease over time as vegetative conditions continue to depart. Any openings produced over time would likely be more extensive than would have occurred historically due to lethal fire events. Within these openings, regeneration would be more conducive to Douglas-fir (nonlethal fire regime) and grand fir (mixed1 fire regime) due to a minimal mineral soil seedbed and lack of species composition change; these species would continue to fill the understory and grow into the overstory. Under this alternative, no development of within-stand openings and other structural diversity would occur in plantations,

which would retain their uniformed appearance. Suppressing wildfire would likely be more difficult and costly due to the expected increase in lethal fire and the vertical and horizontal continuity of fuels. Concerns about firefighter safety would increase.

3.3.4.2 Cumulative Effects of Alternative A

3.3.4.2.1 Past Activities

Appendix B (Cumulative Effects Table B1) outlines the past, ongoing, and foreseeable actions evaluated for inclusion in this analysis. The following activities in the analysis area that are identified in Appendix B may contribute to cumulative effects: past, present, and future vegetation management; fire suppression; and livestock grazing. Although the incremental impacts to wildfire and/or fuel resources of past activities are not known, the existing conditions provide a representation of the effects that have resulted from these activities and thus they are not discussed in detail here (section 3.3.1.1).

3.3.4.2.2 Present/Ongoing Activities

Present and ongoing activities within the analysis area include recreation activities, road and trail use, road and trail maintenance, livestock grazing, vegetation management, and wildfire suppression as needed. These present and ongoing activities would be expected to continue in the future. These present and ongoing actions would not be anticipated to cumulatively impact fuel loads or ladder fuel conditions in the analysis area in combination with direct and indirect effects of this alternative. However, the potential that human-caused fire may start from present and ongoing activities would increase as fuel loads and ladder fuels within the analysis and recreation areas increase. As discussed under direct and indirect effects, should a wildfire start in the analysis area, the risk that an uncharacteristic wildfire may result in undesirable landscape patches and patterns will increase.

3.3.4.2.3 Reasonably Foreseeable Activities

Reasonably foreseeable actions in the analysis area include the Scriver Creek Trails and Scriver Creek Snowmobile Bridge projects. These project proposals are being developed and are not finalized to date. The Scriver Creek Trail project could add miles of NFS trails utilizing new trail construction, conversion of existing NFS roads to trail, and/or designation of NFS trail on NFS road (i.e., dual designation) within the analysis area. The Scriver Creek Snowmobile Bridge project, in conjunction with other landowners, would replace an existing snowmobile bridge to provide over-snow use that meets Forest Service standards. It would not be anticipated that these reasonably foreseeable actions would cumulatively impact fuel loads or ladder fuel conditions in the analysis area in combination with the direct and indirect effects of this alternative. However, the potential that human-caused fire may start from foreseeable future recreation and road and trail uses would increase as fuel loads and ladder fuels within the analysis and recreation areas increase. As discussed under direct and indirect effects, should a wildfire start in the analysis area, the risk that an uncharacteristic wildfire may result in undesirable landscape patches and patterns will increase.

3.3.5 Environmental Consequences of Alternative B—Proposed Action

3.3.5.1 Direct and Indirect Effects of Alternative B

Alternative B would employ one or more of the following treatment activities: commercial and noncommercial timber harvest, noncommercial thinning of plantations, and activity fuel treatments (Table 3-33 and Figure 3-14). Implementing this alternative may reduce the risk of uncharacteristic wildfire behavior within the analysis area through vegetation management and activity fuel treatments. Reducing the wildfire hazard would be accomplished by reducing ladder fuels and treating activity fuels, thereby limiting the fire's ability to transition from a surface fire to a crown fire.

Vegetation management on approximately 839 acres of plantations would include noncommercial thinning and treatment of activity fuels using lop and scatter. As disclosed earlier, surface fuels loads are within desired conditions. Slash generated from thinning activities in plantations would be lopped to be no more than 36 inches from the ground; all boles and large limbs would lie flat on the ground. Although the fuel generated from the thinning would remain onsite, the arrangement would be in a variable distribution, creating a jackpot-like fuel loading across the units. These activity fuels would be expected to increase surface fuel loads and subsequently flame lengths in the plantations for approximately 2 to 3 years (Fuels IDT member professional judgment based on experience in comparable areas). However, during this 2- to 3-year time period, the activity fuels would become compacted by snow and through needle decay, and decomposition of the additional 0- to 3-inch size class would be expected to reduce the wildfire hazard to within the desired tons per acre by the end of the 3-year period. Although the 0- to 3-inch size surface fuel class would no longer be of concern after 3 years, the 3- to 6-inch size class fuels would remain. This surface fuel size class contributes to Forest Plan CWD definitions. Although noncommercial thinning would increase fuel loads in this size class, it would not be expected to exceed the range of desired conditions and would not be a main carrier of fire. Therefore, after 3 years, the surface fuel loadings would not be expected to increase wildfire hazard.

Commercial timber harvest followed by felling of sub-merchantable trees is proposed on about 3,265 acres. Activity fuel treatments in the nonlethal fire regime would include whole tree yarding and lopping of the commercial material to no more than 36 inches from the ground on approximately 1,069 acres (Table 3-33). A prescribed underburn of low-to-moderate intensity would also be implemented in 3 to 5 years after harvest on 962 acres, to further abate the activity fuels in the 0- to 3-inch size class, lessening the chance of a surface fire becoming a sustained crown fire. The prescribed underburn could kill trees ≤8 inches d.b.h, particularly relatively small trees and/or if thin-barked species, such as Douglas-fir.

Activity fuels treatments in the mixed1 fire regime would include lopping to no more than 36 inches from the ground, whole tree yarding and burning of landing material, and top haul back to skid trails on 2196 acres (Table 3-33). Noncommercial thinning and lopping of resulting slash to a depth of no more than 36 inches from the ground would also occur on about 839 acres in the mixed1 fire regime (Figure 3-14). In areas where activity fuel remains onsite, and where noncommercial material would be lopped, the amount of activity fuel would have a variable distribution, creating a jackpot-like fuel loading across the units. The activity fuels would be expected to increase surface fuel loads in the 0- to 3-inch size class and would increase potential

surface flame lengths on these units for approximately 2 to 3 years (Fuels IDT member professional judgment based on experience in comparable areas).

Prescribed fire has not been proposed within the PVG 6 units because fire in this fire regime often results in an undesirable density and continuity of tall shrubs that would compete with the establishment of desirable vegetation, including shade-intolerant species such as ponderosa pine, and increase surface and ladder fuel concerns (Crane and Fischer 1986). During the 2- to 3-year time period, the activity fuels would become compacted by snow and flashy small fuels would decay. At the end of 3 years, activity fuels in the 0- to 3-inch size class would decompose to an average tons per acre consistent with the range of desired conditions. Although the 0- to 3-inch size class fuels would no longer be a concern in 3 years, the activity fuels in the 3- to 6-inch size class would remain onsite. This size class of fuel meets Forest Plan definitions for CWD and while the addition of these activity fuels would increase surface fuel loads over what currently exists, the total tons would remain within desired condition and would not unacceptably increase the wildfire hazard (Forest Service 2010a, Appendix A, Table A-7, p. A-11).

Through plantation thinning and commercial harvest, 4,104 acres would be treated to reduce or repattern the multi-storied structure in the nonlethal and mixed1 fire regimes. Treatments in the nonlethal fire regime would produce openings that could support the regeneration of ponderosa pine as ponderosa pines are favored over Douglas fir in the nonlethal fire regime. In the mixed1 fire regime ponderosa pine and Douglas-fir are favored and grand fir, being the climax species would be discriminated against. This discrimination would create openings in the mixed1 fire regime, creating a group appearance. Over time, this grouping would contribute to the structural diversity of other older groups developed through the treatments.

Table 3-33. Summary of Fuel Treatment Activities for the Scriver Creek Integrated Restoration Project

Fuels Treatments	Alternative A (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)
Commercial Treatments				
Whole tree yarding and prescribed burning	0	500	488	488
Lopping slash and prescribed burning	0	462	462	462
Lopping slash to 36 inches only	0	622	293	403
Whole tree yarding and slash haulback	0	1,011	1,241	1,131
Whole tree yarding and burning of landings	0	670	1,091	1,091
Total area for commercial treatments	0	3,265	3,575	3,575
Noncommercial Treatments				
Thinning and lopping of plantations (outside Riparian Conservation Areas)	0	676	676	676
Thinning and lopping of plantations (within Riparian Conservation Areas)	0	163	163	163
Total area for noncommercial treatments	0	839	839	839

Note: Each alternative is treating approximately the same amount of prescribed underburn acres within the nonlethal fire regime.

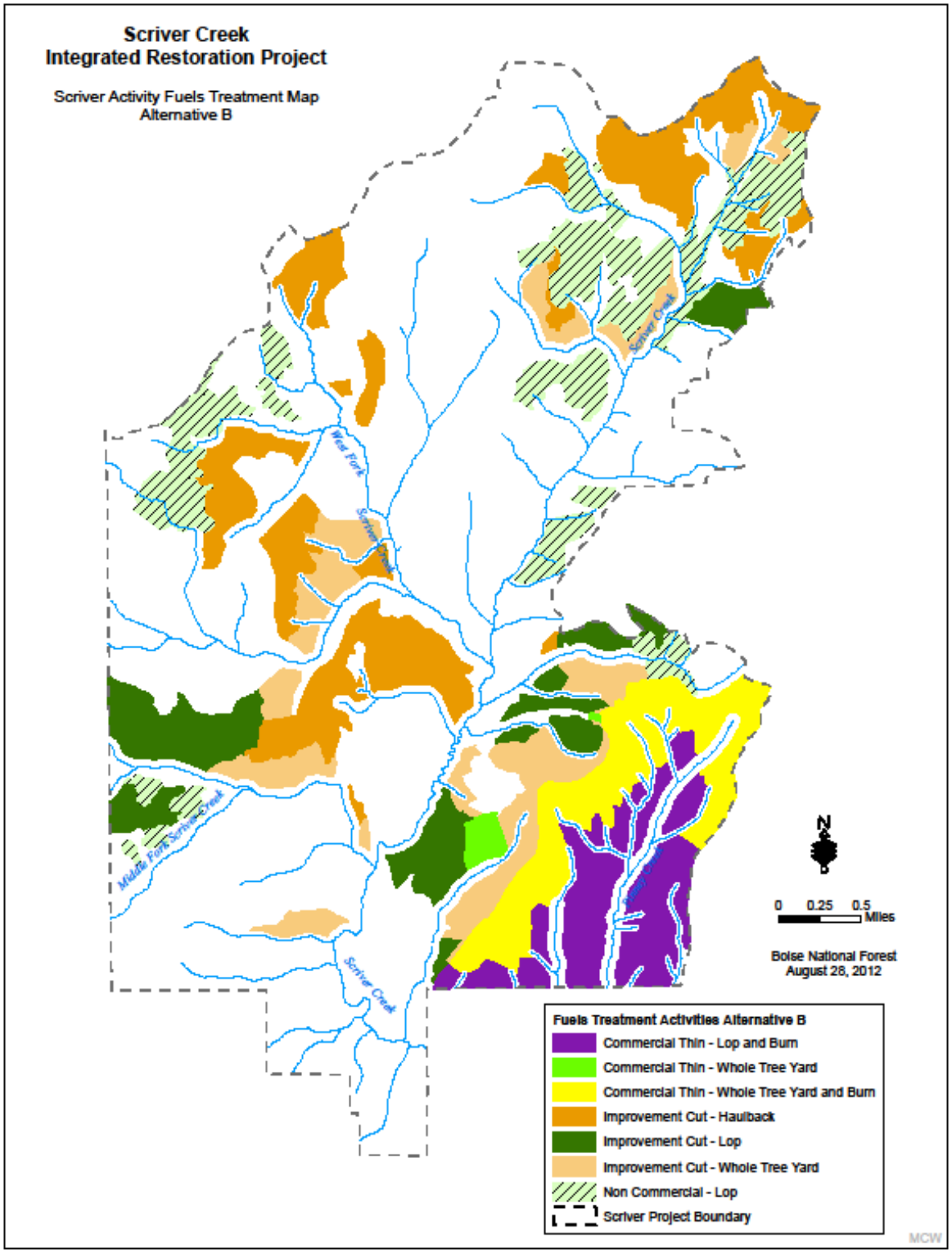

Figure 3-14. Fuels Treatment Map for Alternative B

Treatments would repattern smaller tree size classes into groups, clumps, and openings, thereby reducing the stand densities, decreasing the continuity of ladder fuels, and increasing the canopy base height, all of which reduce the risk of a surface fire transitioning to a crown fire and increase the likelihood of characteristic wildfire behavior. Treatments, in combination with subsequent regeneration, would result in overstory and understory groups of varying number and sizes. Treatments would promote plantations with variable spacing, including groups and openings, which would develop future-generation openings and create within-stand heterogeneity, in turn reducing the potential that undesirable wildfire behavior could result from a wildfire burning through the plantations.

For the purpose of this analysis, wildfire hazard was determined for the year 2030. CI results indicate that in 2030, risk that a wildfire ignition would become a sustained crown fire would be lowered in the treated areas when compared to the existing conditions and Alternative A, thereby reducing the potential for uncharacteristic wildfire behavior and effects (size, intensity, and severity). As illustrated in Table 3-32 and Figure 3-15, wildfire hazard modeling indicates general shift in the number of acres at high wildfire hazard to moderate wildfire hazard under Alternative B, a measurable improvement compared to Alternative A.

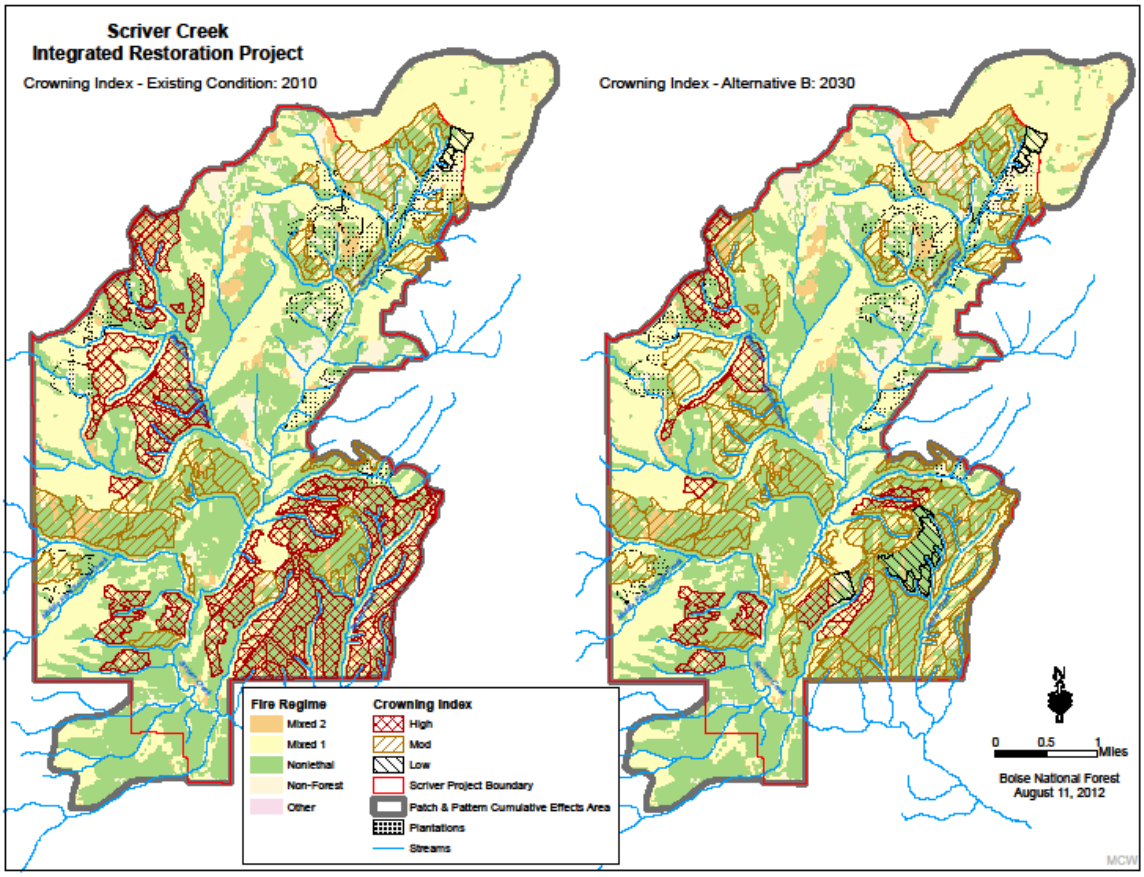

Figure 3-15. Crowning Index Existing Map for Alternative B

In conclusion, under Alternative B, were a wildfire to start within the Project area, greater flexibility in the use of suppression tactics would be available compared to Alternative A as vegetative conditions move toward desired conditions and the risk of stand-replacing wildfire decreases. Suppressing a wildfire under Alternative B would likely be less difficult and costly compared to under Alternative A due to the resulting characteristic fire behavior. Structure condition would be similar to those that occurred historically, and the fire effects would be more characteristic of the nonlethal and mixed1 fire regimes. Concerns about firefighter safety and the risk of uncharacteristic landscape patches would be reduced. Breaking up the fuel continuity across the landscape would make the analysis area more resistant to potential large, severe wildfires from outside of the proposed treatment areas that could run from crown to crown.

3.3.6 Environmental Consequences of Alternative C

3.3.6.1 Direct and Indirect Effects of Alternative C

Alternative C would employ one or more of the following treatment activities: commercial harvest and felling of sub-merchantable trees, noncommercial thinning of plantations, and activity fuel treatments (Table 3-33 and Figure 3-16). Implementing this alternative may reduce the risk of uncharacteristic wildfire behavior within the analysis area through vegetation management and activity fuel treatments. Wildfire hazard reduction would be accomplished by reducing ladder fuels and treating activity fuels, thereby limiting a fire's ability to transition from a surface fire to a crown fire. Alternative C includes approximately 310 more net acres in the southern portion of the Project area than Alternative B. This net difference includes 105 acres adjacent to the Bear Wallow IRA that are not treated in Alternative C. Treating additional area under this alternative would further reduce the wildfire hazard by incorporating a larger area of harvest and fuel treatments within the mixed1 fire regime.

Commercial timber harvest followed felling of sub-merchantable trees is proposed on about 3,575 acres (Table 3-33). Activity fuel treatments in the nonlethal fire regime would include whole tree yarding and lopping of the commercial material to no more than 36 inches from the ground on approximately 1,069 acres (Table 3-33). A prescribed underburn of low-to-moderate intensity would also be implemented in 3–5 years on 950 acres to further abate the activity fuels in the 0- to 3-inch size class, lessening the chance of a surface fire becoming a sustained crown fire. The prescribed underburn could kill trees ≤8 inches d.b.h., particularly relatively small trees and/or thin-barked species, such as Douglas-fir.

Activity fuels treatments in the mixed1 fire regime would include lopping to no more than 36 inches from the ground, whole tree yarding and burning of landing material, and top haul back to skid trails on about 2506 acres (Table 3-33). Alternative C features different logging methods that result in fewer acres of lopping and more of top haulback to skid trails, which would provide for a more comprehensive fuels abatement treatment across a larger area than under Alternatives B and D. Noncommercial thinning and lopping of resulting slash to a depth of no more than 36 inches from the ground would also occur on the about 839 acres in the mixed1 fire regime. In areas where activity fuel remains onsite, and where noncommercial material would be lopped, the amount of activity fuel would have a variable distribution, creating a jackpot-like fuel loading across the units. The activity fuels would be expected to increase surface fuel loads in the 0- to 3-inch size class and would increase potential surface flame lengths on these units for approximately 2 to 3 years (Fuels IDT member professional judgment based on experience in comparable areas).

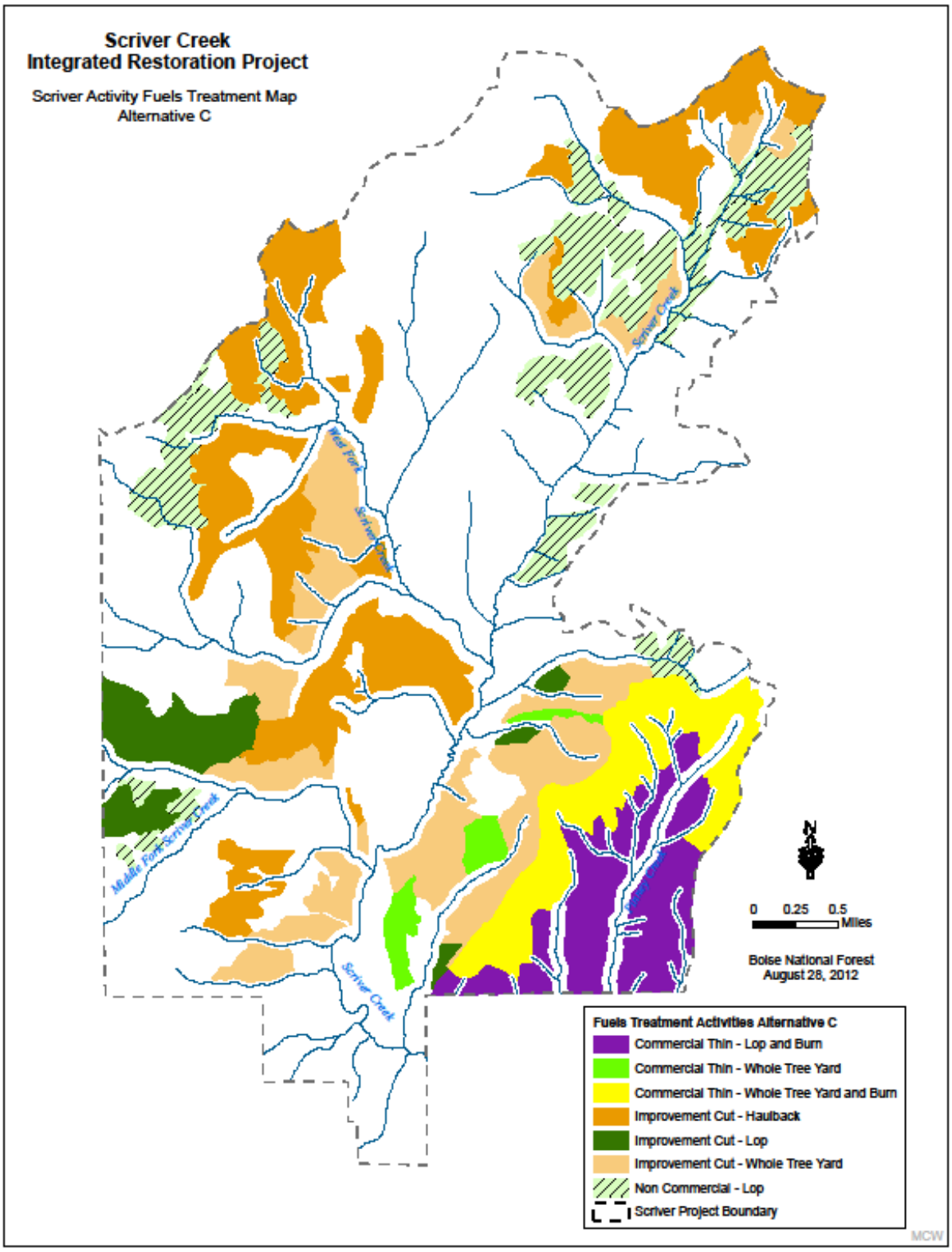

Figure 3-16. Fuels Treatment Map for Alternative C

Prescribed fire has not been proposed within the PVG 6 units because fire in this fire regime often results in an undesirable density and continuity of tall shrubs that would compete with the establishment of desirable vegetation, including shade-intolerant species such as ponderosa pine, and increase surface and ladder fuel concerns (Crane and Fischer 1986). During the 2- to 3-year time period, the activity fuels would become compacted by snow and flashy small fuels would decay. At the end of 3 years, activity fuels in the 0- to 3-inch size class would decompose to an average tons per acre consistent with the range of desired conditions. Although the 0- to 3-inch size class fuels would no longer be a concern in 3 years, the activity fuels in the 3- to 6-inch size class would remain onsite. However, as discussed earlier, this size class of fuel meets Forest Plan definitions for CWD and while the addition of these activity fuels would increase surface fuel loads over what currently exists, the total tons would remain within the desired condition and would not unacceptably increase the wildfire hazard.

Through plantation thinning and commercial harvest, 4,414 acres would be treated to reduce or repattern the multi-storied structure in the nonlethal and mixed1 fire regimes. Treatments in the nonlethal fire regime would produce openings that could support the regeneration of ponderosa pine as ponderosa pines are favored over Douglas fir in the nonlethal fire regime. In the mixed1 fire regime ponderosa pine and Douglas-fir are favored and grand fir, being the climax species would be discriminated against. This discrimination would create openings in the mixed1 fire regime, creating a group appearance. Over time, this grouping would contribute to the structural diversity of other older groups developed through the treatments. Treatments would repattern smaller tree size classes into groups, clumps, and openings, thereby reducing the stand densities, decreasing the continuity of ladder fuels, and increasing the canopy base height, all of which reduce the risk of a surface fire transitioning to a crown fire and increase the likelihood of characteristic wildfire behavior. Treatments, in combination with subsequent regeneration, would result in overstory and understory groups of varying number and sizes. Treatments would promote plantations with variable spacing, including groups and openings, which would begin developing future-generation openings and creating within-stand heterogeneity, in turn reducing the potential that undesirable wildfire behavior could result from a wildfire burning through the plantations.

For the purpose of this analysis, wildfire hazard was determined for the year 2030. CI results indicate that in 2030, risk that a wildfire ignition would become a sustained crown fire would be lowered in the treated areas compared to the existing conditions and Alternative A, thereby reducing the potential for uncharacteristic wildfire behavior and effects (size, intensity, and severity). Wildfire hazard modeling indicates a general shift in the number of acres at high wildfire hazard to moderate wildfire hazard under Alternative C, showing similar results as Alternatives B and D (Table 3-32 and Figure 3-17). Implementing this alternative would also show a measurable improvement compared to Alternative A.

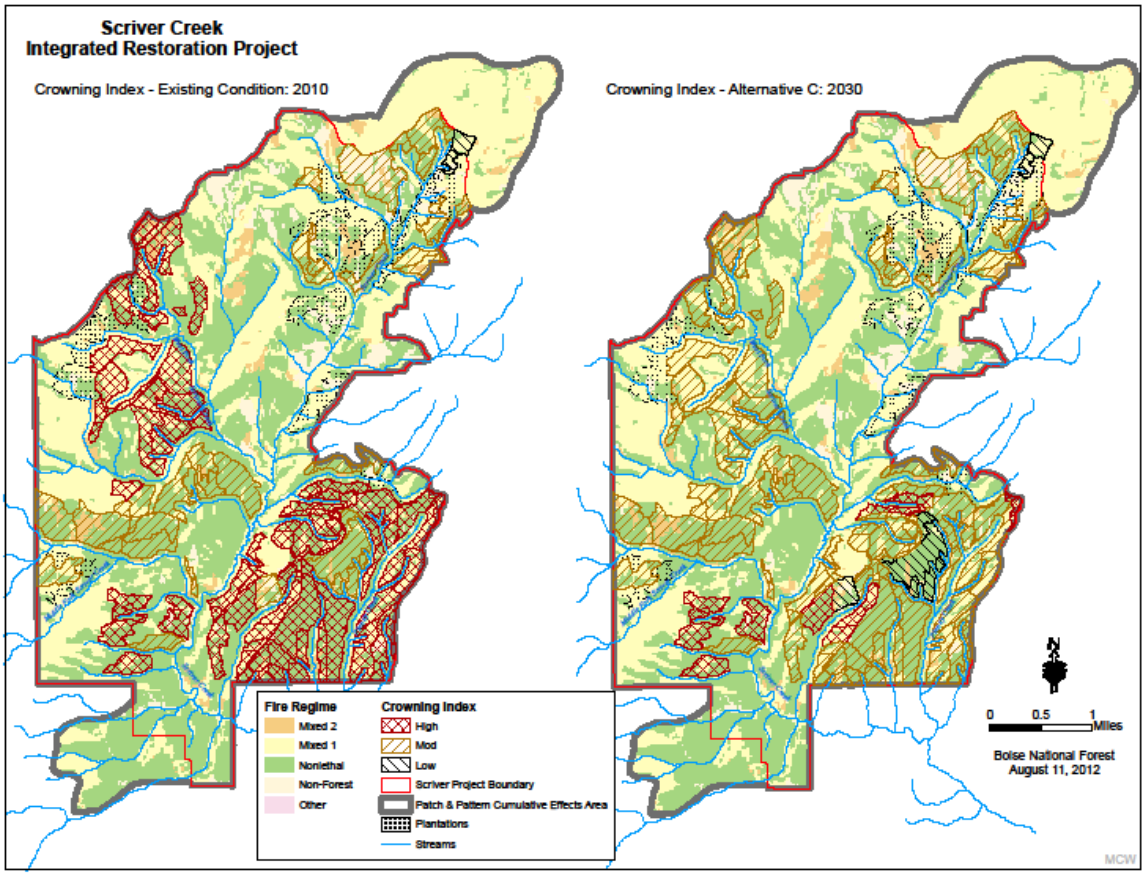

Figure 3-17. Crowning Index Map for Alternative C

In conclusion, under Alternative C, were a wildfire to start within the Project area, greater flexibility in the use of suppression tactics would be available compared to Alternative A as vegetative conditions move toward desired conditions, and the risk of stand-replacing wildfire decreases. Suppressing a wildfire under Alternative C would likely be less difficult and costly compared to under Alternative A due to the resulting characteristic fire behavior. Structure condition would be similar to those that occurred historically, and the fire effects would be more characteristic of the nonlethal and mixed1 fire regimes. Concerns about firefighter safety and the risk of uncharacteristic landscape patches would be reduced. The more comprehensive fuels treatments within this alternative lower the risk of a surface fire becoming a sustainable crown fire within the treated areas. Breaking up the fuel continuity across the landscape would make the analysis area more resilient to potential large, severe wildfires from outside the proposed treatment areas that could run from crown to crown.

3.3.7 Environmental Consequences of Alternative D

3.3.7.1 Direct and Indirect Effects of Alternative D

Alternative D would employ one or more of the following treatment activities: commercial and noncommercial timber harvest, noncommercial thinning of plantations, and activity fuel treatments as shown in Table 3-33 and illustrated in Figure 3-18. Implementing this alternative may reduce the risk of uncharacteristic wildfire behavior within the analysis area through vegetation management and activity fuel treatments. Reducing the wildfire hazard would be accomplished by reducing ladder fuels and treating activity fuels, thereby limiting the fire's ability to transition from a surface to a crown fire. Alternative D includes approximately 310 more net acres in the southern portion of the Project area than Alternative B. This net difference includes 105 acres adjacent to the Bear Wallow IRA that would not be treated in Alternative D. Alternative D and C have the same footprint on the ground. As with Alternative C, treating additional areas would further reduce the wildfire hazard by incorporating a larger area of harvest and fuel treatments within the mixed1 fire regime.

Commercial timber harvest followed by felling on sub-merchantable trees is proposed on about 3,575 acres (Table 3-33). Activity fuel treatments in the nonlethal fire regime would include whole tree yarding and lopping of the commercial material to no more than 36 inches from the ground on approximately 1,069 acres (Table 3-33). In addition, a prescribed underburn of low-to-moderate intensity (as in Alternatives B and C) would be implemented to further abate the activity fuels in the 0- to 3-inch size class. The prescribed underburn would further reduce risk to the surface fuel conditions from the commercial timber harvest specifically in the smaller size class fuels lessening the chance of a surface fire becoming a sustained crown fire. The prescribed underburn could result in mortality of live trees 8 inches d.b.h. and less, particularly if those trees are relatively small in diameter and/or if thin-barked species such as Douglas-fir.

Activity fuels treatments in mixed1 fire regime would include lopping to no more than 36 inches from the ground, whole tree yarding and burning of landing material, top haul back to skid trails on about 2,506 acres (Table 3-33). However, Alternative D features different logging methods that result in more acres of lopping (approximately 110 acres) than in Alternative C and 110 acres less of top haulback to skid trails than Alternative C. Noncommercial thinning and lopping of resulting slash to a depth of no more than 36 inches from the ground would also occur on the above acres in the mixed1 fire regime. In areas where activity fuel remains onsite, and where noncommercial material would be lopped, the amount of activity fuel would have a variable distribution, creating a jackpot-like fuel loading across the units. The activity fuels would be expected to increase surface fuel loads in the 0- to 3-inch size class and would increase potential surface flame lengths on these units for approximately 2 to 3 years (Fuels IDT member professional judgment based on experience in comparable areas).

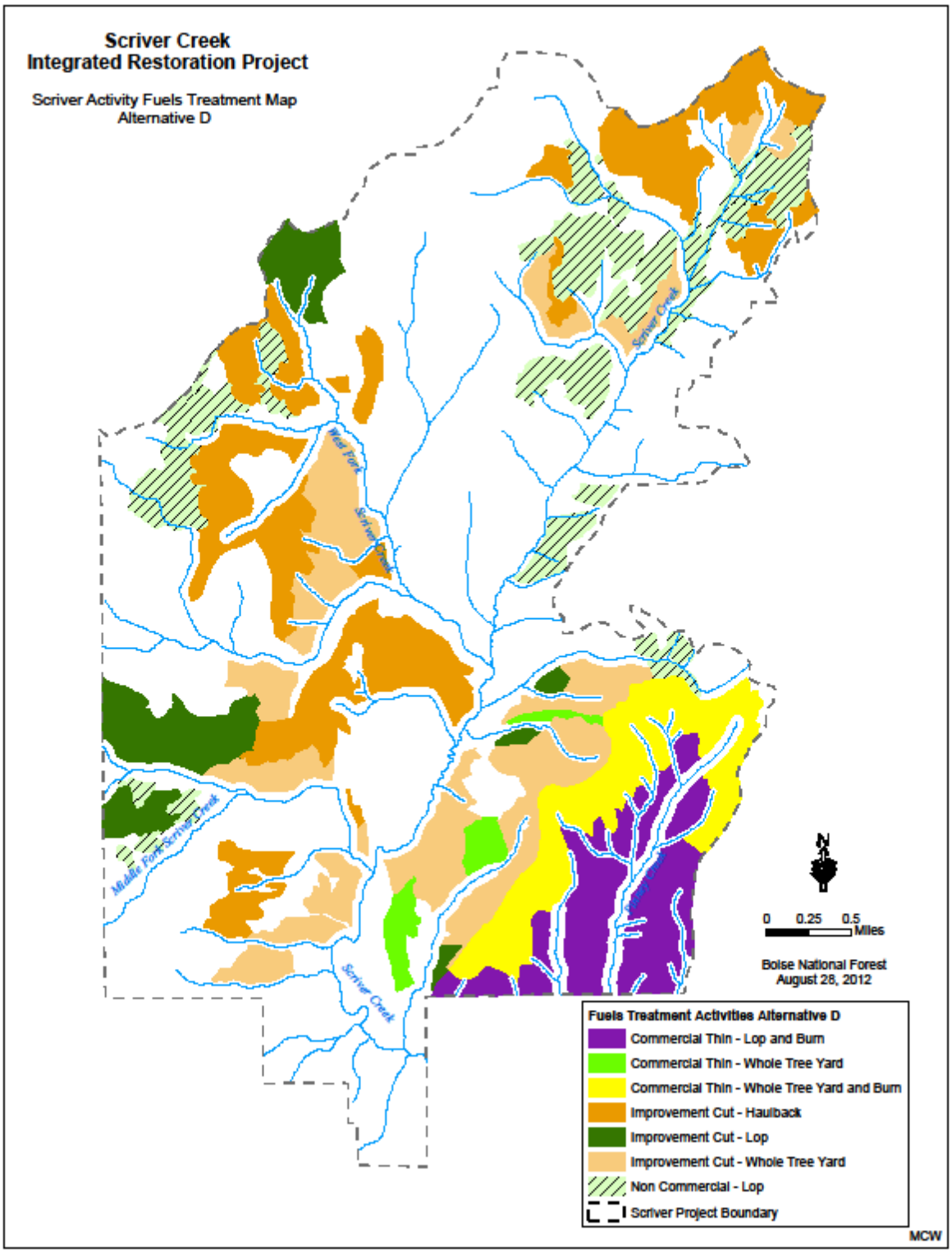

Figure 3-18. Fuels Treatment Map for Alternative D

Prescribed fire has not been proposed within the PVG 6 units because fire in this fire regime often results in an undesirable density and continuity of tall shrubs that would compete with the establishment of desirable vegetation, including shade-intolerant species such as ponderosa pine, and increase surface and ladder fuel concerns (Crane and Fischer 1986). During the 2- to 3-year time period, the activity fuels would become compacted by snow and flashy small fuels would decay. At the end of 3 years, activity fuels in the 0- to 3-inch size class would decompose to an average ton per acre consistent with the range of desired conditions. Although the 0- to 3-inch size class fuels would no longer be a concern in 3 years, the activity fuels in the 3- to 6-inch size class would remain onsite. However, as discussed earlier, this size class of fuel meets Forest Plan definitions for CWD and while the addition of these activity fuels would increase surface fuel loads over what currently exists, the total tons would remain within desired condition and would not unacceptably increase the wildfire hazard.

Through plantation and commercial harvest, 4,414 acres would be treated to reduce or repattern the multi-storied structure in the nonlethal and mixd1 fire regimes. Treatments would produce openings that could support the regeneration of ponderosa pine in the nonlethal fire regime. Treatments would also reduce stand densities, decrease the continuity of ladder fuels, and increase canopy base heights. However, distribution and spatial location of the openings may be constrained and all of the overstory would remain intact due to TH-9. A mix of ponderosa pine and Douglas-fir seed trees would result since ponderosa pine would not be favored in the nonlethal fire regime and ponderosa pine, Douglas fir, and grand fir would not be favored in the mixed1 fire regime. A combination of ponderosa pine and Douglas-fir regeneration would likely result in the nonlethal fire regime openings and Douglas-fir and grand-fir in the mixed1 fire regime openings. Due to a denser overstory, the shade-intolerant Douglas-fir and grand fir would be more likely than ponderosa pine to regenerate under overstory groups and clumps, which would limit structural diversity. As Douglas-fir and grand fir regenerate within the overstory, groups would develop ladder fuels, which would lead to potential transition of surface fire to crown fire and lead to uncharacteristic fire behavior for all the fire regimes as the stand ages. Plantations treatments would develop variable spacing, including groups and openings, which would develop future generation openings and create within-stand heterogeneity, in turn reducing the potential that undesirable wildfire behavior could result from a wildfire burning through the plantations.

For the purpose of this analysis, wildfire hazard was determined for the year 2030. CI results indicate that in 2030, risk that a wildfire ignition would become a sustained crown fire would be lowered in the treated areas compared to the existing conditions and Alternative A, thereby, reducing the potential for uncharacteristic wildfire behavior and effects (size, intensity, and severity). Wildfire hazard modeling indicates a general shift in the number of acres at high wildfire hazard to moderate wildfire hazard under Alternative D, showing similar results as Alternatives B and C (Table 3-32 and Figure 3-19). Implementing this alternative would also show a measurable improvement compared to Alternative A.

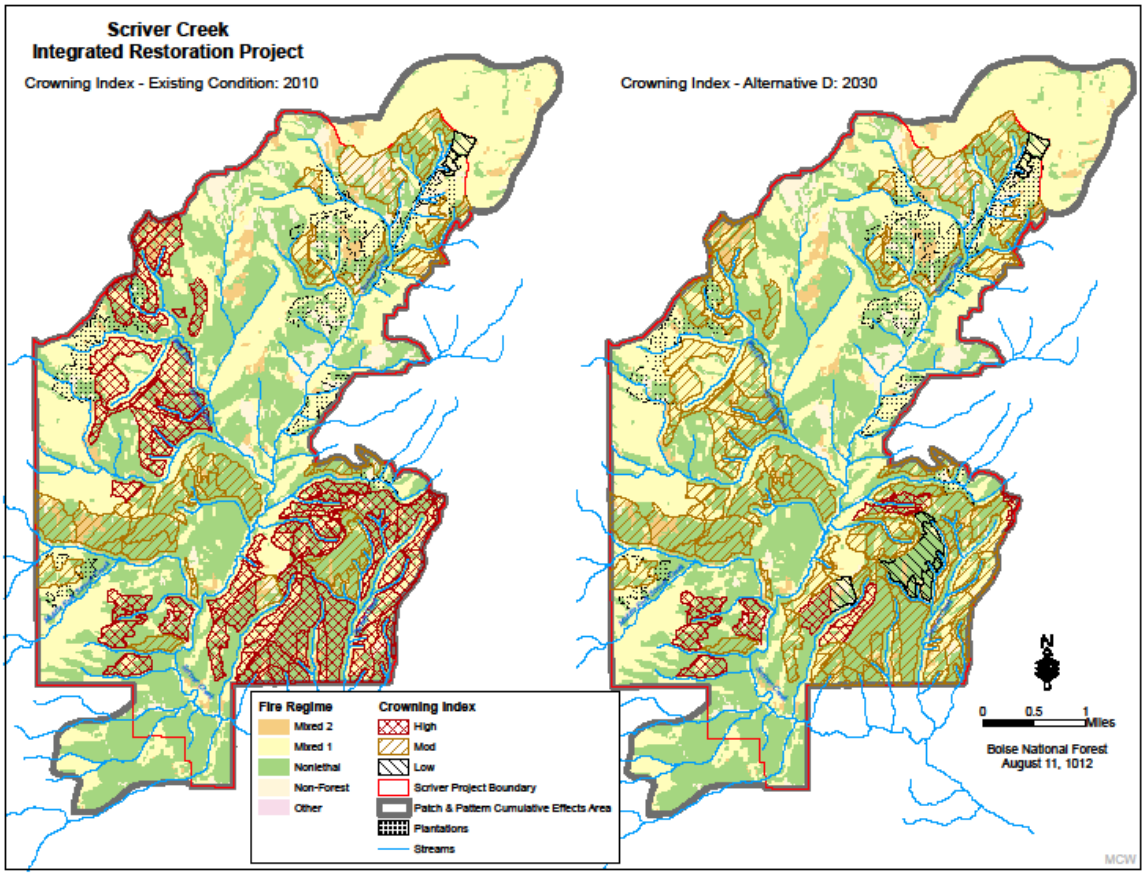

Figure 3-19. Crowning Index Map for Alternative D

In conclusion, under Alternative D, were a wildfire to start within the Project area, greater flexibility in the use of suppression tactics would be available compared to Alternative A. Treatment of the understory vegetation reduces the risk of fire transitioning from the surface to the crowns, and the risk of stand-replacing wildfire decreases. Suppressing a wildfire under Alternative D would be less difficult and costly compared to under Alternative A due to the resulting lower intensity fire behavior. Concerns about firefighter safety would also be reduced. However, the structural condition of the overstory and understory groups could create a different type of fire effect than would have occurred historically. As the stands age, a risk of uncharacteristic landscape patches would occur due to ladder fuels from Douglas-fir and grand fir regeneration into the overstory and understory. Breaking up the fuel continuity across the landscape would make the analysis area more resilient to potential large, severe wildfires originating from outside of the proposed treatment areas.

3.3.8 Cumulative Effects Common to all Action Alternatives

3.3.8.1 Past Activities

The Cumulative Effects Table (Table B.1 Appendix B) outlines the past, ongoing, and foreseeable actions evaluated for inclusion in this analysis. The following activities in the analysis area that are identified in Appendix B may contribute to cumulative effects: past, present, and future vegetation management; fire suppression; and livestock grazing. Although the incremental impacts to wildfire and/or fuel resources of past activities are not known, the existing conditions provide a representation of the effects that have resulted from these activities and thus they are not discussed in detail here (section 3.3.1.1).

3.3.8.2 Present/Ongoing Activities

Present and ongoing activities within the analysis area include recreation activities, road and trail use, road and trail maintenance, livestock grazing, vegetation management, and wildfire suppression as needed. These present and ongoing activities would be expected continue in the future. These present and ongoing actions would not be anticipated to cumulatively impact fuel loads or ladder fuel conditions in the analysis area in combination with direct and indirect effects of this alternative. Though the number of human-caused starts may be the same as Alternative A based on present and ongoing recreation and road and trail use, the potential that these human-caused starts would result in undesirable outcomes, including undesirable landscape patches and patterns, would decrease as fuel loads and ladder fuels within the analysis and recreation areas decreases and fuel continuity is broken up.

3.3.8.3 Reasonably Foreseeable Activities

Reasonably foreseeable actions in the analysis area include the Scriver Creek Trails and Scriver Creek Snowmobile Bridge projects. These project proposals are being developed and are not finalized to date. The Scriver Creek Trail project could add miles of NFS trails utilizing new trail construction, conversion of existing NFS roads to trail, and/or designation of NFS trail on NFS road (i.e., dual designation) within the analysis area. The Scriver Creek Snowmobile Bridge project, in conjunction with other landowners, would replace an existing snowmobile bridge to provide over-snow use that meets Forest Service standards. It would not be anticipated that these reasonably foreseeable actions would cumulatively impact fuel loads or ladder fuel conditions in the analysis area in combination with the direct and indirect effects of this alternative. However, though the number of human-caused starts may be the same as Alternative A based on foreseeable future recreation and road and trail use, the potential that these human-caused starts would result in undesirable outcomes, including undesirable landscape patches and patterns, would likely decrease as fuel loads and ladder fuels within the analysis and recreation areas decreases and fuel continuity is broken up.

3.4 WILDLIFE

3.4.1 Analysis Methodology

This section incorporates by reference the Wildlife Technical Report, including the Biological Assessment and Evaluation for Threatened, Endangered, Proposed and Candidate/Region 4 Sensitive (TEPC/S) wildlife species. The Wildlife Technical Report contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that were used by the Wildlife Biologist to reach the conclusions disclosed in this section.

Wildlife habitat was modeled for this analysis based on stand examination data collected and compiled in 1996 and validated in 2005. Wildlife field data has been collected in the analysis area from 2004 to present. Species occurrence records were obtained from several sources, including the Idaho Department of Fish and Game (IDFG) Conservation Sciences Program (IFWIS 2011), the Forest Service's corporate database (NRIS Wildlife), and project survey data.

This analysis incorporates management direction, findings, and conclusions in the *Final Environmental Impact Statement Supporting Forest Plan Amendments to Integrate the Boise National Forest Wildlife Conservation Strategy, Phase 1: Forested Biological Community* (WCS; Forest Service 2010b). A fundamental concept of the WCS (Nutt et al. 2010) is that if the amount and structure of source 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 source habitats across landscapes are outside their HRV (Forest Service 2010a). The desired condition for wildlife habitats on the Forest is to be within the range of HRV (Forest Service 2010a). Current source habitats, including many acres within the Project area, are outside the range of HRV. The objective of projects implementing the Forest Plan, such as this one, is to take action (or in some cases no action) to move source habitats toward their HRV. Treatments prescribed are designed to both maintain existing desirable habitat attributes in the short term and restore attributes that are lacking in the long term, as well as provide greater assurance that desirable habitat attributes, such as large ponderosa pine trees, are continually sustained over time.

Appendix E of the Forest Plan groups source habitats[45] for terrestrial wildlife species across the Forest. These source habitat groups fit into a hierarchical system of four broad suites of habitat: (1) Forest Only; (2) Combination of Forest and Rangeland; (3) Rangeland Only and; (4) Riverine and Non-riverine Riparian and Wetland (Forest Service 2010a). These four suites are further refined by categorizing similar source 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 13–14 are within Suite 4. Habitat families are a collection of species that share similarities in source habitats, which are arranged along major vegetative themes such as ecological communities, vegetative structure, and fire regime. Focal species are selected species within these habitat families that represent key environmental correlates and ecological functions that may be affected by management activities. Key environmental correlates are the biotic or abiotic habitat

[45] 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).

elements that species use on the landscape to survive and reproduce. Key ecological functions are the set of ecological roles performed by a species in its ecosystem (Marcot and Vander Heyden 2001). These ecological roles are the primary ways organisms use, influence, and alter their biotic and abiotic environments.

The analysis for this project focused on four families including Family 1–Low Elevation, Old Forest; Family 2–Broad Elevation, Old Forest; Family 5–Forest and Range Mosaic; and Family 13–Riverine Riparian and Wetland. Six focal species from these four families (Table 3-34) were selected for this evaluation based on their use of key environmental correlates potentially affected by the action alternatives.

The Wildlife Biologist analyzed additional wildlife species, including Region 4 Sensitive species and species listed as Threatened or Endangered by the USFWS (Table 3-34). The Sensitive, Candidate, and Threatened and Endangered species are included to provide documentation of potential impacts as required by Forest Service manual direction (FSM 2672.4 and FSM 2672.43) and the ESA. Table 3-34 discloses the effects determinations for all TEPC species identified by the USFWS Service as applicable to Boise and Valley counties. Table 3-34 also discloses the effects determinations for those species identified by the Regional Forester as Sensitive species (FSM 2670.5). There are no effect determinations displayed for Alternative A (No Action Alternative) in Table 3-34 because Alternative A does not authorize, fund, nor implement any action and, therefore, despite ongoing activities, does not result in a ‘determination of effect’ for a species. There are effects that may be realized should Alternative A be selected, and thus a full discussion of the effects of every alternative is included in the analysis for each species. Detailed analyses on each species are available in the Wildlife Technical Report in the Project Record.

The TEPC, Sensitive, and MIS wildlife species identified in Table 3-34 are all assessed in the Wildlife Technical Report for the Scriver Creek Integrated Resource Project (Project Record). For species in Families 2, 3, 5, 7, 11, 12, 13, and 14 that have not been discussed in the SDEIS, the Wildlife Technical Report concluded there would no impact to or no effect on these species from Alternatives B, C, or D because of a lack of source habitat for these species or because project activities would have no effect on source habitat. Refer to the Wildlife Technical Report for the Scriver Creek Integrated Resource Project (Project Record) for the analysis for these species.

Table 3-34. Wildlife Species Considered in this Analysis

Family	Common Name	Scientific Name	Status	Effects Determination Common to All Action Alternatives
Family 1	White-headed Woodpecker	Picoides albolarvatus	S	MI
Family 2	American Three-toed Woodpecker	Picoides tridactylus	S	MI
	Black-backed Woodpecker	Picoides articus	MIS	N/A
	Boreal Owl	Aegolius funereus	S	NI
	Fisher	Martes pennanti	S	NI
	Flammulated Owl	Otus flammeolus	S	MI
	Great Gray Owl	Strix nebulosa	S	NI
	Northern Goshawk	Accipiter gentilis	S	MI
	Pileated Woodpecker	Dryocopus pileatus	MIS	N/A
Family 3	Canada Lynx	Lynx canadensis	T	NE
	Mountain Quail	Oreortyx pictus	S	MI
	Wolverine	Gulo gulo	C/S	NI
Family 5	Gray Wolf	Canis lupus	S	MI
	Peregrine Falcon	Falco peregrinus anatum	S	NI
	Rocky Mountain Bighorn Sheep	Ovis canadensis canadensis	S	MI
	Rocky Mountain Elk	Cervus elaphus	SOI	N/A
Family 7	Spotted Bat	Euderma maculatum	S	NI
	Townsend's Big-eared Bat	Corynorhinus townsendii pallescens	S	BI
Family 11	Greater Sage Grouse	Centrocercus urophasianus	C/S	NI
Family 12	Columbian Sharp-tailed Grouse	Tympanuchus phasianellus columbianus	S	NI
	Northern Idaho Ground Squirrel	Spermophilus brunneus brunneus	T	NE
	Southern Idaho Ground Squirrel	Spermophilus brunneus endemicus	C	NI
Family 13	Bald Eagle	Haliaeetus leucocephalus	S	NI
	Columbia Spotted Frog	Rana luteiventris	S	MI
	Yellow-billed Cuckoo	Coccyzus americanus	C/S	NI

Note: Status abbreviations are T = Threatened; C = Candidate; S = Sensitive; SOI = Species of Interest. Determination language for Threatened and Candidate species: NE = "no effect"; NI = "no impact" for candidate species. Determination language for Sensitive species: NI = "no impacts"; BI = "beneficial impact"; MII = "may impact individuals but is not likely to cause a trend to federal listing or loss of viability." Gray shading denotes Focal Species and N/A = Not Applicable (an effects determination is not required)

The analysis area for direct, indirect, and cumulative effects is defined for each species based upon the presence of the species or its habitat, the area where proposed activities are planned, and the outermost extent in which effects would be expected.

The effects analysis below first focuses on old forest and large tree habitat in the Project area. Old forest and large tree habitat are ecological stages of forest development important to many wildlife species associated with Families 1 and 2 (section 3.4.2). This discussion is followed by habitat family and species assessments for each alternative (sections 3.4.3 through 3.4.8), a section on management Indicator species (MIS) (section 3.4.8), and a section on the effects of alternatives to migratory birds (section 3.4.9).

Another important habitat component is large diameter snags. A robust discussion of the effects of alternatives on retention and recruitment of snag habitat is found in the "Snags and Coarse Woody Debris" section of the "Vegetation Resources" analysis of this SDEIS (sections 3.2.8.1 and 3.2.8.2). In addition, the "Old Forest Habitat and Large Tree Habitat" analysis below includes a discussion of how large diameter snags under each alternative contribute to the quality of old forest and large tree habitat. Discussions of the benefits of large diameter snags to the quality of habitat for individual wildlife species is also included in each species analyses for those that are associated with this important habitat element, including the white-headed woodpecker, flammulated owl, northern goshawk, and pileated woodpecker (sections 3.4.4.1 through 3.4.5.3).

3.4.2 Old Forest Habitat and Large Tree Habitat—Families 1 and 2

3.4.2.1 Affected Environment

Old forest habitat is an important source habitat condition that provides denning, nesting, foraging, and cover habitat for many wildlife species. Old forest habitats are distinguished by old trees and related structural attributes, which may include tree size, signs of decadence, large snags and logs, canopy gaps, and understory patchiness (Forest Service 2003a; Van Pelt 2007, 2008). In different forested habitat types, site quality, climate, and disturbance patterns, old forest habitats may vary extensively in tree size, age class, and presence and abundance of structural elements (Helms 1998). Large tree habitat is an important foundational component of old forest habitat that has been identified at the scale of the Forest as being below desired quantities in nonlethal and mixed1 fire regimes. Large tree habitat can be a critical building block to restoring old forest habitat when quantities and distribution of old forest habitat are not reflective of historic conditions and can provide foraging and breeding habitat for many wildlife species that also use old forest habitat.

Currently, no one stand meets all attributes that characterize old forest habitat. However, the large tree stands in the Project area contain attributes of both low elevation (Family 1) and broad elevation (Family 2) large tree and old forest habitat. The large tree size class provides important habitat for a variety of wildlife species, even when not in an old forest habitat condition. Existing large tree and old forest habitat components (e.g., legacy-like trees, large diameter snags, canopy cover, species composition) within large tree stands provide building blocks for developing stands to maintain desired large tree and old forest habitat components. Management actions can facilitate movement toward developing remaining components that are not within the desired conditions for low and broad elevation old forest habitat, such as species composition or canopy cover.

As described in the 2010 Forest Plan and as used in this analysis, large tree and old forest habitat occurs in the mid-seral, fire-maintained systems associated with fire regimes that were historically prevalent in central Idaho. In PVG 2, these systems were historically large diameter; open canopy landscapes dominated by ponderosa pine and maintained under a nonlethal fire regime. In the drier habitat types of PVG 6, vegetative communities were historically comprised of stands in the medium or large tree size classes, in the moderate canopy cover class (40 to 69 percent), dominated by ponderosa pine and Douglas-fir and smaller amounts of other species such as grand fir (refer to section 3.2.5), and maintained under a mixed1 fire regime (refer to section 3.2.2). Appendix E of the 2010 Forest Plan describes the range of desired attributes of old forest habitat (Forest Service 2010a) by PVG: canopy cover of live large trees ≥20 inches d.b.h.; stand canopy cover of live trees ≥0.1 inches d.b.h.; species composition of live large trees ≥20 inches d.b.h.; snag quantities per acre; and quantities of CWD per acre.

Direct and indirect effects to large tree and old forest habitat could result from the proposed vegetation treatments plus the miles of associated road activity identified in Chapter 2 for each alternative. Vegetation treatments would include commercial harvest and noncommercial thinning with associated fuels management activities. The cumulative effects analysis area is the same as used for the “Landscape Patch and Pattern” analysis in “Forested Vegetation” (section 3.2.6) and “Fire and Fuels” (section 3.3). The cumulative effects analysis area is consistent with these two other resource sections due to the inherent relationship between vegetation and fire in providing for wildlife habitat. The existing condition discussions of large tree and old forest habitat within the 4,532-acre vegetation analysis area (section 3.2.1.1, Table 3-1) are based on stand examination data collected in 2006 and projected to 2011 outside of plantation areas and for plantation areas and walk-through surveys and professional judgment of the District Silviculturist, Forest Ecologist, and District and Forest Wildlife Biologists based on experience in similar vegetation types. For areas outside the 4,532 acres, various datasets were used to depict habitat conditions within the cumulative effects area (refer to section 3.2.6).

All 66 stands proposed for treatment were modeled to determine the impacts of the alternatives on old forest habitat attributes. Currently, 49 of the 66 stands proposed for treatment are in the large tree size class. The number of large tree size class stands in PVG 2 is 3 out of the 15; PVG 5 is 2 out of 2; and PVG 6 is 44 out of 49. Of these, none meet all the attributes in combination for the definition of old forest habitat in Appendix E (Forest Service 2010a) although many stands do meet some. Large tree stands that do not meet old forest habitat conditions are due either to inadequate large tree canopy cover; lack of the desired species composition; too few snags; and/or not enough CWD, particularly in the ≥15 inch diameter class. Species composition for many stands in the analysis area is currently too much late-seral and climax species, such as grand fir in PVG 6 or Douglas-fir in PVG 2, and not enough the early seral ponderosa pine. For the nonlethal fire regime (PVG 2) large tree size class stands, the preferred species composition for the trees ≥20 inches d.b.h. for the fire regime area proposed for treatment is ≥80 percent ponderosa pine (refer to section 3.2.4.2.1.2); for the mixed1 fire regime (primarily PVG 6) area proposed for treatment, the preferred species composition is ≥60 percent ponderosa pine (and/or western larch if present), ≤25 percent Douglas-fir, and ≤15 percent grand fir (section 3.2.5.2.1.2). No stands or areas in combination (strata or fire regimes) in the analysis area meet the desired species composition (sections 3.2.4.1.6.2 and 3.2.5.1.6.1).

3.4.2.2 Summary of Direct and Indirect Effects

This section discusses the overall results of the alternatives on large tree and old forest habitat. By 2030, more stands would be in the large tree size class under Alternatives B, C, and D than Alternative A. All stands in PVGs 5 and 6 would be in the large tree size class but Alternative A would have three fewer large tree size class stands than Alternatives B, C, and D in PVG 2. No stands would meet all old forest habitat attributes in combination but some stands would meet some attributes. Under Alternatives A and D, about the same number of stands would meet the large tree canopy cover of ≥30 percent, which would be more than would occur under Alternatives B and C. However, more stands would meet the desired mix of early seral species under Alternatives B and C compared to Alternatives A and D. Alternatives C and D would both develop more stands that would meet the total stand canopy cover; Alternative A would develop the fewest. Under Alternatives A and D, large snags and CWD that develop in the future would be a greater mix of later seral species while Alternatives B and C would produce a greater mix of early and late-seral. Existing deficits in CWD would improve faster in the short term under the action alternatives due to Design Feature TH-8, which would intentionally haul back or leave large CWD on-site in areas with large CWD deficits.

3.4.2.3 Direct and Indirect Effects of Alternative A—No Action

Under Alternative A, 11 additional stands for a total of 60 would move into the large tree size class by 2030. By this time, all of the stands in PVGs 5 and PVG 6 would be in the large tree size class. In PVG 2, 9 of the 15 stands would be in the large tree size class. While canopy cover percentage of large live trees in many stands would still not meet the desired of ≥30 percent for old forest habitat, stands would be moving closer to the desired cover by 2030, particularly in stands that are currently in the large tree size class. Large tree canopy cover in stands that would move from the medium to large tree size class by 2030 would be lower than stands that were already in the large tree size class in 2010. Therefore, of the stands that would be at or above the 30 percent canopy cover, all would be in PVG 6 since most of these stands are currently in the large tree size class. However, no stands would meet the old forest habitat attributes in combination in 2030. Many would still have a greater percentage of later seral large tree species composition (i.e., grand fir and/or Douglas-fir), too much total stand canopy cover, or not enough snags or CWD, particularly large CWD. From a wildlife perspective, decreasing densities of desired tree species such as ponderosa pine in PVG 2, and ponderosa pine and Douglas-fir in PVGs 5 and 6 would likely result in decreased nesting and foraging habitat quality for some wildlife species such as white-headed woodpecker (section 3.4.3.1) and flammulated owl (section 3.4.4.1) since these wildlife species are associated with these desired early seral tree species.

3.4.2.4 Cumulative Effects

Appendix B of this document outlines the past, ongoing, and foreseeable actions considered for this analysis. Past activities that have contributed to the existing condition of large tree and old forest habitat in the cumulative effects landscape patch and pattern analysis area include timber sales, the fuelwood program, construction and maintenance of roads and trails, and fire suppression. Ongoing fuelwood gathering and the foreseeable projects and the Scriver Creek Trails and Scriver Creek Snowmobile Bridge Projects, were determined to be activities that could impact large tree and old forest habitat within the analysis area over time. The project proposals for the Scriver Creek Trail and Scriver Creek Snowmobile Bridge project are being

developed and are not finalized to date. The Scriver Creek Trail project could add miles of NFS trails utilizing new trail construction, conversion of existing NFS roads to trail, and/or designation of NFS trail on NFS road (i.e., dual designation) within the analysis area. The Scriver Creek Snowmobile Bridge project would replace, in conjunction with other landowners, an existing snowmobile bridge with a new bridge to provide access for over snow use that meets Forest Service standards. Potential impacts from these projects would be removal of trees and snags. Loss of these attributes would be expected to be minimal as trail and bridge construction would largely avoid felling large diameter trees and the few that may be removed within a given stand would not change the overall stand structure. As a result, these projects would not be expected to measurably reduce habitat quality or inhibit achievement of large tree and old forest habitat.

Fuelwood cutting for personal use is expected to continue although actual quantities of material removed annually from the area are unknown. Fuelwood cutting affects large tree and old forest habitat through removal of snags and CWD, particularly the larger diameter material. Loss of these attributes can reduce the quality, or in some cases inhibit achievement, of old forest habitat conditions.

Alternative A would have no direct effects on landscape patches or patterns of large tree and old forest habitat. An indirect affect may exist in that if treatment does not occur, insect epidemics and stand-replacing wildfire could result in larger and more extensive patches of stand-replacing disturbance in the nonlethal and mixed1 fire regime than would have occurred historically. The landscape patch and pattern diversity that would have historically occurred due to the intermix of nonlethal and mixed1 fire regime areas would be simplified, creating an uncharacteristic patch condition. In addition, the large ponderosa pine currently present and those stands identified by the Partners in Flight as priorities for restoration would decline and many eventually lost (Mehl and Haufler 2004). This would reduce the quality of habitat for wildlife species that rely on landscape patch and patterns of large tree and old forest habitat dominated by early seral species, as well as other habitat features that are consistent with the historic range of conditions under which they have evolved.

Additionally, a present action is occurring in the cumulative effects analysis area to the north called the Frontier Timber Sale. This action may cumulatively impact the landscape patch and pattern attributes by increasing the species composition of ponderosa pine and Douglas-fir, creating small openings, reducing ladder fuels, and increasing tree size class of certain stands within the landscape. The Frontier Timber Sale will affect approximately 103 acres of the landscape patch and pattern analysis area. The beneficial effect of the change resulting from this timber sale would be diluted within the larger landscape patch and pattern analysis area since under Alternative A stands would be less diverse compositionally and structurally, with few openings and less within-stand diversity. The old forest habitat attribute most likely to be met across the area would be the large tree canopy cover. However, many stands would likely be denser than the desired total stand canopy cover range. Cumulatively, when added to the likely effects from past activities, Alternative A would continue to perpetuate risks that future disturbances from insects and wildfire would result in uncharacteristic effects to forest patches and patterns across this landscape, which would reduce habitat quality in both the short and long term compared to the current condition and areas like the Frontier Timber Sale.

3.4.2.5 Direct and Indirect Effects of Alternative B

Of the 66 stands proposed for treatment in one of the action alternatives, 58 would be treated under Alternative B. More stands would move into the large tree size class by 2030 under Alternative B than Alternative A. As noted above, all stands in PVGs 5 and 6 would be in the large tree size class by 2030. In PVG 2, 12 of the 15 stands would be in the large tree size class, which is 3 more than Alternative A. The species composition of the treated areas would move closer to the desired in that there would be a great proportion of large ponderosa pine within the treated stands than under Alternative A (sections 3.2.4.1.6.1 and 3.2.5.1.6.1). Fewer stands however would meet the ≥30 percent large tree canopy cover attribute for old forest habitat though more would meet the early seral species composition. Canopy cover reductions in the overstory (trees ≥20 inches d.b.h.) and understory (<20 inches d.b.h.) would be proposed in the short term to alter species composition to increase the presence of early seral species like ponderosa pine in order to retain this species and sustain it into the future. Currently, there are stands that meet some of the attributes, primarily large tree canopy cover and species composition for old forest habitat and per the 2010 Forest Plan WIST09, these old forest habitat characteristics would be maintained during implementation. There are also some stands that meet the total stand canopy cover and several that exceed it. However, the understory in many of these stands is dominated by Douglas-fir in PVG 2, and grand fir in PVGs 5 and 6 (section 3.2.4.1.1 and 3.2.5.1.1). Canopy cover reductions in the understory would reduce the composition of later seral species and increase the composition of early seral species, as well as develop openings for ponderosa pine regeneration, in order to perpetuate ponderosa pine in stands into the future. As a result of treatments, more stands would meet the total stand canopy cover under Alternative B than Alternative A.

Several of the stands that would meet or exceed the 30 percent canopy cover of large trees in 2030 would not be treated under Alternative B. However, the majority of these stands are dominated by large grand fir; early seral ponderosa pine and Douglas-fir would comprise less than half the large tree species composition. Trees with legacy characteristics, which are a critical structural element for old forest habitat, would be retained by Design Feature TH-6 though in many stands, particularly on the west side of the Project area, the legacy-like trees would be predominately grand fir. However, Alternative B would take the first steps toward ensuring early seral species, such as ponderosa pine and Douglas-fir, would be sustained and increased in both the overstory and understory in the long term. By reducing ladder fuels in PVGs 2 and 5, and breaking up the continuity of understory fuels in PVG 6 (section 3.3.3), the short-term risks of losing existing large ponderosa pine as well as trees with legacy characteristics, both of which are important diversity components, to uncharacteristic wildfire would be reduced compared to Alternative A (refer to sections 3.3.2 and 3.3.3).

Unlike Alternative A the treatments under Alternative B would improve the representation of early seral species, such as ponderosa pine, which would have an indirect benefit to providing a greater number of snags and large CWD of these species. Snags and CWD of climax species, which would be greater under Alternative A than B, do not provide the same habitat values as those of seral species. Providing snags and CWD composed of a mix of later seral and early seral species that would be more typically of the historic conditions, would provide a greater diversity of habitat values for wildlife species that use a mix of conditions than where either early seral or later seral dominate.

Fuelwood cutting affects large tree and old forest habitat through removal of snags and CWD, particularly the larger diameter material most often along open road corridors. Reduction of these attributes can reduce the quality, or in some cases inhibit achievement, of old forest habitat conditions. The proposed realignment of NFS road 696 could affect snags and large CWD along the 4.3 miles of new road prism and 3.5 miles of existing road prism that is not currently open to motorized access. Design Feature WL-6 would reduce the potential impact to large (≥20 inches d.b.h.) snags within a 600 foot corridor along the realigned segment. This would provide greater assurance that development of old forest habitat would not be inhibited by fuelwood collection in areas adjacent to the new road realignment. Decommissioning the existing 3.8 mile of NFS road 696 road that parallels the west fork of scriver creek following the realignment would improve habitat quality in this area, reducing or eliminating further fuelwood collection in this important habitat area that includes several acres of riparian conservation areas.

Increasing trends in the tree size class and species composition would improve source habitat quality in the long term for many species including white-headed woodpecker and flammulated owl (refer to sections 3.4.3.1 and 3.4.4.1, respectively). Increases in large diameter classes of snags, particularly of early seral tree species would improve source habitat for many wildlife species that utilized a diversity of snag species. Deficits in CWD ≥15 inches would result in reduced forage opportunities for species such as pileated woodpecker (section 3.4.4.3). However, TH-8 would improve large CWD conditions in areas where large CWD is currently lacking.

3.4.2.6 Cumulative Effects

As described for Alternative A, Appendix B outlines the past, ongoing, and foreseeable actions considered for this analysis and the potential effects to large tree and old forest habitat.

The ongoing Frontier Timber Sale may cumulatively benefit the landscape patch and pattern attributes in the northern portion of the Project area by creating small openings, reducing ladder fuels and increasing tree size class of certain stands within the landscape. The Frontier Timber Sale will affect approximately 103 acres of the cumulative effects analysis area. Alternative B would develop similar patch conditions that would increase the size of like patches. Alternative B would improve landscape patches and patterns by altering stand conditions such that future insect and wildfire disturbances would more likely result in changes that are consistent with historical in the treated areas (sections 3.2.6 and 3.3.3). Regardless of the effects of past activities, this alternative would result in a beneficial cumulative effect on the overall extent and connectivity of forested habitat patches, including development of large tree and old forest habitat within the fire regimes over time (sections 3.2.2 and 3.3.1.2). Large tree patches would be more extensive and would connect with existing large tree stands in the Project area, but the species composition and structure of the treated stands would differ from untreated. Treated stands would have a higher proportion of ponderosa pine and within-stand structure would be more diverse. Treated areas would contain more obvious groups in the overstory and understory, and openings for the establishment of regeneration. In PVGs 2 and 5, the understory would be less continuous and stands would appear more open. In PVG 6 stands would contain a diversity of multi-storied and single-storied groups with larger openings. Old forest habitat attributes that would be met within the large tree stands in treated areas would be the large tree species composition and the total stand canopy cover. In untreated areas, the attribute that would most often be met would likely be the large tree canopy cover. Treated areas would more often meet the old forest habitat total stand canopy range while untreated areas would likely be denser. The indirect effects of the treatments in the nonlethal and mixed1 fire regimes would create

patterns within the treated areas that would be more consistent with historical conditions and would potentially reduce the extent of disturbance across the landscape.

As discussed in section 3.4.1, the fundamental concept of the WCS (Nutt et al. 2010) is that if the amount and structure of source habitats within landscapes are within the HRV, wildlife species associated with these habitats will have a greater likelihood of sustainability than if the amount and structure of source habitats are outside their HRV (Forest Service 2010a). Over time, the mix of habitat conditions, including large tree and old forest habitat, would be more consistent with that expected historically under Alternative B compared to Alternative A. Thus, Alternative B would contribute to a greater likelihood of sustaining the habitat conditions needed to support the variety of wildlife species found on the Forest than would occur under Alternative A.

3.4.2.7 Direct and Indirect Effects of Alternative C

Of the 66 stands, 63 would be treated under Alternative C. Three stands treated under Alternative B on the northeast side of the Project area, adjacent to the Bear Wallow Inventoried Roadless Area, would not be treated under Alternative C and nine stands on the west side would be treated. The net gain of stands treated under Alternative C compared to Alternative B would be four Under Alternative C, the same number of stands would move into the large tree size class as under Alternative B, which would be more stands into the large tree size class than under Alternative A. Therefore, all stands in PVGs 5 and 6 would be in the large tree size class by 2030 and in PVG 2, 12 of the 15 stands would be in the large tree size class. Like described for Alternative B, the species composition of the treated areas would move closer to the desired in that there would be a great proportion of large ponderosa pine within the treated stands than under Alternative A (sections 3.2.4.1.6.1 and 3.2.5.1.6.1). Fewer stands however would meet the ≥30 percent large tree canopy cover attribute for old forest habitat since many of the stands that currently meet the ≥30 percent for the large tree canopy cover are in stands not proposed for treatment under Alternative B. However, as a result of treatment, more stands would meet the desired species composition for old forest habitat under Alternative C than Alternative B. Like described above for Alternative B, canopy cover reductions would be proposed in the short term to alter species composition in the overstory and understory to provide greater assurance that early seral species like ponderosa pine would be retained in the short term and sustained over time. Also, more stands would meet the total stand canopy cover for old forest habitat under Alternative C than Alternative B. In all cases, per the Forest Plan WIST09 (Forest Service 2010a), existing old forest habitat characteristics would be maintained within stands during implementation.

Design Feature TH-6 would apply to Alternative C as described for Alternative B. However, similar to Alternative B, in many stands, particularly on the west side of the Project area, the legacy-like trees would be predominately grand fir. However, Alternative C would take the first steps toward ensuring early seral species, such as ponderosa pine and Douglas-fir, would be sustained and increased in both the overstory and understory in the long term. Because Alternative C would treat more stands than Alternative B, Alternative C would maintain or begin development of early seral old forest habitat in more stands than Alternative B. In addition, Alternative B would break up the continuity of understory fuels on more acres in PVG 6 (section 3.3.3). Subsequently, the short-term risk of losing existing large ponderosa pine as well as trees with legacy characteristics, both of which are important diversity components, to wildfire would be reduced compared to Alternative A (sections 3.3.2 and 3.3.3).

Alternative C would improve the representation of early seral species, such as ponderosa pine, on more acres than Alternative B, which would have an indirect benefit to providing a greater number of snags and large CWD of these species. Snags and CWD of climax species, which would be greater under Alternative A than Alternatives B and C, do not provide the same habitat values as those of seral species. Thus, providing snags and CWD composed of a mix of later seral and early seral species would provide a greater diversity of habitat values for wildlife species that use a mix of conditions than where either early seral or later seral dominate.

Increased acres in the large tree size class and early seral species composition would improve source habitat quality in the long term for many species including white-headed woodpecker and flammulated owl (refer to sections 3.4.4.1 and 3.4.5.1 respectively). Increases in large diameter classes of snags, particularly of early seral tree species would improve source habitat for many wildlife species that utilized a diversity of snag species (section 3.4.3). Deficits in CWD ≥15 inches would result in reduced forage opportunities for species such as pileated woodpecker (section 3.4.5.3). However, similar to Alternative B, TH-8 would improve large CWD conditions in areas where large CWD is currently lacking.

3.4.2.8 Cumulative Effects

As described for Alternative A, Appendix B outlines the past, ongoing, and foreseeable actions considered for this analysis and the potential effects to large tree and old forest habitat. The effects of fuelwood cutting related to the realignment of NFS road 696 would be the same as described for Alternative B.

The cumulative effect of the ongoing Frontier Timber Sale and treatments in the Project area would be the same as described for Alternative B for the stands treated in common. The primary difference between Alternatives B and C would be the variation in stands treated and not treated between the two alternatives. Under Alternative C, PVG 6 stands in the northern portion of the Project area near the Bear Wallow IRA would not be treated. However, these stands have a relatively high species composition of early seral ponderosa pine and Douglas-fir though understories are dominated by grand fir. In the near future, these stands would trend toward the old forest habitat attributes though the large tree species composition would decline over time as the understory grand fir succeeds into the overstory. The additional stands that would be treated under Alternative C would develop more extensive patches of large tree size class with a greater diversity of structure and higher component of early seral ponderosa pine than under Alternative B.

Future insect and wildfire disturbances would likely result in changes more consistent with historical changes over a greater area (sections 3.2.6 and 3.3.3). Therefore, Alternative C would improve landscape patches and patterns more than Alternative B by altering stand conditions across more acres. Old forest habitat attributes that would most often be met within the large tree stands within treated areas would be the large tree species composition and the total stand canopy cover. In untreated areas, the attribute that would most often be met would likely be the large tree canopy cover. Treated areas would more often meet the old forest habitat total stand canopy range while untreated areas would likely be denser. The indirect effects of the treatments in the nonlethal and mixed1 fire regimes would create patterns within the treated areas that would be more consistent with historical conditions and would potentially reduce the extent of disturbance across the landscape. Because more stands would be treated under Alternative C, the potential benefit of altering stand conditions would be more extensive.

3.4.2.9 Direct and Indirect Effects of Alternative D

Alternative D would treat the same stands as Alternative C. However, the treatment would be different between the two alternatives. Under Alternative D, all large trees, regardless of species, would be retained. The same number of stands would move into the large tree size class under Alternative D as under Alternative C, but the species composition would be different. Of the action alternatives, Alternative D would develop the fewest stands with species composition consistent with the old forest habitat attributes. By 2030, the number of stands that would meet the early seral species composition under Alternative D would be most similar to Alternative A. However, Alternative D would produce more stands that would meet the ≥30 large tree canopy cover attribute than either Alternative B or C. The number of stands that would meet the total stand canopy cover for old forest habitat would be the same for Alternative D as Alternative C. As described for Alternatives B and C, per Forest Plan WIST09 (Forest Service 2010a), existing old forest habitat characteristics would be maintained within stands during implementation.

Though Design Feature TH-6 would apply to Alternative D, it is likely most legacy-like trees would be retained due to TH-9 rather than TH-6. In the productive vegetative communities found in the Scriver Creek area trees with legacy characteristics are more likely to be much larger than the ≥20 inches d.b.h described in TH-9, even in PVG 2, which contains the driest habitat types in the Project area. However, as discussed for Alternative C, many of the legacy-like trees in PVG 6 are grand fir rather than seral species.

Alternative D would foster the development of the old forest habitat large tree canopy cover attribute of ≥30 percent more than Alternatives B and C, but would not develop the desired early seral species composition in the near term. However, treatments to the understory would reduce grand fir in favor of ponderosa pine and Douglas-fir and therefore the seral component in the overstory would likely increase in the future as understory trees move into the overstory. These understory treatments would break up the continuity of understory fuels but within-stand characteristics would be different between Alternative D and Alternative C. Because Alternative D would retain more canopy cover in the overstory, canopy cover would be reduced more in the understory to achieve the old forest habitat attribute for total stand canopy cover. Under Alternative D, overstory groups would be more continuous, understory groups would be fewer, and openings would be smaller and more shaded (sections 3.2.4.1.4.2 and 3.2.5.1.4.2).

Alternative D would not alter the current mix of large (≥20 inches d.b.h.) trees. Therefore, Alternative D would have less of an indirect benefit to providing a greater number of early seral snags and large CWD of these species. Snags and CWD of climax species, which would be greater under Alternatives A and D than Alternatives B and C, do not provide the same habitat values as those of seral species. Providing snags and CWD composed of a mix of later seral and early seral tree species would be more beneficial and would provide a greater diversity of habitat values for wildlife species that use a mix of conditions than where either early seral or later seral snags dominate.

Increased acres of large tree size class and large tree canopy cover would improve source habitat in the long term for many species, including flammulated owl and pileated woodpecker (refer to sections 3.4.5.1 and 3.4.5.3, respectively). However, the quality of habitat for flammulated owl would potentially be lower than under Alternatives B and C since more of the total stand canopy cover would be in the overstory than understory, resulting in fewer multi-storied groups. Increases in large diameter classes of snags, particularly of later seral tree species would improve

source habitat for many wildlife species that utilized later seral snag species (section 3.4.3). Deficits in CWD ≥15 inches would result in reduced forage opportunities for species such as pileated woodpecker (section 3.4.5.3). However, similar to Alternative C, TH-8 would improve large CWD conditions in areas where large CWD is currently lacking.

3.4.2.10 Cumulative Effects

As described for Alternative A, Appendix B outlines the past, ongoing, and foreseeable actions considered for this analysis and the potential effects to large tree and old forest habitat. The effects of fuelwood cutting related to the realignment of NFS road 696 would be the same as described for Alternatives B and C.

The cumulative effect of the ongoing Frontier Timber Sale and treatments in the Project area would be different for Alternative D than described for the stands treated in common to Alternative C. The primary difference between Alternatives C and D would be species composition of the overstory and the within-stand structural diversity. Though Alternative D would connect to large tree patches in the Frontier Timber Sale, the Frontier Timber Sale patches would have a higher proportion of early seral species in the overstory. Across the Project area as a whole, treated stands would blend in with under-treated stands in the overstory in that the species composition of the large trees would be similar between treated and untreated areas. However, structurally treated areas would different than untreated. Overstory groups in treated stands would be more continuous, like untreated areas, but understory groups would be smaller and more distinct. Treated areas would have some small openings whereas untreated areas are likely to have fewer. In addition, the understory of treated areas would be a higher proportion of early seral ponderosa pine and Douglas-fir than untreated. Old forest habitat attributes within the large tree stands, both within treated and untreated areas that would most often be met would likely be the large tree canopy cover. Treated areas would more often fall within the desired total stand canopy range while untreated areas would likely be denser. Future insect and wildfire disturbances may be less extensive in treated patches, but the results may not be consistent with historical conditions given the structural conditions developed by the treatments (sections 3.2.6 and 3.3.3). However, Alternative D would improve some attributes of old forest habitat within landscape patches within the Project area.

3.4.3 Family 1—Low Elevation, Old Forest Species

Family 1 is identified in the Forest Plan as the habitat family of greatest conservation concern due to widespread and substantial declines in habitat quantity on the Forest (Nutt et al. 2010). This finding is consistent with assessments at other scales in Idaho and the interior Columbia Basin (IDFG 2005, NPPC 2004, Ritter 2000, Wisdom et al. 2000). Wildlife species associated with Family 1 include species identified as Forest sensitive (Forest Service 2011d) and/or state species of greatest conservation need in Idaho (IDFG 2005).

Species within Family 1 depend on late seral multi- and single-storied lower montane forests as source habitat; as well as requiring large diameter (>21 inches d.b.h.) snags or trees with cavities for nesting or foraging (Wisdom et al. 2000). Habitat is generally depicted as relatively homogeneous patches of predominantly large trees in lower canopy cover conditions dominated by ponderosa pine (Forest Service 2010a, Appendix E). Family 1 source habitat occurs in PVGs 1, 2, and 5 and those drier habitat types of PVGs 3 and 6 where ponderosa pine is a major

seral species (section 3.2.5). Historically, these types were maintained in a relatively open condition by frequent, nonlethal fire.

The proposed project lies entirely within the 61,123-acre Crouch 5th field Hydrologic Unit (HU) or watershed (HU 1705012101). Federally managed lands within this HU consist of approximately 37,650 acres, or 62 percent. The following analysis only considers the federally managed portion of this HU unless otherwise stated.

Within this watershed, PVGs 2 and 3 dominate the east end of the watershed and transition to PVGs 5 and 6 (with limited PVG 2) towards the middle and northern portions of the HU, where the Project area is located. Isolated patches of low canopy cover, large-tree size class occur within the eastern portion of the watershed while only one small patch occurs in the northern section in the Scriver Creek drainage. Historically, patches of stands in the large-tree size class with open canopy conditions would have been present in larger and more contiguous patches than exist today (Forest Service 2010a, Appendix A, Table A-5, p. A-8 to 9). In combination, fire suppression and past harvest activities have resulted in a landscape with smaller, more isolated patches of large tree, open canopy conditions.

Historically, the Crouch watershed had between 25 and 50 percent of the watershed in the large tree size class under low canopy conditions within PVGs 1, 2, 3, 5, or 6 (nonlethal and mixed1 fire regimes). Currently, this watershed has just above 1 percent of PVGs 1, 2, 3, 5, or 6 in these structural stages, and the relative change from historic to current has been a 97 percent decline (Nutt et al. 2010). The magnitude of this decline is consistent with changes in Family 1 habitat across the Forest.

Risk associated with changes in snags and CWD can be indirectly assessed through road density. Snag and CWD abundance tend to be lower in areas with more roads (Wisdom and Bate 2008, Hann et al. 1997) due to increased access for forest users to access dead wood. Total road densities within PVGs 1, 2, 3, 5, or 6 (areas capable of developing source habitat) are approximately 3.1 mi/mi^2 in the watershed and are likely having an impact on large diameter snag retention and can also affect recruitment of CWD.

Because of the exclusion of fire and past management-related activities, the Crouch watershed contains stands with a variety of canopy layers and canopy densities. Proposed activities are planned to emphasize retention of the largest diameter trees, while simultaneously reducing stand densities and developing the species composition more reflective of historic conditions. Changes in the vegetative communities within the Project area that move conditions toward an amount and distribution of Family 1 habitat more representative of patch sizes and extent expected under historic disturbance processes will move the Project area, and consequently the watershed it lies within, toward the desired amount and distribution of Family 1 source habitat.

The Project area comprises approximately one-fifth of the watershed. Elevations within the Project area are around 3,500 feet at the southern end and increase to nearly 6,100 feet at the northern end. There are five PVGs in the Project area with the most common being PVG 6 (82 percent, both moist and dry habitat types), followed by PVG 2 (13 percent) and PVG 5 (4 percent). PVGs 8 and 9 are not present in large quantities, with each comprising less than 1 percent of the 11,510-acre analysis area.

Effects of the Project on Family 1 habitat can be assessed through selection and analysis of the project activities on focal species. Focal species are used in this assessment to address expected

or potential changes to key ecosystem attributes. The focal species concept is described by Lambeck (1997) and a discussion of this concept can be found in the 2010 Forest Plan Wildlife Technical Report (Nutt et al. 2010). In the Project, the white-headed woodpecker was selected as a focal species for Family 1 habitat due to its association with large diameter live and dead ponderosa pine trees and open forest conditions (Table 3-34).

Key ecological functions (KEFs) for the white-headed woodpecker include the species' role as a primary consumer of ponderosa pine cones seeds and a secondary consumer of terrestrial invertebrates (Marcot 1997; O'Neil et al. 2001). Large diameter, and typically older, ponderosa pine are important because smaller size classes generally have less surface area and bark cracks/crevices to support insects and may produce fewer cones. Beginning in late summer and through the winter, large ponderosa pine seeds are the primary food source for the white-headed woodpecker and comprise up to 60 percent of its diet. White-headed woodpeckers also play an ecological role in excavating cavities and in seed dispersal via short distance transportation of seeds from source trees to anvil sites (Garrett et al. 1996).

Key environmental correlates (KECs) for this species include an association with forested habitats comprised of legacy trees and live trees and snags in the range of 15 to 30+ inches d.b.h. (Marcot 1997, O'Neil et al. 2001). White-headed woodpeckers utilize the dead parts of live trees, as well as existing tree cavities despite their status as primary excavators (O'Neil et al. 2001). Fire can benefit this species by creating open-canopy habitat with dead standing trees and improving cavity creation potential (O'Neil et al. 2001).

The KEFs and KECs for the white-headed woodpecker overlap with the KEFs and KECs of other species associated with Family 1 habitat, such as the white-breasted nuthatch and Lewis' woodpecker (Nutt et al. 2010, Vol 3, Appendix 3).

3.4.3.1 White-headed Woodpecker (Region 4 Sensitive Species, Management Indicator Species)

3.4.3.1.1 Affected Environment

In Idaho, white-headed woodpeckers are found mainly in open and mature ponderosa pine and mixed ponderosa pine/Douglas-fir forests (Frederick and Moore 1991, Wisdom et al. 2000). A strong correlation exists between white-headed woodpecker presence and large diameter (≥20 inches d.b.h.) live and dead ponderosa pines (i.e., snags) (Blair and Servheen 1995; Dixon 1995a, 1995b, 1998; Frederick and Moore 1991). Densities of white-headed woodpeckers have been shown to increase as old forest ponderosa pine habitat increases (Dixon 1995b). Important source habitat components are an abundance of large diameter ponderosa pine trees with prolific seed production, a relatively open canopy, and availability of snags for nest cavities (Garrett et al. 1996).

On the Forest, vegetative communities that could provide source habitat conditions include PVGs 1, 2, 3, 5, and 6 (Nutt et al. 2010). While the drier habitat types in PVGs 3 and 6 can develop cover types with ponderosa pine in the larger size classes and open canopies, these conditions are not found as commonly as in PVGs 1, 2, and 5 across the Forest. Large diameter snags are an essential habitat feature for white-headed woodpecker.

White-headed woodpecker large tree and old forest source habitat patches should be relatively homogenous with inclusions of smaller tree size classes generally <1 acre in nonlethal fire regimes or inclusions ranging from 1 to 600 acres in mixed1 fire regimes. The amount of area

required to support white-headed woodpeckers in fragmented landscape patches is larger than in landscapes with contiguous habitat patches (Dixon 1995a). Median sizes of home ranges in fragmented mixed-conifer habitat have been documented as 845 acres, compared with 523 acres in contiguous ponderosa pine habitat (Dixon 1995a).

The white-headed woodpecker was selected as a focal species for this analysis because of its association with nonlethal fire regimes, snags, the large tree size classes, and low canopy cover conditions.

3.4.3.1.2 Current Conditions

Source habitat in the watershed has declined by nearly 97 percent for the white-headed woodpecker, which is consistent with the current trends for Family 1 habitat across the Forest (Nutt et al. 2010). Due to the area's overall mid-to-low elevation and warm dry habitat types, a high percentage (70 percent) of source habitat capacity is susceptible to noxious weeds. Road densities are also impacting source habitat quality as total road densities are within the high classification (>1.7 mi/mi^2). Higher road densities increase the risk of the loss of snags to fuelwood collection over time. A portion of source habitat is within a range allotment; 8,300 acres of the 46,800-acre Middle Fork South S&G Allotment occurs within the Project area. This watershed historically provided approximately 14,145 acres of source habitat for the white-headed woodpecker, which equates to 38 percent of federally managed lands (37,848 acres) in the watershed, and was a substantial source of habitat for this species on the Forest.

Existing amounts and distribution of modeled source habitat were found to be limited within the Project area. The small amount of modeled source habitat would not likely contribute to a potential home range contained within the Project area or that went beyond the Project area boundary. The capability of the Project area to provide source habitat is greater than current conditions provide for (Figure 3-20). The 11,510-acre Project area will be used to assess impacts to the amount, distribution, and quality of source habitat for the white-headed woodpecker due to its capability to provide source habitat for this species.

Three occurrences of white-headed woodpeckers have been reported in the vicinity of the analysis area, ranging from 0.1 to 5.2 miles from the analysis area boundary (IFWIS 2011, NRIS 2011). The nearest was just over 0.1 mile from the east edge of the analysis area, and a second was <1 mile from the southeastern boundary (Figure 3-20), a third was >5 miles south of the analysis area within the Crouch watershed.

A Forest annual MIS monitoring transect with 10 point counts occurs within the analysis area along the West Fork of Scriver Creek. White-headed woodpeckers have not been detected along this route during MIS monitoring surveys conducted annually from 2004 through 2012.

Three of the five PVGs capable of developing source habitat for white-headed woodpeckers are present in the analysis area. PVGs 1 and 3 do not occur and will not be included in the following discussions. Source habitat capacity consists of the three remaining potential vegetation groups: PVGs 2, 5, 6. However, because the white-headed woodpecker is only associated with the drier habitat types found within PVG 6, only the drier types within this vegetation group were considered source habitat capacity for this species. PVGs 2, 5, and the dry habitat types of PVG 6 represent approximately 6,897 acres, or 60 percent of the analysis area. It is important to note that although the drier habitat types within PVG 6 can develop cover types with ponderosa pine in the larger size classes and open canopies; these conditions are still not found as

commonly as in PVGs 2 and 5. Source habitat capacity is well distributed and interconnected throughout the analysis area with the potential to build upon remnant source habitat patches and improve interconnectedness. Figure 3-20displays the amount and distribution of source habitat capacity.

Only 71 acres of modeled existing source habitat exists within the analysis area (Figure 3-20), well below the amount believed to have occurred historically within this portion of the HU. While favorable habitat types, large tree component, and even canopy cover generally occurs within source habitat capacity, stands that exhibit these preferred vegetative characteristics often do not have species composition dominated by ponderosa pine. As a result, species composition was the most limiting factor that resulted in limited modeled source habitat within the analysis area. Patches of late-seral ponderosa pine forests are small and fragmented as compared to historical conditions. No patches are large enough to provide for a single home range estimated at 845 acres in fragmented mixed conifer forests (Dixon 1995a,b).

Approximately 13 percent (1,482 acres) of the analysis area is comprised of PVG 2, a key vegetation group for this species. Under historic nonlethal fire regimes, forests in PVG 2 would have been dominated by stands of large, ponderosa pine with open canopies. These conditions were maintained over time by frequent low intensity fire (Forest Service 2010a, Appendix A). A fairly low percentage of PVG 2 within the analysis area is in the large tree size class as compared with what would have been expected historically and most acres have one or more stories of ladder fuels beneath the overstory reducing the overall quality of habitat.

Approximately 86 percent (9,921 acres) of the analysis area is comprised of PVG 5 and 6, which provide source habitat for the white-headed woodpecker in the drier habitat types within these vegetation groups. These habitat types fall within the mixed1 fire regime, which historically experienced somewhat longer fire intervals (5–70 years) and were primarily homogeneous with small patches of different seral stages, densities, and compositions (section 3.2.3 through 3.2.6). Currently, large tree size class and total canopy cover within these acres are at the high end of desired conditions for this PVG (section 3.2.4.1.5.1.). However, species composition is well below what was believed to have occurred historically, meaning there is a lower proportion of ponderosa pine and a higher proportion of grand fir within these stands than desired (section 3.2.4.2.1.2).

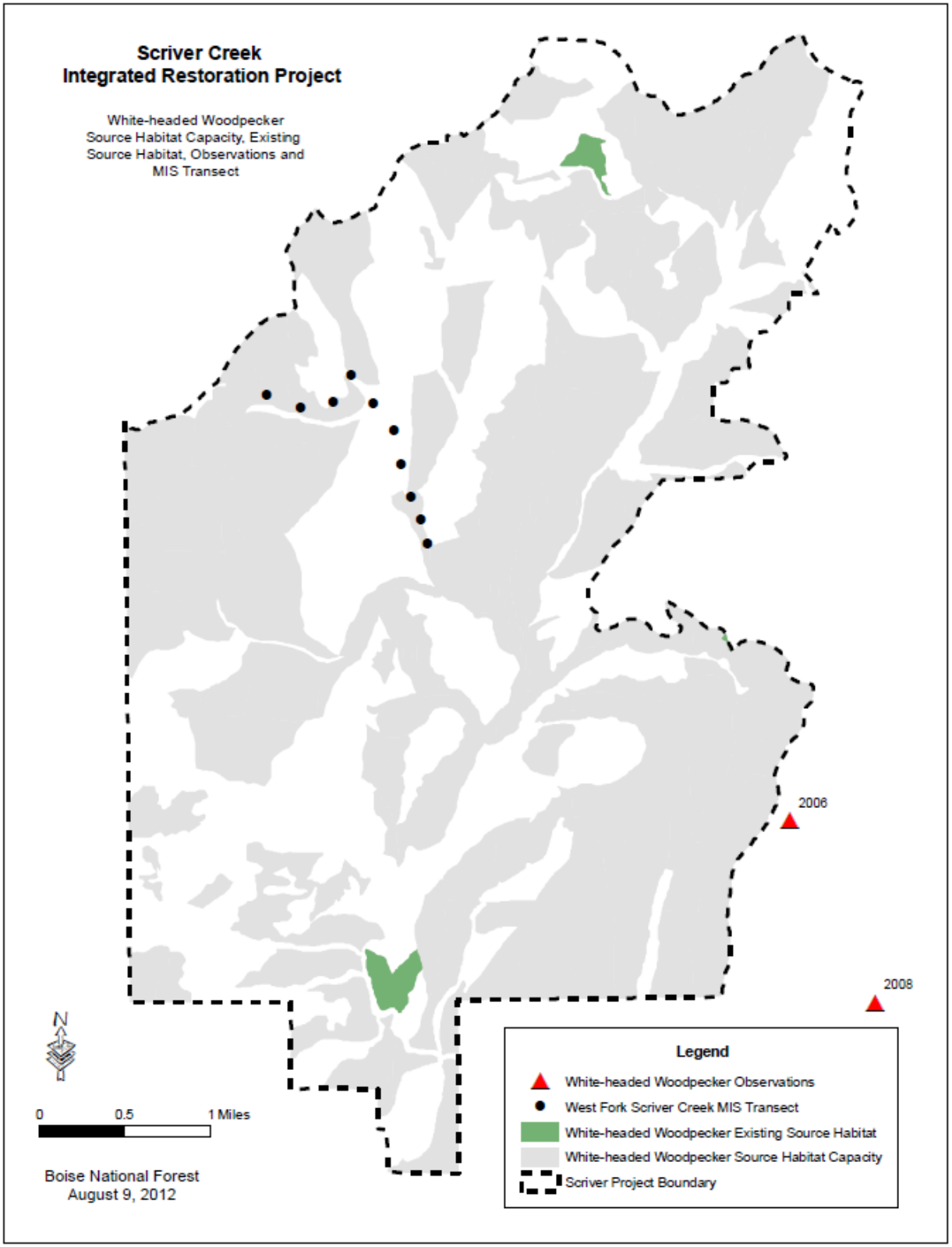

Figure 3-20. White-headed Woodpecker Source Habitat Capacity, Existing Source Habitat, Management Indicator Species (MIS) Transect Route, and White-headed Woodpecker Observations

The decline in habitat quantity and quality within PVG 2 is likely the result of past timber practices that favored removing large ponderosa pine trees and snags, and fire suppression that allowed higher densities of trees to persist in the understory. In combination, these two management practices have resulted in stands in smaller size classes, often with high tree densities and a shift in species composition away from ponderosa pine to more shade-tolerant and less fire-resistant species. Within PVGs 5 and 6 habitat types, these management practices also likely led to the shift away from desired ponderosa pine species composition. Past timber management likely removed the more valuable ponderosa pine and retained less desirable grand fir (section 3.2.5), while fire suppression would not have allowed wildfire to keep grand fir densities somewhat in check and maintain ponderosa pine as a seral component. The changes made to source habitat in all PVGs by past management activities have likely contributed to an overall reduction in white-headed woodpecker source habitat and patch size within the analysis area.

Source habitat quality can also be described in terms of large snag abundance and road density. Large snags provide nesting sites and if not present would limit the use by white-headed woodpeckers. Road density can be used to define a variety of risks to the species and habitat as a result off road-associated factors, one of which being access to fuelwood cutters.

Large snag abundance was assessed for the analysis area (Table 3-35). For stands in PVG 2, in the nonlethal fire regime, current snag levels for snags ≥20 inches d.b.h. exceed the desired ranges. For stands in PVGs 5 and 6, in the mixed1 fire regime, large snag densities are within the desired ranges. Nevertheless, large snag densities have likely been affected by past management actions, such as timber harvest, road construction and use, fuelwood programs, and fire suppression. Roads continue to facilitate loss of snags by providing access to fuelwood.

Table 3-35. Summary of Large Snag (≥20 inches d.b.h.) Densities Relative to Desired Ranges by Potential Vegetation Group (PVG), Alternatives, and Timeframe

PVG and Fire Regime	Desired Range	Existing Condition 2010	Alternative A	Alternative B		Alternative C		Alternative D	
			2030	2011	2030	2011	2030	2011	2030
PVG 2 (Nonlethal)	0.4–3.0	0.54	2.00	0.56	1.27	0.56	1.27	0.57	1.32
PVGs 5 and 6 (Mixed1)	0.2–3.5	1.90	4.03	1.66	2.34	1.99	2.59	2.01	3.01

Total road densities are 6.58 mi/mi^2 within existing white-headed woodpecker source habitat, and within the high classification. In this case, road density is excessively high due to the very small amount of existing source habitat within the analysis area (71 acres). High road densities can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. High road densities can affect the recruitment

and retention of large diameter snags, specifically through providing access to fuelwood cutters, as well as other components of source habitat, such as live, large diameter ponderosa pine trees.

Species-specific concerns within the analysis area were identified based on the current condition described above: 1) reduction in source habitat abundance and patch size; 2) fragmentation of source habitat and reduced connectivity between patches; 3) reduction of ponderosa pine and increase of less fire resistant, more shade tolerant species (altered forest structure and fire effects); 4) trend from late- to mid-seral ponderosa pine forest conditions; 5) the lack of large live and dead ponderosa pine (food and nest sites); and 6) disruption of natural disturbance regimes that maintain source habitat over time. To address these concerns, four indicators were used to quantitatively assess the effects of the alternatives on the white-headed woodpecker: 1) source habitat quantity, 2) patch size and range, 3) species composition and 4) road density. These indicators are described in further detail in section 3.4.3.1.3 below.

3.4.3.1.3 Habitat Indicators for White-headed Woodpecker Analysis

The discussion of the effects to the species and its habitat by alternative is both qualitative and quantitative. Four indicators were selected to quantitatively evaluate the effects of the four alternatives on white-headed woodpecker. These indicators are referred to in the qualitative analysis and are displayed in Table 3-36. These indicators were selected to specifically display trends in habitat quantity, quality, and distribution; and are directly related to concerns identified for the species in the watershed. The selected indicators are described below.

1 Source habitat quantity (acres) was selected to reflect the trends in source habitat abundance (late-seral ponderosa pine forests).

2 Patch size average and range (acres) were selected to indicate whether patches are moving toward or away from those expected under the HRV as well as indicating whether they are of sufficient size to meet home range requirements for the species.

3 The percentage of area with stands that have greater than 40 percent ponderosa pine species composition was selected to indicate trends in the representation of ponderosa pine within PVGs providing source habitat capacity for white-headed woodpeckers (PVGs 2, 5, and 6). Trends are displayed for stands in the medium and large tree size class as these are the two classes that provide the best opportunities for restoration and recruitment of source habitat in the short term (3–15 years).

4 Road density (miles per square mile) in source habitat was selected as an Indicator of trends in large snag abundance and fragmentation of source habitat. Road densities are also a general risk Indicator for other impacts, such as altered fire regimes, resulting from the introduction and spread of noxious weeds.

Table 3-36. Summary of Habitat Condition Indicators for White-headed Woodpecker for the Existing Condition (EC) and by Alternative and Timeframe

Indicator	Reference Condition	EC[a] 2010	Alternative A		Alternative B			Alternative C			Alternative D		
			2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]
Source Habitat Quantity (acres)	SHC in the analysis area is 6,897 acres. Currently, 402 acres (6%) provide source habitat. After Alt B in 2030, 18% of the analysis area provides source habitat.	71	166	↑	511	1,016	↑	456	852	↑	449	825	↑
Average Patch Size (acres)	PVG 2 and 5 are in nonlethal fire regime, which is dominated by large homogenous stands with small patches <1 acre. The majority of the analysis area is in PVG 6 in the mixed1 fire regime, which is relatively homogenous with patches ranging from <1 to 600 acres.	24	33	↑	51	92	↑	57	77	↑	41	82	↑
Patch Size Range (acres)	Same as Average Patch Size	1–46	1-64	↑	1–183	1–595	↑	1–183	1–400	↑	1–120	1–373	↑

Indicator		Reference Condition	EC[a] 2010	Alternative A		Alternative B			Alternative C			Alternative D		
				2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]
Number of Potential Home Ranges within Analysis Area		Estimated home range size in mixed conifer forests: 845 acres.	0	0	NC	0	1	↑	0	1	↑	0	1	↑
Percent of Area in the Med. and Large Tree Size Classes in SHC PVGs that have ≥40% Ponderosa Pine Component	PVG 2	White-headed woodpeckers prefer stands that have a ≥40 percent ponderosa pine component within the medium and large tree size classes.	58%	65%	↑	84%	75%	↑	82%	74%	↑	82%	74%	↑
	PVG 5		19%	19%	NC	19%	19%	NC	19%	19%	NC	19%	19%	NC
	PVG 6		6%	6%		12%	12%		12%	12%		11%	10%	↑
Total Road Density in Source Habitat (mi/mi^2)		Low Risk (desired condition) : <0.7 mi/mi^2 Moderate Risk: 0.7 to1.7 mi/mi^2 High Risk:≥1.7 mi/mi^2	6.58	9.68	↑	2.93	3.51	↑	2.22	3.12	↑	2.29	3.13	↑

Note: NC = No Change and SHC = Source Habitat Capacity
[a] EC = Existing Condition
[b] Overall Trend Compared to Existing Condition

3.4.3.1.4 Environmental Consequences Summary

Under Alternative A, there would be a continued downward trend in source habitat for the white-headed woodpecker as changes to tree species composition trend toward shade-tolerant species and stand densities increase. Actions under Alternatives B, C, or D would increase the amount of white-headed woodpecker source habitat immediately after harvest and into the long term in comparable amounts (Indicator 1) and average patch size (Indicator 2). All three action alternatives would create enough source habitat within PVG 2 habitat types to form a single potential home range, with Alternative B forming the largest and most continuous potential home range. All three action alternatives would shift species composition (Indicator 3) toward desired species (ponderosa pine) and away from shade-tolerant species, essentially moving these stands back into the HRV, with Alternative B resulting in the most acres of increase for this habitat parameter largely due to the additional commercial treatments occurring in areas adjacent to the Bear Wallow inventoried Roadless Area that are not treated under Alternatives C or D due to Issue #3. Total road densities would decrease within source habitat following implementation of all three action alternatives, improving the quality of source habitat through reduced disturbance and snag removal within road corridors. Large snag densities would remain within desired ranges following harvest and would increase into the long term. As a result, while all three action alternatives would move habitat indicators in the right direction and result in more source habitat for the white-headed woodpecker, Alternative B would have the largest gain in source habitat quantity and quality for this species.

3.4.3.1.5 Environmental Consequences of Alternative A—No Action

3.4.3.1.5.1 Direct and Indirect Effects

The following discussion discloses expected changes in source habitat under Alternative A.

Source habitat quantity **(Indicator 1**) would slightly increase but would remain near existing levels into the long term as stands that are not providing adequate percentages of the ponderosa pine component continue to lose ground to more shade-tolerant species. At the same time as the changes to species composition, stand densities increase, moving some stands from low to moderate canopy cover and outside of preferred densities. The large tree size class increases as the forest continues to mature, which results in the slight increase from the existing condition. Trends in abundance and patch size (**Indicator 2**) remain relatively poor into the long term due to the species composition change and the increase in canopy cover (Table 3-36). At no point in the modeled future does total source habitat approach the amount of source habitat necessary to provide for one 845-acre home range within the analysis area.

Large snags (≥20 inches d.b.h.) were assessed for the PVGs providing source habitat capacity. Although some recruitment and loss of snags would occur over time through natural processes, assuming no stand-replacing disturbances, overall snag numbers in all PVGs would increase by 2030. Snag densities that were either within desired ranges for all PVG in 2010 would remain well within the desired ranges or move above the desired range by 2030 (Table 3-35). This increase could be due to insect and disease mortality spurred by high tree densities. The increase in snag availability would provide increased nesting opportunities for white-headed woodpeckers and other cavity nesters where snags of preferred species are recruited.

Without disturbance processes, species composition (**Indicator 3**) would continue to trend away from the desired composition. Ponderosa pine would continue to be replaced over time by more shade tolerant species. The replacement species are generally less fire tolerant. The further species composition moves away from desired condition, the less likely fire behavior will approximate behavior expected under historical disturbance regimes. The replacement of ponderosa pine by other tree species also represents a decline in an important winter food source for white-headed woodpeckers.

Total road densities (**Indicator 4**) would remain high (>6.58 mi/mi^2) and continue to degrade habitat through access for removal of snags for firewood.

3.4.3.1.5.2 Cumulative Effects

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the four indicators used for this species analysis and therefore are included in the affected environment discussion (section 3.4.4.1.1.).

Past timber practices that favored removal of large ponderosa pine trees and snags, and fire suppression that allowed higher densities of trees to persist in the understory have likely resulted in the decline in habitat quantity and quality within PVG 2. In combination, these two management practices have resulted in stands in smaller size classes, often with high tree densities and a shift in species composition away from ponderosa pine to more shade-tolerant and less fire-resistant species. Within PVG 5 and 6 habitat types, these management practices also likely led to the shift away from desired ponderosa pine species composition (**Indicator 3**). Past timber management likely removed the more valuable ponderosa pine and retained less desirable grand fir (section 3.2.5), while fire suppression would not have allowed wildfire to maintain ponderosa pine as a seral component. The changes made to source habitat in all PVGs by past management activities have likely contributed to an overall reduction in source habitat (**Indicator 1**) and patch size (**Indicator 2**) within the analysis area. Alternative A would maintain the current vegetative trend developed through past timber management and fire suppression, incrementally reducing white-headed woodpecker habitat.

Total road density (**Indicator 4**) would remain within the high classification (>1.7 mi/mi^2). High road densities can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This likely affected the recruitment and retention of large diameter snags as well as other components of source habitat, such as live, large diameter ponderosa pine trees. Alternative A would not add cumulatively to this condition.

Present/Ongoing Activities

Present/Ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering. These activities may cause disturbance to individuals, modify vegetation components important to source habitat, or contribute to loss of snags (nest structure) Alternative A does not propose any activities therefore there would be no cumulative effects from Alternative A together with ongoing activities.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

The Scriver Creek Trail and Scriver Creek Snowmobile Bridge projects would not modify source habitat such that it no longer would be suitable because the limited tree felling along the trail would not change overall stand characteristics and because much of the new trail and bridge construction would occur within existing road or trail corridors. Alternative A does not propose any activities therefore there would be no cumulative effects from Alternative A together with reasonably foreseeable activities.

In summary, past timber management and fire suppression have likely contributed to an overall reduction in source habitat amount (**Indicator 1**) and patch size (**Indicator 2**) by shifting species composition (**Indicator 3**) and removing large diameter ponderosa pine, all facilitated by the increase in road density (**Indicator 4**). However, none of the ongoing or future foreseeable activities within the analysis area would impact any of the four indicators used to assess impacts to this species. Alternative A would generally move vegetation away from desired conditions and decrease source habitat in the long term, primarily through decreases in the ponderosa pine component and increased canopy cover. Therefore, the overall effect of this alternative, when combined with ongoing activities within the analysis area, is a decreasing trend in source habitat quantity and quality within the analysis area into the short and long term.

3.4.3.1.5.3 Alternative A Effect Conclusion

A decreasing trend in white-headed woodpecker source habitat quantity and quality would occur within the analysis area into the short and long term. The current lack of source habitat in the analysis area would be perpetuated into the future.

3.4.3.1.6 Environmental Consequences of Alternatives B, C, and D

3.4.3.1.6.1 Direct and Indirect Effects

The following discussion discloses expected impacts to white-headed woodpeckers and expected changes to source habitat with implementation of Alternatives B, C, and D, the action alternatives. Because the analysis shows that all action alternatives would have similar impacts on the white-headed woodpecker, all three action alternatives will be discussed in the same section, with any notable differences discussed individually.

White-headed woodpeckers are noted as being tolerant of human activity as long as the disturbance does not involve the nest tree and the activity is not prolonged. Design Feature WL-1 has been included to provide for protection of any active white-headed woodpecker nest sites discovered during implementation (section 2.4.2.1). The design feature would apply to all action alternatives and would prohibit the removal of known [active] nest trees and would prevent or minimize disturbance at active nest sites, thereby, reducing impacts to breeding birds and reproduction.

Under Alternative B, source habitat quantity (**Indicator 1**) would increase by 440 acres over the existing condition immediately following implementation, and by 2030 there would be 850 acres more than what would have occurred under Alternative A in this long term timeframe

(Table 3-36). Under Alternative C, source habitat quantity would increase by 385 acres over the existing condition immediately following implementation, and by 2030 there would be 686 acres more than what would have occurred under Alternative A. Under Alternative D, source habitat quantity would increase by 378 acres over the existing condition immediately following implementation, and by 2030 there would be 659 acres more than what would have occurred under Alternative A.

Alternative B creates the most source habitat both immediately after implementation and in the long term, while Alternatives C and D create slightly fewer acres immediately following implementation, 164 and 191 acres less, respectively, in the long term. The increase in source habitat across all three action alternatives immediately following harvest stems from prescriptions and design features that reduce canopy cover and shift species composition to ponderosa pine within stands already in the large tree size class. The increase in source habitat in the long term is a result of managed stands in the medium tree size class that experienced reductions in canopy cover and desired shifts in species composition from harvest gradually moving into the large tree classification by 2030. More specifically, Design Feature TH-9 would apply to all action alternatives and would retain all ponderosa pine ≥20 inches d.b.h. in PVG 2 and would generally retain ponderosa pine >8 inches or >16 inches d.b.h., depending on the strata, in PVG 6 (section 2.4.5).

Patch size and distribution (**Indicator 2**) would improve such that one potential home range could be formed in the southeastern corner of the analysis area, an area dominated by PVG 2 habitat types, for each action alternative (Figure 3-21, Figure 3-22, and Figure 3-23). However, because more habitat is formed under Alternative B (Figure 3-21), this potential home range would provide a larger and higher quality potential home range than the smaller home ranges formed under Alternatives C (Figure 3-22) and D (Figure 3-23). Patches outside of the potential home ranges for each action alternative would remain relatively small in size and scattered. This pattern is expected as they are within PVG 6 habitat types, typically not as conducive to large continuous patches of large diameter ponderosa pine forest as PVG 2 habitat types are. Under all three action alternatives the average patch size increases to amounts above what would occur under Alternative A in both the short and long term.

Species composition (**Indicator 3**), as indicated by the percent of ponderosa pine within a given stand, would improve under all three action alternatives, with the highest increase again under Alterative B (Table 3-36). Commercial thinning and the prescribed burn would promote the retention and recruitment of ponderosa pine over other species in appropriate habitat types (sections 3.2.5 and 3.3.3). Treatments would maintain ponderosa pine where it currently occurs, reduce more shade tolerant and less fire resistant species, and create small openings for ponderosa pine regeneration.

Road densities (**Indicator 4**) are another Indicator of habitat quality. Alternatives B, C, and D would reduce total road densities within white-headed woodpecker source habitat for the temporary and long term timeframes, compared to the existing condition (Table 3-36). While total road densities following implementation remain higher than desired (Table 3-36) and would still represent a risk of degradation of habitat from potential loss of snags, the overall risk would be lower than current conditions.

Large snags (≥20 inches d.b.h.) are important components of white-headed woodpecker source habitat. Large snag densities would be maintained near existing levels, and within desired ranges,

across all PVGs immediately following harvest under all three action alternatives (Table 3-37). In addition, large snag densities would increase throughout the 20-year modeling period and would be in the upper half of the desired range under all three alternatives by 2030. While densities under the action alternatives would be somewhat lower across all PVGs than what would be expected under Alternative A, they would still be well within desired ranges and would be on an increasing trend through 2030. In addition, several design features would minimize the impacts to existing snags and would provide for future recruitment and retention of large snags (section 2.4.2.1). Specifically, Design Feature WL-3 would require that snags would not be felled unless they pose a safety hazard under timber sale OSHA requirements and live trees with evidence of cavities, damage, and rot, would be retained throughout the treatment areas to provide for future recruitment of snags. While the loss of large snags cannot be totally avoided due to OSHA safety requirements and uncertainties associated with broadcast burning, large snag densities would remain within desired ranges through 2030 in spite of any nominal losses that may occur during project implementation. Design feature WL-6 would retain up to three large snags per acre within a 600-foot corridor along the relocated segment of NFS road 696 to offset potential losses from fuelwood gathering along this new stretch of roadway. Design features TH-6 and TH-9 would provide for retention and future recruitment of large snags. As a result, because the existing large snag densities are within desired ranges and would continue to increase into the long term, and because design features would largely offset any losses stemming from project activities, habitat within the analysis area would provide increased nesting opportunities for white-headed woodpeckers into the long term.

Design Features TH-5 and TH-6 (section 2.4.2.1) would apply to all three action alternatives and would retain any old forest habitat, retain or promote development of components of old forest habitat in managed large- or medium-sized stands, and would retain all large tree stands in the large tree size class. These design features would conserve important habitat elements for the white-headed woodpecker such as large, remnant legacy ponderosa pine and large diameter snags.

There is the potential for equipment associated with harvest, burning, or road reconstruction or construction to introduce noxious weeds into previously weed-free areas or spread existing weeds further. Proposed activities under all three action alternatives are not expected to introduce noxious weeds into the analysis area with application of standard contract requirements for use of weed-free equipment. Although open road miles would increase by 3.8 miles under all three action alternatives, noxious weed design features that would apply to all three action alternatives would mitigate any potential impacts from noxious weeds. Design Feature NX-1 (section 2.4.2.1) requires the cleaning of all off-road equipment potentially carrying noxious weed seeds prior to moving into the analysis area. Design Features NX-2 through NX-4 (section 2.4.2.1) also provide direction for the use of weed-free sources of aggregate, straw, and seed mixtures. All three action alternatives may however contribute to distribution of noxious weeds already present. Existing noxious weed populations would be addressed through the District’s noxious weed program (section 3.9.3).

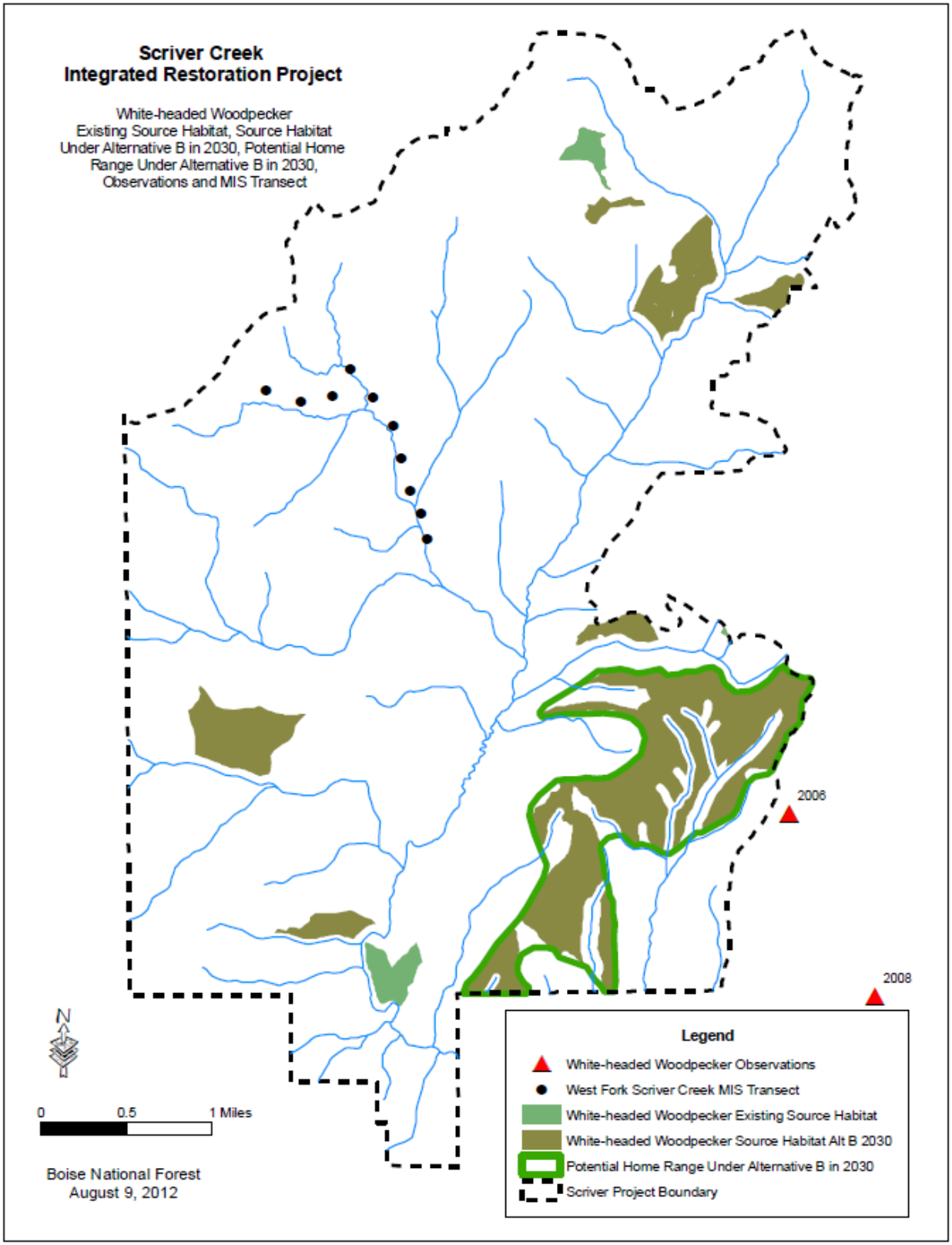

Figure 3-21. White-headed Woodpecker Source Habitat and Potential Home Range Under Alternative B.

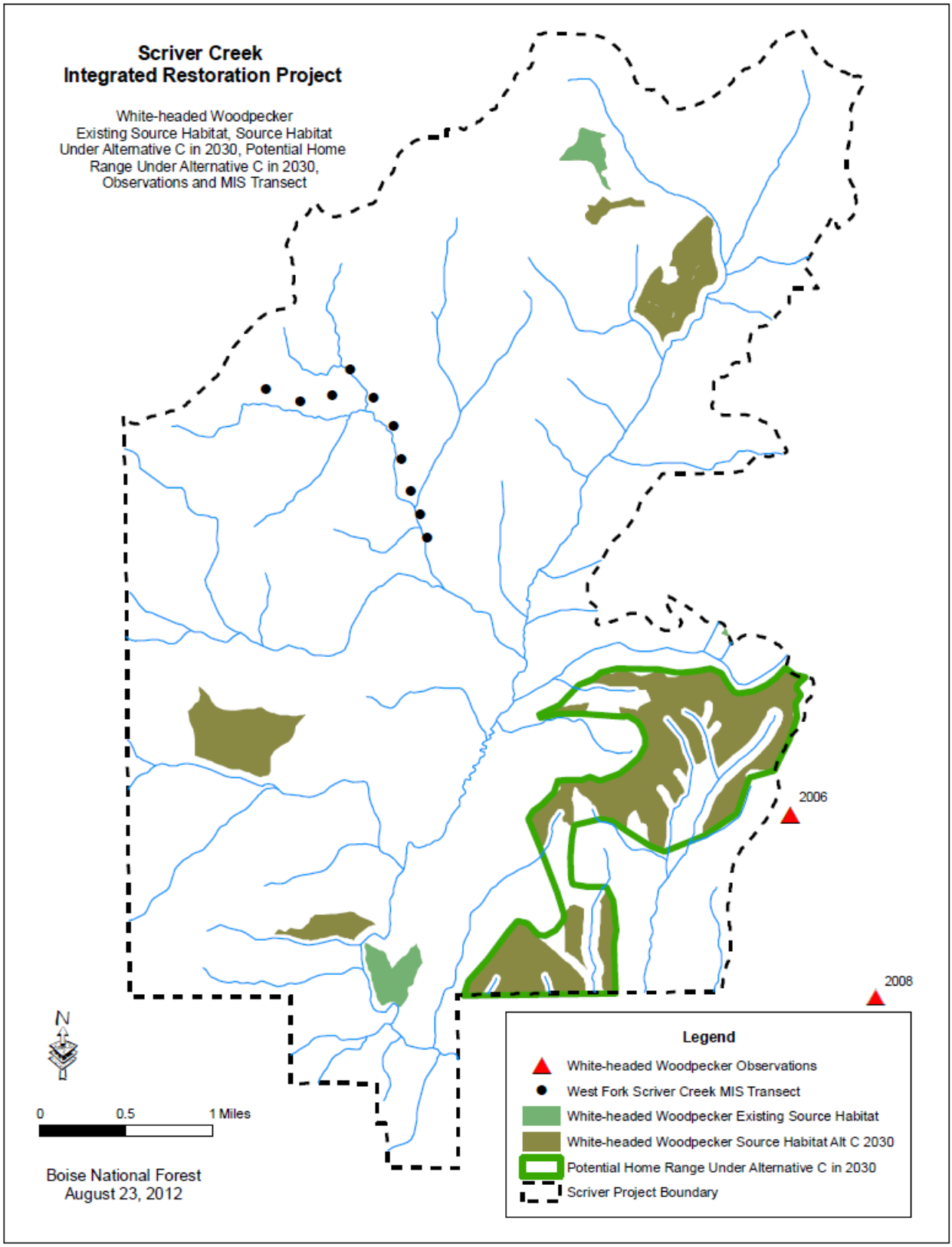

Figure 3-22. White-headed Woodpecker Source Habitat and Potential Home Range under Alternative C

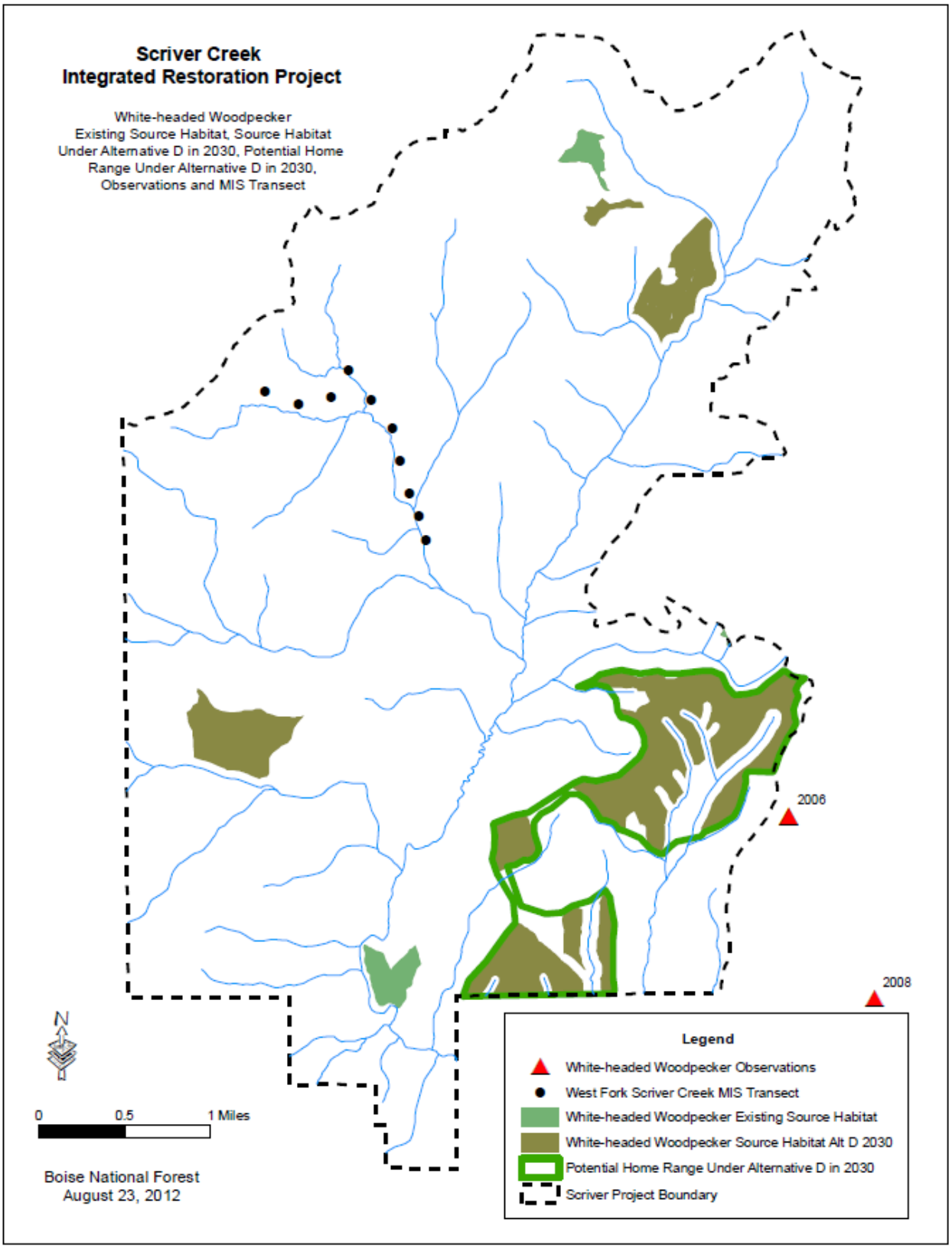

Figure 3-23. White-headed Woodpecker Source Habitat and Potential Home Range under Alternative D

3.4.3.1.6.2 Cumulative Effects

Because Alternatives B, C, and D would have similar impacts on white-headed woodpeckers and their habitat, and would have the same cumulative impact area, the following cumulative impact discussion is common for all three action alternatives.

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the four indicators used for this species analysis and therefore are included in the affected environment discussion (section 3.4.4.1.1.).

Past timber practices that favored removal of large ponderosa pine trees and snags, and fire suppression that allowed higher densities of trees to persist in the understory have likely resulted in the decline in habitat quantity and quality within PVG 2. In combination, these two management practices have resulted in stands in smaller size classes, often with high tree densities and a shift in species composition away from ponderosa pine to more shade-tolerant and less fire-resistant species. Within PVG 5 and 6 habitat types, these management practices also likely led to the shift away from desired ponderosa pine species composition (**Indicator 3**). Past timber management likely removed the more valuable ponderosa pine and retained less desirable grand fir (section 3.2.5), while fire suppression would not have allowed wildfire to maintain ponderosa pine as a seral component. The changes made to source habitat in all PVGs by past management activities have likely contributed to an overall reduction in source habitat (**Indicator 1**) and patch size (**Indicator 2**) within the analysis area. Implementing Alternatives B, C or D would incrementally begin to restore PVG 2 and 5 habitat types to a condition more representative of vegetative communities functioning in the presence of disturbance and thus would not cumulatively add to the trend of decreasing white-headed woodpecker habitat.

High road densities (**Indicator 4**) can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This likely affected the recruitment and retention of large diameter snags as well as other components of source habitat, such as live, large diameter ponderosa pine trees. Activities proposed under Alternatives B, C or D would decrease the open road density affecting northern goshawk habitat and would therefore not cumulatively add to the trend of higher road densities.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. Implementing activities under Alternatives B, C. or D would incrementally add to the ongoing noise and disturbance levels. Design features under Alternatives B, C, or D are intended to avoid or minimize the spread of noxious weeds as a result of proposed activities. If noxious weeds are documented, actions would be taken to treat the infestation; therefore there would be no cumulative effect to the

spread noxious weeds. Fuelwood cutting would continue to impact white-headed woodpecker source habitat by removing snags within road corridors however vegetation management activities in Alternatives B, C or D would retain snags to meet the needs of forest species dependent on snags minimizing any cumulative effect of snag loss.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify a given stand such that it no longer would be suitable. Limited tree felling along the trail would not change overall stand characteristics because much of the new trail and bridge construction would occur within existing road or trail corridors. No cumulative effects would occur.

3.4.3.1.7 Determination of Effect

Alternatives B, C, or D may impact white-headed woodpecker individuals or habitat but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.

3.4.3.1.7.1 Rationale

- Source habitat would increase in the long term.
- Long-term habitat modeling does not show restoration of sufficient habitat to create a home range.
- Design Feature WL-1 is included to minimize or avoid disruption of reproductive success should white-headed woodpeckers be discovered during implementation of activities.

3.4.4 Family 2—Broad Elevation, Old Forest

Species in Family 2 use late-seral multi- and single layered stages of the montane community as source habitats (Wisdom et al. 2000). Source habitats for some species also include late-seral stages of the subalpine community or the lower montane community, or both. Source habitat for Family 2 overlaps Family 1 but encompasses a broader array of cover types and elevations than habitats for Family 1 (Wisdom et al. 2000). Family 2 source habitat occurs primarily in PVGs 3 through 11 (Forest Service 2010a, Appendix E), although some species use lower elevation types. Historical fire regimes in this Family vary by PVG, but are dominated by mixed severity and lethal regimes (Forest Service 2010a, Appendix A). Many species within the family are able to take advantage of departed conditions (Nutt et al. 2010) including pileated woodpeckers and northern goshawks.

Species that comprise Family 2 tend to be habitat generalists that use a wide range of conditions. Many are associated with both the large and medium tree size class forests in moderate- to high-stand canopy conditions. Some Family 2 species can take advantage of PVGs that exhibit uncharacteristically high tree densities and amounts of shade-tolerant tree species that have resulted from fire suppression and/or past management activities. In contrast to Family 1 species,

as forest conditions increase in density and shade tolerant species become more common throughout the landscape, either from suppression of fire or past vegetation management, the quantity, and interconnectedness of Family 2 habitat increases.

Source habitats for Family 2 occur in all watersheds on the Forest (Nutt et al. 2010). While there have been declining source habitat trends for some Family 2 focal species assessed at the scale of the Forest, quantities of source habitat have stayed primarily within the HRV. Declining source habitat trends of individual focal species assessed at the Forest scale are attributed in part to management practices that favored removal of larger diameter trees (Nutt et al. 2010). Restoration of fire disturbance regimes, natural and managed development of the large tree size class, and management to retain large diameter snags and CWD would provide for the maintenance and, as needed, restoration of source habitat conditions. Consistent with that discussed in the "Landscape Patch and Pattern" discussion earlier in this chapter (section 3.2.6), managing for the appropriate patch size and juxtaposition on the landscape based on fire regime is necessary to maintain well connected habitat across the landscape consistent with the range of historic conditions, as restoration activities are implemented.

The Project lies entirely within the 61,123-acre Crouch watershed (HU 1705012101). Federally managed lands within this HU consist of approximately 37,650 acres, or 62 percent of the watershed. The following analysis considers the federally managed portion of this HU unless otherwise stated.

Within the Crouch watershed, PVGs 2 and 3 dominate the eastern portion and transition to PVGs 5 and 6 (with limited PVG 2) toward the middle and northern portions of the watershed. This corresponds relatively well with increasing elevation. The Project area is located in the middle and northern portion. Like many of the watersheds in the northern half of the Forest, the Crouch watershed has the capacity to develop Family 2 source habitat conditions on >75 percent of the acres in the watershed (Nutt et al. 2010). Based on the analysis completed at the scale of the Forest for Family 2, approximately 71 percent of this watershed historically provided source habitat, while currently 61 percent provides source habitat (Nutt et al. 2010). The change in Family 2 source habitat in this watershed from historic to current conditions is within $\pm$20 percent and is considered a neutral trend in habitat (Nutt et al. 2010) consistent with fluctuations expected within the range of natural disturbance patterns expected historically.

Activities such as fire suppression have contributed to development of denser conditions than expected historically and may have shifted tree species compositions in the watershed toward more late seral species. However, because many of these changes remain within the range of historic variability for those vegetative communities and a number of species in Family 2 utilize moderate or high canopy cover conditions in medium or large tree size class stands, these changes continue to provide source habitat.

Certain habitat components, such as large diameter snags and CWD, may be lacking in the watershed as well as the Project area due to the road density in PVGs capable of developing source habitat. The total road density in PVGs capable of developing source habitat in this watershed is 2.5 mi/ mi^2. Road densities greater than 1.7 mi/mi^2 have greater risk of negative impacts from roads or road-associated factors than densities below 1.7 mi/mi^2 (Nutt et al. 2010). High road densities can affect retention of standing dead and down logs in source habitat by facilitating access to cut and gather firewood, which may affect the availability and distribution of large snags and down logs used for nest sites, roost sites, or foraging for Family 2 species.

High road densities can also be indicative of past management practices that typically felled standing dead trees as part of forest management or removed downed wood from treated stands. The Project area is representative of conditions in the watershed and has similar concerns.

Proposed activities with the Project are planned to emphasize retention of the largest diameter trees, while simultaneously reducing stand densities and developing the species composition more reflective of historic conditions within both PVGs 2 and 6. What would principally result are decreases of source habitat for Family 2 species within PVG 2 habitat types as stands are moved back in to the HRV. In PVG 6 habitat types, changes in stand densities would remain within the HRV although in some cases, densities may be at the low end of the HRV as species composition in these stands is changed to favor seral species and reduce the proportion of shade-tolerant species. Accomplishing these vegetative goals would move treated stands towards the desired extent and quality of old forest and large tree habitat over time.

Effects of the Project on Family 2 habitat can be reflected through selection and analysis of the project activities on focal species. Focal species are used in this assessment to address expected or potential changes to key ecosystem attributes. The focal species concept is described by Lambeck (1997) and a discussion of this concept can be found in the 2010 Forest Plan Wildlife Technical Report (Nutt et al. 2010). For analysis of this Project, the flammulated owl, northern goshawk and pileated woodpecker were selected as focal species for Family 2 habitat due to their association with a variety of vegetative characteristics, such as large diameter live and dead trees, ponderosa pine forest types, CWD, medium and large tree size classes, and moderate and high canopy cover.

KEFs for the Family 2 Focal Species addressed in this analysis are as follows:

- Flammulated owls are secondary consumers of terrestrial invertebrates, and are prey to secondary or tertiary consumers (Marcot 1997, O'Neil et al. 2001). Flammulated owls hunt exclusively at night, preying on nocturnal arthropods (moths, beetles, crickets, and grasshoppers), using foraging tactics uniquely adapted for open forest habitats (IDFG 2005).
- Northern goshawks are secondary and tertiary consumers of terrestrial herbivores and predators (Marcot 1997, O'Neil et al. 2001). According to Kennedy (2003), northern goshawks are prey generalists. The species influences terrestrial vertebrate populations through predation and/or displacement and builds nests that are often used by other species (Marcot 1997, O'Neil et al. 2001).
- Pileated woodpeckers are secondary consumers of terrestrial invertebrates, and primary cavity excavators of snags and live trees (O'Neil et al. 2001, Marcot 1997).

KECs for Family 2 Focal Species addressed in this analysis are as follows:

- Range wide, flammulated owl habitat consists of mature montane forests, scattered thickets of saplings and shrubs, and grasslands (IDFG 2005). Key forested features include small– to giant–sized snags and live trees (>25.4 centimeters [cm] [10 inches] d.b.h). Flammulated owls can take advantage of insect irruptions, such as spruce budworm (McCallum 1994, Marcot 1997, O'Neil et al. 2001). Flammulated owls are obligate secondary cavity nesters, occupying natural cavities and (more commonly) old woodpecker cavities (Marcot 1997, O'Neil et al. 2001, IDFG 2005, Barnes 2007).

- Northern goshawks use a variety of forest ages, structural conditions, and successional stages (Griffith 1993) and are associated with shrubland and grassland habitats. Nest sites are typically located next to the trunks of large diameter trees and in older stands where trees are widely spaced (Hayward and Escano 1989). Deformities (i.e., multiple trunks and mistletoe), especially in smaller diameter trees, are also used as nest site substrates. Snags are often used as plucking posts. Northern goshawks prefer transitional zones from forest to shrubland and bog to forest for hunting. Riparian zones and mosaics of forested and open areas are equally important (Griffith 1993).
- Pileated woodpeckers are associated with large ≥20 inches diameter snags and living trees for nesting, roosting and foraging habitat. They predominantly use portions of dying trees and snags of hard and moderate decay classes (early to mid-stages of decomposition). In addition, the species uses down logs, hollow living trees (chimney trees), and dead portions of live trees (Bull et al. 1992).

Additional species analyzed under the Family 2 section include sensitive species that may be affected by one or more alternatives.

3.4.4.1 Flammulated Owl (Focal Species, Region 4 Sensitive Species)

3.4.4.1.1 Affected Environment

Breeding habitat for flammulated owls combines open, mature montane pine forests for nesting, scattered thickets of saplings or shrubs for roosting and calling, and grassland edge habitat for foraging (IDFG 2005, Reynolds and Linkhart 1987, Goggans 1986); which are all necessary across multiple spatial scales (e.g., microhabitat, home range, landscape) (Wright 1996). In Idaho, flammulated owls were documented occupying mid-elevation, old forest or mature stands of open ponderosa pine, Douglas-fir, or stands codominated by both species (Groves et al. 1997). Old forests of ponderosa pine and Douglas-fir are key components of home ranges for flammulated owl (Reynolds and Linkhart 1992) as these forest types apparently support a particular abundance of favored lepidopteran prey (McCallum 1994). Flammulated owls nest in cavities that have been previously excavated in snags and live, large diameter trees (Bull et al. 1990, McCallum and Gehlback 1988). Habitat for flammulated owls is strongly associated with the upper slopes or ridges (Groves et al. 1997, Bull et al. 1990, Barnes 2007). Flammulated owls are obligate cavity nesters (IDFG 2005) and can take advantage of insect irruptions, such as spruce budworm outbreaks (McCallum 1994, O'Neil et al. 2001, Marcot 1997).

On the Forest, vegetative communities that could provide source habitat conditions include PVGs 2, 3, 5, and 6 in the medium and large tree size classes and moderate canopy cover class (Nutt et al. 2010). These types are most likely to have the habitat types that develop late seral stages of open forest with stands dominated by ponderosa pine or Douglas-fir, or co-dominated by both. Historical fire regimes in these PVGs include nonlethal and mixed1 (Forest Service 2010a, Appendix A). Snags are a special habitat feature for flammulated owls and provide nesting sites.

The flammulated owl was selected as a focal species for this analysis because of its association with nonlethal fire regimes, snags, the medium and large tree size classes, and moderate canopy cover conditions.

3.4.4.1.2 Current Conditions

This watershed historically provided approximately 7,872 acres of source habitat. Source habitat in the watershed has increased by 59 percent for the flammulated owl, which is consistent with the current condition for Family 2 within the watershed (Nutt et al. 2010). Due to the area's overall mid-to-low elevation and warm habitat types, a high percentage (70 percent) of source habitat capacity is susceptible to noxious weeds. Invasive weed species can affect prey availability through displacement of native plant species. Roads often facilitate the spread of invasive plant species. Road densities are also impacting source habitat quality as total road densities are within the high classification (>1.7 mi/mi^2). Higher road densities increase the risk of the loss of snags to fuelwood collection over time. A portion of source habitat is suitable for range; 8,300 acres of the Middle Fork South S&G Allotment occurs within the Project area. Livestock grazing may also adversely impact the understory herb and shrub community, which can influence Lepidoptera prey abundance and diversity.

The analysis area for flammulated owl consists of the 11,510-acre Project area and will be used to assess impacts to the amount, distribution and quality of source habitat for this species. This analysis area was chosen because of the capability of the Project area to provide source habitat for this species and because potential direct and indirect impacts are not expected to go beyond the Project area boundary.

Surveys were conducted for flammulated owls within the analysis area in June 2012, June 2006 and June 2010 using the ASC Flammulated Owl protocol. A total of 13 responses, some with multiple owls, were recorded in 2012; a total of 6 responses were solicited in 2010; and a total of 4 responses were solicited in 2006 (Survey Records available in Project Record). Detections were concentrated in the very northern part of the analysis area, as well as the southeast portion (Figure 3-24). The 2012 survey detected owls in the extreme southern section, which had not occurred in previous survey attempts, and expanded known owl locations in the southeastern section of the analysis area. No other anecdotal sightings have been documented within the analysis area (IFWIS 2011, NRIS 2011).

Three of the four PVGs capable of developing source habitat for flammulated owls are present in the analysis area, including PVGs 2, 5, and 6. These PVGs represent approximately 11,403 acres or 99 percent of the analysis area (Figure 3-24). The majority of these acres are in PVG 6 (82 percent).

There are 2,483 acres of existing modeled source habitat within the analysis area, which equates to approximately 22 percent of source habitat capacity within the analysis area (Figure 3-24). Patches are concentrated in the southeastern corner of the analysis area where PVG 2 is more prevalent, while patch size is good and comparable to historical conditions within the mixed1 fire regime. It is likely that patches were distributed more broadly across the western portion of the analysis area. The current amount and distribution of source habitat would provide for approximately 73 home ranges with an average 31-acre size (Barnes 2007).

Approximately 86 percent (9,921 acres) of the analysis area is comprised of PVG 5 and 6 vegetation groups, which provide source habitat for the flammulated owl where stands contain medium and large tree sizes with moderate canopy cover. These habitat types fall within the mixed1 fire regime, which historically experienced somewhat longer fire intervals (5–70 years) and were primarily homogeneous with small patches of different seral stages, densities and compositions (Forest Service 2010a, Appendix A). Currently, most stands are within the large

tree size class. However, a large portion of stands are dominated by grand fir and not the preferred Douglas-fir or ponderosa pine cover types and do not have moderate canopy cover, which is why a relatively small percentage (15 percent or 1,477 out of 9,921 acres) of stands within PVGs 5 and 6 currently provide source habitat.

Approximately 13 percent (1,482 acres) of the analysis area is comprised of PVG 2. Under historic nonlethal fire regimes, forests in PVG 2 would have been dominated by stands of large ponderosa pine with open canopies. These conditions were maintained over time by frequent low intensity fire (Forest Service 2010a, Appendix A). Stands in the medium and large tree size class within this PVG would have provided source habitat when the lack of low intensity fire allowed stand densities to increase and canopy cover to move from low to moderate. Currently, a large portion of stands are within the medium or large tree size classes and have moderate canopy cover, which is why an uncharacteristically high percentage of stands (68 percent) within this PVG provide source habitat for the flammulated owl and not white-headed woodpecker.

While it is difficult to determine how much the analysis area contributed to the watershed conditions historically, the analysis area's large amount of PVG 6 within the mixed1 fire regime and drier habitat types would suggest that this portion of the watershed would have had large amounts of source habitat and may have contributed more than it currently does. Habitat types within the mixed1 fire regime would have had less frequent fire intervals, allowing canopy cover to be maintained within the moderate canopy cover class compared to the PVG 2 habitat types at the other end of the HU where a nonlethal fire regime would have maintained canopy cover generally lower and more within white-headed woodpecker preferences.

The decline of source habitat within PVG 5 and 6 habitat types is likely the result of past harvest practices that favored removal of large ponderosa pine trees, in combination with fire suppression that allowed higher tree densities and favored shade tolerant species, such as grand fir, to develop within the stands. The factors that resulted in a decline in white-headed woodpecker habitat within PVG 2 tend to favor flammulated owl, or at least remain within this species' preferences, as the owl can utilize a wider array of habitat types and structure, including both moderate and large tree sizes, higher canopy cover densities, as well as a larger departure from ponderosa pine forest cover types. Past management practices that facilitated these conditions in PVG 2 are likely the reason source habitat amount and patch size are overrepresented in this PVG, and why nearly two-thirds of the total area under these PVGs currently provides source habitat for the flammulated owl and not white-headed woodpecker.

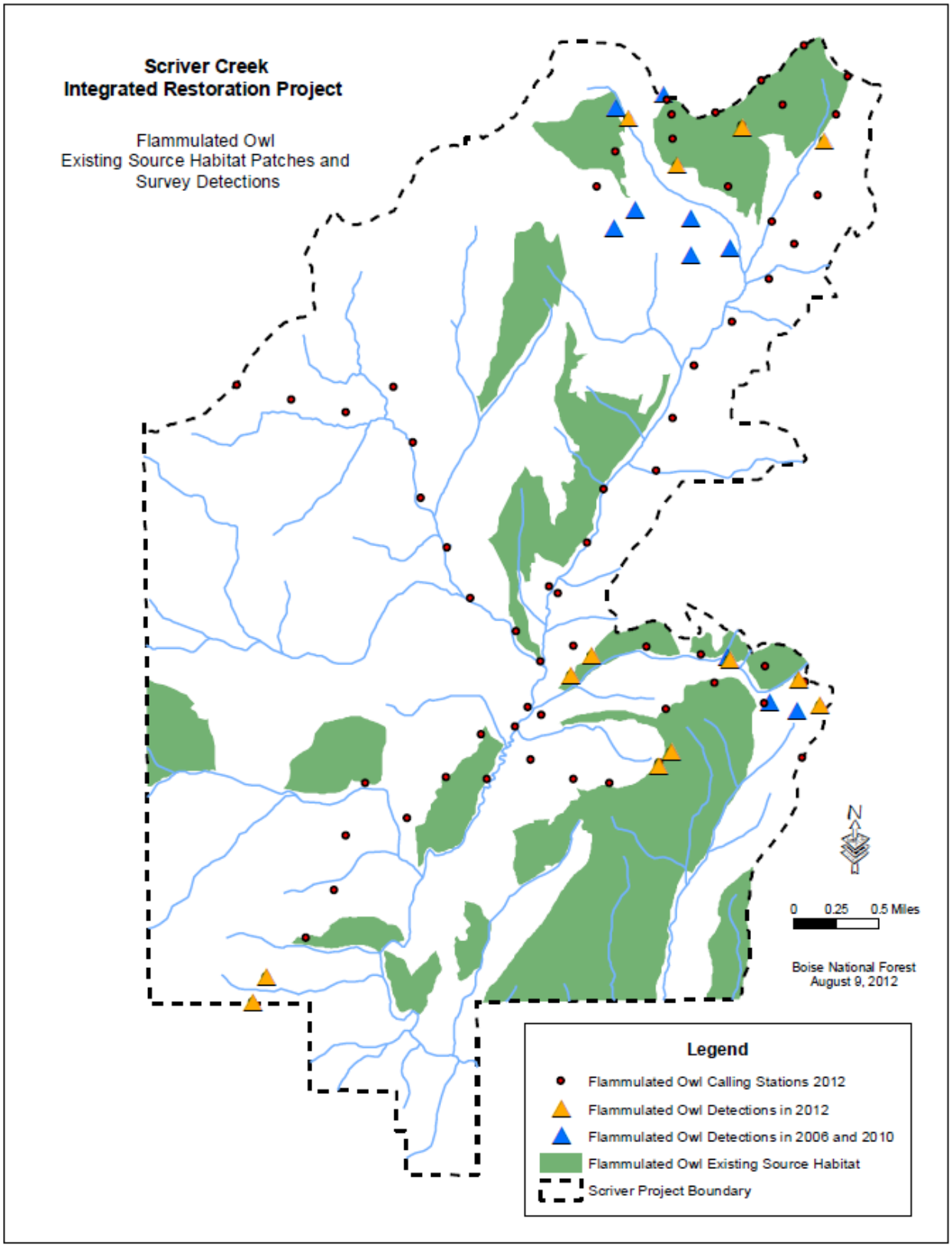

Figure 3-24. Flammulated Owl Existing Source Habitat Patches and Survey Detections

Source habitat quality can also be described in terms of large snag abundance and road density. Large snags provide nesting sites and if not present would limit the use by flammulated owls. Road density can be used to define a variety of risks to the species and habitat as a result of road-associated factors, one of which being access to fuelwood cutters.

The abundance of 10–20 inch d.b.h. snags and large snags were assessed for the analysis area (Table 3-37). Snag densities for the 10–20 inch d.b.h. class are slightly above the desired range across all PVGs that provide source habitat. Large snag densities in PVG 2 (nonlethal) and PVGs 5 and 6 (mixed1) are within desired ranges. While existing snag densities in both size classes are either within or above desired ranges, snag densities in general have likely been affected to some degree by past management actions, such as timber harvest, road construction and use, fuelwood programs, and fire suppression. Roads continue to facilitate loss of snags by providing access to fuelwood.

Table 3-37. Snag Densities for Source Habitat Capacity PVGs Relative to Desired Ranges by Potential Vegetation Group (PVG) for the Existing Condition and Alternative by Year

Snag Size	PVG and Fire Regime	Desired Range	Existing Condition 2010	Alt. A	Alternative B		Alternative C		Alternative D	
				2030	2011	2030	2011	2030	2011	2030
Snags [10-20 inch d.b.h.] Densities per Acre Relative to Desired Range	PVG 2 (Nonlethal)	1.8–2.7	2.76	14.72	2.85	4.39	2.85	4.39	2.84	4.30
	PVGs 5 and 6 (Mixed1)	1.8–5.5	5.65	13.16	5.26	4.99	5.78	4.92	5.75	4.76
Large Snag [>20 inch d.b.h.] Densities per Acre Relative to Desired Range	PVG 2 (Nonlethal)	0.4–3.0	0.54	2.00	0.56	1.27	0.56	1.27	0.57	1.32
	PVGs 5 and 6 (Mixed1)	0.2–3.5	1.90	4.03	1.66	2.34	1.99	2.59	2.01	3.01

Total road densities (**Indicator 4**) are 3.63 mi/mi^2 within flammulated owl source habitat and in the high classification. High road densities can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. Road density can affect the recruitment and retention of large diameter snags, specifically through providing access to fuelwood cutters, as well as other components of source habitat, such as live, large diameter ponderosa pine, or Douglas-fir trees.

Species-specific concerns within the analysis area were identified based on the current condition described above: 1) reduction in source habitat abundance and patch size; 2) fragmentation of source habitat and reduced connectivity between patches; 3) reduction of ponderosa pine and increase of less fire resistant, more shade tolerant species (altered forest structure and fire

effects); 4) trend from late- to mid-seral ponderosa pine forest conditions; 5) the loss of large live and dead ponderosa pine (food and nest sites); and 6) disruption of natural disturbance regimes that maintain source habitat over time. To address these concerns, four indicators were used to quantitatively assess the effects of the alternatives on the flammulated owl: 1) source habitat quantity, 2) patch size and range, 3) species composition and 4) road density. These indicators are described in further detail in section 3.4.4.1.3 below.

3.4.4.1.3 Habitat Indicators for Flammulated Owl Analysis

The discussion of the effects to the species and its habitat by alternative is both qualitative and quantitative. Four indicators were selected to quantitatively evaluate the effects of the four alternatives on the flammulated owl. These indicators are referred to in the qualitative analysis and are displayed in a comparison table at the end of the species discussion. These indicators were selected to specifically display trends in habitat quantity, quality, and distribution; and are directly related to concerns identified for the species in the watershed. The selected indicators are described below.

1 Source habitat quantity (acres) was selected to reflect the trends in source habitat abundance (late-seral ponderosa pine and Douglas-fir forests).

2 Patch size average and range (acres) were selected to indicate whether patches are moving toward or away from those expected under the HRV as well as indicating whether they are of sufficient size to meet home range requirements for the species.

3 The percentage of area with stands within ponderosa pine or Douglas-fir forest types was selected to indicate trends in the representation of both species within PVGs providing source habitat capacity for flammulated owls (PVGs 2, 5, and 6).

4 Total Road density (mi/mi^2) in source habitat was selected as an Indicator of trends in large snag abundance and fragmentation of source habitat. Road densities are also a general risk Indicator for other impacts such as altered fire regimes resulting from the introduction and spread of noxious weeds.

3.4.4.1.4 Environmental Consequences Summary

Alternative A would improve some habitat conditions for flammulated owls as stands in the large tree size class increase over time and the lack of disturbances allows some stands to move from low canopy cover class to moderate. However, stands would continue to trend away from desired species composition as shade tolerant species would continue to replace seral ponderosa pine, and other stands would move from moderate to high canopy cover, negating the gain in preferred large tree size class and moderate canopy cover classes. Total road densities (**Indicator 4**) would remain high and continue to degrade habitat through access for removal of snags for firewood. The effect of this alternative, when combined with the ongoing and foreseeable activities within the analysis area, would be a decreasing trend in source habitat quantity and quality within the analysis area into the short and long term.

Alternatives B, C, or D would move vegetation toward its desired conditions within PVG 2, 5, and 6 habitat types, increasing source habitat within PVGs 5 and 6 (mixed1 fire regime) and reducing source habitat within PVG 2 (nonlethal fire regime). However, individual alternatives sometimes had different impacts on the four habitat indicators selected for this species. For example Alternative D results in the most source habitat immediately following harvest

(1,874 acres) (**Indicator 1**) (Table 3-38), but Alternative C results in the largest total amount of source habitat in the long term (2,229 acres) (Table 3-38), The Alternative C long-term total is the same as under Alternative A. Alternatives B, C, and D would all initially move 625 acres in PVG 2 below the preferred 40 percent threshold for canopy cover (and back into the HRV) immediately following harvest. However, Alternative C would result in the largest gain of source habitat in PVG 6 habitat types in the long term (558 acres). Alternative C also results in the largest improvement in species composition (**Indicator 3**), slightly more than Alternative B (Table 3-38). All three action alternatives would reduce total road densities within flammulated owl source habitat (**Indicator 4**). Alternative D results in the largest decrease in total road density into the long term, closely followed by Alternative C (Table 3-38).

Altogether, habitat indicators show that Alternative C would result in the most source habitat in the long term, the largest gain in source habitat within PVG 6 habitat types, and the largest improvement in species composition. In addition, Alternative C would retain the second most home ranges immediately following implementation and would maintain the most home ranges into the long term. Alternative C would also result in the second most road density reduction throughout the modeling period compared to Alternative A (Table 3-38).

3.4.4.1.5 Environmental Consequences of Alternative A—No Action

3.4.4.1.5.1 Direct and Indirect Effects

Alternative A may impact flammulated owl individuals or habitat but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. The following discussion discloses expected changes in source habitat under Alternative A.

Source habitat quantity (**Indicator 1**) would decrease into the long term, moving from 2,483 acres to 2,230 acres by 2030, a reduction of 253 acres (Table 3-38). Some habitat conditions for flammulated owls improve as stands in the large tree size class increase over time and the lack of disturbances allows about 600 acres of low canopy cover class to move to moderate. However, more stands move out of preferred conditions as species composition moves away from the ponderosa pine and Douglas-fir forest types and into grand fir types, and other stands move from moderate to high canopy cover, negating the gain in preferred large tree size class and moderate canopy cover classes. As a result, trends in patch size (**Indicator 2**) also decrease from the existing condition in the long term as there is less overall source habitat (Table 3-38). The existing amount and distribution of source habitat patches would provide up to 73 potential home ranges, and would decrease to 63 by year 2030 due to the habitat trends discussed above (Table 3-38).

Table 3-38. Summary of Habitat Condition (SHC) Indicators for Flammulated Owl by Alternative and Timeframe

Indicator	Reference Condition	EC[a] 2010	Alternative A		Alternative B			Alternative C			Alternative D		
			2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]
Source Habitat Quantity (acres)	SHC in the analysis area is 11,403 acres; Currently 2,483 ac. (22%) provides source habitat. After action alternatives in 2030, 18-20% of the analysis area provides source habitat.	2,483	2,230	↓	1,787	2,104	↑	1,817	2,229	↑	1,874	2,020	↑
Average Patch Size (acres)	The majority of the analysis area is in PVG 5 and 6 (mixed1 fire regime), which is relatively homogenous with patches ranging from <1 to 600 acres. PVG 2 (nonlethal fire regime) is dominated by large homogenous stands with small patches <1 acre.	175	112	↓	126	141	↑	121	124	↑	119	135	↑
Patch Size Range (acres)	Same as Average Patch Size	36–907	1–738	↓	39-313	39-348	↑	39-313	39-348	↑	39-313	39-348	↑
Number of Potential Home Ranges within Analysis Area	Estimated home range size in mixed conifer forests: 31 acres.	73	63	↓	49	57	↑	50	60	↑	52	55	↑

Indicator		Reference Condition	EC[a] 2010	Alternative A		Alternative B			Alternative C			Alternative D		
				2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]
Percent of Area in PP or DF Forest Types	PVG 2 (1482 ac.)	Flammulated owls prefer ponderosa pine and Douglas-fir forest types.	100%	100%	NC	100%	100 %	NC	100 %	100 %	NC	100 %	100 %	NC
	PVG 5 (508 ac.)		68%	68%	NC	66%	68%	↑	68%	66%	↓	68%	66%	↓
	PVG 6 (9,413 ac.)		41%	36%	↓	44%	42%	↑	44%	43%	↑	43%	39%	↓
Total Road Density in Source Habitat (mi/mi^2)		Low Risk (desired condition): <0.7 mi/mi^2 Moderate Risk: 0.7 to1.7 mi/mi^2 High Risk: ≥1.7 mi/mi^2	3.63	3.32	↓	3.04	2.45	↓	2.74	2.17	↓	2.56	2.15	↓

Note: NC = No Change
[a]EC = Existing Condition
[b] = Overall Trend Compared to Existing Condition

Snags 10–20 inches d.b.h. and ≥20 inches d.b.h. were assessed for the PVGs providing source habitat capacity. Although some recruitment and loss of snags would occur over time through natural processes, assuming no stand-replacing disturbances, snag numbers in all PVGs would increase away from open roads. Snag densities in both diameter classes and across all three source habitat PVGs would move well into or exceed the desired ranges by 2030 (Table 3-37). Increases in snags could be due to insect and disease mortality spurred by high tree densities. The increase in snag availability would improve habitat quality through increased nesting opportunities for flammulated owls and other cavity nesters.

Without disturbance processes, tree size would likely remain suitable for flammulated owls for the foreseeable future; however, there would come a point when large tree size may diminish and canopy cover begins to move from the moderate to high densities and outside of species preferences. Canopy cover shifts from moderate to high were already occurring within the 20-year modeling period. Species composition (**Indicator 3**) would likely continue to trend away from desired composition as ponderosa pine and Douglas-fir forest types are replaced by less fire-tolerant species, such as grand fir (Table 3-38). The further species composition moves away from desired condition, the less likely fire behavior will approximate historical regimes. The replacement of ponderosa pine and Douglas-fir by grand fir also negatively alters the prey species diversity that this species feeds on.

Total road densities (**Indicator 4**) would remain in the high classification (>1.7 mi/mi^2) and continue to degrade habitat through access for removal of snags for firewood (Table 3-38).

3.4.4.1.5.2 Cumulative Effects

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the four indicators used for this species analysis and therefore are included in the affected environment discussion (section 3.4.4.1.1.). Past timber management and fire suppression have likely contributed to an overall reduction in source habitat amount (**Indicator 1**) and patch size (**Indicator 2**) by shifting species composition (**Indicator 3**) and removing large diameter ponderosa pine and Douglas fir, all facilitated by the increase in road density (**Indicator 4**).

The decline of source habitat within PVG 5 and 6 habitat types is likely the result of past harvest practices that favored removal of large ponderosa pine trees, in combination with fire suppression that allowed higher tree densities and favored shade tolerant species such as grand fir to develop within the stands (**Indicator 3**). The factors that resulted in a decline in white-headed woodpecker habitat within PVG 2 tend to favor flammulated owl, or at least remain within this species' preferences, as the owl can utilize both moderate and large tree sizes, higher canopy cover densities, and a larger departure from ponderosa pine forest cover types. Past management practices that facilitated these conditions in PVG 2 are likely the reason flammulated owl source habitat amount (**Indicator 1**) and patch size (**Indicator 2**) are overrepresented in this PVG, and why nearly 70 percent of the total area under this PVG currently provides source habitat for the flammulated owl and not white-headed woodpecker. Alternative A does not propose any activities so vegetation trends would continue to move toward dense stand conditions increasingly comprised of shade-tolerant tree species and this would incrementally contribute to flammulated owl habitat.

High road densities (**Indicator 4**) can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. The access afforded by these road systems can affect the recruitment and retention of large diameter snags as well as other components of source habitat, such as live, large diameter ponderosa pine or Douglas-fir trees through harvest and fire suppression activities. Roads further facilitate access for fuelwood cutters; increasing the potential for the loss of snags. Since Alternative A does not propose any activities there are no cumulative effects with road density concerns.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering. These activities may disturb individuals, modify understory vegetation important to prey species, or contribute to loss of snags (nest structure). Alternative A does not propose any activities therefore there would be no cumulative effects from Alternative A together with ongoing activities.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify flammulated owl source habitat such that it no longer would be suitable as the limited tree felling along the trail would not change overall stand characteristics because much of the new trail and bridge construction would occur within existing road or trail corridors. As a result, no reasonably foreseeable activities would impact any of the four indicators used to assess impacts to the flammulated owl.

3.4.4.1.5.3 Alternative A Effect Conclusion

Without disturbance from natural processes or management actions, tree size class would continue to increase and tree canopy cover conditions would move toward a moderate or high cover class; in the long term, source habitat would decline. Since flammulated owls are associated with early seral tree species, decreasing densities of desired tree species, such as ponderosa pine in PVG 2, and ponderosa pine and Douglas-fir in PVGs 5 and 6, would decrease nesting and foraging habitat quality. Flammulated owls present in the Project area would not be disturbed by activities beyond the ongoing activities described.

3.4.4.1.6 Environmental Consequences of Alternatives B, C, and D

3.4.4.1.6.1 Direct and Indirect Effects

Alternatives B, C, and D may impact flammulated owl individuals or habitat but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. Alternatives B, C, and D, in general, would move vegetation toward its desired conditions within PVG 2, 5, and 6 habitat types, increasing source habitat within PVGs 5 and 6 (mixed1 fire regime) but reducing source habitat within PVG 2 (nonlethal fire regime) (section 3.2.6). Alternatives B, C, and D would also reduce impacts from roads in source habitat

in both the temporary and long term. All design features and marking prescriptions discussed in this section would be applied to all three action alternatives unless otherwise specified.

Flammulated owls could be disturbed or displaced by proposed activities. Design Feature WL-1 (section 2.4.2.1) has been included to provide for protection of any active flammulated owl nest sites discovered during implementation of any of the three action alternatives. This design feature would prevent or minimize disturbance at active nest sites, thereby, reducing impacts to breeding birds and reproduction.

Habitat modeling indicated that **Alternative B** would move approximately 696 acres of existing source habitat to an unsuitable condition immediately following implementation (Table 3-38). The primary cause for this decrease was from the reduction in canopy cover in stands that brought total canopy cover below the 40 percent threshold preferred by this species. More specifically, Alternative B would result in a loss within PVG 2 stands of 625 acres and a net loss within PVG 5 and 6 stands of 71 acres, totaling the 696 acres (Table 3-38). However, by 2030, source habitat would be only 126 acres less than what would have occurred under Alternative A at that same point in time (Table 3-38). This smaller difference between Alternative A in 2030 and Alternative B in 2030 of 126 acres is a result of some stands being able to recover to within preferred parameters in the long term. In other words, some managed stands were reduced below the 40 percent canopy cover threshold and stayed below that threshold through 2030, while other managed stands were able to recover either to within the canopy cover threshold (40–70 percent) and/or experience a species shift to stands where ponderosa pine or Douglas fir are the dominant species. The net reduction in source habitat of 126 acres by 2030 was the result of a net loss within PVG 2 stands of 336 acres and a net gain in PVG 5 and 6 stands of 210 acres.

Habitat modeling indicated that **Alternative C** would move approximately 666 acres of existing source habitat to an unsuitable condition immediately following implementation (Table 3-38). Again, the primary cause for this decrease was from the reduction in canopy cover in stands that brought total canopy cover below the 40 percent threshold preferred by this species. More specifically, the initial harvest under Alternative C resulted in a loss within PVG 2 stands of 625 acres and a net loss within PVG 5 and 6 stands of 41 acres, totaling the 666 acres. However, by 2030 source habitat would be only 1 acre less than what would have occurred under Alternative A at that same point in time (Table 3-38). The similarity between Alternative A and Alternative C in the long term is a result of nearly as many acres recovering to within preferred thresholds as were initially reduced by harvest activities. Similar to Alternative B, some managed stands were reduced below the 40 percent canopy cover threshold and stayed below that threshold through 2030, while other managed stands were able to recover either to within the canopy cover threshold (40–70 percent) or experience a species shift to stands where ponderosa pine or Douglas fir are the dominant species, or both. The net reduction in source habitat of 1 acre by 2030 was the result of a net loss within PVG 2 stands of 333 acres and a net gain in PVG 5 and 6 stands of 332 acres.

Habitat modeling indicated that **Alternative D** would move approximately 609 acres of existing source habitat to an unsuitable condition immediately following implementation (Table 3-38). Again, the primary cause for this decrease was from the reduction in canopy cover in stands that brought total canopy cover below the 40 percent threshold preferred by this species. More specifically, the initial harvest under Alternative D resulted in a net loss within PVG 2 stands of 625 acres and a net gain within PVG 5 and 6 stands of 16 acres, totaling the 609 acres. However, by 2030 source habitat would be only 210 acres less than what would have occurred under

Alternative A at that same point in time (Table 3-38). This smaller difference between Alternative A in 2030 and Alternative D in 2030 of 210 acres is a result of some stands being able to recover to within preferred parameters in the long term. In other words, some managed stands were reduced below the 40 percent canopy cover threshold and stayed below that threshold through 2030, while other managed stands were able to recover either to within the canopy cover threshold (40–70 percent) or experience a species shift to stands where ponderosa pine or Douglas fir are the dominant species, or both. The net reduction in source habitat of 210 acres by 2030 was the result of a net loss within PVG 2 stands of 333 acres and a net gain in PVG 5 and 6 stands of 123 acres.

While there are differences in actual acres impacted between the action alternatives, a key similarity is that all three action alternatives result in significant reductions in source habitat within PVG 2 habitat types. Under Alternative B, 90 percent of the net amount of source habitat reduced below 40 percent canopy cover in the short term (696 acres), and 100 percent in the long term (126 acres), occurs within PVG 2 stands. Desired conditions for PVG 2 stands, as defined by Forest Plan Appendix A (Forest Service 2010a), include the majority of stands within the large tree size class, and for that large tree component to be mostly within the low canopy cover class with a species composition dominated by ponderosa pine. The goals and objectives for the Project focus on moving stands within PVG 2 (and 6) back into historical conditions and improving conditions where those vegetative conditions are departed from their HRV. Additionally, the Purpose and Need (section 1.5) identifies the need to restore white-headed woodpecker source habitat; the species on the forest with the greatest extent of departed habitat from historical habitat conditions. Silviculture prescriptions that retained large tree size class, moved species composition to favor ponderosa pine, and reduced canopy cover to low, in effect moving PVG 2 stands back into the HRV, would eliminate flammulated owl habitat from this PVG. Within PVG 2 habitat types, this tradeoff between restoring white-headed woodpecker source habitat and reducing flammulated owl source habitat was desired and is a recognized tradeoff between species recognized in Forest-scale analyses addressing habitat needs for each species across the Forest.

Habitat modeling also indicated that some managed stands within PVG 6 habitat types moved below 40 percent canopy cover preferred by flammulated owls. Under **Alternative B**, these amounts totaled 331 acres in the short term and 256 acres in the long term. Under **Alternative C**, these amounts totaled 301 acres in the short term and 226 acres in the long term. Under **Alternative D**, these amounts totaled 214 acres in the short term and 226 acres in the long term. A key element of flammulated owl source habitat is the structural complexity of breeding stands. Stands are primarily openly spaced with multiple canopy layers and large diameter snags, but also have interspersed clumps with higher densities and canopy cover that provide nesting, roosting, and calling habitat (Moore and Frederick 1991, McCallum 1994). This variation within a stand is difficult to replicate using habitat models that use stand data that is averaged across the stand. As a result, those stands that have canopy cover reduced below the preferred 40 percent threshold would likely still provide source habitat for owls if their structural diversity is maintained, albeit at lower average canopy cover. Figure 3-26 displays the changes in flammulated owl source habitat under the Alternative C scenario.

To maintain this structural complexity and maintain any flammulated owl territories that may currently exist within those stands that were managed below 40 percent canopy cover, Design Features WL-4 and WL-5, together, were developed to manage for flammulated owls in these

stands. Design Feature WL-4 states, “Provide snags, snag replacement trees, and CWD in clusters if available rather than uniformly spaced including those with broken tops, cavities, lightning scars, and dead portions where such trees are available.” Priority should be given to large snags and trees for snag recruitment over smaller diameter snags and trees.

Design Feature WL-5 further describes selection of one of these snags every 10 acres to receive an 83-foot no treatment buffer. The 83-foot buffer is approximately half an acre around the nest tree. The diameter was based on field observations where the District Wildlife Biologist looked at habitat around potential nest snags and decided that that distance appeared to provide the microsite structure necessary for the nest site, taking in to account the remaining vegetation that would be left following harvest. A monitoring element was developed to assess whether or not the design feature is effective at sufficiently providing all the nesting components for flammulated owls. The monitoring element would provide a comparison of pre-implementation owl locations with post implementation use of occupied stands to see if the owls reuse the same stands following treatments.

This prescription would retain the structurally diverse vegetative condition that currently exists around that snag, moderating the effects of reducing stand densities on any acres within PVG 5 or 6 that fall below 40 percent in the short term. Design Feature WL-5 applies to those stands of source habitat in the medium or large tree size class in PVG 6 that currently have >40 percent canopy cover, which would be managed under Alternatives B, C, and D to a canopy cover condition of <40 percent in order to facilitate the maintenance and restoration of ponderosa pine in this PVG, an important tree species associated with improved habitat quality for flammulated owls. Applying WL-5 is expected to moderate the changes in current source habitat to allow for the maintenance and restoration of ponderosa pine, and still provide for structural heterogeneity within the stand that could meet flammulated owl needs. Because the important components of nesting habitat would be retained around potential nest sites within a given stand, the expectation is that all existing flammulated owl source habitat within PVG 6 would be retained in a suitable condition. WL-5 would be applied to 343 acres under Alternative B; 313 acres under Alternative C; and 226 acres under Alternative D. This no-treatment buffer would be retained during commercial thin activities as well as noncommercial thinning actions post-harvest.

In addition to Design Features WL-4 and WL-5 outlined above, marking prescriptions described in the Vegetation Technical Report (Project Record) for commercial thin treatments include provisions for retaining clumps of existing ponderosa pine and Douglas-fir within all managed stands. Design Feature TH-9 also requires that all ponderosa pine ≥8 or ≥16 inches d.b.h., depending on the strata, be retained in PVG 6. This design feature also has provisions for retaining large Douglas-fir (≥20 inches d.b.h.) within specific strata in PVG 6. In combination, these design features and marking prescriptions would help to maintain the structural complexity, such as multiple canopy layers and dense pockets for nesting and roosting activities with preferred tree species (i.e., ponderosa pine) where they exist, necessary to retain these managed stands as potential nesting habitat for flammulated owls in the long term and across all action alternatives.

Including Design Features WL-4 and TH-9 and marking prescriptions are expected to maintain important vegetation components of source habitat within managed stands in PVG 6 habitat types. In effect, these Design Features would increase the composition of the preferred ponderosa pine tree species and, to a lesser extent, Douglas-fir in forests within PVG 6 habitat types while at the same time reducing the extent of less desirable late seral grand fir species.

Collectively, project silvicultural prescriptions, Design Features WL-4 and TH-9, and marking prescriptions would result in moving some stands within PVG 6 habitat types into source habitat for the flammulated owl. For Alternative B, this would result in an increase in source habitat of 260 acres immediately after harvest and 210 acres by year 2030. Alternative C would result in an increase of 260 acres immediately after harvest and 558 acres by 2030. Alternative D would result in an increase of 230 acres immediately after harvest and 349 acres by 2030.

All three action alternatives would move existing flammulated owl source habitat in PVG 2 back into the HRV, of which the end result is a net reduction in source habitat abundance and patch size for flammulated owl in the analysis area (**Indicators 1 and 2**) (Table 3-38). Figure 3-25, Figure 3-26, and Figure 3-27 display the distribution and juxtaposition of source habitat patches for Alternatives B, C, and D, respectively. However, an overall reduction in flammulated owl source habitat is not expected to cause a negative trend for the species due to the current abundance of source habitat within the watershed. Moving source habitat back into desired conditions would also decrease the amount of the landscape that is in a departed condition, which in turn would allow fire regimes to function properly and ultimately reduce the potential for uncharacteristic wildfire, a benefit to retaining characteristic landscape patches and patterns desired by this species.

Species composition (**Indicator 3**), as indicated by the area of ponderosa pine or Douglas-fir forest types, would improve under Alternatives B, C, and D (Table 3-38). Of the three action alternatives, Alternative C would result in the largest amount of increase over Alternative A in acres moved into preferred ponderosa pine and Douglas-fir forest types, both immediately following harvest and in the long term. Acres moved into preferred forest types under Alternative B would be the same immediately after harvest but slightly less in the long term. All action alternatives would experience an initial increase in preferred species composition immediately following harvest, which would slowly decrease into the long term as shade-tolerant species recover over time. In general, commercial thinning treatments and the prescribed burn would promote the retention and recruitment of ponderosa pine and Douglas-fir over grand fir in appropriate habitat types (sections 3.2.5 and 3.3.3). As discussed above, treatments would maintain ponderosa pine ≥8 inches d.b.h. where it currently occurs in PVG 6, reduce more shade-tolerant and less fire-resistant species, and create small openings for ponderosa pine regeneration important to the long term sustainability of this tree species in flammulated owl habitat areas.

Road densities (**Indicator 4**) are another Indicator of habitat quality. Alternatives B, C, and D would reduce total road densities in flammulated owl source habitat in the temporary and long term (Table 3-38). Total road densities following implementation remain higher than desired, however, and still represent a risk of degradation of habitat from potential loss of snags. However, the overall risk would be lower than current conditions or Alternative A. The decrease in total road density would improve the quality of source habitat through reduced disturbance and reduced loss of snags within road corridors.

Snags >10 inches in d.b.h. would be maintained very close to existing levels, which are currently within or above desired ranges, across all PVGs immediately following harvest under all three action alternatives (Table 3-37). In addition, snag densities would remain within desired ranges throughout the 20-year modeling period under all three action alternatives. While densities under the action alternatives would be somewhat lower across all PVGs than what would be expected under Alternative A, they would still be well within desired ranges through 2030. In addition,

Design Features WL-3, WL-6, TH-6 and TH-9 (section 2.4.2.1) would minimize potential impacts to existing snags and would provide for future recruitment and retention of all snags >10 inches d.b.h. Snags would not be felled unless they pose a safety hazard under timber sale OSHA requirements. Live trees with evidence of cavities, damage, and rot, would be retained throughout the treatment areas to provide for future recruitment of snags. Design Feature WL-6 would retain up to three large snags per acre within a 600-foot corridor along the relocated segment of NFS road 696 to offset potential losses from fuelwood gathering along this new stretch of roadway. While the loss of snags cannot be totally avoided due to OSHA safety requirements and uncertainties associated with broadcast burning in PVG 2, snag numbers would be maintained within or above existing densities in the long term (Table 3-37).

Design Features TH-5 and TH-6 would retain any old forest habitat, retain or promote development of components of old forest in managed large- or medium-sized stands, and would retain all large stands in the large tree size class. These design features would conserve important habitat elements for the flammulated owls, such as large, remnant legacy ponderosa pine and Douglas-fir and large diameter snags.

Proposed activities associated with these alternatives are not expected to introduce noxious weeds into the analysis area. While open road miles would increase by 3.8 miles within the analysis area, project design features were developed to mitigate any potential impacts from the increase in open road access. Design Feature NX-1 associated with all three action alternatives requires the cleaning of all off-road equipment potentially carrying noxious weed seeds prior to moving into the analysis area. Design Features NX-2 through NX-4 also provide direction for the use of weed-free sources of aggregate, straw, and seed mixtures for this project These alternatives may however contribute to distribution of noxious weeds already present. As noted above, existing noxious weed populations would be addressed through the District’s noxious weed program.

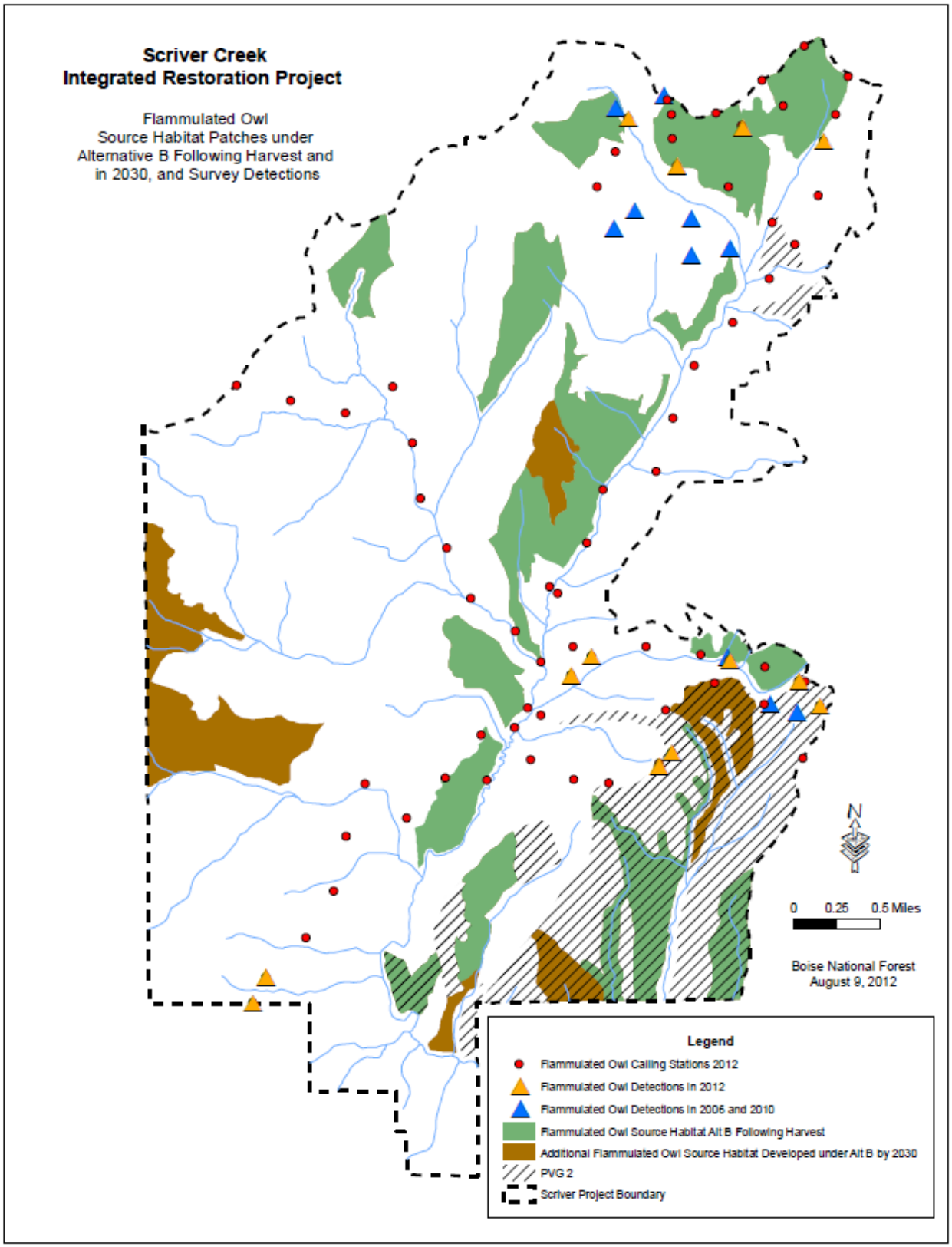

Figure 3-25. Flammulated Owl Source Habitat under Alternative B Following Harvest and in 2030

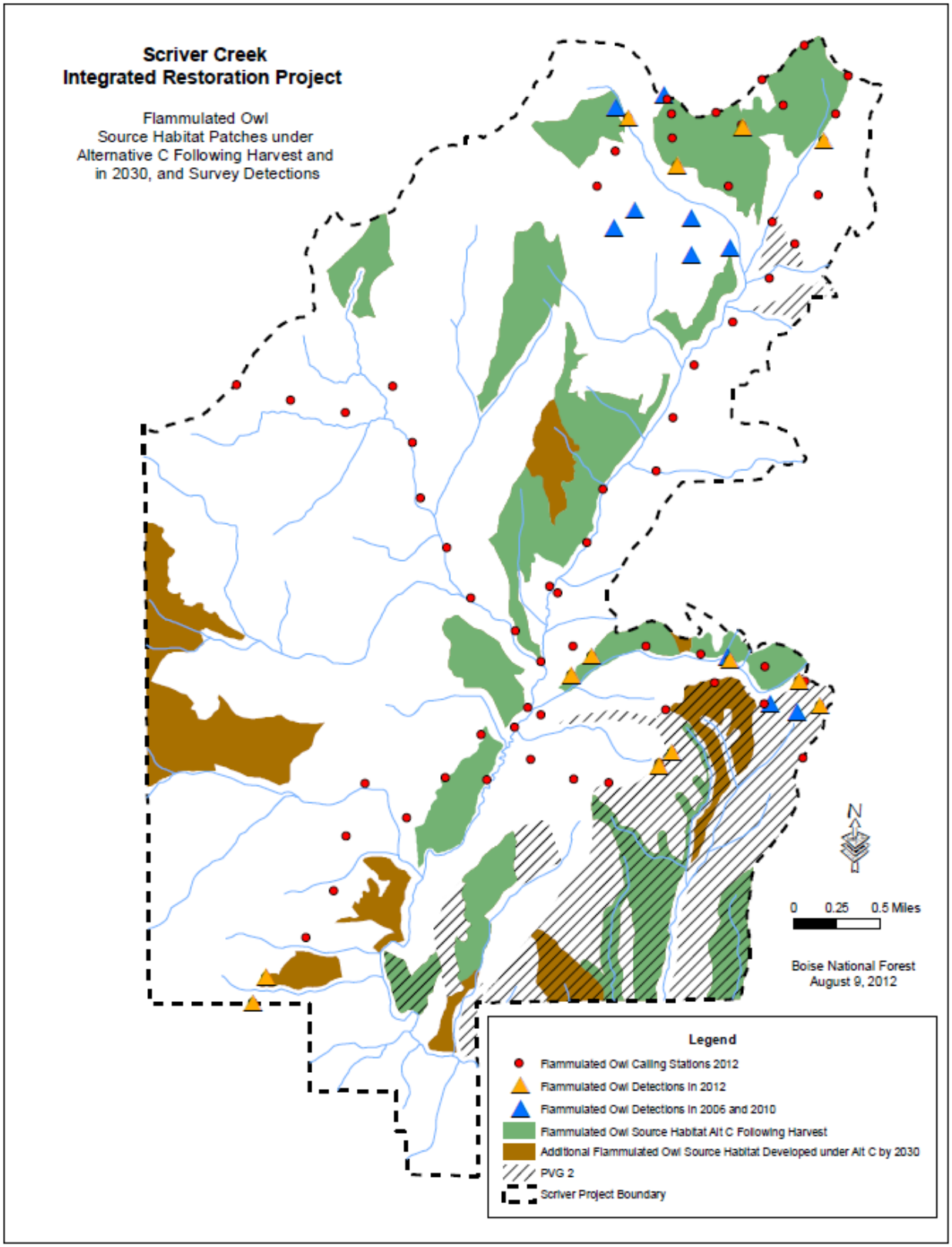

Figure 3-26. Flammulated Owl Source Habitat under Alternative C Following Harvest and in 2030

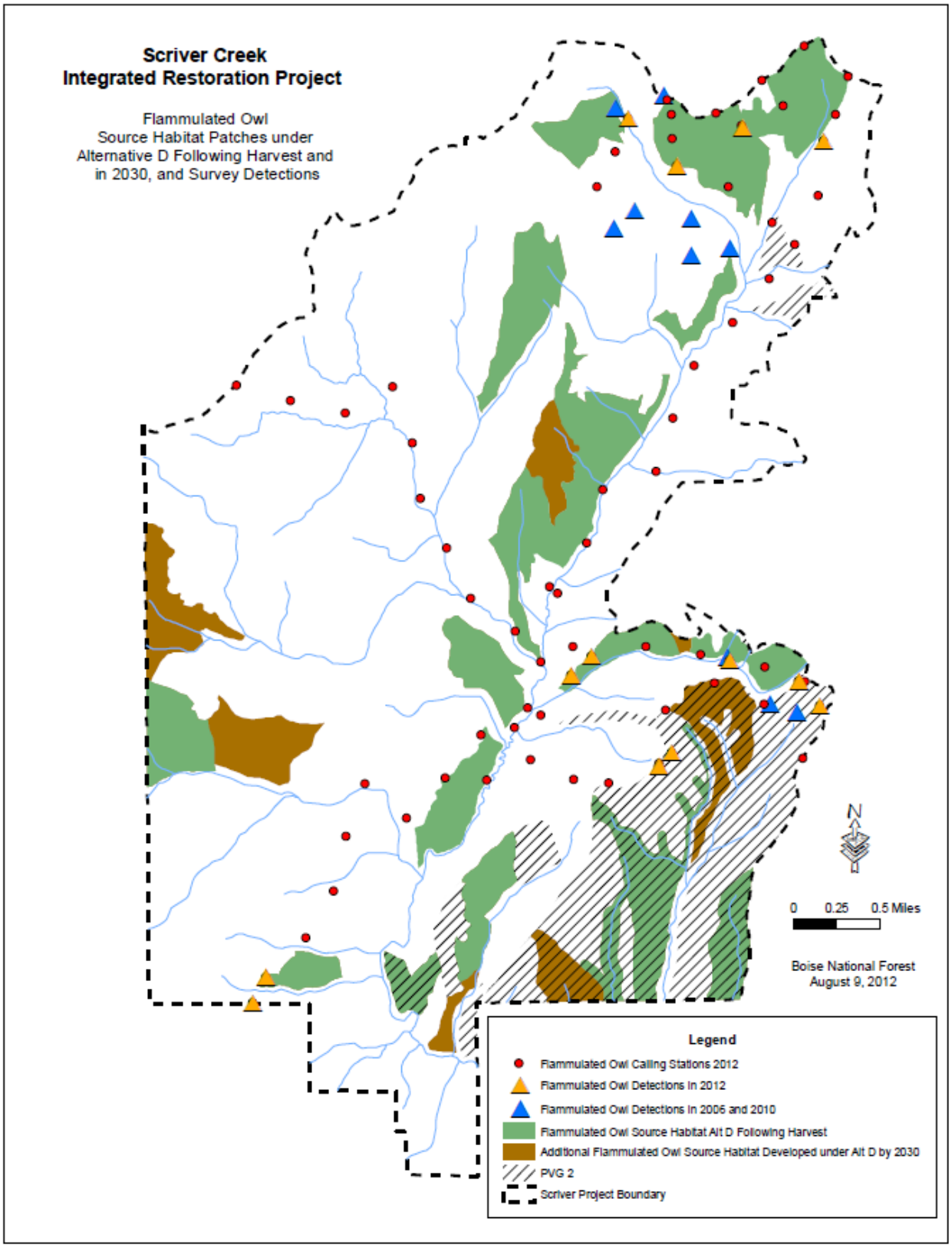

Figure 3-27. Flammulated Owl Source Habitat under Alternative D Following Harvest and in 2030

3.4.4.1.6.2 Cumulative Effects

Because Alternatives B, C, and D would have similar impacts on the flammulated owl and its habitat, and would have the same cumulative impact area, the following cumulative impact discussion is common for all three action alternatives.

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the four indicators used for this species analysis and therefore are included in the affected environment discussion (section 3.4.4.1.1.).

The decline of source habitat within PVG 5 and 6 habitat types (mixed1 fire regime) is likely the result of past harvest practices that favored removal of large ponderosa pine trees, in combination with fire suppression that allowed higher tree densities and favored shade tolerant species such as grand fir to develop within the stands (**Indicator 3**). The factors that resulted in a decline in white-headed woodpecker habitat within PVG 2 (nonlethal fire regime) tend to favor flammulated owl, or at least remain within this species' preferences, as the owl can utilize both moderate and large tree sizes, higher canopy cover densities, and a larger departure from ponderosa pine forest cover types. Past management practices that facilitated these conditions in PVG 2 are likely the reason flammulated owl source habitat amount (**Indicator 1**) and patch size (**Indicator 2**) are overrepresented in this PVG, and why nearly 70 percent of the total area under this PVG currently provides source habitat for the flammulated owl and not white-headed woodpecker. Implementing Alternatives B, C or D would incrementally begin to restore PVG 2 and 5 habitat types to a condition more representative of vegetative communities functioning in the presence of disturbance and thus would not cumulatively add to the trend of increasing flammulated owl habitat in these departed vegetation communities.

High road densities (**Indicator 4**) can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. The access afforded by these road systems can affect the recruitment and retention of large diameter snags as well as other components of source habitat, such as live, large diameter ponderosa pine or Douglas-fir trees through harvest and fire suppression activities. Roads further facilitate access for fuelwood cutters; increasing the potential for the loss of snags. Activities proposed under Alternatives B, C or D would decrease the open road density affecting northern goshawk habitat and would therefore not cumulatively add to the trend of higher road densities.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. Additional noise and disturbance would occur with the activities in the Project area and be additive to these ongoing effects. The noxious weed program treats infested areas and results in improved source habitat conditions. Design features under Alternatives B, C, or D are intended to avoid or minimize the

spread of noxious weeds as a result of proposed activities. If noxious weeds are documented, actions would be taken to treat the infestation; therefore there would be no cumulative effect to the spread noxious weeds. Grazing was identified as a low risk for the flammulated owl due to its potential to affect understory shrub development important to Lepidoptera species. The activities in the Project area would primarily reduce tree canopy cover in habitat types that develop a shrub understory, thereby benefitting understory growth; there would be no cumulative effects. Fuelwood cutting would continue to impact available nesting structure in flammulated owl source habitat by removing snags within road corridors. Realigning NFS road 696 and NFS road 696D would expose new areas to snag removal, which would incrementally add to the amount of area currently accessible to fuelwood cutting. Over the long term, the vacated section of NFS road 696 should develop and retain snags since that portion of the road prism would no longer be readily accessible for fuelwood removal. Vegetation management activities in Alternatives B, C, or D would retain snags to meet the needs of forest species dependent on snags minimizing any cumulative effect of snag loss.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify flammulated owl source habitat such that it no longer would be suitable. Limited tree felling along the trail(s) would not change overall stand characteristics because much of the new trail(s) and bridge construction would occur within existing road or trail corridors. No cumulative effects would occur.

3.4.4.1.7 Determination of Effect

Alternative B, C or D **may impact** individuals or habitat but is not likely to cause a trend toward federal listing or loss of viability for the flammulated owl.

3.4.4.1.7.1 Rationale

- Source habitat would decrease in the temporary and short term and an increase in the long term.
- Flammulated owls are documented in the analysis area and are known to occupy stands proposed for treatment.
- Design Feature WL-1 is included to minimize or avoid disruption of reproductive success if breeding individuals are discovered during implementation of activities.

3.4.4.2 Northern Goshawk (Family 2 Focal Species, Region 4 Sensitive Species)

3.4.4.2.1 Affected Environment

Northern goshawks use a variety of forest ages, structural conditions, and successional stages (Griffith 1993), and are associated with shrubland and grassland habitats. Nest sites are typically located next to the trunk of large diameter trees and in older stands where trees are widely spaced (Hayward and Escano 1989). Deformities (multiple trunks and mistletoe) especially in smaller diameter trees are used as nest site substrates. Snags are often used as plucking posts. Northern goshawks prefer transitional zones for hunting. Mosaics of forested and open areas and riparian zones are equally important (Griffith 1993). The nesting home range for northern goshawks is estimated at more than 5,900 acres and includes three components: nesting, foraging, and post fledging family areas (Reynolds et al. 1992).

On the forest, source habitat for northern goshawks occurs in all PVGs except 1 and 11 in the medium and large tree size classes and moderate and high canopy cover class (Nutt et al. 2010). PVGs 2 through 9 are capable of developing multi-layered, mature, and late seral stands with a dense canopy. For some PVGs such as PVG 6, these conditions occur under historical fire regimes, while other PVGs such as PVG 2 and 5 develop these conditions due to fire suppression and altered fire regimes. No special habitat features have been identified for northern goshawk.

The northern goshawk was selected as a focal species for this analysis area because of its association with the medium and large tree size classes and moderate and high canopy cover conditions.

3.4.4.2.2 Current Conditions

Source habitat in the watershed has increased by nearly 35 percent for the northern goshawk (Nutt et al. 2010). The abundance of northern goshawk source habitat within the watershed is a result of large portions of the PVG 2 habitat types being outside HRV, likely caused by fire suppression activities that allowed higher tree densities and favored shade tolerant species to develop within the stands. Similarly, there is likely an abundance of source habitat within the analysis area due to PVG 2 habitat types in the southeastern corner also being outside HRV with regard to canopy cover.

The analysis area’s large amount of PVG 5 and 6 within the mixed1 fire regime would suggest that this portion of the HU would have historically provided the majority of source habitat within the watershed, as habitat types in the south half of the HU are predominantly PVG 2 and would not have provided source habitat when within HRV.

Total road densities are high and the motorized access they facilitate are likely impacting source habitat quality. Higher road densities increase the risk of the loss of snags to fuelwood collection over time. A portion of source habitat is suitable for livestock grazing; 8,300 acres of the 46,800-acre Middle Fork South S&G Allotment occurs within the Project area. This watershed historically provided approximately 6,236 acres of source habitat for the northern goshawk, which equates to 16 percent of federally managed lands (37,848 acres) in the watershed. The prevalence of PVG 2 within the watershed is likely the reason less than 20 percent of the watershed historically provided source habitat.

The analysis area for northern goshawk consists of the 11,510-acre Project area and will be used to assess impacts to the amount, distribution and quality of source habitat for this species. This analysis area was chosen because of the capability of the Project area to provide source habitat for this species and because potential direct and indirect impacts are not expected to go beyond the Project area boundary.

Surveys were conducted in June 2012 using the protocol from *Northern Goshawk Inventory and Monitoring Technical Guide* (Woodbridge and Hargis 2005). An active nest with one nestling was located within the analysis area in June 2012, near the center of the analysis area (Project Record, Wildlife Survey Information, 2012). In addition, the survey crew located the historical nest that was found in 2005 (NRIS 2011). This nest site is likely an alternative nest site and is approximately 1.30 miles northwest of the active nest site. Three other sightings have occurred within the analysis area since 2002 (NRIS 2011). In addition to the surveys completed in 2012, earlier surveys had been completed within the analysis area in July 2010, which resulted in no detections (Wildlife Survey Information, 2010 available in the Project Record).

The PVGs capable of developing source habitat historically for northern goshawks present in the analysis area are PVGs 6, 8, and 9. Typically PVG 5 only provides source habitat when outside of HRV. However, because stands in PVG 5 in the Project area were very similar to PVG 6 stands, the few stands in PVG 5 were lumped with PVG 6 in the mixed1 fire regime. As a result, for the purposes of this analysis PVG 5 is considered capable of developing source habitat, a source habitat capacity PVG. PVGs 5, 6, 8, and 9 represent approximately 9,988 acres or 87 percent of the analysis area (Figure 3-28). PVG 6 is the dominant PVG within the analysis area; PVGs 8 and 9 are incidental as they combine for only 68 acres. The northern goshawk can also take advantage of PVG 2 when conditions are outside HRV. PVG 2 comprises 1,482 acres or 13 percent of the analysis area. Source habitat capacity is well distributed and interconnected throughout the analysis area with the potential to build upon remnant source habitat patches and improve interconnectedness.

There are 9,246 acres of existing modeled source habitat within the analysis area, which equates to approximately 93 percent of source habitat capacity within the analysis area (Figure 3-28). The ratio of source habitat to source habitat capacity is high because of the large number of stands within PVG 2 that are currently outside the HRV and are providing source habitat. Of the existing modeled source habitat, 1,026 acres are nesting habitat and 8,220 acres are forage habitat. Patches of nesting habitat are concentrated in the middle third of the analysis area, while modeled forage habitat is well distributed and connected. Nesting habitat is the most limiting factor for northern goshawk within the analysis area due to the general lack of stands with high total canopy cover. Patch size is good and comparable to historical conditions within the mixed1 fire regime.

The current amount and distribution of source habitat would provide for one average sized home range of 5,930 acres as recommended by Reynolds et al. (1992) (Figure 3-28). The delineation of the home range considered several factors, including amount and juxtaposition of existing modeled nesting and PFA habitat, the location of the active nest site, plucking post and historical nest site, topography and natural barriers, and condition of potential source habitat outside of the analysis area. Because both the active nest site and the historical nest site were only 1.3 miles away from each other, and both within the relatively small West Fork of Scriver Creek drainage, one potential home range was determined to make sense in both an ecological and spatial context. However, a section of the proposed realignment of the NFS road 696 is within 100 feet of the historical nest. Because of the close proximity to the proposed realignment and the inability of the road to be relocated, the PFA did not include the historical nest as one of the alternate nest stands, although the historical nest was an important component of the formation of the single existing home range within the analysis area. Figure 3-28 shows the nest locations, plucking post, the six alternate and replacement nest stands, the post-fledging area (PFA) and the potential home range boundary.

Approximately 86 percent (9,921 acres) of the analysis area is comprised of PVG 5 and 6 vegetation groups, which provide source habitat for the northern goshawk where stands contain medium and large tree sizes with moderate and high canopy cover. These habitat types fall within the mixed1 fire regime, which historically experienced fire intervals of 5–70 years and were primarily homogeneous with small patches (1–600 acres) of different seral stages, densities and compositions (section 3.3.1.2). Currently, most stands are within the medium and large tree size class, while nearly half of the PVG 5 and 6 stands are in the high canopy cover class. Even with a substantial amount of high canopy cover, the majority of stands does not meet preferred slope and aspect parameters and is why a relatively small amount of nesting habitat was modeled.

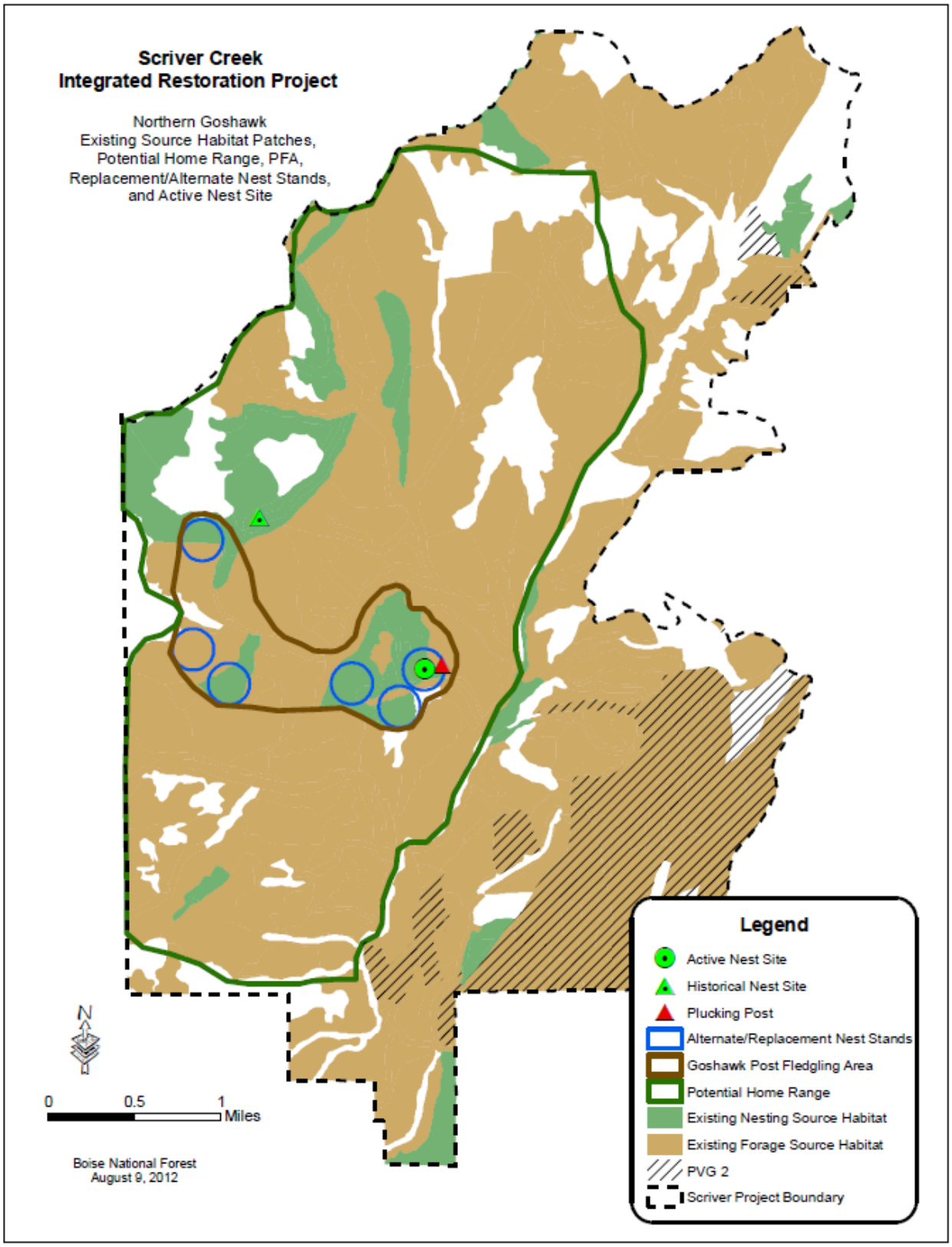

Figure 3-28. Northern Goshawk Existing Source Habitat and Existing Potential Home Range

Approximately 13 percent (1,482 acres) of the analysis area is comprised of PVG 2. Under historic nonlethal fire regimes, forests in PVG 2 would have been dominated by stands of large ponderosa pine with open canopies. These conditions were maintained over time by frequent low intensity fire (Forest Service 2010a, Appendix A). Stands within this PVG only provide source habitat for the northern goshawk when outside the HRV (i.e., when stands in the large tree size class have moderate to high canopy cover). The lack of disturbances, primarily low intensity fire, has allowed shade-tolerant and intolerant species to increase stand densities and canopy cover such that most stands are no longer within the HRV. At present, only 6 percent (91 acres) of the total area within PVG 2 (1,482 acres) is within the low canopy cover class (HRV). This illustrates why 14 percent (1,315 acres) of the total modeled source habitat for northern goshawk within the analysis area is comprised of PVG 2 habitat types that are outside the HRV.

Past timber management within PVGs 5 and 6 likely negatively affected nesting habitat by reducing total canopy cover below the 60 percent threshold and by reducing medium-to-large diameter trees that could serve as nesting structures. Fire suppression, however, would have increased overall stand densities within PVG 6 stands, improving this component of nesting habitat. Fire suppression within PVG 2 would have also resulted in denser stands, moving these stands outside of the HRV, which is the only time PVG 2 stands provide source habitat for the northern goshawk. The changes made to source habitat by past management activities have likely contributed to an overall increase in source habitat and patch size within the analysis area, mostly in the form of PVG 2 stands that are departed from the HRV (or near the high end of the historic range) and contributing to source habitat (forage) and the lack of natural disturbances within stands in PVGs 5 and 6 that would have periodically reduced tree densities and created openings.

Source habitat quality can be described in terms of large snag abundance and road density. Snags provide a variety of needs for prey species, such as vegetative structure for nesting, denning, and forage activities. Road density can be used to define a variety of risks to the species and habitat.

Total road densities within northern goshawk source habitat are currently 3.80 mi/mi^2 (Table 3-39) and in the high classification (>1.7 mi/mi^2) (Forest Service 2010a, Appendix E). High road densities can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This can affect the recruitment and retention of snags >10 inches d.b.h., which provide forage and nesting structure for prey species. Roads further facilitate access for fuelwood cutters; increasing the potential for the loss of snags.

The abundance of snags 10–20 inches d.b.h. and large snags were assessed for the analysis area (Table 3-40). Snag densities for the 10–20 inch class are slightly above the desired range across all PVGs that provide source habitat. Large snag densities in PVG 2 (nonlethal) and PVGs 5 and 6 (mixed1) are within desired ranges. While existing snag densities in both size classes are either within or above desired ranges, snag densities in general have likely been affected to some degree by past management actions, such as timber harvest, road construction and use, fuelwood programs, and fire suppression. Roads continue to facilitate loss of snags by providing access to fuelwood.

Table 3-39. Summary of Source Habitat Condition (SHC) Indicators for Northern Goshawk by Alternative and Timeframe.

Indicator	Reference Condition	EC[a]	Alternative A		Alternative B			Alternative C			Alternative D		
		2010	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]
Source Habitat Quantity (acres)	SHC in the analysis area is 9,988 acres; Currently 9,246 acres (93%) provides source habitat. After Alt B in 2030 77% of SHC provides source habitat.	9,246	10,350	↑	7,692	9,536	↓	7,682	9,543	↓	7,947	9,578	↓
Modeled Nesting and PFA Habitat Quantity (acres)	A northern goshawk nesting territory contains approximately 180 acres of nesting habitat surrounded by 420 acres of post-fledging area.	1,026	1,372	↑	813	1,199	↓	788	1,199	↓	878	1,252	↓
Average Patch Size (acres)	The majority of the analysis area is in PVG 5 and 6 (mixed1 fire regime), which is relatively homogenous with patches ranging from <1 to 600 acres. PVG 2 is in nonlethal fire regime, which is dominated by large homogenous stands with small patches <1 acres	2,311	10,350	↑	366	2,384	↓	334	1,909	↓	361	871	↓
Patch Size Range (acres)	Same as Average Patch Size	1–9,144	10,350	↑	1–7,064	1–9,531	↓	1–7,041	1–9,537	↓	1–7,309	1–9,567	↓
Number of Potential Home Ranges within Analysis Area	Estimated home range size is 5,931 acres.	1	1	NC	1	1	NC	1	1	NC	1	1	NC
Total Road Density in Source Habitat (mi/mi^2)	Low Risk (desired condition) : <0.7 mi/mi^2 Moderate Risk: 0.7 to1.7 mi/mi^2 High Risk: ≥1.7 mi/mi^2	3.80	3.96	↑	3.32	3.42	↓	3.12	3.18	↓	2.99	3.10	↓

Note: NC = No Change and NA = Not Applicable because there is only one patch
[a] EC = Existing Condition
[b] Overall Trend Compared to Existing Condition

Table 3-40. Snag Densities for Northern Goshawk Source Habitat Capacity Relative to Desired Range by Potential Vegetation Group (PVG) Alternative and Year.

Snag Size	PVG and Fire Regime	Desired Range	Existing Condition	Alt. A	Alternative B		Alternative C		Alternative D	
			2010	2030	2011	2030	2011	2030	2011	2030
Snags [10–20 inch d.b.h.] Densities per Acre Relative to Desired Range	PVG 2 (Nonlethal)	1.8-2.7	2.76	14.72	2.85	4.39	2.85	4.39	2.84	4.30
	PVGs 5 and 6 (Mixed1)	1.8-5.5	5.65	13.16	5.26	4.99	5.78	4.92	5.75	4.76
Large Snag [≥20 inch d.b.h.] Densities per Acre Relative to Desired Range	PVG 2 (Nonlethal)	0.4-3.0	0.54	2.00	0.56	1.27	0.56	1.27	0.57	1.32
	PVGs 5 and 6 (Mixed1)	0.2-3.5	1.90	4.03	1.66	2.34	1.99	2.59	2.01	3.01

Species-specific concerns within the analysis area were identified based on the current condition described above: 1) reduction in source habitat abundance and patch size; 2) fragmentation of source habitat and reduced connectivity between patches; 3) reduction of ponderosa pine and increase of less fire resistant, more shade tolerant species (altered forest structure and fire effects); and 4) disruption of natural disturbance regimes that maintain source habitat over time. To address these concerns, three indicators were used to quantitatively assess the effects of the alternatives on the northern goshawk: 1) source habitat quantity, 2) patch size and range, 3) road density. These indicators are described in further detail below.

3.4.4.2.3 Habitat Indicators for Northern Goshawk Analysis

The discussion of the effects to the species and its habitat by alternative is both qualitative and quantitative. Three indicators were selected to quantitatively evaluate the effects of the four alternatives on the northern goshawk. These indicators are referred to in the qualitative analysis and are displayed in a comparison table at the end of the species discussion. These indicators were selected to specifically display trends in habitat quantity, quality, and distribution; and are directly related to concerns identified for the species in the watershed. The selected indicators are described below.

1 Source habitat quantity (acres) was selected to reflect the trends in source habitat abundance. More specifically, the quantity of nesting habitat will reflect trends in this most limiting factor of northern goshawk persistence within the analysis area.

2 Patch size average and range (acres) were selected to indicate whether patches are moving toward or away from those expected under the HRV as well as indicating whether they are of sufficient size to meet home range requirements for the species.

3 Total road density (mi/mi^2) in source habitat was selected as an Indicator of trends in large snag abundance and fragmentation of source habitat. Road densities are also a general risk Indicator for other impacts such as altered fire regimes resulting from the introduction and spread of noxious weeds.

3.4.4.2.4 Environmental Consequences Summary

Alternatives B, C, or D would reduce northern goshawk source habitat abundance (**Indicator 1**) within the analysis below what would be expected to occur under Alternative A, primarily from reductions in canopy cover that move densities under 60 percent for nesting and 40 percent for forage habitat (Table 3-39). Nesting habitat would correspondingly decrease as well under all three action alternatives. Most of the reductions in forage habitat were a result of stands in PVG 2 being moved back into the HRV. While there were some losses of forage habitat within PVGs 5 and 6, stands that fell below canopy cover requirements for nesting habitat in these PVGs shifted to forage habitat. As a result, forage habitat remained generally unchanged under all three action alternatives. Of the three action alternatives, Alternative D retains the most total northern goshawk source habitat (nesting and forage) through the modeling period (Table 3-39). Alternative D also retains the most nesting habitat through 2030.

All three action alternatives would retain sufficient quantity and distribution of source habitat to support a home range within the analysis area. In addition, all action alternatives would retain the important vegetation characteristics within the active nest stand as a result of Design Feature WL-2, would retain the quality of nesting habitat within the five other alternate/replacement nest stands, and would retain overall source habitat quality within the PFA. While the differences between the alternatives are relatively small with respect to effects within the home range, Alternative D would retain the most nesting habitat within the potential home range throughout the modeling period and would retain more of the PFA above 60 percent canopy cover than Alternatives B and C, although there would be less actual harvest within Alternative B.

Average patch size (**Indicator 2**) would be less in Alternatives B, C, or D than Alternative A throughout the modeling period for all action alternatives, although Alternative B would retain the largest average patch size. All three action alternatives would reduce total road densities compared to Alternative A (**Indicator 3**). Alternative D results in the largest decrease in total road densities into the long term (Table 3-39).

Overall, the habitat indicators show that Alternative D would retain the most source habitat and the most nesting habitat throughout the modeling period, would retain the most nesting habitat within the home range, would maintain more of the PFA above the 60 percent canopy cover threshold, and would result in the largest long term reduction of total road density within source habitat. The quality and quantity of source habitat within the home range would be maintained closest to the existing condition under Alternative D.

3.4.4.2.5 Environmental Consequences of Alternative A—No Action

3.4.4.2.5.1 Direct and Indirect Effects

Alternative A would be expected to maintain the vegetative conditions on the current trajectory (section 3.2). The following discussion discloses expected changes in source habitat under Alternative A, Alternative A.

Source habitat quantity (**Indicator 1**) would increase into the long term as stands in the large tree size class increase over time, and the lack of disturbance allows about 600 acres of low canopy cover class to move to moderate and within preferred densities for the northern goshawk. Average patch size (**Indicator 2**) increases over the existing condition into the long term as the addition of source habitat connects patches and enlarges patch sizes, creating fewer, larger patches (Table 3-39). The current amount and distribution of source habitat patches would provide for one potential home range, which would be maintained through 2030 under Alternative A. Modeled nesting habitat would increase from 1,026 to 1,372 acres by 2030 (Table 3-39), and could potentially be enough modeled nesting habitat to possibly contribute to two potential home ranges that would likely have to go beyond the analysis area boundary. However, because there is both an active and historical nest within this relatively concentrated group of nesting habitat, likely used by the same nesting pair, the additional modeled nesting habitat would not be expected to alter the current configuration of the existing potential home range into the long term.

Snags 10–20 inches d.b.h. and ≥20 inches d.b.h. were assessed for the PVGs providing source habitat capacity. Although some recruitment and loss of snags would occur over time through natural processes, assuming no stand-replacing disturbances, snag numbers in all PVGs would increase away from open roads. Snag densities in both diameter classes and across all three source habitat PVGs would move well into or exceed the desired ranges by 2030 (Table 3-40). Increases in snags could be due to insect and disease mortality spurred by high tree densities. The increase in snag availability would provide increased nesting and forage opportunities for northern goshawk prey species.

Without disturbance processes, increases in tree size and canopy cover would increase in northern goshawk source habitat in the foreseeable future. As canopy cover increases within PVGs 5 and 6, habitat types more stands would move towards the high canopy cover class to provide additional nesting habitat. Within PVG 2, maturing stands would also increase canopy cover and move further away from the HRV and would maintain the abundance of source habitat within the analysis area.

Total road densities (**Indicator 3**) would remain within the high classification (>1.7 mi/mi^2) and would continue to degrade habitat through access for removal of snags for firewood (Table 3-39).

3.4.4.2.5.2 Cumulative Effects

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the three indicators used for this species analysis and therefore are included in the affected environment discussion (section 3.4.5.2.2.).

Past timber management within PVG 6 likely negatively affected nesting habitat by reducing total canopy cover below the 60 percent threshold for nesting habitat and by reducing medium to large diameter trees that could serve as nesting structures. Fire suppression, however, would have increased overall stand densities within PVG 6 stands, improving this component of nesting habitat. Fire suppression within PVG 2 would have also resulted in denser stands, moving these stands outside of HRV, which is the only time PVG 2 stands provide source habitat for the northern goshawk. The changes made to source habitat by past management activities have likely contributed to an overall increase in source habitat (**Indicator 1**) and patch size (**Indicator 2**) within the analysis area, especially in the form of PVG 2 stands that are departed from HRV (or near the high end of the historic range) and contributing to source habitat (forage) and the lack of natural disturbances within stands in PVGs 5 and 6 that would have periodically reduced tree densities and created openings. Alternative A would maintain the current vegetative trend developed through past timber management and fire suppression, incrementally adding to increasing northern goshawk habitat.

High total road densities (**Indicator 3**) can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This can affect the recruitment and retention of snags >10 inches d.b.h., which provide forage and nesting structure for prey species. Alternative A would not add cumulatively to this condition.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering. These activities may cause disturbance to individuals, modify understory vegetation important to prey species or contribute to loss of snags (nest structure) Alternative A does not propose any activities therefore there would be no cumulative effects from Alternative A together with ongoing activities.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

The Scriver Creek Trail and Scriver Creek Snowmobile Bridge projects would not modify source habitat such that it longer would be suitable. This is because the limited tree felling along the trail would not change overall stand characteristics and because much of the new trail and bridge construction would occur within existing road or trail corridors. Alternative A does not propose any activities therefore there would be no cumulative effects from Alternative A together with reasonably foreseeable activities.

Alternative A Effect Conclusion

Without disturbance from natural processes or management actions, tree size class would continue to increase and tree canopy cover conditions would move toward a moderate or high cover class; more source habitat would develop.

The pair of northern goshawks occupying the Project area would not be disturbed by activities beyond the ongoing activities described.

3.4.4.2.6 Environmental Consequences of Alternatives B, C, and D

3.4.4.2.6.1 Direct and Indirect Effects

Alternatives B, C, and D may impact northern goshawk individuals or habitat but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. All design features discussed in this section would be applied to all three action alternatives unless otherwise specified. The following discussion discloses expected impacts to northern goshawk individuals and source habitat under Alternatives B, C, and D**.**

To address the active nest that was found in June 2012, Design Feature WL-2 was developed to avoid disruption of nesting activities (section 2.4.2.1). The design feature would provide for a 1,500-foot buffer around the active nest where no commercial harvest, noncommercial thinning, or roadwork activities would occur from March 1 through August 15, developed from recommendations found in Jones (1979). Because northern goshawks commonly move to alternate nest sites within a territory, the design feature requires that the nest site location would be re-identified on an annual basis. In addition, Design Feature WL-1 has been included to provide for protection of any other active northern goshawk nest sites discovered during implementation (section 2.4.2.1). The design feature would prohibit the removal of known [active] nest trees and would prevent or minimize disturbance at active nest sites, thereby, reducing impacts to breeding birds and reproduction.

To address the condition of source habitat around the nest site, Design Feature WL-2 also restricts vegetation management within a 650-foot radius of the nest tree, which would retain the closed canopy conditions around the nest tree that currently provides concealment and hiding cover from potential predators for the nest site. This design feature would apply to all three action alternatives.

Alternative B

Under Alternative B, total source habitat (**Indicator 1**), which includes both nesting and forage habitat, would decrease by about 1,554 acres immediately following implementation, and would be 814 acres less than what would have occurred under Alternative A by year 2030 (Table 3-39). The decrease stems from reductions in canopy cover that move stands from moderate or high to below the 60 percent threshold for nesting habitat or the 40 percent threshold for forage habitat, and do not recover by 2030. The abundance and distribution of nesting habitat is the most limiting factor in the persistence of a home range within the analysis area, as forage habitat remains very abundant throughout the modeling period. Modeled nesting habitat is reduced from 1,026 acres before to 813 acres immediately following implementation, a reduction of 213 acres (Table 3-39).

The existing potential home range would be expected to remain a functioning home range following the reduction of modeled nesting habitat. Within the home range itself there are 787 acres of existing nesting habitat, which increases to 1,068 acres by 2030 under Alternative A. Implementing Alternative B would initially reduce nesting habitat to 634 acres following harvest, and would recover to about 928 acres by 2030. As a result, there would be enough nesting habitat remaining in the temporary, short and long term for the potential home range to be sustained through the modeling period.

Within the home range a 666-acre PFA was delineated, which includes the existing nest stand, three alternate nest stands and two replacement nest stands (Figure 3-29). Each of these stands is represented by a 30-acre circle drawn within modeled nesting habitat within the PFA. Harvest would not occur within the active nest stand as a result of Design Feature WL-2. Four of the alternate/replacement stands would also not have harvest within them. The remaining one would have portions modified by harvest but would still retain sufficient large tree density and canopy cover to remain nesting habitat following Alternative B.

Within the 666-acre PFA there would be approximately 217 acres treated. Desired conditions within the PFA outside of the alternate and replacement stands include providing a mosaic of vegetation structural stages with approximately 60 percent of the PFA in medium and large tree size classes above 60 percent canopy cover (Reynolds et al. 1992). The remaining 40 percent of the PFA would be in smaller tree size classes or openings. The intent of the PFA is to retain sufficient concealment and structural diversity for forage for fledging young around the nest stands. Following harvest under Alternative B, 87 percent of the PFA would remain above 60 percent canopy cover, and, therefore, would meet the PFA desired conditions. The entire PFA would remain in the moderate or large tree size class. As a result, the alternate/replacement nest stands and the PFA would retain preferred stand characteristics following Alternative B such that they would continue to provide the core nesting and PFA habitat necessary for the potential home range to persist into the long term.

Alternative C

Under Alternative C, total source habitat (**Indicator 1**), which includes both nesting and forage habitat, would decrease by about 1,564 acres immediately following implementation, and would be 807 acres less than what would have occurred under Alternative A by year 2030 (Table 3-39). The decrease stems from reductions in canopy cover that move stands from moderate or high to below the 60 percent threshold for nesting habitat or the 40 percent threshold for forage habitat, and do not recover by 2030. The abundance and distribution of nesting habitat is the most limiting factor in the persistence of a home range within the analysis area, as forage habitat remains very abundant throughout the modeling period. Modeled nesting habitat is reduced from 1,026 acres before to 788 acres immediately following implementation, a reduction of 238 acres (Table 3-39).

The existing potential home range would be expected to remain a functioning home range following the reduction of modeled nesting habitat. Within the home range itself there are 787 acres of existing nesting habitat, which increases to 1,068 acres by 2030 under Alternative A. Implementing Alternative C would initially reduce nesting habitat to 609 acres following harvest, and would recover to about 928 acres by 2030. As a result, there would be enough nesting habitat remaining in the temporary, short and long term for the potential home range to be sustained through the modeling period.

Within the home range a 666-acre PFA was delineated, which includes the existing nest stand, three alternate nest stands and two replacement nest stands (Figure 3-30). Each of these stands is represented by a 30-acre circle drawn within modeled nesting habitat within the PFA. Harvest would not occur within the active nest stand as a result of Design Feature WL-2. Four of the alternate/replacement stands would also not have harvest within them. The remaining one would have portions modified by harvest, but would still retain sufficient large tree density and canopy cover to remain nesting habitat following Alternative C.

Within the 666-acre PFA there would be approximately 249 acres treated. Desired conditions within the PFA outside of the alternate and replacement stands include providing a mosaic of vegetation structural stages with approximately 60 percent of the PFA in medium and large tree size classes above 60 percent canopy cover (Reynolds et al. 1992). The remaining 40 percent of the PFA would be in smaller tree size classes or openings. The intent of the PFA is to retain sufficient concealment and structural diversity for forage for fledging young around the nest stands. Following harvest under Alternative C, 86 percent of the PFA would remain above 60 percent canopy cover, and, therefore, would meet the PFA desired conditions. The entire PFA would remain in the moderate or large tree size class. As a result, the alternate/replacement nest stands and the PFA would retain preferred stand characteristics following Alternative C such that they would continue to provide the core nesting and PFA habitat necessary for the potential home range to persist into the long term.

Alternative D

Under Alternative D, total source habitat (**Indicator 1**), which includes both nesting and forage habitat, would decrease by about 1,299 acres immediately following implementation, and would be 772 acres less than what would have occurred under Alternative A by year 2030 (Table 3-39). The decrease stems from reductions in canopy cover that move stands from moderate or high to below the 60 percent threshold for nesting habitat or the 40 percent threshold for forage habitat and do not recover by 2030. The abundance and distribution of nesting habitat is the most limiting factor in the persistence of a home range within the analysis area, as forage habitat remains very abundant throughout the modeling period. Modeled nesting habitat is reduced from 1,026 acres before to 878 acres immediately following implementation, a reduction of 148 acres (Table 3-39).

The existing potential home range would be expected to remain a functioning home range following the reduction of modeled nesting habitat. Within the home range itself there are 787 acres of existing nesting habitat, which increases to 1,068 acres by 2030 under Alternative A. Implementing Alternative D would initially reduce nesting habitat to 700 acres following harvest, and would recover to about 980 acres by 2030. As a result, there would be enough nesting habitat remaining in the temporary, short and long term for the potential home range to be sustained through the modeling period.

Within the home range a 666-acre PFA was delineated, which includes the existing nest stand, three alternate nest stands and two replacement nest stands (Figure 3-31). Each of these stands is represented by a 30-acre circle drawn within modeled nesting habitat within the PFA. Harvest would not occur within the active nest stand as a result of Design Feature WL-2. Four of the alternate/replacement stands would also not have harvest within them. The remaining one would have portions modified by harvest, but would still retain sufficient large tree density and canopy cover to remain nesting habitat following Alternative D.

Within the 666-acre PFA there would be approximately 249 acres treated. Desired conditions within the PFA outside of the alternate and replacement stands include providing a mosaic of vegetation structural stages with approximately 60 percent of the PFA in medium and large tree size classes above 60 percent canopy cover (Reynolds et al. 1992). The remaining 40 percent of the PFA would be in smaller tree size classes or openings. The intent of the PFA is to retain sufficient concealment and structural diversity for forage for fledging young around the nest stands. Following harvest under Alternative D, 88 percent of the PFA would remain above 60 percent canopy cover, and, therefore, would meet the PFA desired conditions. The entire PFA would remain in the moderate or large tree size class. As a result, the alternate/replacement nest stands and the PFA would retain preferred stand characteristics following Alternative D such that they would continue to provide the core nesting and PFA habitat necessary for the potential home range to persist into the long term.

Source habitat within PVG 2 habitat types, which uncharacteristically comprise a large portion of existing northern goshawk source habitat (all forage), greatly decreases after treatments as more stands are moved back into the HRV. Of the 1,482 acres within PVG 2 in the analysis area, 89 percent of those acres provide existing source habitat (forage) for the northern goshawk. By 2030, the percent increased to 93 percent as stand density increased under Alternative A. Under Alternative B, the percent of PVG 2 acres providing northern goshawk source habitat went from the existing 89 percent to 35 percent immediately following harvest and from 93 percent under Alternative A in 2030 back up to 63 percent as some PVG 2 stands filled back in over time. Under Alternatives C and D, the percent of PVG 2 acres providing northern goshawk source habitat went from the existing 89 percent to 37 percent immediately following harvest and from 93 percent under Alternative A in 2030 back up to 63 percent as some PVG 2 stands filled back in over time.

Patch size and distribution (**Indicator 2**) would decrease under all action alternatives compared to the existing condition as source habitat is fragmented by harvest activities. Alternative B maintains the largest average patch size throughout the modeling period (Table 3-39). However, as discussed above, all three action alternatives would retain sufficient source habitat abundance, patch size and connectivity to maintain the single potential home range within the analysis area.

Total road densities (**Indicator 3**) are another Indicator of habitat quality. Alternatives B, C, and D would reduce total road densities within northern goshawk source habitat for the temporary and long term timeframes, compared to Alternative A, with the largest reduction occurring under Alternative D into the long term (Table 3-39). While total road densities following implementation remain higher than desired (Table 3-39) and would still represent a risk of degradation of habitat from potential loss of snags, the overall risk would be lower than current conditions. The decrease in total road density would improve the quality of source habitat through reduced disturbance and reduced loss of snags within road corridors.

Snags >10 inches in d.b.h. would be maintained very close to existing levels, which are currently within or above desired ranges, across all PVGs immediately following harvest under all three action alternatives (Table 3-40). In addition, snag densities would remain within desired ranges throughout the 20-year modeling period under all three action alternatives. While densities under the action alternatives would be somewhat lower across all PVGs than what would be expected under Alternative A, they would still be well within desired ranges through 2030. In addition, Design Features WL-3, WL-6, TH-6 and TH-9 (section 2.4.2.1) would minimize the impacts to existing snags and would provide for future recruitment and retention of all snags >10 inches d.b.h. Snags would not be felled unless they pose a safety hazard under timber sale OSHA requirements. Live trees with evidence of cavities, damage, and rot, would be retained throughout the treatment areas to provide for future recruitment of snags. Design Feature WL-6 would retain up to three large snags per acre within a 600 foot corridor along the relocated segment of NFS road 696 to offset potential losses from fuelwood gathering along this new stretch of roadway. While the loss of snags cannot be totally avoided due to OSHA safety requirements and uncertainties associated with broadcast burning in PVG 2, snag numbers would be maintained within or above existing densities in the long term (Table 3-40).

Design Features TH-5 and TH-6 would retain any old forest habitat, retain or promote development of components of old forest in managed large- or medium-sized stands, and would retain all large stands in the large tree size class. These design features would conserve important habitat elements for the northern goshawk, such as large diameter trees for nesting and large snags for prey species.

Proposed activities associated with this alternative are not expected to introduce noxious weeds into the analysis area. Although open roads would increase by 3.8 miles, project design features were developed to mitigate any potential impacts from the increase in roads. Design Feature NX-1 associated with this alternative requires the cleaning of all off-road equipment potentially carrying noxious weed seeds prior to moving into the analysis area. Design Features NX-2 through NX-4 also provide direction for the use of weed-free sources of aggregate, straw, and seed mixtures for this project This alternative may however contribute to distribution of noxious weeds already present. Existing noxious weed populations would be continued through the Forest’s noxious weed program.

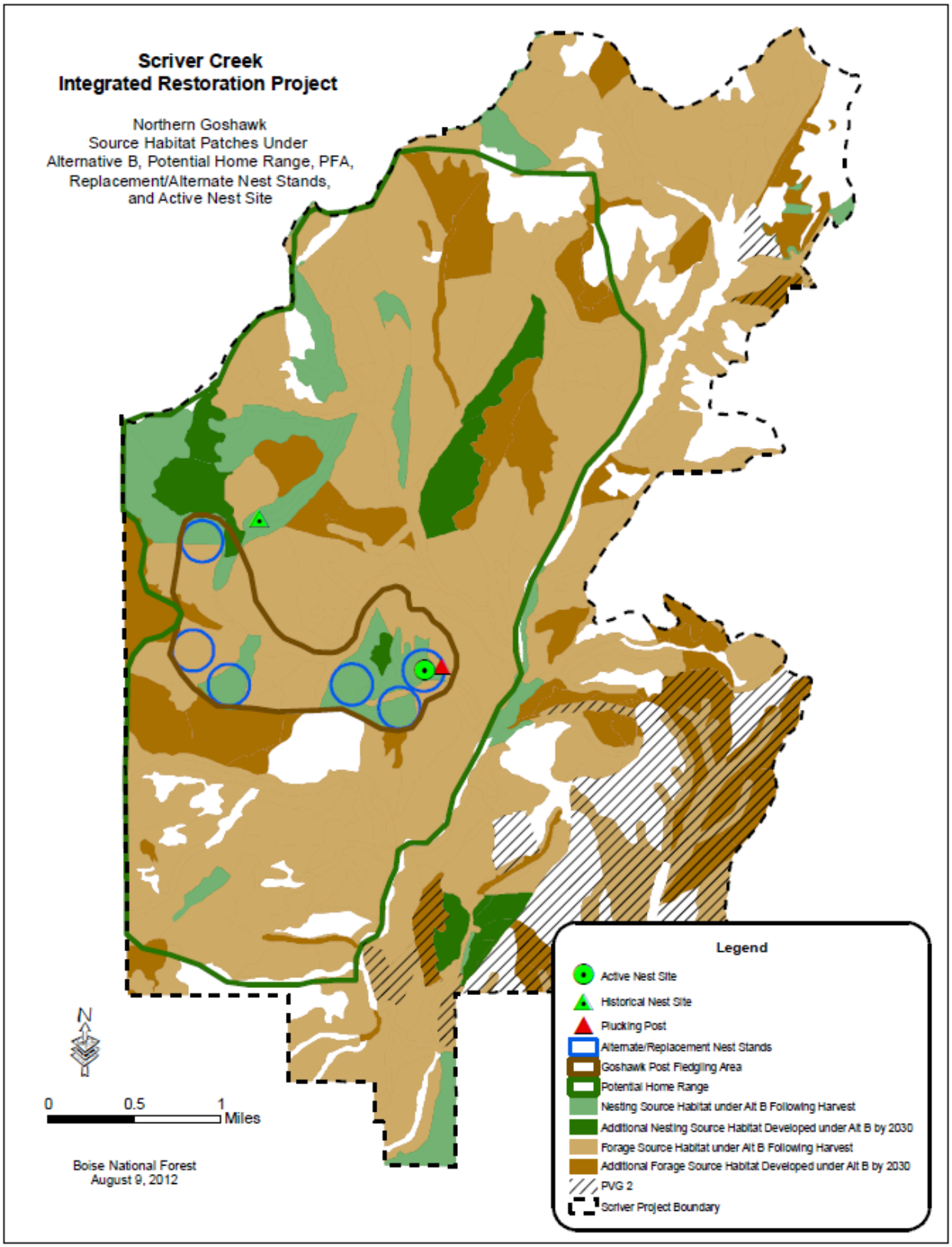

Figure 3-29. Northern Goshawk Source Habitat Under Alternative B and Potential Home Range

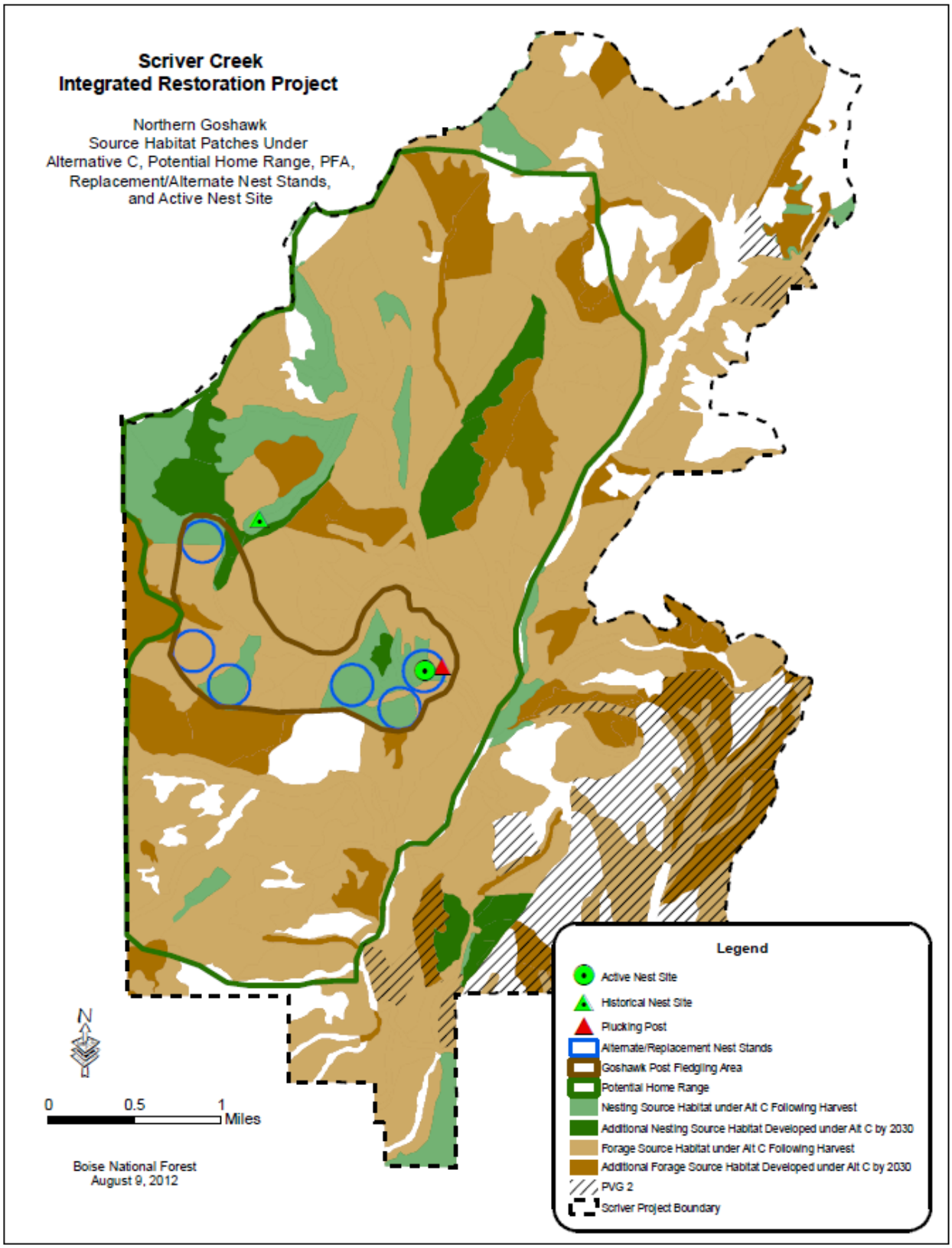

Figure 3-30. Northern Goshawk Source Habitat Under Alternative C and Potential Home Range

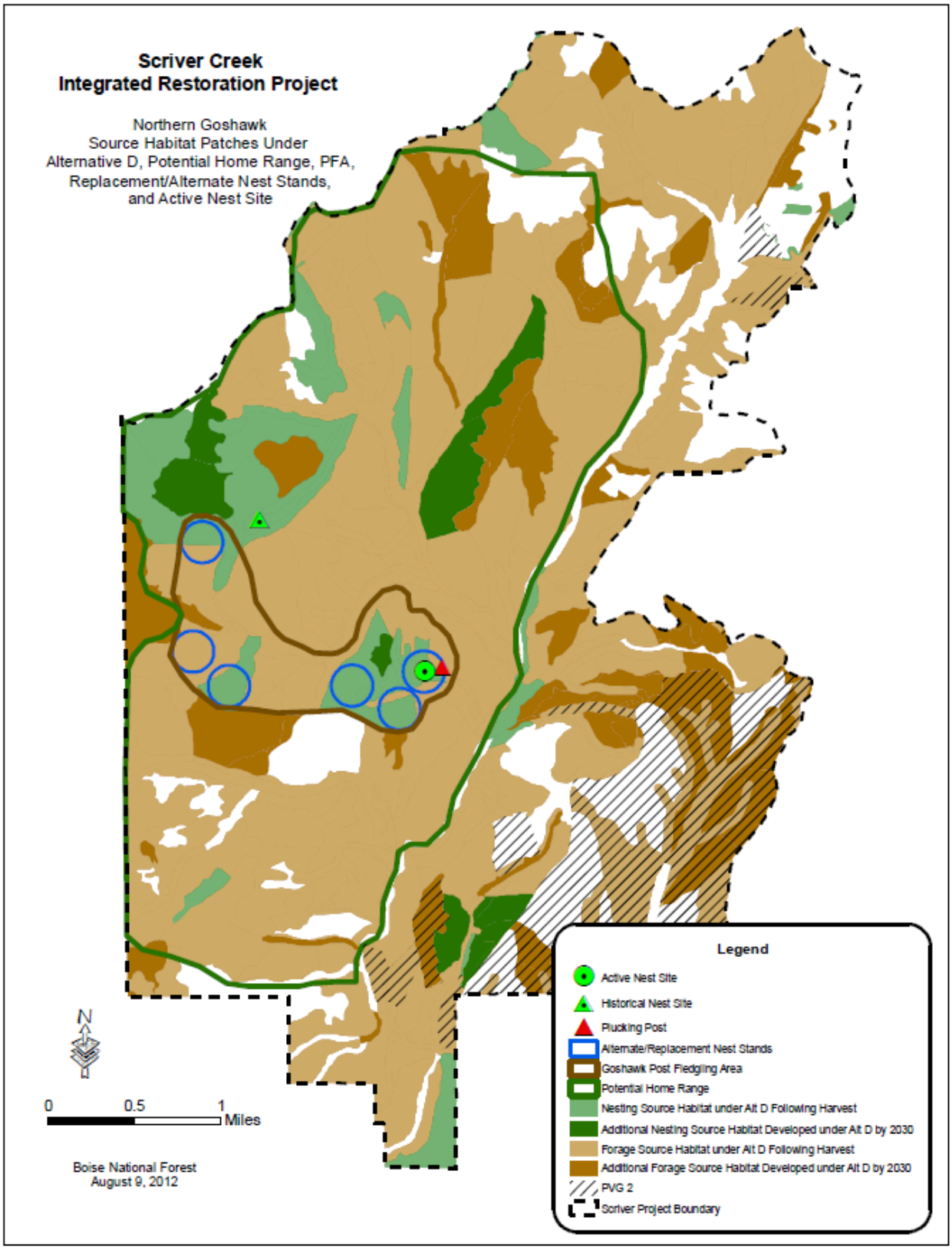

Figure 3-31. Northern Goshawk Source Habitat Under Alternative D and Potential Home Range

3.4.4.2.7 Cumulative Effects (Alternatives B, C, and D)

Because Alternatives B, C, and D would have similar impacts on the northern goshawk and its habitat, and would have the same cumulative impact area, the following cumulative impact discussion is common for all three action alternatives.

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the three indicators used for the northern goshawk analysis and therefore are included in the affected environment discussion (section 3.4.5.2.2.).

Past timber management within PVG 6 likely negatively affected nesting habitat by reducing total canopy cover below the 60 percent threshold for nesting habitat and by reducing medium to large diameter trees that could serve as nesting structures. Fire suppression, however, would have increased overall stand densities within PVG 6 stands, improving this component of nesting habitat. Fire suppression within PVG 2 would have also resulted in denser stands, moving these stands outside of the HRV, which is the only time PVG 2 stands provide source habitat for the northern goshawk. The changes made to source habitat by past management activities have likely contributed to an overall increase in source habitat (**Indicator 1**) and patch size (**Indicator 2**) within the analysis area, especially in the form of PVG 2 stands that are departed from the HRV (or near the high end of the historic range) and contributing to source habitat (forage) and the lack of natural disturbances within stands in PVGs 5 and 6 that would have periodically reduced tree densities and created openings. Implementing Alternatives B, C or D would incrementally begin to restore PVGs 2 and 5 habitat types to a condition more representative of vegetative communities functioning in the presence of disturbance and thus would not cumulatively add to the trend of increasing northern goshawk habitat in these departed vegetation communities.

High total road densities (**Indicator 3**) can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This can affect the recruitment and retention of snags over 10 inches d.b.h., which provide forage and nesting structure for prey species. Activities proposed under Alternatives B, C or D would decrease the open road density affecting northern goshawk habitat and would therefore not cumulatively add to the trend of higher road densities.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. As a result, these activities are considered part of the existing condition and at their current scope and frequency any cumulative impacts would be negligible. The noxious weed program treats infested areas and results in improved source habitat conditions. Design features under Alternatives B, C, or D are intended to avoid or minimize the spread of noxious weeds as a result of proposed activities. If noxious weeds are documented, actions would be taken to treat the infestation; therefore there would be

no cumulative effect to the spread noxious weeds. Grazing was identified as a low risk for the northern goshawk because of the potential to affect understory vegetation important to prey species (Nutt, et al. 2010). Alternatives B, C, or D provide for northern goshawk nesting and foraging habitat and therefore would not have a cumulative effect on prey habitat with grazing. Fuelwood cutting would continue to impact northern goshawk prey species' source habitat by removing snags within road corridors however vegetation management activities in Alternatives B, C or D would retain snags to meet the needs of forest species dependent on snags minimizing any cumulative effect of snag loss.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify a given stand such that it no longer would be suitable. Limited tree felling along the trail would not change overall stand characteristics because much of the new trail and bridge construction would occur within existing road or trail corridors. No cumulative effects would occur.

3.4.4.2.8 Determination of Effect

Alternative B, C or D **may impact** individuals or habitat but is not likely to cause a trend toward federal listing or loss of viability for northern goshawk.

3.4.4.2.8.1 Rationale

- Source habitat would decrease in the temporary and short term and increase in the long term due to an increasing density of canopy cover.
- Northern goshawks are present in the Scriver Creek Project area.
- Proposed management activities would affect the current nest stand and foraging habitat.
- Design Features WL-2 and WL-1 are included to minimize or avoid disruption of reproductive success and to protect active nest trees.

3.4.4.3 Pileated Woodpecker (Family 2 Focal Species, Management Indicator Species)

3.4.4.3.1 Affected Environment

Pileated woodpeckers occupy dense deciduous, coniferous, or mixed forests, open woodlands, second growth forests, and parks and wooded residential areas of towns (NatureServe 2012b). The species prefers habitats with tall closed canopies and high basal areas. General characteristics of habitat provide opportunities for nesting, roosting and foraging and include the presence of 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 populations to forage upon (NatureServe 2012b). Source habitats for pileated woodpeckers are typically late-seral stages of subalpine and montane community types.

On the Forest, vegetative communities that could provide source habitat conditions include PVGs 2, 3, 5, 6, 8, and 9 in the large tree size classes and moderate and high canopy cover class (Nutt et al. 2010). Some PVGs are capable of providing source habitat conditions under historical fire regimes while others do so because of altered fire regimes (i.e., PVGs 2 and 5). Special habitat features for pileated woodpecker include large diameter (>21 inches d.b.h.) snags and hollow live trees for nesting and roosting, and large standing dead and downed trees for foraging.

Pileated woodpecker is a Forest Plan management Indicator species (Forest Service 2010a, Appendix E). The species was included in this analysis to facilitate Forest Plan monitoring of management Indicator species. In addition, the species serves a variety of functional roles within the community and is associated with habitat elements used by other species in the family.

3.4.4.3.2 Current Conditions

Source habitat in the watershed has increased by nearly 53 percent for the pileated woodpecker (Nutt et al. 2010). The abundance of pileated source habitat within the watershed is likely a result of large portions of PVG 2 and 5 habitat types being outside HRV, likely caused by fire suppression activities that allowed higher tree densities and favored shade tolerant species to develop within the stands.

The analysis area's large amount of PVG 6 within the mixed1 fire regime would suggest that this portion of the watershed would have historically provided the majority of source habitat for pileated woodpeckers within the watershed, as habitat types in the south half of the watershed are predominantly PVG 2 and would have provided source habitat only when outside HRV.

Approximately 39 percent of source habitat capacity is susceptible to noxious weeds. Road densities are also impacting source habitat quality as total road densities are within the high classification (>1.7 mi/mi^2). Higher road densities increase the risk of the loss of snags to fuelwood collection over time. A portion of source habitat is suitable for range; 8,300 acres of the 46,800-acre Middle Fork South S&G Allotment occurs within the Project area.

The analysis area for the pileated woodpecker consists of the Project area in its entirety and in addition 643 acres outside the Project area that represent portions of two reconfigured home ranges delineated to replace the home ranges eliminated by Alternatives B, C, and D. This 12,153-acre analysis area will be used to assess impacts to the amount, distribution, and quality of source habitat for this species.

An MIS monitoring transect (West Fork Scriver Creek) with ten point counts occurs within the analysis area along the West Fork of Scriver Creek in the northern portion of the analysis area (Figure 3-32). Pileated woodpeckers have been detected along this route during MIS monitoring surveys in 2005, 2006, 2007, 2008, and 2009 (MIS Monitoring). No other observations have been documented within the analysis area (IFWIS 2011, NRIS 2011).

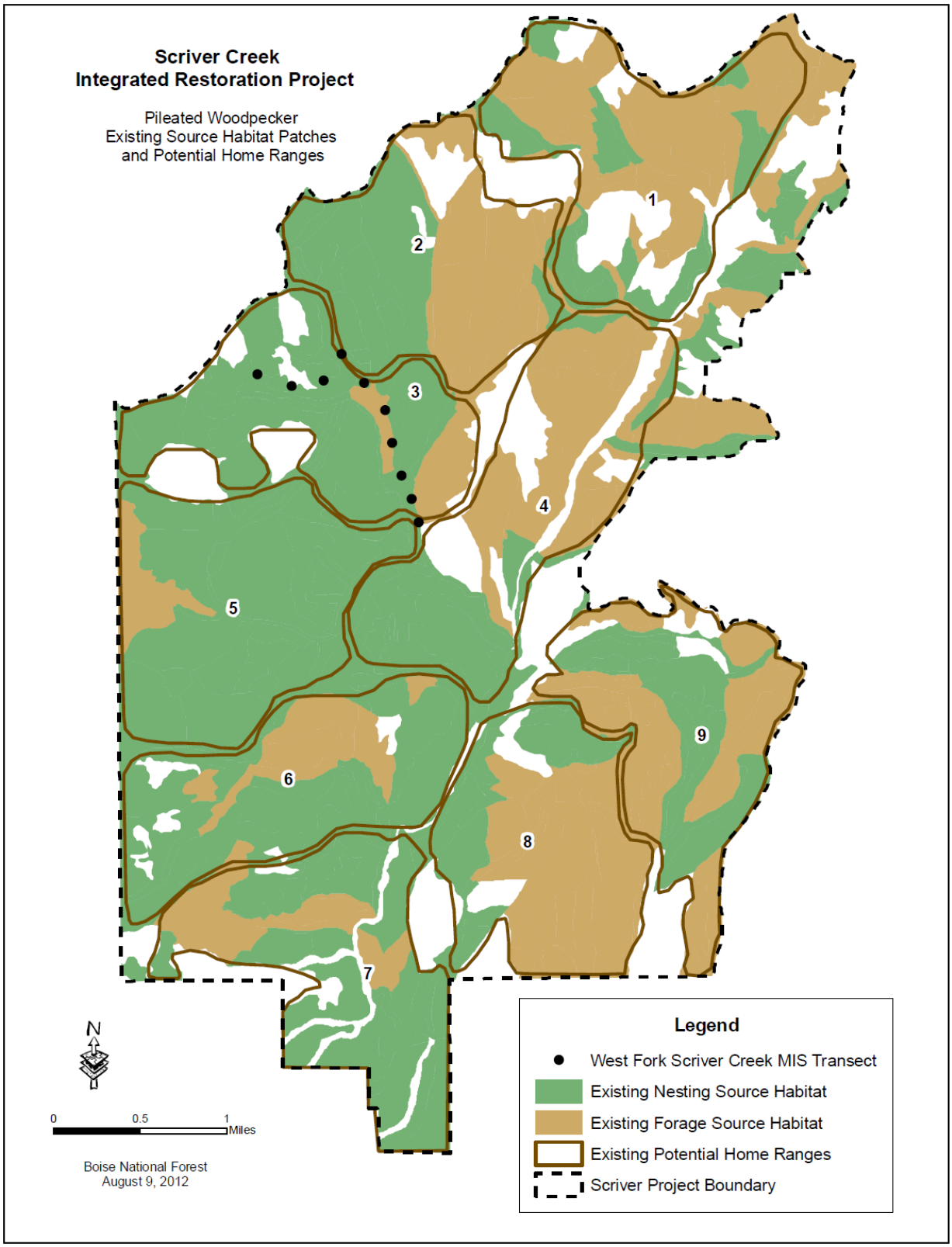

Figure 3-32. Pileated Woodpecker Existing Source Habitat and Potential Home Ranges

The PVGs capable of developing source habitat historically for the pileated woodpecker present in the analysis area are PVGs 6, 8, and 9. Typically PVG 5 only provides source habitat when outside of the HRV. However, because stands in PVG 5 in the Project area were very similar to PVG 6 stands, the few stands in PVG 5 were lumped with PVG 6 in the mixed1 fire regime. As a result, for the purposes of this analysis, PVG 5 is considered capable of developing source habitat. PVGs 5, 6, 8, and 9 represent approximately 9,988 acres or 87 percent of the 11,510-acre Project area (Figure 3-32). PVG 6 is the dominant PVG within the Project area; PVGs 8 and 9 are incidental as they combine for only 68 acres. The pileated woodpecker can also take advantage of PVG 2 when conditions are outside HRV. PVG 2 comprises 1,482 acres or 13 percent of the Project area. Source habitat capacity is well distributed and interconnected throughout the analysis area with the potential to build upon remnant source habitat patches and improve interconnectedness (Figure 3-32).

There are 9,602 acres of existing modeled source habitat, which equates to approximately 96 percent of source habitat capacity within the analysis area (Figure 3-32). Of the existing modeled source habitat, 5,695 acres are nesting habitat and 3,907 acres are forage habitat (Figure 3-32). Similar to source habitat conditions in the watershed, there is a greater amount of source habitat within the analysis area than would be expected due to PVG 2 habitat types in the southeastern corner being outside HRV with regard to canopy cover. Patches of nesting habitat are somewhat concentrated on the west half of the analysis area, while modeled forage habitat is well distributed and connected. Patch size is good and comparable to historical conditions within the mixed1 fire regime. The current amount and distribution of source habitat would provide for nine potential home ranges, all contained within the analysis area boundary (Figure 3-32). Because nesting habitat is typically the most limiting factor when forming home ranges, the potential home ranges were delineated based on the distribution of modeled nesting habitat, and a portion of modeled forage habitat was not used due to the lack of nesting habitat on the east side of the analysis area. In addition to modeled source habitat, the home ranges were drawn to emulate natural home ranges that would follow landscape features (e.g., ridges and drainage bottoms) versus a simple area delineation not tied to an ecological boundary. While there may be many different ways these potential home ranges could be configured, the existing home range boundaries made sense both ecologically and spatially given the numerous data sets used to define them.

Approximately 86 percent (9,921 acres) of the 11,510-acre Project area is comprised of PVG 5 and 6 vegetation groups, which provide source habitat for the pileated woodpecker where stands contain large tree sizes with moderate and high canopy cover (high canopy cover is not within the HRV). These habitat types fall within the mixed1 fire regime, which historically experienced fire intervals of 5 to 70 years and were primarily homogeneous with small patches between 1 and 600 acres of different seral stages, densities, and compositions (Forest Service 2010a, Appendix A). Currently, most stands are within the large tree size class and have moderate or high canopy cover, which is why such a large amount of source habitat was modeled.

Approximately 13 percent (1,482 acres) of the Project area is comprised of PVG 2. Under historic nonlethal fire regimes, forests in PVG 2 would have been dominated by stands of large ponderosa pine with open canopies. These conditions were maintained over time by frequent low intensity fire (Forest Service 2010a, Appendix A). Stands within this PVG only provide source habitat for the pileated woodpecker when outside the HRV (i.e., when stands in the large tree size class have moderate to high canopy cover). The lack of disturbances, primarily low intensity

fire, has allowed shade-tolerant species to increase stand densities and canopy cover such that most stands are no longer within the HRV. Within the analysis area, 87 percent (1,283 acres) of the total available PVG 2 (1,482 acres) currently provide source habitat because stands are generally outside the HRV. At present, only 21 percent (305 acres) of the total area within PVG 2 (1,482 acres) is within the low canopy cover class (HRV), an amount well below what would be expected under the HRV.

Similar to the northern goshawk, past timber management within PVG 6 likely negatively affected nesting habitat by reducing total canopy cover below the 60 percent threshold and by reducing medium-to-large diameter trees that could serve as nesting and forage structures. Fire suppression, however, would have increased overall stand densities within PVG 6 stands, improving this component of nesting habitat. Fire suppression within PVG 2 would have also resulted in denser stands, moving these stands outside of the HRV, which is the only time PVG 2 stands provide source habitat for the pileated woodpecker. The changes made to source habitat by past management activities have likely contributed to an overall increase in source habitat and patch size within the analysis area, especially in the form of PVG 2 stands that are uncharacteristically dense and now contributing to source habitat as forage habitat. Nesting habitat still remains limited on the east side of the analysis area as stands in PVG 6 in that area are generally lacking sufficient large tree ***and*** high canopy cover densities. The large amount of PVG 2 departed from HRV (or near the high end of the historic range) and contributing to source habitat (forage) also speaks to this overall increase in source habitat.

Source habitat quality can be described in terms of large snag abundance, CWD abundance and road density. Snags provide nesting and forage structure while CWD provides forage opportunities for pileated woodpeckers. Road density can be used to define a variety of risks to the species and habitat.

Total road density is 3.75 mi/mi^2 within pileated source habitat and in the high classification (>1.7 mi/mi^2) (Table 3-41). High road densities can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This can affect the recruitment and retention of large diameter snags and large diameter CWD, as well as other components of source habitat, such as live, large diameter trees. Roads further facilitate access for fuelwood cutters; increasing the potential for the loss of snags and down logs.

The abundance of 10–20 inch d.b.h. snags and large snags were assessed for the analysis area (Table 3-42). Snag densities for the 10–20 inch class are slightly above the desired range across all PVGs that provide source habitat. Large snag densities in PVG 2 (nonlethal) and PVGs 5 and 6 (mixed1) are within desired ranges (Table 3-42). While existing snag densities in both size classes are either within or above desired ranges, snag densities in general have likely been affected to some degree by past management actions, such as timber harvest, road construction and use, fuelwood programs, and fire suppression. Roads continue to facilitate loss of snags by providing access to fuelwood.

Table 3-41. Summary of Habitat Condition Indicators for Pileated Woodpecker by Alternative and Timeframe

Indicator	Reference Condition	EC[a]	Alternative A		Alternative B			Alternative C			Alternative D		
		2010	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]	2011	2030	Trend[b]
Source Habitat Quantity (acres)	SHC in the analysis area is 9,988 acres; 9,602 acres (96%) provides source habitat. After Alt B in 2030, there is more source habitat than SHC due to PVG 2 stands being outside HRV[c].	9,602	10,594	↑	9,043	10,342	↓	9,077	10,342	↓	9,237	10,487	↓
Modeled Nesting and PFA Habitat Quantity (acres)	Bull and Jackson (1995) recommend managing for 300-acre stands of nesting habitat within home ranges	5,569	7,462	↑	4,253	5,584	↓	4,036	5,392	↓	4,208	5,619	↓
Average Patch Size (acres)	The majority of the analysis area is in PVG 5 and 6 (mixed1 fire regime), which is relatively homogenous with patches ranging from <1 to 600 acres. PVG 2 is in nonlethal fire regime, which is dominated by large homogenous stands with small patches <1 acres.	1,600	10,594	↑	1,130	10,342	↓	1,513	10,342	↓	924	10,487	↓
Patch Size Range (acres)	Same as Average Patch Size	1–9,485	10,594	↑	1–9,020	10,342	↓	1–9,058	10,342	↓	1–9,218	10,487	↓
Number of Potential Home Ranges within Analysis Area	Estimated home range size is 1,006 acres (Bull and Jackson 1995)	9	9	NC	8	8	NC	8	8	NC	8	8	NC
Total Road Density in Source Habitat (mi/mi^2)	Low Risk (desired condition) : <0.7 mi/mi^2 Moderate Risk: 0.7 to 1.7 mi/mi^2 High Risk: ≥1.7 mi/mi^2	3.75	3.98	↑	3.17	3.39	↓	2.91	3.13	↓	2.77	3.02	↓

Note: NC = No Change, NA = Not Applicable because there is only one patch, SHC = Source Habitat Capacity
[a]EC = Existing Condition
[b] Overall trend compared to existing
[c] = Source Habitat Capacity does not include those PVGs that provide source habitat only when outside HRV

Table 3-42. Snag Densities for Pileated Woodpecker Source Habitat Capacity Relative to Desired Range by PVG, Alternative and Year.

Snag Size	PVG and Fire Regime	Desired Range	EC	Alternative A	Alternative B		Alternative C		Alternative D	
			2010	2030	2011	2030	2011	2030	2011	2030
Snags (10–20 inch d.b.h.) Densities per Acre Relative to Desired Range	PVG 2 (Nonlethal)	1.8-2.7	2.76	14.72	2.85	4.39	2.85	4.39	2.84	4.30
	PVGs 5 and 6 (Mixed1)	1.8-5.5	5.65	13.16	5.26	4.99	5.78	4.92	5.75	4.76
Large Snag (≥20 inch d.b.h.) Densities per Acre Relative to Desired Range	PVG 2 (Nonlethal)	0.4-3.0	0.54	2.00	0.56	1.27	0.56	1.27	0.57	1.32
	PVGs 5 and 6 (Mixed1)	0.2-3.5	1.90	4.03	1.66	2.34	1.99	2.59	2.01	3.01

CWD was assessed by PVG for the analysis area (section 3.2.8). Total CWD for all PVGs is within desired ranges (Table 3-43) while CWD greater than 12 inches d.b.h. was below desired conditions across all PVGs, an Indicator that this important component of forage habitat is lacking within most stands. CWD volume has likely been affected by activities that impact snag densities, such as timber harvest, road construction and use, fuelwood programs, and fire suppression. Roads continue to facilitate loss of snags/CWD by providing access to fuelwood.

Species-specific concerns within the analysis area were identified based on the current condition described above: 1) reduction in source habitat abundance and patch size; 2) fragmentation of source habitat and reduced connectivity between patches; 3) reduction of ponderosa pine and increase of less fire resistant, more shade tolerant species (altered forest structure and fire effects); and 4) disruption of natural disturbance regimes that maintain source habitat over time. To address these concerns, three indicators were used to quantitatively assess the effects of the alternatives on the pileated woodpecker; 1) source habitat quantity, 2) patch size and range, 3) road density. These indicators are described in further detail in section 3.4.5.1.3 below.

Table 3-43. Coarse Woody Debris Densities for Pileated Woodpecker Source Habitat Capacity Relative to Desired Range by Potential Vegetation Group (PVG), Alternative, and Year

CWD Size	PVG and Fire Regime	Desired Range	EC	Alternative A	Alternative B		Alternative C		Alternative D	
			2010	2030	2011	2030	2011	2030	2011	2030
CWD >3 inch d.b.h. Densities in Tons per Acre Relative to Desired Range	PVG 2 (Nonlethal)	4–14	4.09	4.78	4.16	4.36	4.16	4.36	4.18	4.37
	PVGs 5 and 6 (Mixed1)	4–14	9.23	8.88	8.48	7.80	9.34	8.57	9.10	8.62
CWD >12 inch d.b.h. Densities in Tons per Acre Relative to Desired Range	PVG 2 (Nonlethal)	3–10.5	0.01	0.23	0.01	0.15	0.01	0.15	0.01	0.15
	PVGs 5 and 6 (Mixed1)	2.6–9.1	0.03	0.55	0.40	0.40	0.04	0.44	0.04	0.46

3.4.4.3.3 Habitat Indicators for Pileated Woodpecker Analysis

The discussion of the effects to the species and its habitat by alternative is both qualitative and quantitative. Three indicators were selected to quantitatively evaluate the effects of the four alternatives on the pileated woodpecker. These indicators are referred to in the qualitative analysis and are displayed in a comparison table at the end of the species discussion. These indicators were selected to specifically display trends in habitat quantity, quality, and distribution; and are directly related to concerns identified for the species in the watershed. The selected indicators are described below.

1 Source habitat quantity (acres) was selected to reflect the trends in source habitat abundance. More specifically, the quantity of nesting habitat will reflect trends in this most limiting factor of pileated woodpecker persistence within the analysis area.

2 Patch size average and range (acres) were selected to indicate whether patches are moving toward or away from those expected under the HRV as well as indicating whether they are of sufficient size to meet home range requirements for the species.

3 Total road density (mi/mi^2) in source habitat was selected as an Indicator of trends in snag and CWD abundance and fragmentation of source habitat. Road densities are also a general risk Indicator for other impacts such as altered fire regimes resulting from the introduction and spread of noxious weeds.

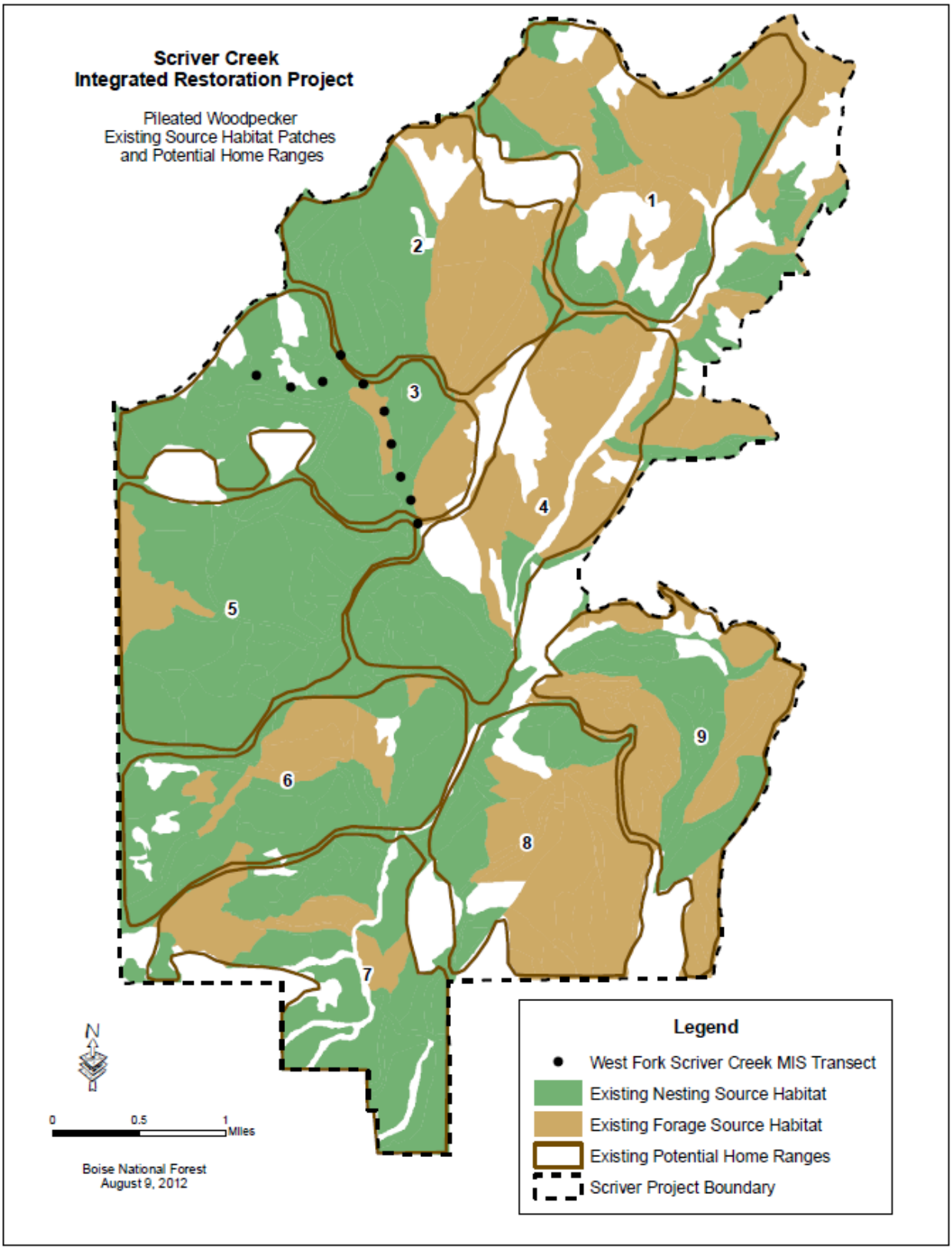

Figure 3-33. Pileated Woodpecker Existing Source Habitat and Existing Potential Home Ranges

3.4.4.3.4 Environmental Consequences Summary

Considering that there is an abundance of source habitat within the watershed, the overall effect of Alternatives B, C, and D, is that despite habitat reductions within the analysis area the overall trend for source habitat would be maintained and source habitat quantity and quality would remain abundant within the watershed.

Alternatives B, C, and D would reduce source habitat abundance (**Indicator 1**) within the analysis below what would be expected to occur under Alternative A, primarily from reductions in canopy cover that move densities under 60 percent for nesting and 30 percent for forage habitat. Nesting habitat would correspondingly decrease as well under all three alternatives. A significant portion of the reductions in forage habitat was a result of stands in PVG 2 being moved back into the HRV. While there were some losses of forage habitat within PVGs 5 and 6, most stands that fell below canopy cover requirements for nesting habitat in these PVGs shifted to forage habitat. As a result, forage habitat generally increased under all three alternatives due to reductions in nesting habitat. Of the three action alternatives, Alternative D retains the most total source habitat (nesting and forage) through the modeling period (Table 3-41).

Alternatives B, C, and D would maintain five potential home ranges with no modification, would maintain three with minor reconfiguration, and would result in the acceptable loss of one potential home range that occurred within PVG 2 habitat types. Alternative B would retain the most nesting habitat within the analysis area immediately following harvest, while Alternative D would retain the most nesting habitat into the long term.

Average patch size (**Indicator 2**) would be less than Alternative A throughout the modeling period for all action alternatives, although Alternative C would retain the largest average patch size. All three action alternatives would reduce total road densities compared to Alternative A (**Indicator 3**). Alternative D results in the largest decrease in total road density within the analysis area throughout the modeling period.

Altogether the habitat indicators show that Alternative D would retain the most source habitat within the analysis area throughout the modeling period, the most nesting habitat into the long term, and would retain the most overall nesting habitat within the potential home ranges. While all three action alternatives would retain the same amount of existing potential home ranges, the quality and quantity of source habitat within the analysis area would be maintained closest to the existing condition under Alternative D.

3.4.4.3.5 Environmental Consequences of Alternative A—No Action

3.4.4.3.5.1 Direct and Indirect Effects

Alternative A may impact pileated woodpecker individuals or habitat but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. Alternative A would be expected to maintain the vegetative conditions on the current trajectory (section 3.2). The following discussion discloses expected changes in source habitat under Alternative A, the No Action alternative.

Source habitat quantity (**Indicator 1**) would increase into the long term as stands in the large tree size class increase over time, and the lack of disturbance allows about 600 acres of low canopy cover class to move to moderate and within preferred densities for the pileated

woodpecker. Average patch size (**Indicator 2**) increases over the existing condition into the long term as the addition of source habitat connects patches and enlarges patch sizes, creating fewer, larger patches (Table 3-41). The current amount and distribution of source habitat patches would provide for approximately nine potential home ranges, which would be maintained through 2030 under Alternative A. The number of potential home ranges for pileated woodpecker in the analysis area would be expected to be maintained at the current condition despite the increase in source habitat acres (Table 3-41). Modeled nesting habitat would increase from 5,695 to 7,462 acres by 2030. However, most of the increase occurs within the existing potential home ranges and does not allow formation of additional home ranges.

Snags 10–20 inches d.b.h. and ≥20 inches d.b.h. were assessed for the PVGs providing source habitat capacity. Although some recruitment and loss of snags would occur over time through natural processes, assuming no stand-replacing disturbances, snag numbers in all PVGs would increase away from open roads. Snag densities in both diameter classes and across all three source habitat PVGs would move well into or exceed the desired ranges by 2030 (Table 3-42). Increases in snags could be due to insect and disease mortality spurred by high tree densities.

The increase in snag availability would provide increased nesting and forage opportunities for the pileated woodpecker.

CWD was also assessed for the PVGs providing source habitat capacity. Although some recruitment and loss of CWD would occur over time through natural processes, assuming no stand-replacing disturbances, CWD volumes in all PVGs would increase. CWD >3 inches d.b.h. would remain within desired ranges through 2030 for all PVGs (Table 3-43). CWD >12 inches d.b.h. would slightly increase but would remain well below desired ranges through 2030 (Table 3-43). The small increase in availability of CWD >12 inches in across all PVGs would provide correspondingly small increases in forage opportunities for the pileated woodpecker.

Without disturbance processes, tree size and canopy cover would increase pileated source habitat in the foreseeable future. As canopy cover increases within PVGs 5 and 6 habitat types, more stands would move toward the high canopy cover class to provide additional nesting habitat. Within PVG 2, maturing stands would also increase canopy cover and move further away from HRV, contributing to abundant source habitat within the analysis area.

Total road densities **(Indicator 3**) would remain in the high classification (>1.7 mi/mi^2) and would continue to degrade habitat through access for removal of snags for firewood (Table 3-41).

3.4.4.3.5.2 Cumulative Effects

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the three indicators used for this species analysis and therefore are included in the affected environment discussion (section 3.4.5.3.2.).

Past timber management within PVG 6 likely negatively affected nesting habitat by reducing total canopy cover below the 60 percent threshold for nesting habitat and by reducing medium to large diameter trees that could serve as nesting structures. Fire suppression, however, would have increased overall stand densities within PVG 6 stands, improving this component of nesting habitat. Fire suppression within PVG 2 would have also resulted in denser stands, moving these stands outside of the HRV, which is the only time PVG 2 stands provide source habitat for the pileated woodpecker. The changes made to source habitat by past management activities have likely contributed to an overall increase in source habitat (**Indicator 1**) and patch size (**Indicator 2**) within the analysis area, especially in the form of PVG 2 stands that are departed from HRV (or near the high end of the historic range) and contributing to source habitat (forage) and the lack of natural disturbances within stands in PVG 5 and 6 that would have periodically reduced tree densities and created openings.

High total road densities (**Indicator 3**) can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This can affect the recruitment and retention of snags ≥20 inches d.b.h., and large diameter CWD, which provide forage and nesting structure for this species.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. As a result, these activities are considered part of the existing condition and at their current scope and frequency any cumulative impacts would be negligible. The noxious weed program treats infested areas and results in improved source habitat conditions. Grazing was identified as a low risk for the pileated woodpecker (Nutt et al. 2010), and, therefore, no impacts are expected from this ongoing activity. Fuelwood cutting would continue to impact pileated woodpecker source habitat by removing snags and CWD within road corridors; because there are no changes to the existing access Alternative A would not reduce or add to this effect. As a result, none of the present/ongoing activities would impact any of the three indicators used to assess impacts to the pileated woodpecker (source habitat quantity, patch size, road density), although fuelwood cutting would incrementally reduce the quality of source habitat within road corridors by reducing potential nesting and forage structure.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are indentified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify a given stand such that it no longer would be suitable as the limited tree felling along the trail would not change overall stand characteristics and because much of the new trail and bridge construction would occur within existing road or trail corridors.

In summary, past management has likely contributed to an overall increase in source habitat and patch size (**Indicators 1 and 2**), mostly the result of fire suppression that allowed stand densities to increase within PVG 2 habitat types and now provide forage habitat. Past timber harvest in PVG 5 and 6 habitat types also likely played a role in reducing large diameter trees and may be why many stands do not provide both high canopy cover and adequate numbers of large trees necessary for nesting habitat. Past management also increased road densities (**Indicator 3**), which have fragmented habitat and impacted snag and CWD densities. However, none of the ongoing or future foreseeable activities within the analysis area would impact any of the three indicators used to assess impacts to this species. Considering the impacts of Alternative A, ongoing activities and that there is an abundance of source habitat within the watershed, the overall trend for source habitat would be maintained as source habitat quantity and would remain abundant within the watershed.

3.4.4.3.6 Environmental Consequences of Alternatives B, C, and D

3.4.4.3.6.1 Direct and Indirect Effects

Implementing Alternatives B, C, and D would reduce source habitat quantity and quality in the temporary and short and long term and would reduce modeled nesting habitat for pileated woodpecker below existing conditions (Table 3-41). Eight of the nine existing potential home ranges would persist through the long term, although two would have to be reconfigured to incorporate source habitat from outside the Project area (Table 3-41). Alternatives B, C, and D would reduce impacts from roads in both the temporary and long term (Table 3-41). The following discussion describes impacts to pileated woodpecker source habitat under Alternatives B, C, and D.

Pileated woodpeckers could be disturbed or displaced by proposed activities. Design Feature WL-1 has been included to provide for protection of any active nest sites discovered during implementation (section 2.2.4.1). The design feature would prohibit the removal of known [active] nest trees and would prevent or minimize disturbance at active nest sites, thereby, reducing impacts to breeding birds and reproduction.

Alternative B

Source habitat quantity (**Indicator 1**) would decrease by about 559 acres immediately following implementation and would be only 252 acres less than what would have occurred under Alternative A as densities recover by 2030 (Table 3-41). The decrease stems from reductions in canopy cover that move stands from moderate or high to below the 60 percent threshold for nesting habitat or the 30 percent threshold for forage habitat, although over half of the initial decrease following harvest recovers by 2030. The abundance and distribution of nesting habitat is the most limiting factor in the persistence of a home range within the analysis area, as forage habitat remains very abundant throughout the modeling period (Figure 3-34). Modeled nesting habitat would be reduced by 1,316 acres immediately following implementation, and would be 1,878 acres less than under Alternative A. Of note is that the reductions in nesting habitat are much greater than the overall reduction in source habitat. This is because most of the nesting habitat that fell below the 60 percent canopy cover threshold would revert to forage habitat, so the difference in the total source habitat would not necessarily reflect this.

Alternative C

Source habitat quantity (**Indicator 1**) would decrease by about 525 acres immediately following implementation, and would be only 252 acres less than what would have occurred under Alternative A as densities recover by 2030 (Table 3-41). The decrease stems from reductions in canopy cover that move stands from moderate or high to below the 60 percent threshold for nesting habitat or the 30 percent threshold for forage habitat, although over half of the initial decrease following harvest recovers by 2030. The abundance and distribution of nesting habitat is the most limiting factor in the persistence of a home range within the analysis area, as forage habitat remains very abundant throughout the modeling period (Figure 3-35). Modeled nesting habitat would be reduced by 1,533 acres immediately following implementation, and would be 2,070 acres less than under Alternative A by 2030. Similar to Alternative B, the reductions in nesting habitat are much greater than the overall reduction in source habitat because most of the nesting habitat that fell below the 60 percent canopy cover threshold would revert to forage habitat, so the difference in the total source habitat would not necessarily reflect this.

Alternative D

Source habitat quantity (**Indicator 1**) would decrease by about 365 acres immediately following implementation, and would be only 107 acres less than what would have occurred under Alternative A as densities recover by 2030 (Table 3-41). The decrease stems from reductions in canopy cover that move stands from moderate or high to below the 60 percent threshold for nesting habitat or the 30 percent threshold for forage habitat, although over half of the initial decrease following harvest recovers by 2030. The abundance and distribution of nesting habitat is the most limiting factor in the persistence of a home range within the analysis area, as forage habitat remains very abundant throughout the modeling period (Figure 3-36). Modeled nesting habitat would be reduced by 1,361 acres immediately following implementation, and would be 1,843 acres less than under Alternative A by 2030. Similar to Alternatives B and C, the reductions in nesting habitat are much greater than the overall reduction in source habitat because most of the nesting habitat that fell below the 60 percent canopy cover threshold would revert to forage habitat, so the difference in the total source habitat would not necessarily reflect this.

Because existing nesting habitat was concentrated in the western half of the analysis area, and because home range size was based on the average home range size found in the literature in habitat most similar to that found in Scriver Creek (Bull and Jackson 1995), these constraints resulted in potential home ranges in that area having very large percentages of modeled nesting habitat. Because reductions in nesting habitat were somewhat evenly distributed between the home ranges, five of the nine existing home ranges (home ranges 2, 3, 4, 5, and 6) would maintain sufficient amounts of nesting habitat under all three action alternatives without modification. Potential home range 1 could be maintained by incorporating approximately 100 acres to the north on adjacent federal lands to compensate for nesting habitat reductions. Potential home range 7 could be reconfigured at the southern end of the analysis area by roughly splitting it and combining half to the remaining portion is of home range 8, which lost most of its modeled nesting habitat, and the other half to habitat outside of the Project area to the south on federal lands. Potential home range 9 occurred almost entirely within PVG 2 habitat types. The reductions in tree densities that moved stands back into the HRV caused this home range to be eliminated. However, because moving PVG 2 stands back into the HRV is a desired outcome of this project, the loss of this

particular home range would be considered acceptable and it would not be necessary to replace it. This potential home range scenario occurred under all three action alternatives. As a result, Alternatives B, C, and D would maintain five potential home ranges with no modification, three with minor reconfiguration, and would result in the acceptable loss of one potential home range that occurred within PVG 2 habitat types.

Source habitat within PVG 2 habitat types, which uncharacteristically comprise a large portion of existing pileated woodpecker source habitat, greatly decreases after treatments as more stands are moved back into the HRV. Of the 1,482 acres within PVG 2 in the analysis area, 87 percent of those acres provide existing source habitat for the pileated woodpecker. By 2030 the percent increased to 95 percent as stand density increased under Alternative A. Under Alternative B, the percent of PVG 2 acres providing pileated source habitat went from the existing 87 percent to 70 percent immediately following harvest and from 95 percent under Alternative A in 2030 back up to 92 percent as many PVG 2 stands moved above 30 percent canopy cover preferred by pileated woodpeckers. Under Alternatives C and D, the percent of PVG 2 acres providing northern goshawk source habitat went from the existing 87 percent to 70 percent immediately following harvest and from 95 percent under Alternative A in 2030 back up to 92 percent for the same reasons mentioned for Alternative B.

Average patch size and patch size range (**Indicator 2**) decreases in the short and long term under all action alternatives when compared to the existing condition and No Action alternative as harvest fragments current source habitat patches. Alternative C maintains the largest average patch size immediately following implementation, while Alternative D maintains the largest average patch size in the long term (Table 3-41). However, as discussed above, all three action alternatives would retain sufficient source habitat abundance, patch size and connectivity to maintain the single potential home range within the analysis area.

As discussed above, two reconfigured potential home ranges incorporated source habitat outside of the Project area to replace habitat lost under Alternatives B, C, and D, all occurring on federally managed lands. The intent of delineating potential home ranges before and after implementing an alternative is to show how far outside the Project area impacts could extend based on the habitat needs and source habitat availability in adjacent areas. While it is unknown if the replacement source habitat is occupied or not, the home range delineated outside of the Project area shows that a nesting pair would not have to go far to find additional source habitat within the watershed. Finding alternative source habitat so close to the Project area is indicative of the overall condition of the watershed, where source habitat for this species is in excess. Even though Alternatives B, C, and D resulted in the loss of one home range within PVG 2 habitat types, the impacts to the species as a whole would still be considered negligible due to the abundance of source habitat within the watershed.

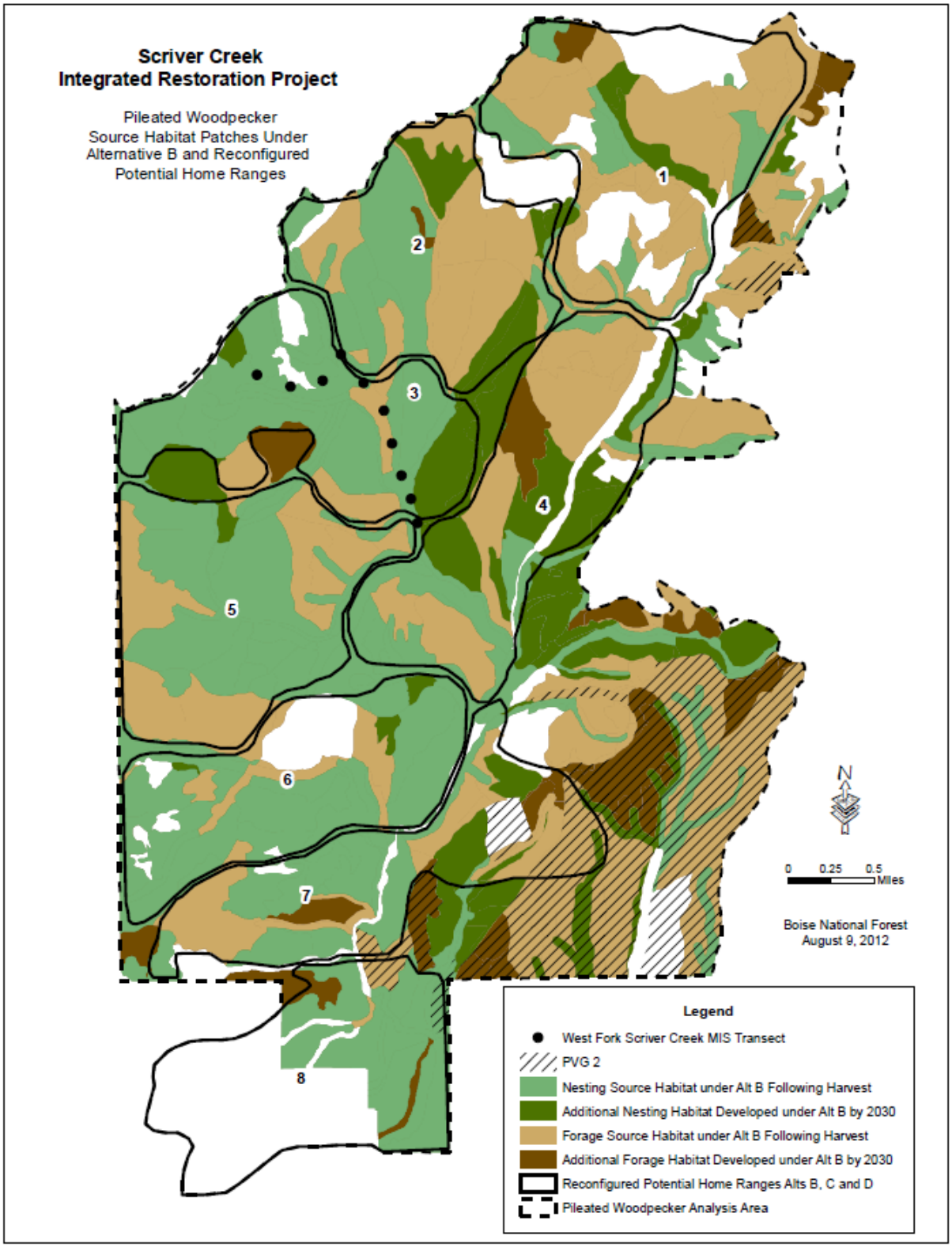

Figure 3-34. Pileated Woodpecker Source Habitat Under Alternative B Following Harvest and Reconfigured Potential Home Ranges

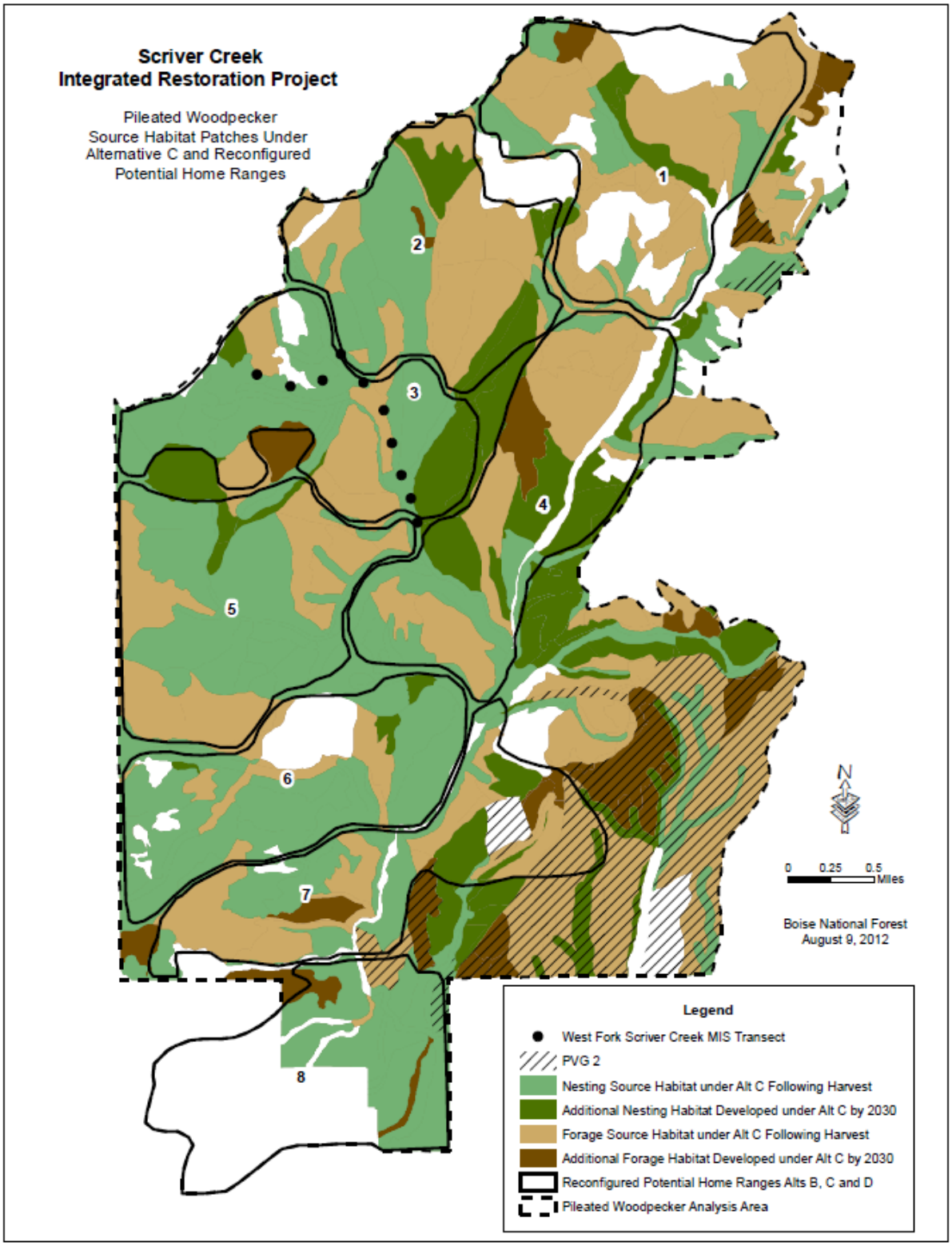

Figure 3-35. Pileated Woodpecker Source Habitat Under Alternative C Following Harvest and Reconfigured Potential Home Ranges

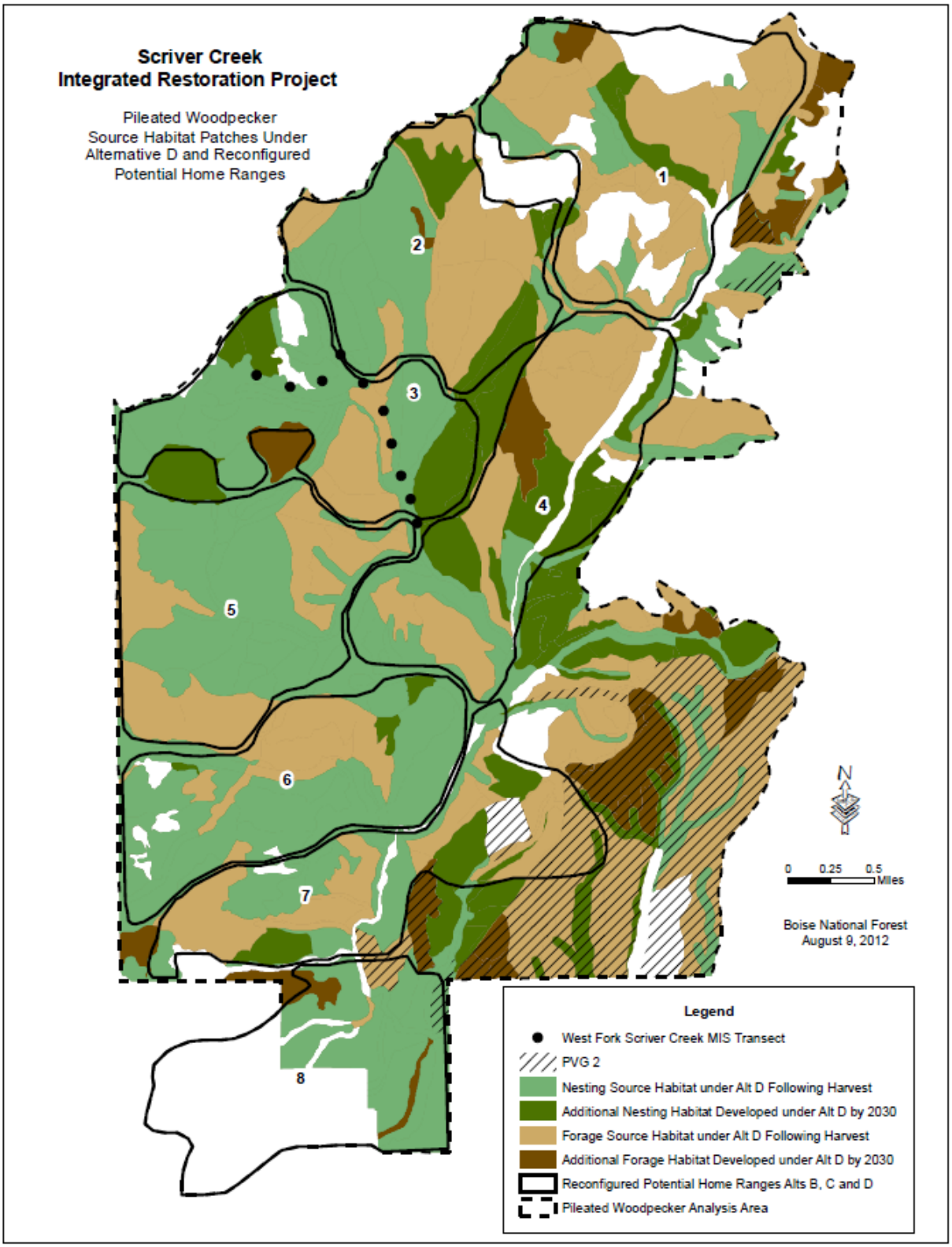

Figure 3-36. Pileated Woodpecker Source Habitat Under Alternative D Following Harvest and Reconfigured Potential Home Ranges

Snags >10 inches in d.b.h. would be maintained very close to existing levels, which are currently within or above desired ranges, across all PVGs immediately following harvest under all three action alternatives (Table 3-42). In addition, snag densities would remain within desired ranges throughout the 20-year modeling period under all three action alternatives. While densities under the action alternatives would be somewhat lower across all PVGs than what would be expected under Alternative A, they would still be well within desired ranges through 2030. In addition, Design Features WL-3, WL-6, TH-6 and TH-9 (section 2.4.2.1) would minimize the impacts to existing snags and would provide for future recruitment and retention of all snags >10 inches d.b.h. Snags would not be felled unless they pose a safety hazard under timber sale OSHA requirements. Live trees with evidence of cavities, damage, and rot, would be retained throughout the treatment areas to provide for future recruitment of snags. Design feature WL-6 would retain up to three large snags per acre within a 600 foot corridor along the relocated segment of NFS road 696 to offset potential losses from fuelwood gathering along this new stretch of roadway. While the loss of snags cannot be totally avoided due to OSHA safety requirements and uncertainties associated with broadcast burning in PVG 2, snag numbers would be maintained within or above existing densities in the long term (Table 3-42).

Similar to Alternative A, CWD volumes in both size classes and all PVGs under Alternatives B, C, and D would either stay the same or increase. Under all three action alternatives, amounts of CWD >3 inches d.b.h. would remain within desired ranges into 2030 for all PVGs (Table 3-43). For the larger CWD size class (>12 inches d.b.h.) stands in PVG 2 do not remain unchanged into the long term under all action alternatives. Large CWD in PVGs 5 and 6 increases into the long term. However, large CWD would remain below desired ranges through 2030 under all action alternatives. Design Features WL-3, WL-6, TH-6 and TH-9 (section 2.4.2.1) would minimize impacts to existing snags and would provide for future recruitment and retention of CWD into the long term. In addition, Design Feature TH-8 would provide a means to manage for large diameter CWD in harvest units where this habitat component is lacking. Forage opportunities for pileated woodpeckers would slightly improve over the existing condition, but would still be limited due to the low abundance of large diameter CWD across the landscape.

Total road densities (**Indicator 3**) are another Indicator of habitat quality. Alternatives B, C, and D would reduce total road densities within pileated woodpecker source habitat within the temporary and long term, compared to Alternative A, with the largest reduction occurring under Alternative D (Table 3-41). While total road densities following implementation remain higher than desired conditions (Table 3-41) and would still represent a risk of degradation of habitat from potential loss of snags, the overall risk would be lower than current conditions.

Design Features TH-5 and TH-6 would retain any old forest habitat, retain or promote development of components of old forest in managed large- or medium-sized stands, and would retain all large stands in the large tree size class. These design features would conserve important habitat elements for the pileated woodpecker, such as large diameter snags for nesting and forage and large diameter down logs for foraging. Design Feature TH-8 would provide a means to manage for large diameter CWD in harvest units where this habitat component is lacking. TH-8 states, “If during the layout process, it is determined that the large size class of CWD is lacking, provisions would be made to include cull logs to also be

hauled back into the unit. If cull logs are encountered in skyline or helicopter units, they would be felled and left onsite."

Proposed activities associated with these alternatives are not expected to introduce noxious weeds into the analysis area. Although open road miles would increase by 3.8 miles, project design features were developed to mitigate any potential impacts from the increase in roads. Design Feature NX-1 associated with this alternative requires the cleaning of all off-road equipment potentially carrying noxious weed seeds prior to moving into the analysis area. Design Features NX-2 through NX-4 also provide direction for the use of weed-free sources of aggregate, straw and seed mixtures for this project These alternatives may, however, contribute to distribution of noxious weeds already present. As noted above, existing noxious weed populations would be addressed through the District's noxious weed program

3.4.4.3.6.2 Cumulative Effects

Because Alternatives B, C, and D would have similar impacts on the pileated woodpecker and its habitat, and would have the same cumulative impact area, the following cumulative impact discussion is common for all three action alternatives.

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the three indicators used for this species analysis and therefore are included in the affected environment discussion (section 3.4.5.3.2.).

Past timber management within PVG 6 likely negatively affected nesting habitat by reducing total canopy cover below the 60 percent nesting habitat threshold and by reducing medium and large diameter trees that could serve as nesting and forage structure. Fire suppression, however, would have increased overall stand densities within PVG 6 stands, improving this component of nesting habitat. Fire suppression within PVG 2 would have also resulted in denser stands, moving these stands outside of HRV, which is the only time PVG 2 stands provide source habitat for the pileated woodpecker. The changes made to source habitat by past management activities have likely contributed to an overall increase in source habitat (**Indicator 1**) and patch size (**Indicator 2**) within the analysis area, especially in the form of PVG 2 stands that are uncharacteristically dense and now contributing to source habitat and the lack of natural disturbances within stands in PVGs 5 and 6 that would have periodically reduced tree densities and created openings. Implementing Alternatives B, C, or D would incrementally begin to restore PVG 2 and 5 habitat types to a condition more representative of vegetative communities functioning in the presence of disturbance and thus would not cumulatively add to the trend of increasing pileated woodpecker habitat in these departed vegetation communities.

High total road densities (**Indicator 3**) can be indicative of past management activities that changed forest structure, altered fire disturbance patterns, and/or fragmented habitat. This can affect the recruitment and retention of snags ≥20 inches d.b.h., and large diameter CWD, which provide forage and nesting structure for this species. Activities proposed under Alternatives B, C or D would decrease the open road density affecting pileated woodpecker habitat and would therefore not cumulatively add to the trend of higher road densities

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, and fuelwood gathering.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. As a result, these activities are considered part of the existing condition and at their current scope and frequency any cumulative impacts would be negligible. The noxious weed program treats infested areas and results in improved source habitat conditions. Design features under Alternatives B, C, or D are intended to avoid or minimize the spread of noxious weeds as a result of proposed activities. If noxious weeds are documented, actions would be taken to treat the infestation; therefore there would be no cumulative effect to the spread noxious weeds. Fuelwood cutting would continue to impact pileated woodpecker source habitat by removing snags and future CWD within road corridors. However, vegetation management activities in Alternatives B, C or D would retain snags and CWD to meet the needs of forest species dependent on snags or downed logs minimizing any cumulative effect of snag or CWD loss.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify a given stand such that it no longer would be suitable. Limited tree felling along the trail would not change overall stand characteristics because much of the new trail and bridge construction would occur within existing road or trail corridors. No cumulative effects would occur.

3.4.4.4 American Three-toed Woodpecker (Region 4 Sensitive Species)

3.4.4.4.1 Affected Environment

American three-toed woodpeckers inhabit mature and overmature stands containing bark beetles, disease, and heart rot (Goggans et al. 1989), and recent stand-replacing burns with abundant woodboring 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. 1989). Foraging has been described on dead trees averaging 9 inches d.b.h. (Bull et al. 1986) and 15.5 inches d.b.h. (Goggans et al. 1989). Although these tree sizes are not the larger diameter classes typically found in late-seral old forests, studies have found use of these 9 to 15 inch diameter trees for nesting and foraging are not occurring in mid-seral stands comprised of most trees in this size range but rather in late-seral forest where dead and dying trees in the 9 to 15 inch range occur within a matrix of larger, dense trees. Late-seral old forest would be expected to have higher incidences of heart rot, disease, or the early stages of decay present (Goggans et al. 1989, Bull et al. 1986). Three-toed woodpecker populations typically peak during the first 3 to 5 years after a fire. Home range size for this species is highly variable (Leonard 2001). Home

range sizes for 3 radio-tagged birds in central Oregon were 131, 363, and 751 acres (Goggans et al. 1989). An average of these documented home range sizes was used for this analysis, 415 acres.

On the Forest, vegetative communities that could provide source habitat conditions include PVGs 8, 9, 10, and 11 in the medium and large tree size classes and with moderate or high canopy cover (Nutt et al. 2010). PVG 5 can also provide source habitat when outside of HRV. Mountain pine beetle infestations and/or high intensity fire events are primary recycling agents in these PVGs, both of which are disturbances associated with three-toed woodpecker habitat and population irruptions. Snags are a special habitat feature for three-toed woodpeckers and provide both nesting and foraging opportunities.

The three-toed woodpecker was not selected as a focal species but is a Forest sensitive species that would be affected by Alternatives B, C, or D and therefore has been included in the SDEIS.

3.4.4.4.2 Current Conditions

Source habitat capacity for this species within the watershed comprises <5 percent of the HU. Historically, it is estimated that <1 percent of the watershed provided source habitat for the three-toed woodpecker at any given time; currently there is 13 percent providing source habitat (Nutt et al. 2010). The amount of source habitat is due to conditions within PVG 5 being outside of the HRV. The three-toed woodpecker can take advantage of departed vegetative conditions within PVG 5 (Nutt et al. 2010). Historic and current fire suppression management has likely played a role in the amount of source habitat within the watershed.

Two of the four PVGs capable of developing source habitat for three-toed woodpeckers are present in the Project area: PVGs 8 and 9. These PVGs together comprise <70 acres (<1%) of the Project area. PVG 5 can also provide source habitat for the three-toed when outside the HRV conditions. There are approximately 500 acres of PVG 5 in the Project area.

Due to the low number of acres capable of developing source habitat, it is expected that the Project area has historically never had many acres in source habitat condition at any one point in time and as a result three-toed woodpeckers would be uncommon or absent, unless large-scale disturbance events like a mountain pine beetle outbreak or stand-replacing fire were to occur.

The analysis area for the American three-toed woodpecker consists of the 11,510-acre Scriver Creek Project area and will be used to assess impacts to the amount, distribution and quality of source habitat for this species. This analysis area was chosen because of the limited capability of the Project area to provide source habitat for this species and because potential direct and indirect impacts are not expected to go beyond the Project area boundary (there are only 251 acres of source habitat (Table 3-44), an average home range is 415 acres (Goggans et al. 1989). Of the 251 acres of existing modeled source habitat within the analysis area, nearly all is in PVG 5 habitat types (Figure 3-37). Due to this small amount and its scattered distribution, no patches are large enough to provide for one average-sized home range of 415 acres (Goggans et al.1989).

No occurrences of three-toed woodpeckers have been documented within the analysis area (IFWIS 2011; NRIS 2011).

Table 3-44. Three-toed Woodpecker Source Habitat Existing Condition within the Scriver Creek Project Analysis Area

Source Habitat Capacity (acres)	Departed Condition PVG (acres)	Source Habitat[a] (acres)	Source Habitat Patch Characteristics		
			No. Patches	Ave. Patch Size (acres)	Patch Size Range (acres)
67	508	251	8	31	<1–110

[a] Total includes acres from PVG 5 in a departed condition.

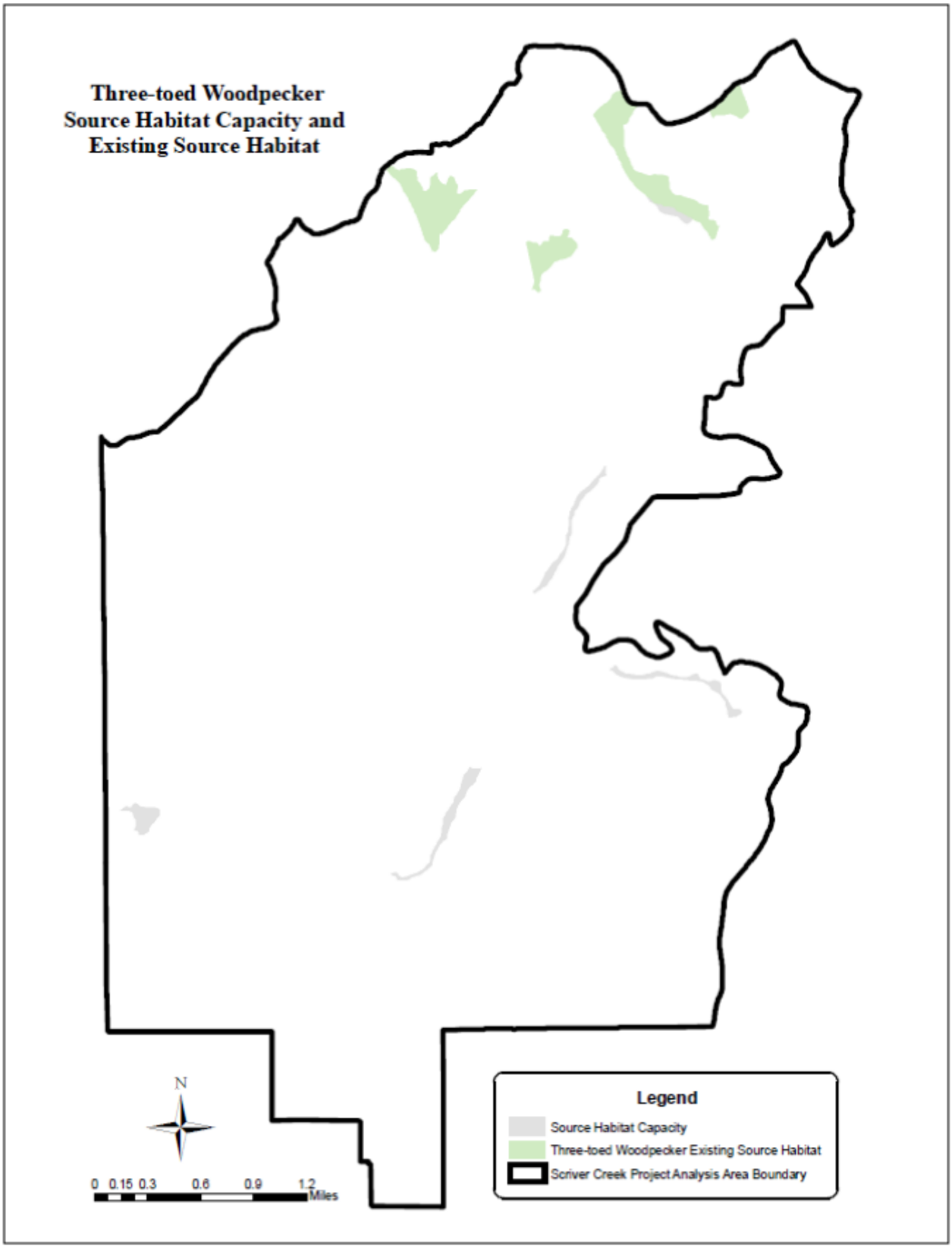

Figure 3-37. Three-toed Woodpecker Source Habitat Capacity and Existing Source Habitat

3.4.4.4.3 Environmental Consequences Summary

While there is a reduction in source habitat under Alternative A, source habitat in general would remain near existing levels into the long term as stands currently providing source habitat that are outside HRV are maintained within those conditions. Under Alternatives B, C, or D source habitat quantity would slightly decrease (by 36 acres) immediately following harvest; although this decrease is within PVG 5 habitat types that are moved back into the HRV and desired conditions. Due to the lack of source habitat capacity and the inability of the analysis area to provide meaningful amounts of source habitat for this species, any impacts from habitat modification would be considered negligible

3.4.4.4.4 Environmental Consequences of Alternative A—No Action

3.4.4.4.4.1 Direct and Indirect Effects

Source habitat would decrease under Alternative A as one stand within PVG 5 moves from moderate to high canopy cover class. Because the reduction is within PVG 5, which provides source habitat only when outside of HRV, any direct effects from the reduction of 62 acres is considered negligible. In general, source habitat quantity would remain near existing levels into the long term as stands within PVG 5 that are currently outside of HRV are maintained within those conditions (Table 3-45). Patches remain scattered and unable to provide a potential home range.

3.4.4.4.4.2 Cumulative Effects

Because source habitat conditions remain near existing levels through the long term (2030) and the reduction in source habitat occurs within PVG 5 in stands already outside HRV, therefore there are no cumulative impacts.

3.4.4.4.4.3 Alternative A Effect Conclusion

There is no change to the quantity of source habitat for the American three-toed woodpecker.

3.4.4.4.5 Environmental Consequences of Alternatives B, C, or D

3.4.4.4.5.1 Direct or Indirect Effects

No disturbance or displacement is expected due to the overall lack of source habitat within the analysis area and the resulting lack of presence. Under Alternatives B, C, and D source habitat quantity would slightly decrease (by 36 acres); although this decrease is within PVG 5 habitat types that are moved back into HRV and desired conditions. Due to the lack of source habitat capacity and the inability of the analysis area to provide meaningful amounts of source habitat for this species, any impacts from habitat modification would be considered negligible.

Table 3-45. Habitat Condition Indicators for Three-toed Woodpecker for the Existing Condition (EC) and by Alternative and Year

Indicator	EC 2010	Alternative A	Alternative B		Alternative C		Alternative D	
		2030	2011	2030	2011	2030	2011	2030
Source Habitat Quantity (acres)	251	189	215	153	215	157	215	153
Average Patch Size (acres)	31	24	21	15	21	16	21	15
Patch Size Range (acres)	<1–111	1–54	<1–111	<1–54	<1–111	<1–54	<1–111	<1–54
Number of Potential Home Ranges w/in Analysis Area	0	0	0	0	0	0	0	0

3.4.4.4.5.2 Cumulative Effects

Past Activities

Past activities are identified in Table B.1 in Appendix B of this document. Impacts of past activities that have contributed to the existing condition of the American three-toed woodpecker's habitat are included in the affected environment discussion (section 3.4.5.4.2.).

A disruption of the disturbance regime processes for habitat types in the nonlethal fire regime in PVG 5 has contributed to the current habitat situation, meaning there is more habitat showing in the analysis area than would be expected historically given the PVGs and absence of recent fire or insect outbreak activity. Implementing Alternatives B, C or D would incrementally begin to restore PVG 5 habitat types to a condition more representative of vegetative communities functioning in the presence of disturbance and thus would not cumulatively add to the trend of increasing habitat.

Present/Ongoing Activities

Present/ongoing activities that could potentially impact the three-toed woodpecker or its habitat in conjunction with the activities proposed in Alternatives B, C or D, are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, and fuelwood gathering.

Fuelwood cutting affects woodpecker source habitat by removing snags within road corridors in source habitat. Road and trail maintenance can also reduce snags along road and trail corridors in source habitat, particularly for safety concerns. The 36 acres of source habitat affected by the Scriver Creek project would retain snag habitat that meets or moves toward desired conditions for snags defined in Appendix A of the Forest Plan (Forest Service 2010a) and thus would not cause further loss of snags in source habitat, and would therefore not cumulatively contribute to snag loss.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. There are no reasonably foreseeable activities that occur in three-toed woodpecker source habitat therefore there are no cumulative effects of the 36 acres of habitat modification that would occur.

Neither the proposed action nor any of the projects or activities listed above would substantially modify source habitat. Furthermore, the species is not expected to be present due to the overall lack of source habitat within the analysis area. As a result, no cumulative impacts are expected to occur from this alternative.

3.4.4.4.6 Determination of Effect

Alternative B, C or D may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability for the American three-toed woodpecker.

3.4.4.4.6.1 Rationale

- Habitat would be reduced by 36 acres in the analysis area.
- There would be no cumulative effects.
- American three-toed woodpeckers are not expected to be present in the analysis area due to the overall lack of source habitat.
- Approximately 5 percent of the analysis area is capable of developing source habitat. The lack of source habitat capacity does not allow for meaningful amounts of source habitat for American three-toed woodpeckers to develop.

3.4.4.5 Mountain Quail (Region 4 Sensitive Species)

3.4.4.5.1 Affected Environment

Source habitats for mountain quail include all structural stage, except stem exclusion, of interior Douglas-fir, Sierra Nevada mixed conifer, ponderosa pine (Pacific and interior), and chokecherry-serviceberry-rose (Wisdom et al. 2000). Habitat is characterized by brushy slopes and shrub-dominated communities ranging in elevation from 2,300 to more than 9,850 feet. Mountain quail are most often associated with steep slopes or rugged terrain but this is not always present in occupied habitat (Brennan et al. 1987). Breeding often occurs at high elevations during spring and summer, with migrations occurring to lower elevations generally prior to snowfall. High elevation aspen stands surrounded by sagebrush and riparian habitats associated with forest habitats that have a significant shrub component are also used (Brennan et al. 1987). Fires in source habitat can have a short-term negative effect on source habitat but in the long term can promote growth and development of shrub habitats (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 a forest canopy associated with them and typically occur along waterways and secondary drainages that are within a few hundred meters of water (Vogel and Reese 1995). Mountain quail require drinking water during hot weather and juveniles must drink soon after hatching to survive (Brennan et al. 1987). South-facing slopes are arid and dominated by grasses, such as bluebunch wheatgrass and Idaho fescue together with several species of forbs. In draws or on

north facing slopes, serviceberry, hawthorn, ninebark, snowberry, and wild rose are common. Moist sites have elderberry, alder, red-osier dogwood, and cottonwood and higher elevation sites contain ponderosa pine and Douglas-fir (Vogel and Reese 1995).

On the Forest, vegetative communities that could provide source 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. In the Interior Columbia Basin, mountain quail are usually found within 100 to 200 meters (328 to 656 feet) of a water source (Brennan 1989).

3.4.4.5.2 Current Conditions

Source habitat in the watershed has declined by nearly 58 percent for the mountain quail (Nutt et al. 2010). A high percentage (75 percent) of source habitat capacity is susceptible to noxious weeds. A portion of source habitat is suitable for range; 8,300 acres of the Middle Fork South S&G Allotment occurs within the Project area.

Existing amounts and distribution of modeled source habitat were found to be somewhat limited within the Project area, due to the limited amount of preferred PVGs for mountain quail. As a result, the 11,510-acre Project area will be used to assess impacts to the amount, distribution and quality of source habitat for this species because direct, indirect, and cumulative effects from the activities proposed in the Project area are not expected to extend beyond this boundary.

One potential sighting of a mountain quail occurred at the southern end of the analysis area in 1991 (IFWIS 2011; Forest Service 2011a, unpublished data available in the project record). However, the sighting was considered of poor reliability due to an ambiguous description of the location.

Two of the six PVGs (PVG 2 and PVG 5) capable of developing source habitat for mountain quail are present in the analysis area. Source habitat capacity is concentrated in the southeast corner of the analysis area where PVG 2 is found, although a small amount of PVG 5 is located at the north end of the analysis area. Total source habitat capacity for mountain quail in the analysis area is 250 acres (PVGs 2 or 5 within 200 meters or about 650 feet of a water source). Because canopy cover conditions on these acres are mostly in the moderate or high canopy cover class, only about 70 acres currently provide source habitat.

3.4.4.5.3 Environmental Consequences Summary

There is little existing source habitat in the analysis area and limited capability to develop source habitat due to the PVGs that are present. Under Alternative A as the riparian stands comprising source habitat cover grow denser and move into moderate canopy cover, source habitat declines. Alternatives B, C or D increase source habitat by a very small amount (15 acres) in the short term but due to the small amount of source habitat modified by Alternative B, C or D, any impacts to the species are expected to be negligible.

3.4.4.5.4 Environmental Consequences of Alternative A—No Action

3.4.4.5.4.1 Direct and Indirect Effects

As the riparian stands comprising source habitat cover grow denser and move into moderate canopy cover, source habitat declines to approximately 26 acres by 2030.

3.4.4.5.4.2 Cumulative Effects

Past Activities

Past activities are identified in Table B.1 in Appendix B of this document. Impacts of past activities that have contributed to the existing condition of the mountain quail's habitat are included in the affected environment discussion (section 3.4.5.5.2.).

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, and Middle Fork South S&G Allotment.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors which are often along riparian areas. The likelihood of mountain quail in the analysis area is low due to the natural rarity of the species and the small amount of source habitat available and capable of developing. Should individuals be present in the analysis area, they are likely habituated to noise and disturbance that are associated with these areas or may completely avoid these sources of disturbance. There are no further activities that would occur under Alternative A therefore there are no cumulative effects. The noxious weed program treats infested areas and results in improved source habitat conditions. No activities under Alternative A would cumulatively contribute toward improvement of noxious weed treatments. Grazing was identified as a low risk for the mountain quail (Nutt et al. 2010), and, current riparian conditions of canopy cover in the moderate and high classes would indicate grazing is not affecting development of riparian shrubs in the analysis area. Alternative A, again, does not propose activities that would affect riparian habitat therefore there is no cumulative effect.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify source habitat such that it no longer would be suitable as the limited tree felling along the trail would not change characteristics of the riparian shrub and herbaceous community and because much of the new trail and bridge construction would occur within existing road or trail corridors. It is expected there would be minor or no effects from these projects to mountain quail habitat. Alternative A does not propose any activities and therefore would have no cumulative effect.

Alternative A Effect Conclusion—There would be a decline in source habitat by 44 acres through increasing density of canopy cover. Mountain quail are not expected to be present in the analysis area due to the overall lack of habitat. There is limited capability to develop source habitat in the analysis area.

3.4.4.5.5 Environmental Consequences of Alternatives B, C, or D

3.4.4.5.5.1 Direct and Indirect Effects

Design feature WL-1has been included to provide for protection of any active mountain quail nest sites discovered during implementation (see section 2.2.4.1). The design feature would prohibit the removal of known [active] nests and would prevent or minimize disturbance at active nest sites, thereby reducing impacts to breeding birds and reproduction. With the limited amount of source habitat present within the analysis area, the likelihood that individuals are present to be disturbed is extremely low.

Alternative B, C, or D results in a similar overall condition as Alternative A. There are approximately 85 acres of source habitat immediately following implementation of Alternative B, C, or D. The 15 additional acres of source habitat would be created by precommercial thinning within RCAs in PVG 5 to move the moderate canopy cover to low. By year 2030, source habitat drops to around 41 acres, again as canopy cover increases within many of the existing stands providing source habitat. Alternative B, C, or D only precommercially thins about 15 acres of RCA habitat within PVGs 2 and 5 out of the total 250 acres possible. This is why the amount of source habitat remains low under the action alternatives. Due to the small amount of source habitat modified by Alternative B, C or D, any impacts to the species are expected to be negligible.

3.4.4.5.5.2 Cumulative Effects

Past Activities

Past activities are identified in Table B.1 in Appendix B of this document. Impacts of past activities that have contributed to the existing condition of the mountain quail's habitat are included in the affected environment discussion (section 3.4.5.5.2.).

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, and Middle Fork South S&G Allotment.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors, which are often along riparian areas. The likelihood of mountain quail in the analysis area is low due to the natural rarity of the species and the small amount of source habitat available and capable of developing. Should individuals be present in the analysis area, they are likely habituated to noise and disturbance that are associated with these areas or may completely avoid these sources of disturbance. Disturbance associated with treatment activities in RCAs may disturb or displace individuals should they be present and this would be additive to any disturbance occurring from ongoing activities. The noxious weed program treats infested areas and results in improved source habitat conditions. Design features under

Alternatives B, C, or D are intended to avoid or minimize the spread of noxious weeds as a result of proposed activities. If noxious weeds are documented, actions would be taken to treat the infestation; therefore there would be no cumulative effect to the spread noxious weeds. Grazing was identified as a low risk for the mountain quail (Nutt et al. 2010), and, current riparian conditions of canopy cover in the moderate and high classes would indicate grazing is not affecting development of riparian shrubs in the analysis area. The action alternatives propose RCA treatments that would increase source habitat in the analysis area in the temporary and short term even though in the long term, there would be a decline. Alternatives B, C, or D do not cumulatively add to the decline in source habitat.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify source habitat such that it no longer would be suitable as the limited tree felling along the trail would not change characteristics of the riparian shrub and herbaceous community and because much of the new trail and bridge construction would occur within existing road or trail corridors. It is expected there would be minor or no effects from these projects to mountain quail habitat and therefore no cumulative effect.

3.4.4.5.6 Determination of Effect

Alternative B, C or D **may impact** individuals or habitat but is not likely to cause a trend toward federal listing or loss of viability for mountain quail.

3.4.4.5.6.1 Rationale

- Source habitat would increase in the temporary and short term and decline in the long term due to an increasing density of canopy cover.
- There is limited capability to develop source habitat in the analysis area.
- Mountain quail are not expected to be present in the analysis area due to the overall lack of habitat.

3.4.5 Family 5—Forest and Range Mosaic

Family 5 species use a broad range of forest, woodlands, and rangelands as source habitat (Wisdom et al. 2000). Source habitat occurs in all PVGs and structural types, as well as woodland and non-forested types. Human disturbance is a primary factor affecting some species as is altered fire regimes (Wisdom et al. 2000). One focal species, Rocky Mountain elk, was selected to assess human disturbance in the analysis area from the alternatives. For two R4 sensitive species in this family, peregrine falcon, and Rocky Mountain bighorn sheep, it was concluded that there would be *No Impact* on these species from any alternative because there is no source habitat for these species in the analysis area (Table 3-34 and Wildlife Technical Report, sections 3.0.5.2 and 3.0.5.3). There is habitat in the analysis area for the gray wolf (sensitive species). Peregrine falcon and Rocky Mountain bighorn sheep will not be discussed further.

3.4.5.1 Gray Wolf (Region 4 Sensitive Species)

3.4.5.1.1 Affected Environment

The species was recently removed from the list of endangered and threatened species and is currently managed as a big game species in Idaho and is a Intermountain Regional Forester sensitive species for the Forest.

Gray wolves utilize a wide array of forested and non-forested habitats. They have large home ranges and make seasonal movements in pursuit of their primary prey (ungulates). The primary threat to wolves is human-caused mortality. Human factors have been the greatest source of documented mortality for wolves in Idaho (Nadeau et al. 2009). Roads, trails, and their associated human use and development increase the potential for human-wolf conflict as does the presence of livestock.

On the Forest, vegetative communities that could provide source habitat conditions include all forest, woodland, and non-forested vegetation types. All structural conditions are utilized (Nutt et al. 2010). Key features of habitat include sufficient ungulate prey and limited human conflict. The gray wolf was not selected as a focal species in favor of selecting its prey as focal species.

An area encompassing two 6th field HUs or subwatersheds was chosen as the analysis area for the wolf because this area includes the Project area in its entirety and because the size of the two watersheds (44,800 acres) approximates a wolf home range. This analysis area will be used to assess impacts to the amount, distribution, and quality of source habitat for this species.

In 2004, rendezvous sites for the Scott Mountain pack were identified 0.8 mile west of the Project area, and in 2005 the pack used rendezvous habitat within the analysis area. Rendezvous sites used by this pack in 2006 were 5 miles northwest of the Project area boundary. Currently, the analysis area is likely being used by the Bear Wallow pack based on the most recent telemetry data from collared individuals (Holyan et al. 2011).

The entire analysis area is source habitat for the gray wolf as this species is considered a habitat generalist and is not tied to specific habitat types or vegetative structure. The existing open route density in the analysis area is 1.5 mi/mi^2 and within the moderate risk classification ($\geq$0.7 and <1.7 mi/mi^2). A portion of source habitat is suitable for range; 35,500 acres of the Middle Fork South S&G and Middle Fork North S&G Allotments occur within the analysis area. South-facing, forested slopes within the analysis area could be used for denning and rendezvous habitat, while the entire analysis area is forage habitat. The analysis area contains approximately 620 acres of elk winter range and 4,900 acres of mule deer winter range.

Source habitat condition for wolves is primarily a function of human disturbance and is largely based on the potential for human-wolf interaction. The likelihood of disturbance can be quantified by open route density, as motorized roads and trails are a predictor for human-wolf interaction. Open road density was selected as an Indicator to evaluate the effects of the alternatives on wolf. This Indicator was also used to assess how past activities have contributed to the existing condition, described below. A listing of specific past activities that occurred within the gray wolf analysis area that have affected road density can be found in Table B.1 in Appendix B of this document. In addition to measuring open route density, a

qualitative discussion of disturbance associated with implementation of proposed actions was also included in the effects discussion.

Past management practices that constructed roads, such as timber sales and motorized trail construction, have increased the open route density within the analysis area, which has increased the potential for human-caused disturbance and mortality to wolves. Past activities have contributed to the existing open route density found within the analysis area today.

3.4.5.1.2 Environmental Consequences Summary

Past management practices that constructed roads have increased the open route density within the analysis area, which has increased the potential for human-caused disturbance and mortality to wolves. The three action alternatives would continue this trend. Alternative A has the lowest open road density (1.5 mi/mi^2) of all alternatives and the greatest amount of security habitat for elk, an important prey species. Security habitat reduces the effects of road associated factors that negatively affect elk (vulnerability to disturbance) and contributes to higher quality habitat; this in turn can benefit wolves. All three action alternatives would increase the open route densities from 1.5 to 1.7 mi/mi^2. Under the wildlife analysis completed for the Forest Plan (Nutt et al. 2010), this change in road density is a shift from a moderate to high risk classification for this species. The increase in open route density would incrementally reduce the quality of source habitat for the gray wolf by increasing both the potential for human-caused mortality to wolves and increasing vulnerability to important wolf prey species (elk), the later described in more detail in section 3.4.6.2. For the gray wolf, alternatives with a lower road density and greater amount of prey security habitat are more beneficial than those with high road densities and less security habitat for prey. The alternatives ranked in this order are A, D, B, and C. All three action alternatives would implement comparable amounts of activities between 2013 and 2018, resulting in a cumulative increase in human presence and associated noise on the landscape above that which exists from ongoing activities.

3.4.5.1.3 Environmental Consequences of Alternative A—No Action

There would be no direct or indirect effects to gray wolf with implementation of this alternative and therefore no cumulative effects. The quality and quantity of source habitat within the analysis area would not change from the existing condition. Open road densities are 1.5 mi/mi^2 and would remain in the moderate risk classification and continue to have the same level of risk of human-caused mortality.

3.4.5.1.4 Environmental Consequences of Alternative B, C, or D

3.4.5.1.4.1 Direct and Indirect Effects

Human presence is a key factor in the persistence of wolves within source habitat. Roads are a measure of the extent of human presence on the landscape and can directly affect the quality of wolf source habitat by increasing the potential for human-caused wolf mortality (i.e., poaching, vehicle collisions, hunting vulnerability). Indirectly, roads can (1) cause displacement of individuals from source habitat if wolves avoid roaded areas, (2) degrade foraging habitat for important prey species (elk, deer) through spread of invasive species, or

(3) increase the risk to prey species from mortality (i.e., poaching, vehicle collisions, hunting vulnerability) resulting in underused habitats and a lower prey carrying capacity.

Direct impacts from commercial, noncommercial thinning, or prescribed burning activities could occur through the disturbance of individuals by temporarily altering foraging or traveling patterns, but any impacts would be expected to be minor due to the mobility and large home ranges used by this species. While proposed activities would occur within 4,100 acres of source habitat in Alternative B and 4,400 acres in Alternatives C or D, and there is the potential for disturbance throughout the implementation period (2013–2018), activities would not occur within the critical denning period when young are immobile between March and early May (USFWS 2002) as snow levels and/or road conditions would prevent access. Design Feature WL-1 would prevent or minimize disturbance at active den sites, thereby, reducing impacts to denning wolves if they should occur in the area.

Alternatives B, C, or D would modify approximately 4,100–4,400 acres of source habitat; however, all would remain suitable as this species is not tied to specific vegetative characteristics. Source habitat quality for prey species would be reduced through reductions in security habitat from harvest activities and changes in open road miles, which could change prey use patterns and distribution but is not expected to change overall prey densities. The risk of spread of invasive weed species along roads and in disturbed areas associated with activities in Alternatives B, C, or D is minimized through Design Features NX-1 through NX-5.

Some activities under the action alternatives may overlap with the critical denning period for wolves from March through early May. Design Feature WL-1 has been included in all action alternatives to provide for protection of sensitive species, such as discovery of a den site during implementation of activities. This design feature would avoid or minimize disturbance at active den or rendezvous sites that could disrupt reproductive success.

3.4.5.1.5 Cumulative Effects

The following cumulative effects discussion is common for all three action alternatives.

Past Activities

Past activities are identified in Table B.1 in Appendix B of this document. Impacts of past activities that have contributed to the existing source habitat conditions are included in the affected environment discussion. This includes management practices that constructed roads, such as timber sales and motorized trail construction which have contributed to the open route density within the analysis area and increased the potential for human-caused disturbance and mortality to wolves. The changes made to source habitat by past management activities have likely contributed to an overall reduction in the quality of source habitat within the analysis area.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, the Middle Fork South S&G Allotment, Stolle 7 Timber Sale, Frontier Timber Sale, Peacemaker Timber Sale, and fuelwood gathering.

There are no present/ongoing activities that are altering open route density; therefore, the discussion will focus on a qualitative discussion of disturbance.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. Activities associated with the Project would cumulatively increase the noise and disturbance in the analysis area during implementation. After 2018, the projected completion year of all activities proposed under Alternatives B, C, or D, noise and disturbance levels would decrease. The noxious weed program treats infested areas and results in improved source habitat conditions for prey species such as elk. Design features under Alternatives B, C, or D are intended to avoid or minimize the spread of noxious weeds as a result of proposed activities. If noxious weeds are documented, actions would be taken to treat the infestation, this would be additive to ongoing treatments.

Grazing on public lands has the potential to substantially impact wolves through depredation control actions if wolves prey on livestock. Control actions that eliminate individuals or packs are in direct response to wolf depredation of livestock, and are independent of disturbance or mortality that may result from existing or future State, private or other Federal actions (i.e., cumulative impacts from this project or other activities within the analysis area do not figure in to the action of removing wolves due to depredation on livestock).

The ongoing Stolle 7, Frontier, and Peacemaker Timber Sale Projects will modify approximately 1,825 acres within the analysis area. These activities could disturb or displace wolves for the duration of project activities, but are occurring on existing open roads and would not increase open route density or the potential for human-caused mortality within the analysis area. Contracts for these three timber sale projects indicate activities will be completed prior to 2016. The Project activities would overlap and extend the disturbance window to approximately 2018 The Stolle 7, Frontier, and Peacemaker Timber Sale projects may reduce source habitat quality for prey species by reducing security cover within the analysis area, which may cause changes in prey habitat use and movements within this potential wolf home range. These same effects are projected to occur in the Scriver Creek Project therefore there would be additive cumulative effects to prey habitat use and movements on the landscape as a result of changes in security cover and response to implementation activities.

Proposed activities together with ongoing activities could cause wolves to temporarily change foraging or traveling habits during implementation periods however cumulative effects are not expected to be substantial enough to cause wolves to reconfigure existing territories

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project, the Scriver Creek Snowmobile Bridge Project, and the Wet Foot Culvert Replacement Project.

The future Scriver Creek Trails project could result in increased open route density within the analysis area if additional motorized trails are permitted with this project. The other two projects do not involve changes to open road density and will not affect wolf or wolf prey

habitat. Implementing any of these projects could disturb or displace wolves or their prey for the duration of project activities. It is not known if these activities will occur commensurate with the timeframe expected for implementation of the Scriver Creek Project.

3.4.5.1.6 Determination of Effect

Alternative B, C or D may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability for the gray wolf.

3.4.5.1.6.1 Rationale

- Source habitat quality would be reduced in the short and long term by incrementally increasing the potential for human-caused mortality through the increase in open route density.
- An increase in road density would result in an increase in risk to wolves from negative human-wolf interactions.

3.4.5.2 Rocky Mountain Elk (Family 5 Focal Species, Species of Interest)

3.4.5.2.1 Affected Environment

The Rocky Mountain elk was selected as a focal species due to the potential for impacts and because it is a species with specific management direction outlined by the Forest Plan. In addition, elk provide an important source of food for other species (gray wolf,) considered in the analysis, and an evaluation of effects on elk supports analysis of effects on those species.

Elk were once distributed across most of North America and inhabited all of the major forest and plains plant communities, except the western deserts and the humid ecosystems of the Southeast (Skovlin et al. 2002). Elk are considered habitat generalists and are found across the Forest in a variety of habitats. Habitat use and distribution change seasonally, and can be generalized by seasonal movements. During the winter months, snow forces elk to move to lower elevation winter ranges. Winter ranges are often of mixed ownership and include portions of the Forest as well as other public and private lands. As snows recede, elk follow the spring green-up back to mid- and high-elevation summer ranges located on the forest.

Some basic habitat components, such as the availability of food and water, are important throughout the year, and others are seasonally important. During temperature extremes, thermal cover or vegetation that modifies the effects of temperature may be important. Habitats located on gentle terrain and that provide a mix of lush vegetation and adjacent cover are important during the calving period. Hiding cover and security areas become increasingly important during hunting season, providing some escape from the pressures and stress of hunting season.

Food habits of elk are variable and are dependent on the plant species available in the habitat they are occupying. Forage preferences vary among seasons and years, and appear to be strongly related to availability and phenology of plants, both of which are influenced by weather conditions (Nelson and Leege 1982). Where both grasses and shrubs are available, elk usually prefer grasses. When grasses are not available, shrubs are utilized, and conifers and arboreal lichens may be consumed on forested winter ranges during deep snow periods. Grass comprises a high component of spring and summer diets following green-up. As grasses dry and mature, elk use shifts to forbs and woody plants. On the Forest, vegetative

communities that could provide source habitat conditions include all forest, woodland, and non-forested vegetation types.

The Scriver Creek Project Area was chosen as the analysis area for elk because this area includes the Project area in its entirety, because potential impacts from the proposed project would not be expected to go beyond this area, and because the area is large enough to assess seasonal movements of this highly mobile species. This 11,510-acre analysis area will be used to assess impacts to the amount, distribution, and quality of source habitat for this species.

The analysis area occurs within the IDFG Big Game Management Unit (BGMU) 33. Within this BGMU, current populations of cows and bulls are below objectives for the unit. Many factors have been identified as potential reasons for the decline in population, including decreases in the quantity and quality of winter range due to noxious weeds, predation from wolves, bears and lions, high vulnerability stemming from high road densities, and the overharvest of bulls within this unit (IDFG 2010).

The analysis area does not provide elk winter range, although winter range occurs less than 0.5 miles south. Calving habitat likely occurs within the analysis area, although specific calving areas have not been documented. Components of calving habitat include close access to water, hiding and thermal cover, and high quality forage (Thomas et al. 1979, Skovlin et al. 2002).

Vulnerability is a key factor in assessing habitat quality for elk. Lyon and Christiansen (2002) identified several indicators that can be used to assess vulnerability, which included road density, security cover, and the interaction of security cover with road density, which influence elk vulnerability to hunting mortality. Cited by Lyon and Christensen (2002), several studies demonstrated a relationship between high road densities and high rates of hunting mortality of elk, while low road densities equated to lower rates of hunting mortality.

Security habitat, in the form of vegetative cover, provides concealment or hiding cover for elk as well as escape cover once detected by hunters. Security habitat is defined as vegetative cover capable of hiding 90 percent of a standing deer or elk at a distance less than or equal to 200 feet (Thomas et al. 1979, Forest Service 2003a). Forested stands with a total canopy cover greater than or equal to 40 percent were considered to provide security cover habitat. Within these stands providing 40 percent or more canopy cover, the combination of tree boles, shrubs and conifer saplings would be sufficient to meet the above definition of security habitat.

Security habitat is also a function of road density and distribution. Models developed on the Lolo and Deerlodge National Forests identify effective security habitat as being located greater than 0.5 mile from open motorized roads (Christiansen et al. 1993). This is in response to road influences on elk distribution and the species' tendency to avoid open roads and trails (Rowland et al. 2005, Wisdom et al. 2005, and Naylor et al. 2009). Open routes, as used in this analysis, include open roads, motorized trails, and unauthorized routes.

Past timber projects that reduced canopy cover below 40 percent likely reduced elk security cover within affected stands. Past management practices that constructed roads, such as timber sales and motorized trail construction, increased the open route density within the analysis area, which in turn reduced the amount of security cover over 0.5 miles from an

open road. These past management practices likely contributed to an overall reduction in elk source habitat quantity and quality within the analysis area.

One **Indicator** was selected to assess the effects of the alternatives on Rocky Mountain Elk: (1) amount and distribution of security cover habitat greater than 0.5 mile from open motorized routes.

At present, approximately 9,889 acres meets the 40 percent canopy cover criteria for security habitat (Table 3-46 and Figure 3-38). In order to determine how much elk security habitat is greater than 0.5 miles from an open road, two habitat components were used, including open route density and security habitat (habitat with greater than 40 percent canopy cover). Currently, approximately 2,170 acres of security habitat is more than 0.5 miles from a motorized route. As a result, about 22 percent of the available security habitat is within 0.5 mile of a motorized route and is not providing security habitat. These values indicate that elk vulnerability as a function of both security habitat and open motorized route density is very high within the analysis area, as less than one-fourth of the available security habitat is not impacted by motorized routes.

Open route density within the analysis area is 1.75 mi/mi^2, currently within the high classification as described in Appendix E of the Forest Plan (Forest Service 2010a). In addition, studies have shown that areas with what they considered high road densities (>4.0 mi/mi^2 was used, for example) led to substantially higher harvest rates than areas with lower open route densities (<1.0 mi/mi^2), although no specific relationship between road density and vulnerability was developed (Lyon and Christensen 2002). While the existing road densities are at the lower end of the examples from Lyon and Christensen (2002), they are likely still having a negative effect on vulnerability as indicated by the large amount of security habitat within 0.5 mile of motorized routes.

Table 3-46. Acres of Elk Security Habitat >0.5 miles from Open Routes by Alternative

Elk Habitat Indicator and Indicator Components	Existing Condition	Alt. A	Alternative B		Alternative C		Alternative D	
	2010	2030	2011	2030	2011	2030	2011	2030
Acres of Elk Security Habitat >0.5 miles from an Open Route	2,170	2,270	1,694	2,023	1,668	1,996	1,774	2,038
Acres of Security Habitat within Analysis Area (Indicator Component)	9,889	10,588	8,350	9,801	8,340	9,808	8,605	9,842
Open Route Density (mi/mi^2) (Indicator Component)	1.75	1.75	1.79	1.79	1.79	1.79	1.79	1.79

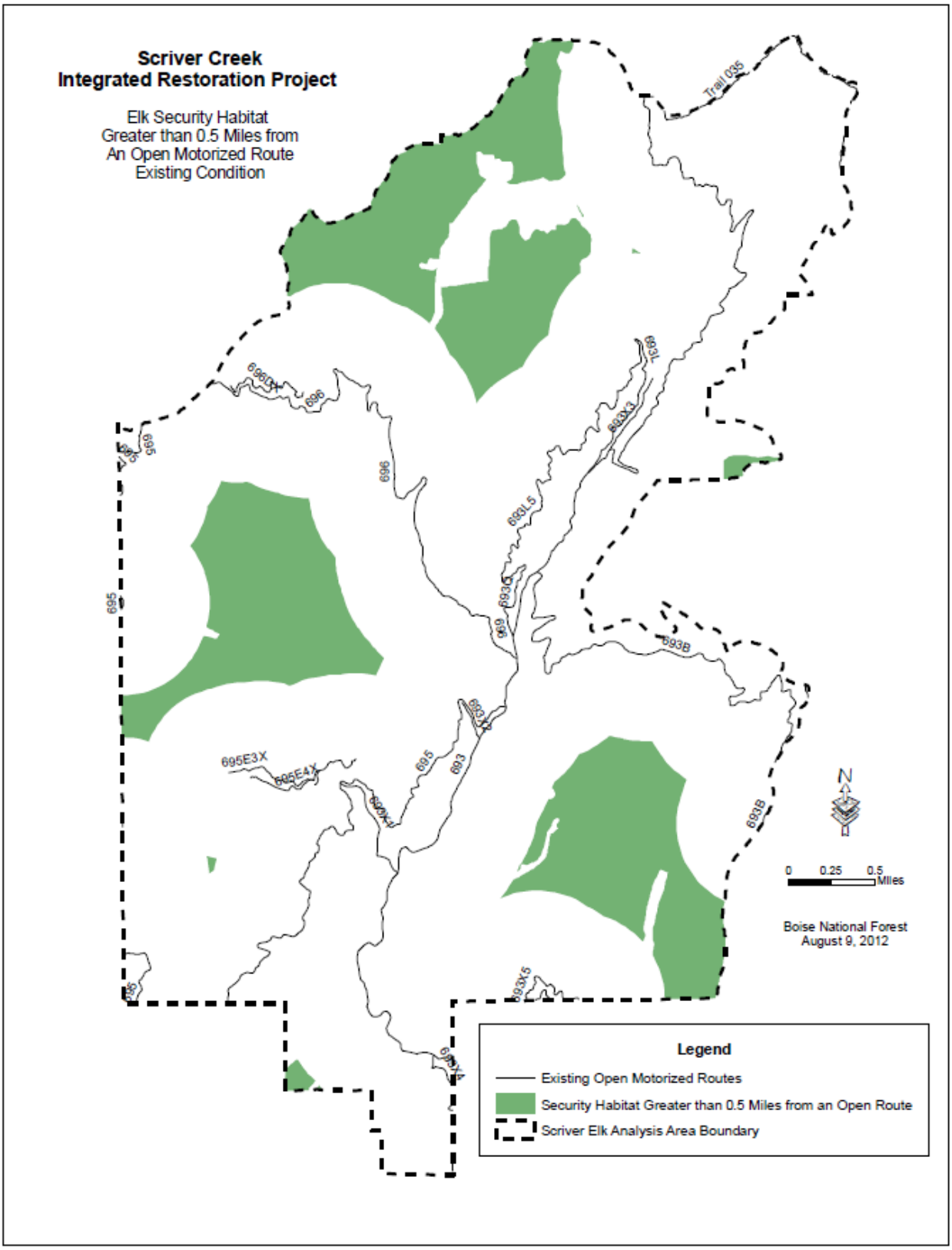

Figure 3-38. Alternative A: Existing Elk Security Cover Greater than 0.5 miles from an Open Motorized Route

3.4.5.2.2 Environmental Consequences Summary

In Alternative A there would be no change to open route densities however there would be a slight increase in acreage of security cover greater than 0.5 mile from those open routes as stands mature over time. There would be an even larger increase in security cover within 0.5 mile of those existing open routes (699 acres) resulting in an incremental improvement in elk vulnerability despite no change to the open route density (Table 3-46). Under Alternatives B, C or D the amount of security cover greater than 0.5 miles from an open motorized route would be reduced below the existing condition and would remain below what would have occurred under Alternative A into the long term (Table 3-46). This is a function of reduced security habitat and a slight in increase in open road density in these alternatives. Of the three alternatives, Alternative D would result in the most security habitat more than 0.5 miles from an open road through 2030, although the amounts under Alternatives B and C are not much less. Harvest and fuel treatments in the action alternatives would likely cause disturbance to individuals intermittently for the duration of project activities, which are expected to occur up to 5 years. While individuals could be disturbed during calving (May 1 through July 1), harvest activities would be localized around a small subset of units at any given time, leaving the majority of the analysis area undisturbed during the calving period.

3.4.5.2.3 Environmental Consequences of Alternative A—No Action

3.4.5.2.3.1 Direct and Indirect Effects

The amount of security cover greater than 0.5 miles from an open route (**Indicator 1**) would increase by about 100 acres, the increase a result of additional security habitat forming as stands mature over time. Alternative A would not change open route density and would not factor in to the increase noted above (Table 3-46). Security cover, one component of Indicator 1, would be expected to increase from the existing 9,889 acres to about 10,588 acres by 2030 under Alternative A, an increase of 699 acres over the existing condition, as additional stands move above the 40 percent canopy cover threshold. Open route densities, the second component, would remain at existing levels and would continue to facilitate human-caused mortality. No disturbance impacts beyond current levels would occur. The quality and quantity of source habitat within the analysis area would not be expected to change substantially from the existing condition.

3.4.5.2.3.2 Cumulative Effects

Past Activities

Past activities considered for this Indicator are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the Indicator used for this species analysis and therefore are included in the affected environment discussion.

Past timber projects that reduced canopy cover below 40 percent likely reduced elk security cover within affected stands. Past management practices that constructed roads, such as timber sales and motorized trail construction, increased the open route density within the analysis area, which in turn reduced the amount of security cover over 0.5 miles from an

open route (**Indicator 1**). These past management practices likely contributed to an overall reduction in elk source habitat quantity and quality within the analysis area.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering.

Road and trail maintenance, dispersed recreation and fuelwood gathering occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. Nevertheless, these activities would continue to reduce the quality of security habitat within the analysis area. The noxious weed program treats infested areas and results in improved source habitat conditions by maintaining native forage species.

Grazing within the Middle Fork South S&G Allotment would overlap in both time and space with the Alternative A. This activity would continue to cause localized disturbance around where the sheep are being trailed and could result in localized reductions in forage availability where sheep grazing has occurred.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify a given stand such that it no longer would be suitable as the limited tree felling along the trail would not change overall stand characteristics because much of the new trail and bridge construction would occur within existing road or trail corridors.

The Scriver Creek Snowmobile Bridge and Scriver Creek Trails Projects would not be expected to modify security habitat and both would occur within existing road or trail corridors that already experience some level of disturbance. Because these activities are expected to be relatively short in duration and have a very small footprint, they would not substantially add to existing levels of disturbance within those corridors.

3.4.5.2.4 Environmental Consequences of Alternatives B, C, and D

3.4.5.2.4.1 Direct and Indirect Effects

The amount of security cover greater than 0.5 miles from an open motorized route would be reduced below the existing condition under all three action alternatives and would remain below what would have occurred under Alternative A in 2030 (Table 3-46). Of the three alternatives, Alternative D would result in the most security habitat more than 0.5 miles from an open road through 2030, although the amounts under Alternatives B and C are not much less. This reduction across all three alternatives stems from decreases in security habitat from reductions in canopy cover below 40 percent in treated stands and increases in open route density within the analysis area. Table 3-46 shows the amount of security habitat greater than 0.5 miles from an open route, modeled security habitat, and open route density by alternative.

Security cover, consisting of stands greater than 40 percent canopy cover, would decrease under all three action alternatives within treated stands (Table 3-46). Alternative D would retain the most security cover through 2030 compared to Alternative A, a reduction of 396 acres immediately following harvest and only 232 by 2030.

Alternatives B, C, and D would increase the open road miles within the analysis area, primarily from the relocation NFS road 696, which would slightly increase open route density from the existing 1.75 mi/mi^2 to 1.79 mi/mi^2, and would remain within the high classification (>1.7 mi/mi^2) (Table 3-46). The impacts from Alternatives B, C, and D would be the same, as these alternatives propose the same changes to the open road and trail system within the analysis area, including the total miles of open road increase (3.8 miles) and miles of decommissioned unauthorized routes (3.3 miles). No changes would occur to the existing motorized trail system. As a result, open route densities would be the same for all three action alternatives. While road density increases seem fairly small, the incremental increase is further degrading security habitat within the analysis area and contributing to an increase in elk vulnerability.

Alternatives B, C, and D would result in greater elk vulnerability than Alternative A, as fewer acres would be more than 0.5 miles from an open route, a function of reduced security habitat and a slight in increase in open road density. Figure 3-39 shows an example of this shrub layer within the Scriver Creek Analysis Area. Figure 3-40, Figure 3-41, and Figure 3-42 display the remaining security cover greater than 0.5 mile from an open route for each of the action alternatives. However, decreases in security habitat may be overestimated because the shrub layer could not be accounted for in the modeling exercises. The Scriver Creek Project area has an abundant shrub component, including ceanothus, willow, mountain maple and ninebark species.

Figure 3-39. Shrub Component in Scriver Creek Integrated Project

Following harvest, a large portion of the shrub layer would remain intact to provide elk security cover within stands that experienced reductions in live trees. Reductions in canopy cover would likely result in a thicker shrub component in the PVG 6 stands from more light reaching the ground. In addition, Design Feature WL-4 and marking guidelines (section 3.2) that require mature live trees and regeneration to be retained in clumps rather than evenly distributed would provide additional opportunities for understory development. Following harvest PVG 2 stands would have a single storied appearance, but would also contain large diameter ponderosa pine situated in clumps. While regeneration would be reduced overall, seedlings and saplings would be retained in pockets within existing openings to eventually fill in these openings. Within PVG 6, stands following harvest would be comprised of several tree size classes of ponderosa pine, Douglas fir and grand fir in the understory, with groups of even-aged saplings occurring in the understory and created openings interspersed throughout. The structural diversity resulting from these prescriptions, even in PVG 2, is expected to provide some concealment for big game.

Opening the canopy within dense stands that have limited understory can result in increases in forage for elk (Leege 1984, pg.4). Proposed treatments within dense stands of PVG 2 and 6 habitat types would encourage grass, forb and shrub growth within treated stands where sunlight can reach the ground.

Harvest and fuel treatments would likely cause disturbance to individuals intermittently for the duration of project activities, which are expected to occur up to 5 years. While individuals could be disturbed during calving (May 1 through July 1), harvest activities would be localized around a small subset of units at any given time, leaving the majority of the analysis area undisturbed during the calving period.

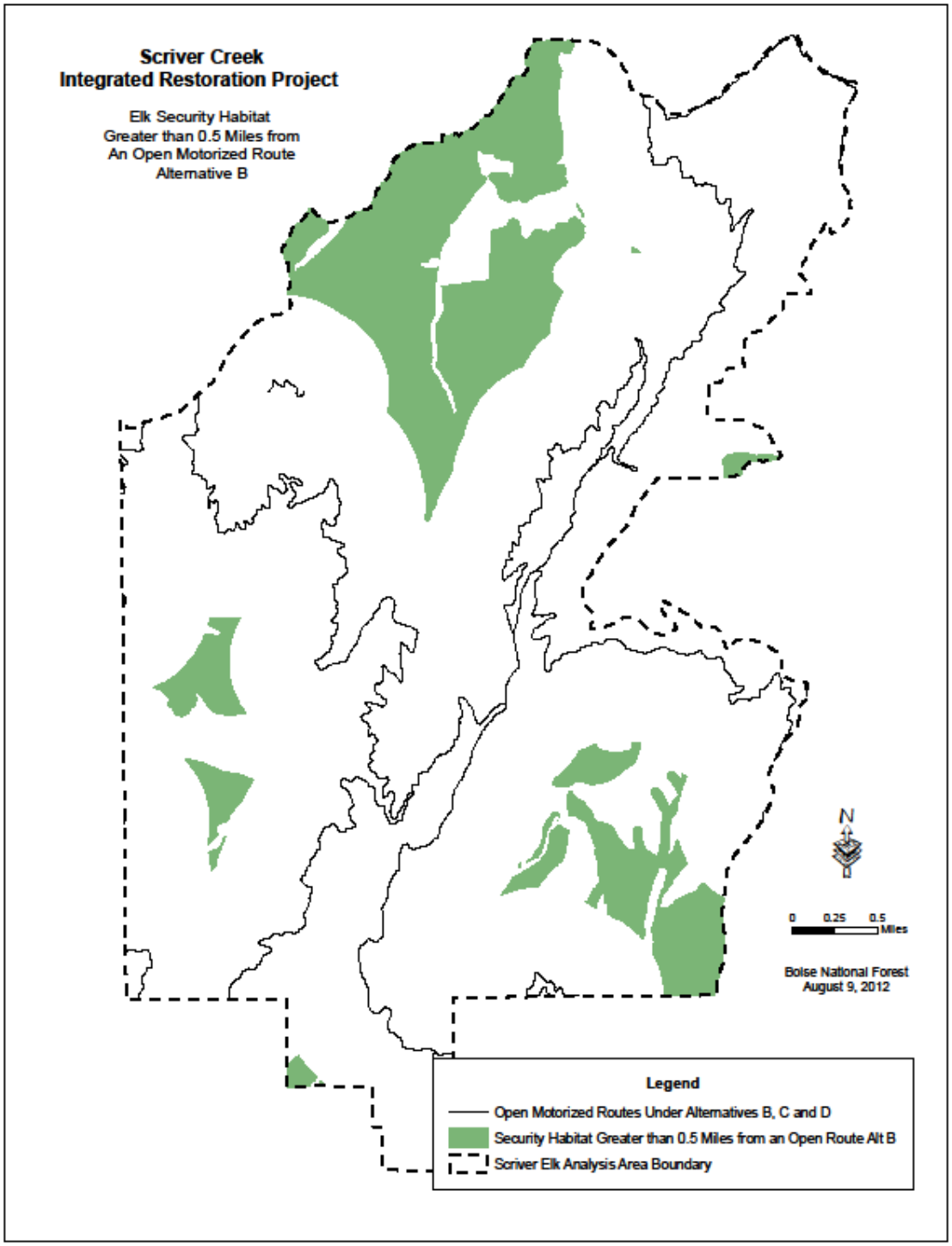

Figure 3-40. Alternative B Elk Security Cover Greater than 0.5 miles from an Open Motorized Route

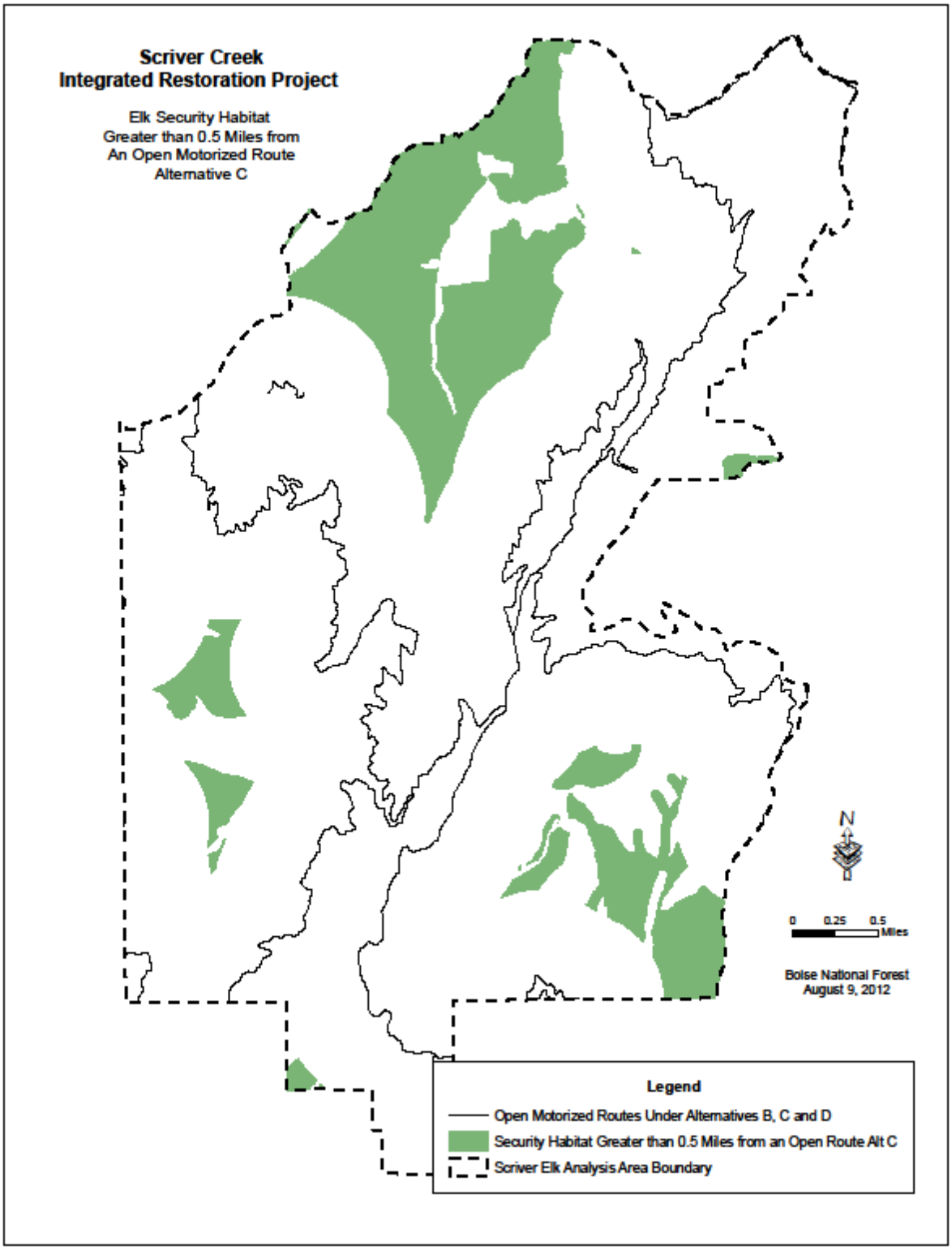

Figure 3-41. Alternative C Elk Security Cover Greater than 0.5 miles from an Open Motorized Route

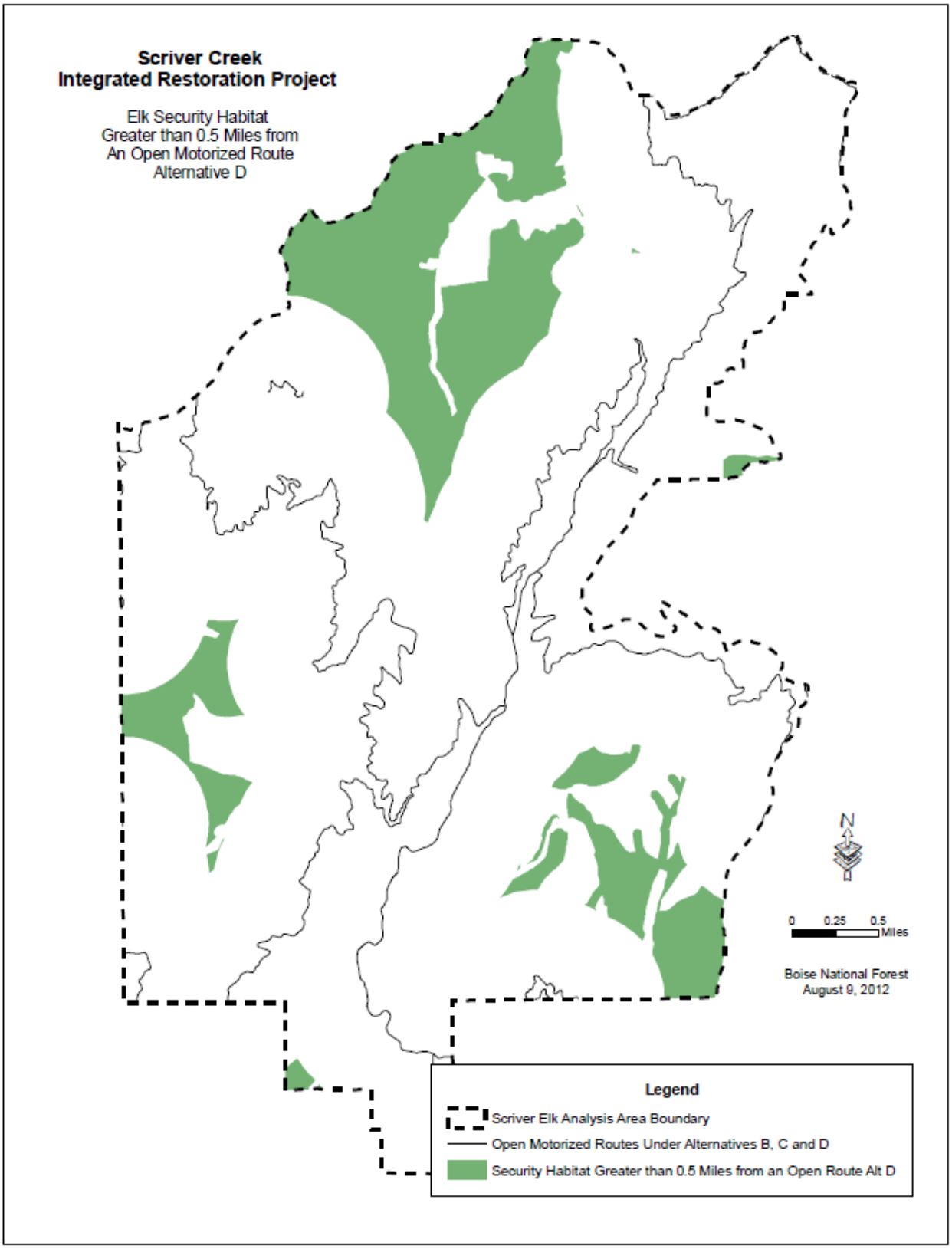

Figure 3-42. Alternative D Elk Security Cover Greater than 0.5 miles from an Open Motorized Route

3.4.5.2.5 Cumulative Effects

Because Alternatives B, C, and D would have similar impacts on the Rocky Mountain elk and its habitat, and would have the same cumulative impact area, the following cumulative impact discussion is common for all three action alternatives.

Past Activities

Past activities considered for these indicators are identified in Table B.1 in Appendix B of this document. Impacts of the past activities have contributed to the existing conditions for the Indicator used for this species analysis and therefore are included in the affected environment discussion.

Past timber projects that reduced canopy cover below 40 percent likely reduced elk security habitat, within affected stands. Past management practices that constructed roads, such as timber sales and motorized trail construction, increased the open route density within the analysis area, which in turn reduced the amount of security cover over 0.5 miles from an open road (**Indicator 1**). These past management practices likely contributed to an overall reduction in elk source habitat quantity and quality within the analysis area.

Present/Ongoing Activities

Present/ongoing activities considered for this species are identified in Table B.1 in Appendix B of this document. These activities include road maintenance, NFS trails and trail maintenance, dispersed recreation, Forest Noxious Weed Program, Middle Fork South S&G Allotment, and fuelwood gathering.

Road and trail maintenance, dispersed recreation and fuelwood gathering occur primarily within existing road and trail corridors. Individuals are likely habituated to the noise and disturbance that are associated with these areas or completely avoid these sources of disturbance. Nevertheless, these activities would continue to reduce the quality of security habitat within the analysis area. The noxious weed program treats infested areas and results in improved source habitat conditions by maintaining native forage species.

Grazing within the Middle Fork South S&G Allotment would overlap in both time and space with activities under Alternatives B, C, and D. This activity would continue to cause localized disturbance around where the sheep are being trailed and could result in localized reductions in forage availability where sheep grazing has occurred.

However, none of the present/ongoing activities would impact the Indicator used to assess impacts to elk or its components.

Reasonably Foreseeable Activities

Reasonably foreseeable activities considered for this species are identified in Table B.1 in Appendix B of this document. These include the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project.

Neither the Scriver Creek Trails Project nor the Scriver Creek Snowmobile Bridge Project would modify a given stand such that it no longer would be suitable as the limited tree felling along the trail would not change overall stand characteristics because much of the new trail and bridge construction would occur within existing road or trail corridors.

The Scriver Creek Snowmobile Bridge and Scriver Creek Trails Projects would not be expected to modify security habitat and both would occur within existing road or trail corridors that already experience some level of disturbance. Because these activities are expected to be relatively short in duration and have a very small footprint, they would not substantially add to existing levels of disturbance within those corridors.

Alternatives B, C, and D would contribute cumulatively to the reduction in the quantity and quality of elk security habitat within the analysis area. Reductions in canopy cover and increases in open route density would result in an overall increase in elk vulnerability to hunting mortality within the analysis area into the long term.

3.4.6 Family 7—Forests, Woodlands, and Sagebrush

Species in Family 7 use a complex pattern of forest, woodlands, and sagebrush cover types (Wisdom et al. 2000). A distinguishing feature of the family is that most species have specialized requirements for nesting and roosting which often limits population size and distribution. There were no focal species selected for this family due to the lack of roost opportunities in the Project area. For one R4 sensitive species, spotted bat, it was concluded that there would be *No Impact* on this species from either alternative since the analysis area lacks roost sites within 6 miles (Table 3-34 and Wildlife Technical Report, sections 3.0.7.1). Spotted bat will not be discussed further. For the second R4 sensitive species in this habitat family, Townsend's big-eared bat, it was concluded there may be an impact to individuals, but it is unlikely to contribute to a trend toward federal listing.

3.4.6.1 Townsend's Big-eared Bat (Region 4 Sensitive Species)

3.4.6.1.1 Affected Environment

The Townsend's big-eared bat is a year-round resident of the Interior Columbia River Basin and is considered a forest generalist within the subalpine, montane, upland woodland, and riparian woodland community groups (Wisdom et al. 2000). This species uses caves, mines, and buildings for roosting where they aggregate in large colonies. Townsend's big-eared bats forage for moths in sagebrush, bitterbrush, and open ponderosa pine forests. The distribution of this species is patchy due to their specialized roosting requirements. Primary threats are related to human disturbance at, and loss of, roost sites and hibernacula. Townsend's big-eared bats are negatively affected by the presence of roads at roosting sites and hibernacula because of increased potential for harassment of bats (Wisdom et al. 2000). Use of pesticides that would impact Lepidoptera populations can also affect this species by reducing food availability.

On the Forest, vegetative communities that could provide source habitat conditions include PVGs 1, 2, 3, 4, 5, 6, and 7 in all size classes and the low canopy cover class; and nonforest vegetation types: low sagebrush, mountain and Wyoming big sagebrush, montane shrub, and shrub-forest transition in all size classes and canopy cover classes (Geier-Hayes and Nutt 2008). These types provide source habitat when located within the maximum foraging distance (15 miles) from roost (caves, mines, and other suitable structures) locations.

The 11,510-acre Project area will be used to assess impacts to the amount, distribution and quality of source habitat for this species as potential impacts are not expected to go beyond the Project area boundary.

Three of the seven PVGs capable of developing source habitat for the Townsend's big-eared bat are present in the analysis area. Source habitat capacity consists of the PVGs 2, 5, and 6 which represent approximately 11,403 acres or 99 percent of the analysis area. The analysis area does not contain the non-forest vegetation types described for source habitat.

There are no potential roost sites within the analysis area and Townsend's big-eared bats have not been documented to occur within the analysis area (IFWIS 2011, NRIS 2011). However, within a 15-mile radius of the Project area there are 34 potential bat roosts, comprised of 26 underground mines and 8 historic Forest Service structures. It is unknown if there are Townsend's big-eared bats using any of these potential roost sites. Given the proximity of possible roost sites to the analysis area, there is the potential analysis area provides foraging opportunities for the species. Currently, about 3,255 acres of source habitat occur within the analysis area, most of which is concentrated in the northern half of the analysis area where stands and plantations with low canopy cover are abundant.

3.4.6.1.2 Environmental Consequences Summary

Under Alternative A the absence of vegetation management results in decreasing foraging habitat availability for the Townsend's big-eared bat. Alternatives B, C or D would have a beneficial impact on the Townsend's big-eared bat by increasing the number of acres in the low canopy cover class in PVGs 2 and 6. The analysis area lacks roosting or hibernacula structures; therefore, so there would be no disturbance or physical impact to roost or hibernacula sites. Disturbance to foraging individuals is not expected as project activities occur during daylight and would not overlap nocturnal foraging activities. Beneficial effects are expected to result from Alternatives B, C, or D.

3.4.6.1.3 Environmental Consequences of Alternative A—No Action

Source habitat would measurably decreases, from approximately the existing 3,255 acres to 2,116 acres, as stands move out of the low canopy cover by 2030. These changes would decrease foraging habitat availability in the analysis area. Stands in the low canopy cover class are less likely to remain in that canopy class without the presence of disturbance processes, such as fire, insects and disease, or management.

3.4.6.1.3.1 Cumulative Effects

Appendix B of this document outlines the past, ongoing, and foreseeable actions considered for this analysis. Past activities that have contributed to the existing condition of source habitat in the analysis area include timber sales, the firewood program, construction, and maintenance of roads, and fire suppression. These activities either directly or indirectly contributed to manipulation of the vegetative structure in the analysis area. Ongoing activities within the analysis area that could potentially impact the Townsend's big-eared bat or its habitat in conjunction with the activities proposed in this alternative include road maintenance, NFS trails and trail maintenance, dispersed recreation, and fuelwood gathering. There are no foreseeable activities that could cumulatively impact the Townsend's big-eared bat.

Road and trail maintenance, dispersed recreation, and fuelwood cutting would not impact roosting or hibernacula as there are no such structures within the analysis area. In addition, none of these ongoing activities or projects would affect canopy cover of source habitat or

impact nocturnal foraging activities of the bat since they are daytime activities. Therefore, no cumulative impacts would be anticipated with Alternative A.

3.4.6.1.3.2 Alternative A Effect Conclusion

There would be a decline of approximately 1,000 acres in low canopy forested habitat within the analysis area. This decreases potential foraging habitat for the Townsend's big-eared bat. There would be no risk of disturbance to roost locations.

3.4.6.1.4 Environmental Consequences of Alternative B, C or D

3.4.6.1.4.1 Direct and Indirect Effects

Alternatives B, C or D would have a beneficial impact on the Townsend's big-eared bat by increasing the number of acres in the low canopy cover class in PVGs 2 and 6. Alternative B would have the greatest beneficial impact by creating the most acres in the low canopy cover class, while Alternatives C and D would do so to a slightly lesser extent and are comparable to each other. The analysis area lacks roosting or hibernacula structures; therefore, there would be no disturbance or physical impact to roost or hibernacula sites. Disturbance to foraging individuals is not expected as project activities occur during daylight and would not overlap nocturnal foraging activities.

All three action alternatives would move many stands from moderate back to low canopy cover, resulting in an increase of over 2,000 acres in source habitat for the Townsend's big-eared bat. While harvest would occur within existing source habitat, harvest prescriptions would maintain the preferred low canopy cover into the long term and these acres would be maintained as source habitat. By 2030 source habitat decreases by nearly 1,000 acres, which is entirely due to natural succession of stands moving to denser canopy closures. Even with the natural decrease, source habitat abundance under the action alternatives remains more than 2,000 acres above what could be expected under Alternative A in the long term. In addition, the modification of source habitat stands is not expected to decrease the availability of moth prey species.

3.4.6.1.4.2 Cumulative Effects

Appendix B of this document outlines the past, ongoing, and foreseeable actions considered for this analysis. Past activities that have contributed to the existing condition of source habitat in the analysis area include timber sales, the firewood program, construction and maintenance of roads, and fire suppression. These activities either directly or indirectly contributed to manipulation of the vegetative structure in the analysis area. Ongoing activities within the analysis area that could potentially impact the Townsend's big-eared bat or its habitat in conjunction with the activities proposed in this alternative include road maintenance, NFS trails and trail maintenance, dispersed recreation, and fuelwood gathering. There are no foreseeable activities included in this analysis that could cumulatively impact Townsend big-eared bat.

Road and trail maintenance, dispersed recreation, and fuelwood cutting would not impact roosting or hibernacula as there are no such structures within the analysis area. In addition, none of these ongoing activities or projects would modify canopy cover of source habitat or impact nocturnal foraging activities of the bat since they are daytime activities.

As a result, the overall effect of this alternative, when combined with ongoing and future activities within the analysis area, is that source habitat quantity would be improved in the short and long term, a beneficial impact to the Townsend's big-eared bat.

3.4.6.1.5 Determination of Effect

Alternatives B, C or D has beneficial impacts to Townsend's big-eared bat.

3.4.6.1.5.1 Rationale

- Low canopy forested habitat would increase within the analysis area in both the short and long term.
- There would be no risk of disturbance to roost locations.

3.4.7 Family 13—Riverine Riparian and Wetland

Source habitat for species in Family 13 occurs in conjunction with riverine riparian and wetland areas. Some species within the family also use non-riverine riparian and wetland habitats. Adjacent forests and woodlands provide nesting sites for some species. Columbia spotted frog was selected as the focal species for this family. For two R4 sensitive species in this family, bald eagle, and yellow-billed cuckoo, it was concluded that there would be *No Impact* on these species from either alternative because there is no source habitat for these species in the analysis area (Table 3-34 and Wildlife Technical Report). These species will not be discussed further.

3.4.7.1 Columbia Spotted Frog (Region 4 Sensitive Species)

3.4.7.1.1 Affected Environment

Columbia spotted frogs are aquatic and typically occur in or near permanent bodies of water, such as lakes, ponds, slow-moving streams, and marshes (Gomez 1994). The frogs generally occur along the marshy edges of such sites where emergent vegetation (e.g., grasses, sedges, cattails, etc.) is fairly thick and where there is an ample amount of dead and decaying vegetation. Some occupied sites may also have a layer of algae or small vegetation (e.g., duckweed) on the surface of the water. During summer months, they may travel away from breeding sites, but are still typically associated with aquatic sites with vegetated margins (Gomez 1994). Given the altitudinal range of the species, occupied aquatic sites may be surrounded by a wide variety of terrestrial vegetation including mixed coniferous and subalpine forests, grasslands, and shrub-steppe communities.

Key features of source habitat for the Columbia spotted frog include the aquatic site itself, its banks and bank-side vegetation, and the conditions of the surrounding uplands. These features can be correlated with watershed pathways used to assess the conditions of the watershed. The pathways that have relevance to the Columbia spotted frog include: watershed condition, water quality, channel conditions and dynamics, and flow/hydrology. No special habitat features have been identified for the Columbia spotted frog.

The Project area was chosen as the analysis area for the spotted frog because this area includes the Project area in its entirety and because potential impacts from the proposed project would not be expected to go beyond this area. As a result, the 11,510-acre Project

area will be used to assess impacts to the amount, distribution and quality of source habitat for this species.

No observations of spotted frogs have occurred within the analysis area (IFWIS 2011, unpublished data available in the project record).

Source habitat for this species, including overwintering, breeding, and post-breeding habitat, occurs along slow-moving portions of Scriver Creek and its larger tributaries at the edges of pools or eddies with emergent vegetation. Approximately 34.3 miles of perennial streams occur within the analysis area. While the majority of perennial streams are fast-moving with high to moderate gradients, slow-moving sections exist that could provide source habitat for the spotted frog.

The Water Quality, Channel Conditions and Dynamics, Flow/Hydrology and Watershed Condition pathways were evaluated in the Hydrologic and Fisheries Resource in section 3.6 of this document. The hydrology and fisheries analysis was conducted at the Scriver Creek subwatershed (6th Field HU) scale. This scale encompasses the spotted frog analysis area and it was assumed that conditions described within the subwatershed were representative of source habitat conditions for the spotted frog in the analysis area. The current condition of these pathways in terms of functionality ratings are presented in Table 3-47. In general, the Water Quality, Watershed Condition and Flow/Hydrology pathways are functioning poorly primarily due to high road densities within and outside of RCA corridors; while Channel Condition and Dynamics and Water Quality with respect to Chemical Contamination are currently functioning appropriately. Spotted frog source habitat in the analysis area is currently in a degraded condition.

3.4.7.1.2 Environmental Consequences Summary

Alternative A would maintain the quality of Columbia spotted frog habitat in a degraded state. Alternatives B, C, or D would incrementally improve habitat quality. Culvert replacement activities under Alternatives B, C or D have the capability of disturbing, displacing or killing individual tadpoles or frogs but would also facilitate movement up and downstream once completed. Effects to riparian vegetation from precommercial thinning within RCAs and disturbance of individual frogs while those activities are occurring would be temporary and discrete, affecting only individuals in the local population at that location and time but not impacting the population as a whole. Design features WL-1, FF-7, SW-2, SW-3, SW-8 and SW-9 under Alternatives B, C or D (see section 2.2.4.1) are intended to minimize habitat modification and disturbance effects. Alternatives C and D would replace five culverts and Alternative B would replace three. Acres of precommercial thinning remain the same for Alternatives B, C, and D.

3.4.7.1.3 Environmental Consequences of Alternative A—No Action

No direct, indirect or cumulative effects would be expected with implementation of Alternative A. The quantity of source habitat within the analysis area would not change from the existing condition. Pathways relevant to spotted frog source habitat would be maintained within current trends, in particular the Water Quality and Watershed Condition pathways. As a result, the quality of spotted frog source habitat would remain in a degraded state into the long term timeframe. Road densities would remain high and would continue to impact water quality and watershed condition (section 3.6).

3.4.7.1.3.1 Alternative A Effect Conclusion

Alternative A would maintain the quality of Columbia spotted frog habitat in a degraded state.

3.4.7.1.4 Environmental Consequences of Alternative B, C or D

3.4.7.1.4.1 Direct and Indirect Effects

Due to the presence of overwintering, breeding, and post-breeding habitat, if present, this species could be impacted by culvert replacement activities and thinning within riparian habitat. Overwintering activities would not be impacted because no work would occur adjacent to source habitat during the hibernation period. Impacts to breeding and post-breeding individuals could occur at the three culvert replacement sites where standing water may occur and within the 163 acres of precommercial thinning within RCAs. Design Feature WL-1 is included in Alternatives B, C or D to minimize or avoid impacts to sensitive species that would disrupt their reproductive success (see section 2.2.4.1)

Culvert work could disturb, displace, or even lead to mortality if individuals happen to occur in the path of the excavator and are not able to move out of the way, or if they hide in the substrate being removed. Culvert replacement activities would take place between July 1 and September 30 and overlap the metamorphosis period for the species (Bull 2005). Recently metamorphosed frogs may be at greatest risk of harm or mortality from excavation activities due to their behavior to seek out cover and hide coupled with their small size, this risk declines as mobility increases with maturity through the season. Adult spotted frogs are fairly long-lived and mobile, exhibiting movements up to 1.4 miles (Bull 2005), decreasing their risk of being harmed or killed during culvert replacement. Thinning within RCAs is not expected to have the same potential for mortality since machinery would not be used, but could still have temporary disturbance impacts from thinning crews working within RCAs. While the impacts to a small number of individuals from either culvert work or thinning activities could be substantial, impacts to the local population as a whole would be considered negligible due to the small total area modified at the three culvert sites and the small number of individuals impacted, and because spotted frogs are quite mobile and would likely be able to move away from equipment or thinning activities.

Modification of habitat by instream work is not expected to result in substantial negative impacts to spotted frog source habitat because habitat would largely remain suitable after culvert installation is completed and because these impacts would only occur at three isolated sites. The replacement of existing culverts with AOP culverts would improve the ability of spotted frogs to move from source habitat above and below the culvert. Thinning within RCAs could have temporary impacts to vegetation within the RCA, but vegetation would be expected to recover after 1 to 2 years. As a result, any impacts from habitat modification are expected to be minimal.

Proposed activities including replacement of the three existing culverts under Alternatives B and C and five culverts under Alternative D with AOP culverts, relocation of 3.3 miles of existing road prisms out of RCAs, decommissioning of 19 miles of roads and, application of aggregate and drainage improvements could have temporary negative impacts to some watershed pathways, but would ultimately improve water quality and other watershed pathways in the short and long term (section 3.6). Proposed activities would improve the

functionality rating for Sediment/Turbidity, RCAs, and Change in Drainage Network, and would maintain but show a positive trend for Streambank Condition, Road Density and Location, Change in Peak/Base Flows and Disturbance History. Improvement of these watershed pathways would improve the overall quality of source habitat within the Scriver Creek drainage for spotted frogs in the short and long term.

In addition, Design Features FF-7, SW-2, SW-3, SW-8, and SW-9 have been incorporated into the project to protect habitat within RCAs, and would further reduce the potential for impacts to spotted frogs from habitat modification or disturbance (section 2.2.4.1). .

3.4.7.1.4.2 Cumulative Effects

Appendix B of this document outlines the past, ongoing, and foreseeable actions considered for this analysis.

Past Activities

Past activities that have contributed to the existing condition of source habitat in the analysis area include timber sales, the firewood program, construction, and maintenance of roads, dispersed recreation and fire suppression. The effects from these actions are reflected in the discussion of the current condition in the analysis area.

Ongoing Activities

Ongoing activities within the analysis area that could potentially impact the Columbia spotted frog or its habitat in conjunction with the activities proposed in this alternative include road maintenance, NFS trails and trail maintenance, dispersed recreation, and the Middle Fork South S&G Allotment.

Road and trail maintenance and dispersed recreation occur primarily within existing road and trail corridors and have the potential to impact spotted frogs through disturbance or displacement where they occur in RCAs. Activities in the action alternatives for the Project may also occasionally disturb or displace individuals if implementation occurs during breeding or dispersal time periods in the spring, summer, and fall. Impacts are expected to be infrequent and limited to a few individuals within a given location.

Grazing has the potential to impact streamside riparian vegetation and trample individuals or egg masses (Bull 2005). Impacts from sheep grazing within the Middle Fork South S&G Allotment would be limited to isolated areas within RCAs where grazing is occurring. Alternatives B, C or D each propose 163 acres of precommercial thinning activities within RCAs which would have some effect on woody conifer vegetation in RCAS in addition to the effect from ongoing sheep grazing. It is unlikely this additional acreage would result in a change to riparian vegetation beyond the effects to conifers however and no cumulative effect to streamside vegetation is expected.

Alternatives B, C, or D could have temporary negative impacts from habitat modification and disturbance at the three culvert replacement sites and thinning within RCAs, but would improve the overall quality of source habitat for the spotted frog with long-term improvements to watershed pathways through road decommissioning, graveling, and installation of AOP culverts. Therefore, the cumulative impact of this alternative, when combined with ongoing activities and reasonably foreseeable actions within the analysis area, is an improving trend in source habitat quality in the short and long term.

Foreseeable Activities

Foreseeable activities included in this analysis that could cumulatively impact Columbia spotted frog are the Scriver Creek Trails Project and the Scriver Creek Snowmobile Bridge Project. Both projects could impact spotted frog source habitat and individuals during construction, but impacts would be limited to the bridge site and discrete water crossings. It is not known if Columbia spotted frogs occur at the location of these two projects.

3.4.7.1.5 Determination of Effect

Alternative B, C or D may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability for the Columbia spotted frog.

3.4.7.1.5.1 Rationale

- Columbia spotted frogs may occur in the analysis area and activities affecting either streamside vegetation or in the stream itself can disturb or displace individuals
- Implementation of the culvert replacement actions could contribute to mortality of individuals unable to move out of the path of activities.
- Displacement or harm to individuals would be limited to discrete areas within the larger analysis area.

3.4.8 Management Indicator Species

The Forest Plan defines management Indicator species (MIS) as representative species whose habitat conditions or population changes are used to assess the impacts of management activities on similar species in a particular area (Forest Service 2010a). Forest MIS were selected largely due to their use of snag habitats but also because of their association with old forest habitats, departed conditions, and natural disturbance patterns within forest communities. These types of habitats are also areas where the effects of management actions are of greatest interest due to current conditions, the types of management activities in those habitats, and the dependence of numerous wildlife species, especially species of conservation concern, on those habitats. In particular, selected MIS are associated with snags in low-elevation old forest, broad-elevation old forest, or disturbed forest habitats following events such as wildfire or outbreaks of insect or disease. Many wildlife species depend on snags, either directly for denning, nesting, or foraging habitat, or indirectly for recruitment of logs, which are then used for denning, resting, or foraging habitat.

Three wildlife species, the white-headed woodpecker, black-backed woodpecker, and pileated woodpecker, were identified as MIS in the Forest Plan (Forest Service 2010a). Direction for MIS is found in the Forest Plan FEIS Chapter 3, Wildlife section (Forest-wide goals, objectives, standards and guidelines); Appendix E; and Chapter 4, Monitoring and Evaluation (Forest Service 2010b).

Fifty MIS monitoring transects/500 point counts were established on the Forest in 2004 to monitor pileated woodpeckers and white-headed woodpeckers. Data have been collected annually since 2004 during the breeding season. The black-backed woodpecker was added as a MIS in 2010 (Forest Service 2010a) and the monitoring protocol for this species is currently in draft.

3.4.8.1 White-headed Woodpecker

The white-headed woodpecker was selected as an MIS in the Forest Plan because it is likely linked to a suite of other species that use source habitats tied to large trees, open canopy conditions, large snags, and old-forest habitat in low-elevation forests dominated by ponderosa pine that developed under nonlethal and mixed1 fire regimes. The white-headed woodpecker is a Forest sensitive species and was also selected as a focal species for this analysis. A description of this species, its habitat requirements, existing condition in the Project area, the analysis area, and occurrence records, has been described in section 3.4.4.1.

Population Trend—Population trend data for white-headed woodpeckers is limited. Apart from attempting to collect trend data on the Forest, reliable trend data for white-headed woodpeckers in Idaho does not exist (Sauer et al. 2005). In general, woodpeckers are not well suited for trend monitoring using BBS protocols because vocalizations occur in early spring before surveys are conducted (IDFG 2005).

As noted above, annual monitoring is ongoing. Although there has been 8 years of data collection (through 2012), data have not been collected long enough to establish a Forestwide population trend for the species (Forest Service 2010a). Detection rates on MIS surveys for white-headed woodpeckers have been low, supporting a belief that this species is uncommon and not well-distributed on the Forest. White-headed woodpeckers are a USFS Region 4 sensitive species and a species of conservation concern for the state of Idaho. Throughout the species' range, it is considered vulnerable, imperiled, or critically imperiled (NatureServe 2012c).

Habitat Trend—Source habitat trends for this species are downward at all scales. Source habitat declined more than 60 percent throughout the ICB and declined by approximately 60 percent within the Central Idaho Mountains ERU which overlays much of the Forest (Wisdom et al. 2000). At the Forest-scale, source habitat for this species has declined from historical levels and is currently substantially below the HRV (Nutt et al. 2010). Projected forest trends under the Forest Plan are upward although it is expected to take approximately 70 years for source habitat quantities to move within the HRV (Nutt et al. 2010). Most importantly, the Forest Plan increases source habitat under the guidance of a short- and long-term restoration strategy. The strategy, together with Forest Plan direction for retaining large tree size class forest stands, old-forest habitat, legacy ponderosa pines, and large snags, addresses immediate concerns of habitat loss and threats for white-headed woodpeckers, thereby, providing a better foundation from which cumulative results can develop.

Trend Discussion—All three action alternatives would increase the amount of white-headed woodpecker source habitat immediately after harvest and into the long term, although Alternative B would have the largest increase in source habitat amount and average patch size. All three action alternatives would create enough source habitat within PVG 2 habitat types to form a single potential home range, again with Alternative B forming the largest and most continuous potential home range. All three action alternatives would shift species composition toward desired species (ponderosa pine) and away from shade-tolerant species, essentially moving these stands back into the HRV, with Alternative B resulting in the most acres of increase for this habitat parameter. Total road densities would decrease within source habitat following implementation of all three action alternatives, improving the quality of source habitat through reduced disturbance and snag removal within road corridors. Large

snag densities would remain within desired ranges following harvest and would increase into the long term. As a result, while all three action alternatives would result in more source habitat for the white-headed woodpecker, Alternative B would have the largest gain in source habitat quantity and quality for this species (Figure 3-20 and Table 3-36).

Alternatives B, C or D would be consistent with the Forest Plan for activities within an active, high Vegetation Restoration Priority area, although the number of acres being affected would not demonstrably change source habitat trends at the scale of the Forest, this project does incrementally contribute to larger efforts to improve the quantity and quality of source habitat. Although individual white-headed woodpeckers may be affected by proposed activities, any individuals within the Project area that benefit from improvements to source habitat would incrementally contribute toward a positive population trend but would not in or of itself affect population trends at the scale of the Forest.

3.4.8.2 Pileated Woodpecker

The pileated woodpecker was selected as a MIS for the Forest because of its association with broad-elevation old forest and habitat components including large trees, snags, and logs. This species was also selected as a focal species for this analysis, and a description of the pileated woodpecker, its habitat requirements, existing condition in the Project area, the analysis area, and occurrence records, are described in section 3.4.5.3.

Population Trend—Population trend data for pileated woodpeckers are limited although the species is considered secure globally and is apparently secure in Idaho (Natureserve 2012b). Breeding Bird Survey (BBS) analyses suggest that pileated woodpecker populations have increased throughout their range (Sauer et al. 2005). Western BBS Region data show a modest annual increase of 2.2 percent between 1966 and 2007. Idaho data shows an annual increase of 2.0 percent ($p = 0.39$, $n = 18$) during the same period. Finer-scale BBS data are limited, so these results should be interpreted with caution (Sauer et al. 2007).

As noted above, annual monitoring is ongoing. Although there has been 8 years of data collection (through 2012), data have not been collected long enough to establish a Forest wide population trend for the species. Information to-date shows detection rates fluctuating year-to-year. Annual detections are reported in the Forest Plan Annual Monitoring Report (Forest Service 2010).

Habitat Trend—The BBS population trend data is supported by an assessment of broad scale changes in source habitats in the Interior Columbia River Basin (ICB). In the ICB, source habitats for pileated woodpeckers showed strong declines in 30 percent of Ecologic Reporting Units (ERUs), predominantly north of the Forest, while 60 percent of ERUs showed moderate or strong increases (Wisdom et al. 2000). Within the Central Idaho Mountain ERU, which overlays most of the Forest, source habitats for pileated woodpeckers increased 21 percent relative to historical levels, despite ecologically significant declines in some late-seral forest cover types (e.g., interior Douglas-fir) (Wisdom et al. 2000). At the Forest-scale source habitat for this species has declined from historical levels and is currently below HRV (Nutt et al. 2010). However, pileated woodpeckers appear to take advantage of departed conditions that develop in the absence of disturbance processes such as fire or vegetation management. When source habitat is added together with departed conditions (acres which develop similar structural conditions and tree species compositions, as a result of disrupted disturbance processes), habitat quantities are within HRV (Nutt et al. 2010).

Projected habitat trends of source habitat, and source habitat plus departed habitat, is on an increasing trend on the Forest (Nutt et al. 2010). Although it is not desirable for source habitat acres to be below the HRV, more forested acres are aging and increasing in size class and density than can be managed with silvicultural or fire tools on the Forest (Nutt et al. 2010). Consequently, the extent and quantity of pileated woodpecker source habitat is expected to develop regardless of management activities rather than only from them.

Trend Discussion—All action alternatives would reduce source habitat abundance within the analysis below what would be expected to occur under Alternative A, primarily from reductions in canopy cover that move densities under 60 percent for nesting and 30 percent for forage habitat. Nesting habitat would correspondingly decrease as well under all three alternatives. A substantial portion of the reductions in forage habitat was a result of stands in PVG 2 being moved back into HRV. While there were some losses of forage habitat within PVGs 5 and 6, most stands that fell below canopy cover requirements for nesting habitat in these PVGs shifted to forage habitat. As a result, forage habitat generally increased under all three alternatives due to reductions in nesting habitat. Of the three action alternatives, Alternative D retains the most total source habitat (nesting and forage) through the modeling period (Table 3-41).

Alternatives B, C, and D would maintain five potential home ranges with no modification, would maintain three with minor reconfiguration, and would result in the acceptable loss of one potential home range that occurred within PVG 2 habitat types. Alternative B would retain the most nesting habitat within the analysis area immediately following harvest, while Alternative D would retain the most nesting habitat into the long term. Average patch size of source habitat would be less in Alternatives B, C, and D than Alternative A throughout the modeling period for all action alternatives, although Alternative C would retain the next largest average patch size. All three action alternatives would reduce total road densities compared to Alternative A. Alternative D results in the largest decrease in total road density within the analysis area throughout the modeling period.

Considering the abundance of source habitat within the watershed and the increasing trend of source habitat plus departed conditions on the Forest, the loss of source habitat under Alternatives B, C or D would not change the overall trend for source habitat for this species. Although individual pileated woodpeckers may be affected by proposed activities that reduce source habitat, this would not result in a loss of this species' presence or ability to survive and reproduce in the Scriver Creek Project area due to the abundance of habitat that would remain into the long term. The individuals within the Project area contribute toward but do not largely represent the pileated woodpecker population at the scale of the Forest and there would be no change in population trends at that scale as a result of the Project.

3.4.8.3 Black-backed Woodpecker

Black-backed woodpeckers were selected as a MIS for the Forest in 2010 (Forest Service 2010a) because of their association with high numbers of snags in disturbed forests, use of late-seral old forest conditions, and relationship with beetle outbreaks in the years immediately following fire or insect or disease outbreaks. Management activities, such as salvage logging, timber harvest, and firewood collection, can affect this species. This species was also selected as a focal species for this analysis, and a description of the black-backed

woodpecker, its habitat requirements, existing condition in the Project area, the analysis area, and occurrence records, are described in the Wildlife Technical Report in the Project Record.

Population Trend—Reliable data on the population trend for the black-backed woodpecker is not available (Nutt et al. 2010). Black-backed woodpeckers are rarely detected on the North American BBS, and there are relatively few BBS survey routes in montane and northern boreal forests; therefore, data are adequate only for the broadest-scale trend estimates (NatureServe 2012a). In general, woodpeckers are not well suited for trend monitoring using BBS protocols because vocalizations occur in early spring before surveys are conducted (IDFG 2005).

Habitat Trend—Source habitat trends for this species are mixed at the ICB scale within the Central Idaho Mountains ERU which overlays much of the Forest (Wisdom et al. 2000). Historical and existing estimates are nearly equal. At the Forest-scale the overall trend for source habitat for this species has declined from historical levels, but trends in the northern portion of the Forest, including the Emmett RD, are increasing (Nutt et al. 2010). Projected forest trends under the Forest Plan are upward as source habitat quantities are expected to move within the HRV within the first decade (Nutt et al. 2010).

Trend Discussion—Alternative B would reduce source habitat for black-backed woodpeckers in Alternatives B, C, or D by around 700 acres each. In general, existing habitat becomes unsuitable as a result of reductions in canopy cover. The reduction of source habitat within PVG 6 habitat types was necessary to shift species composition to desired conditions in stands where ponderosa pine and Douglas-fir were being outcompeted by grand fir.

As another form of comparison, potential home ranges were developed using the existing amount and distribution of source habitat within the black-backed woodpecker analysis area. Forty-five potential home ranges could be developed with available source habitat. Initially following implementation of Alternatives B and D there would be a reduction of about five home ranges under Alternative B and four home ranges under Alternative D; however, source habitat would recover enough by 2030 such that 47 potential home range could be formed in Alternative B and 46 in Alternative D; a net gain within the modeling period ending in 2030. Alternative C similarly reduces the number of home ranges by five but ends up with a net loss of one home range by the end of the 2030 modeling period.

Considering the abundance of source habitat within the watershed and the increasing trend of source habitat on the north end of the Forest, even with the loss of source habitat equivalent to one potential home range within the analysis area under Alternative C there would be no change in overall trend for population or source habitat for this species.

3.4.9 Migratory Birds

The Migratory Bird Treaty Act decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. Under the Act, taking, killing or possessing migratory birds is unlawful. The original intent was to put an end to the commercial trade in birds and their feathers that had wreaked havoc on the populations of many native bird species. On January 17, 2001, President William Clinton signed an executive order (No. 13186) directing executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act.

The Forest Service and USFWS Service have entered into a memorandum of understanding (MOU) to promote the conservation of migratory birds as a direct response to the executive order (Forest Service and USFWS 2008). One of the steps outlined for the Forest Service is applicable to this analysis: “Within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors.” The Forest Service additionally agreed, to the extent practicable, to evaluate and balance benefits against adverse effects, to pursue opportunities to restore or enhance migratory bird habitat, and to consider approaches for minimizing take that is incidental to otherwise lawful activities.

For the analysis of migratory birds in this project, the Idaho Partners in Flight Bird Conservation Plan (Ritter 2000) was used to identify relevant migratory bird species and habitats. This plan takes a habitat-based approach to conserving bird populations in Idaho and correlated priority bird species with four habitats of highest priority as well as ten habitats identified as important (Ritter 2000). Most priority birds identified in the Idaho Bird Conservation Plan (IBCP) were identified as such due to concerns about conservation. Since the IBCP was developed in 2000, a State Comprehensive Wildlife Conservation Strategy has been developed (IDFG 2005). It is expected the IBCP, which is more than a decade old, will be updated in the future to tie priority bird species more closely to the State Comprehensive Wildlife Conservation Strategy’s species of conservation concern. Until that occurs, the priority species identified in the IBCP will be used to meet the agreement defined in EO 13186.

Idaho PIF priority migratory bird species are displayed in Figure 3-49 and are shown with the high priority habitats they represent. Only priority habitats present in the Project area and that may be affected by proposed activities are displayed in the table. The Wildlife Technical Report (Project Record) includes the complete table of all Idaho PIF highest priority habitats and associated priority migratory bird species.

Table 3-47. Relationship of the Idaho Partners in Flight Highest Priority Habitats to the Source Habitat Families and Migratory Bird Species discussed

Idaho PIF Highest Priority Habitats	Corresponding Habitat Family	Idaho PIF Priority Migratory Bird Species	Priority Migratory Bird Species Analyzed in Report
Dry Ponderosa Pine/Douglas-fir/Grand Fir Forests (Aspen can occur)	Predominantly Family 1- Low Elevation Old Forest; overlaps some of Family 2—Broad Elevation Old Forest	White-headed woodpecker, Flammulated owl	Flammulated Owl White-headed Woodpecker
Riparian	Family 13—Riverine riparian and wetland	Barrow's Goldeneye Hooded Merganser Blue Grouse Mountain Quail Black-chinned Hummingbird Calliope Hummingbird Rufous Hummingbird Willow Flycatcher Dusky Flycatcher Black-billed Magpie American Dipper Yellow Warbler MacGillivray's Warbler	Mountain Quail
Other Important Habitats identified by Idaho Partners In Flight Associated with Priority Migratory Bird Species			
Low-elevation mixed conifer	Predominantly Family 2-Broad Elevation Old Forest Habitat; some overlap with Family 1 Low Elevation Old Forest Habitat	Sharp-shinned Hawk Northern Goshawk Lewis' Woodpecker Williamson's Sapsucker Black-backed Woodpecker Brown Creeper Varied Thrush Townsend's Warbler Western Tanager	Northern Goshawk Black-backed Woodpecker

Three high priority habitats in Idaho (Ritter 2000) would be affected in this project. Priority bird species associated with these habitats have been discussed in this report and the effects to the species and their habitat have been analyzed. For the white-headed woodpecker, flammulated owl, northern goshawk, and mountain quail effects to these species' habitat are summarized in sections 3.4.4.1, 3.4.5.1, 3.4.5.2, and 3.4.5.5, respectively. Further discussion of population trend and habitat trend has been completed for the white-headed woodpecker and black-backed woodpecker in sections 3.4.9.1 and 3.4.9.3, respectively.

In general, effects to migratory birds from proposed activities have been minimized by considering the timing of activities to minimize disturbances during the breeding season; retaining snags for nesting structures where snags are underrepresented; and retaining the integrity of breeding sites. Proposed vegetation management activities have been developed to move macro-vegetative structure (tree size class, tree species composition and /or tree canopy cover) toward desired conditions representative of the historic range of variability of

those plant communities. In addition to retaining the integrity of breeding sites, this is expected to continue to provide habitat used for migration routes, and stopover habitat.

Alternatives B, C, or D would comply with the Migratory Bird Treaty Act but may result in an "unintentional take" of individuals during proposed activities. However the project complies with the U.S. Fish and Wildlife Service Director's Order #131 related to the applicability of the Migratory Bird Treaty Act to Federal agencies and requirements for permits for "take". In addition, this project complies with EO 13186 because the analysis meets agency obligations as defined under the 2008 Memorandum of Understanding between the Forest Service and FWS (Forest Service and FWS 2008) designed to complement EO 13186. If new requirements or direction result from subsequent interagency memorandums of understanding pursuant to EO 13186, this project would be reevaluated to ensure that it is consistent.

3.5 AIR QUALITY

This section incorporates by reference the Fuels and Air Quality Specialist Report (available in the Project record), which contains data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on air quality. The analysis area for direct, indirect, and cumulative effects to air quality consists of a 62-mile radius around the Project area. This area was used to evaluate impacts of smoke generated from proposed activities on sensitive areas, including mandatory Class I areas, non-attainment areas, maintenance areas, and/or populations centers, as directed by the Forest-wide air quality guideline ASGU02 (Forest Service 2010a, p. III-17). While the air quality analysis (available in the Project Record) was completed for a 62-mile radius of the Project area, only maintenance areas, mandatory Class I and Class II areas, and population centers/sensitive areas within a 15-mile radius of the Project area will be presented. A 15-mile radius was selected because the smoke modeling results indicated that only sensitive areas within a 15-mile radius of the Project area would potentially be impacted by smoke generated by project activities. In addition, the 15-mile distance is the radius used for the Forest burn plan sensitive area evaluation.

Indicators

Although several pollutants listed in the standards can be identified in smoke from burning vegetation, particulate matter (PM) is typically of most concern from a human health and visibility standpoint (Story and Dzomba 2005). In 1987, the EPA established annual and 24-hour National Ambient Air Quality Standards (NAAQS) for PM_{10} and $PM_{2.5}$. The $PM_{2.5}$ NAAQS applicable for this project is 35 $\mu g/m^3$ in a 24-hour period. $PM_{2.5}$ is the standard of focus, as 80 percent of smoke combustion of woody biomass is smaller than 2.5 microns (Story and Dzomba 2005) and is more likely to affect health by lodging deeply in the lungs. Based on this standard, $PM_{2.5}$ is the Indicator used in the Smoke Impact Spreadsheet (SIS) for analyzing particulate matter impacts from prescribed burn treatments within the Project area.

Analysis Methodology

To ensure compliance with NAAQS, the SIS (Air Sciences Inc. 2003) was used to estimate smoke production, dispersion, and potential impacts to receptors within a 62-mile radius of the Project area based on common weather and fuel moisture conditions when burn activities occur. The model can predict 1-hour average and 24-hour average $PM_{2.5}$ concentrations at

increments of distance either straight downwind or at a user-defined offset. Site-specific wind direction, wind speed, mixing height, and ventilation index inputs for SIS were obtained from local Fuel's specialist knowledge of the area, and historical Remote Automated Weather System (RAWS) data. The modeling process for burning assumes approximately 20 landing piles per day would be treated and 60 percent of the proposed underburn would be ignited in one burn period.

3.5.1 Affected Environment

The basic framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act (CAA), as amended in 1990 and 1998 (EPA 1998). The CAA was designed to protect and enhance air quality. Although smoke from wildfire is considered a natural event by the EPA's Natural Events Policy, smoke generated from prescribed burning must meet federal land and State air quality standards set forth in the CAA. Several parts of the CAA, as amended, could apply to the use of prescribed fire (management-ignited) activities. Meeting federal and State standards is primarily accomplished through the implementation of the NAAQS. To protect human health and comfort, the EPA established the NAAQS according to the federal CAA amendments of 1977. In addition to the NAAQS, sections or provisions of the CAA, as amended, may apply to project-level analysis, including General Conformity, Prevention of Significant Deterioration, and Regional Haze.

The Project area lies within Boise and Valley counties and within the lower southwest corner of the Montana/Idaho (MT/ID) Airshed 21A. The MT/ID Airshed Group was created to minimize or prevent adverse smoke impacts that may occur while using fire to accomplish land management objectives.

Ambient air quality for this area is likely to be good due to the lack of urban and industrial sources that are primary sources of man-made pollutants, and a minimum of other activities that would generate pollutants. Relatively minor amounts of pollutants could come from fugitive road dust, motorized vehicles, prescribed fire and wildfire, or other rural or agricultural activities.

In 1998, the State of Idaho developed a monitoring network to determine designations for $PM_{2.5}$. The initial placements of monitors were near urban and industrial sources of pollutants such as Boise, Caldwell, and Nampa. In the MT/ID Airshed 21A, there are three ambient air monitors located near Idaho City, McCall, and Garden Valley. Specific ambient air concentration data for the MT/ID Airshed 21A are lacking, but according to EPA's AirData records (http://airquality.deq.idaho.gov), Garden Valley (the closest monitoring station to the Project area) recorded a 24-hour average of 4.6 $\mu g/m^3$ of $PM_{2.5}$ in 2003. No PM_{10} data was available at this site.

Table 3-48 lists the maintenance area, Class I, and Class II areas within a 62-mile radius along with population center/sensitive areas within a 15-mile radius of the Project area. Table 3-48 includes where smoke impacts may occur, approximate distances, general direction from the Project, and if the sensitive area is in line with prevailing winds and pooling of smoke down-drainage.

Table 3-48. Summary of the Air Quality Sensitive Areas, Including Maintenance, Class I, and Class II Areas within a 62-mile Radius along with Population Centers/Sensitive Areas within a 15-mile Radius of the Scriver Creek Integrated Restoration Project

Identified Sensitive Areas	Name	Approximate Distance from Project Area (air miles)	Approximate Direction from Project Area	In Line with Prevailing Winds	In Line with Pooling of Smoke Down-Drainage
PM_{10} Maintenance Area (Note: former non-attainment area for PM_{10})	North Ada County, Idaho	40	Southwest	No	No
Population Center(s)	Boise "Impact Zone"	46	Southwest	No	No
	Banks	8	Southwest	No	No
	Lowman	16	Southeast	No	No
	Smiths Ferry	4	Northwest	No	No
	Garden Valley	8	South	No	Yes
	Crouch	6	South	No	Yes
	Homes Adjacent to Project Area	2	South	No	Yes
	Terrance Lakes	3	South	No	Yes
	High Valley	7	West	No	No
	Ola	14	West	No	No
Other Sensitive Areas and Recreation Centers	Boiling Springs	6	Northeast	Yes	No
	Silver Creek Plunge	6	Northeast	Yes	No
	Sagehen Reservoir	10	Northwest	No	No
	Deadwood Reservoir	14	East	No	No
	Big Eddy and Cold Springs Campgrounds	4	West	No	No
	Highway 55	4	West	No	No
Mandatory Class I Areas	Sawtooth Wilderness	40	East	No	No
Class II Areas	Frank Church River of No Return Wilderness	25	Northeast	Yes	No

3.5.1.1 General Conformity

No mandatory Class I areas, maintenance areas, or non-attainment areas occur within the Project area, so elements pertaining to General Conformity do not apply and will not be discussed further in this document. In addition, the EPA regards prescribed fire as a temporary and short-lived area source EPA 1998) that must meet federal land and State air quality standards set forth in the CAA (section 160) and the NAAQS. In Idaho, coordination and compliance with the MT/ID Airshed Group is also necessary. The MT/ID Airshed Group was created to ensure air quality guidelines are not violated through the cumulative additions of members' management actions to existing levels of pollutants. The MT/ID Airshed Group has been certified to the EPA by the IDEQ to meet the necessary smoke management program basic elements of the Interim Policy. This group monitors daily emissions, burning activities, and particulate matter levels with established monitoring units and certified meteorologists to estimate whether NAAQS are within compliance. Since IDEQ does not yet apply prevention of significant deterioration (PSD) increments to prescribed fire activities and burning of post-harvest slash due to their temporary and short-lived sources, those activities will not be discussed further in this document. Air quality discussion and analysis will focus on NAAQS.

3.5.1.2 Regional Haze

National goals exist for improving visibility in Class I areas. The Sawtooth Wilderness is the closest mandatory Class I area within the analysis area (Table 3-48). Studies conducted at similar or nearby Class I areas (primarily wilderness areas) indicate that visibility is better in the western half of United States than the eastern half; the average visual range in the west is 33–90 miles (EPA 2011). Pollutants contributing to visibility impairment include sulfates, organic carbon, and nitrates, and are primarily from industrial or urban activities. Elemental carbon (i.e., soot) from wood combustion and soil also contribute to visibility impairment. In the western United States, 5–15 percent of visibility impairment is attributable to elemental carbon (NWCG 2001). Particulate matter from prescribed burning would be a source of elemental carbon.

The Regional Haze Rule was designed by the EPA to call on States to establish goals for improving visibility in mandatory Class I areas and to develop long-term strategies for reducing emissions of air pollutants that impair visibility. Idaho does not yet have a State Implementation Strategy to address regional haze or visibility impairment and no standards are currently enforced. Therefore, regional haze will not be discussed further.

3.5.1.3 National Ambient Air Quality Standards

The EPA has established NAAQS for the following six pollutants: carbon monoxide (CO), lead (Pb), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM). Although several pollutants listed in the standards can be identified in smoke from burning vegetation, PM is typically of most concern from a human health and visibility standpoint (Story and Dzomba 2005). The EPA established annual and 24-hour NAAQS for PM_{10} in 1987, and for $PM_{2.5}$ in 1997. The PM_{10} NAAQS is 150 µg/m^3 in a 24-hour period. The $PM_{2.5}$ NAAQS applicable to this Project is 35 µg/m^3 in a 24-hour period. About 80 percent of smoke combustion of woody biomass is smaller than 2.5 microns (Story and Dzomba 2005), therefore the $PM_{2.5}$ standard is the focus of this air quality analysis.

3.5.2 Environmental Consequences of Alternative A—No Action

3.5.2.1 Direct and Indirect Effects

Alternative A does not propose any management actions no direct effects to air quality would occur. Air quality impacts from existing sources, such as dust and vehicle emissions, would be expected to continue in the analysis area.

A greater risk of a wildfire exists with this alternative (section 3.3) and, consequently, air quality would be impacted if one were to occur in the analysis area. While the occurrence of a wildfire in the analysis area is speculative, if a wildfire were to occur, it would have a different and unpredictable impact than would a controlled, prescribed burn. Prescribed fire effects usually last for a short time, are managed, and may be mitigated. Smoke from wildfire is unmanageable. It can occur when dispersion is poor, is likely to occur in large quantities with abundant particulates, and lasts longer than planned ignitions. The duration and severity of air quality degradation from wildfire is difficult to predict. In general, a wildfire occurring in a previously untreated area would be expected to produce more particulate matter at one time than prescribed burning because of the greater amount of fuel consumed (EPA 1992, NWCG 2001). Large wildfires can adversely impact air quality for weeks, as demonstrated by the 1986 Anderson Creek, 2006 Rattlesnake, and 2007 Middle Fork fire complexes near the Garden Valley and Crouch, Idaho.

3.5.2.2 Cumulative Effects

3.5.2.2.1 Past Activities

Appendix B, Table B 1 of this document outlines the past, ongoing, and foreseeable actions evaluated for inclusion in this analysis. The following activities in the analysis area that are identified in Appendix B may contribute to cumulative effects: past, present, and future vegetation management, prescribed burning, fire suppression as needed, and livestock grazing. There are no past projects that, when combined with this alternative, would result in a measureable incremental change on air quality.

3.5.2.2.1.1 Present/Ongoing Activities

Present/ongoing activities which impact air quality would be expected to continue. These impacts include dust and vehicle emissions from present and/or ongoing activities, such as recreational uses, road use and maintenance, trail use and maintenance, livestock grazing, vegetation management activities, and fire suppression as needed.

3.5.2.2.1.2 Reasonably Foreseeable Activities

Reasonably foreseeable future actions considered in this cumulative effects analysis include burning activities associated with the present/ongoing timber sales (Frontier, Stolle 7, and Peacemaker) located to the northeast of the Project area. The fuel treatment activities with these sales would be limited to burning of landing piles. Other reasonably foreseeable future actions would include prescribed burning associated with the Rocky Canyon Prescribed Fire Project to the north and east of the Project area.

Because Alternative A does proposed to implement any management activities that would have a direct or indirect effect on air quality, there would be no cumulative impact on air quality in the analysis area should Alternative A be selected.

3.5.3 Environmental Consequences Common to all Action Alternatives

3.5.3.1 Direct and Indirect Effects

Smoke from prescribed underburning of activity fuels would temporarily reduce air quality. Burning would likely occur in spring or fall and would be scheduled to occur when fuel moistures and atmospheric conditions are conducive to meeting resource objectives. Other activities that could temporarily reduce air quality would be smoke, dust, and vehicle emissions that result from implementing any action alternative. These air pollutants could combine with those from other sources, including prescribed fires, wildfires, rural or agricultural activities, industrial sources, and/or recreation uses on adjacent National Forest System, State, and private lands. Each of these activities is largely driven by seasonal opportunities or requirements and it is likely they would occur simultaneously with proposed activities. The impacts of these activities are largely unforeseen, of short duration, and widely spaced over vast, complex terrain, and although degradation of air quality could occur at localized sites, it would not be expected to measurably impact air quality in the analysis area.

Although all action alternatives would have temporary direct impacts (1–3 days) on air quality standards, the air quality levels would be in compliance with State and federal air quality regulations. Additionally, the underburn activities would be implemented at a time when visitor use to the area would be at lower levels. To ensure compliance with NAAQS (EPA 2011) the SIS was used to estimate smoke production, dispersion, and potential impacts to receptors based on common weather and fuel moisture conditions when burn activities would occur. The model can predict 1-hour average and 24-hour average $PM_{2.5}$ concentrations at increments of distance either straight downwind or at a user-defined offset. Site-specific wind direction, wind speed, mixing height, and ventilation index inputs for SIS were based on professional judgment and knowledge of the area. Application of Project Design Features AQ-1, AQ-2, and AQ-3 (as described in section 2.4.5) would ensure the prescribed fire is in prescription when the burn is ignited and smoke is monitored throughout the ignition. The Project design features also requires coordination with federal, State, and local governments, as well as notifying the public of potentially affected areas, including posting of warning signs on primary access routes.

Smoke dispersal output generated by SIS (for both the proposed underburn of activity fuels and landing pile burn treatments) indicate that impacts to all sensitive areas outlined in Table 3-48 would be in compliance with the $PM_{2.5}$ standards when combined with average ambient pollutants. For underburn treatments, SIS was used to represent the proposed underburn, about 962 acres for Alternative B, and 949 acres for Alternatives C and D, to generate smoke in a single-day burn with no wind offset. There is a slight difference when comparing the effects of Alternative B to those of Alternatives C and D; Alternative B adds approximately 13 acres of underburn treatment. This small difference would not have a significant impact on overall $PM_{2.5,}$ so the largest number of underburn acres (Alternative B) was used in the modeling process. This situation represents the worst-case scenario for smoke conditions and $PM_{2.5}$ standards. The worst-case scenario smoke conditions and the $PM_{2.5}$ standards for the landing pile burn treatments for all action alternatives was modeled

using SIS to represent the pile type, size, material, and number of acres impacted (10 acres) to generate smoke in a single-day burn with no wind offset. Outputs for the prescribed underburn, as well as the landing piles, indicated that within 1 mile, $PM_{2.5}$ generated would be below the 24-hour $PM_{2.5}$ NAAQS (Figure 3-43). SIS outputs illustrate that the landing pile burn treatments are within 24-hour $PM_{2.5}$ NAAQS at all distances from the landing pile burn activities (Figure 3-44).

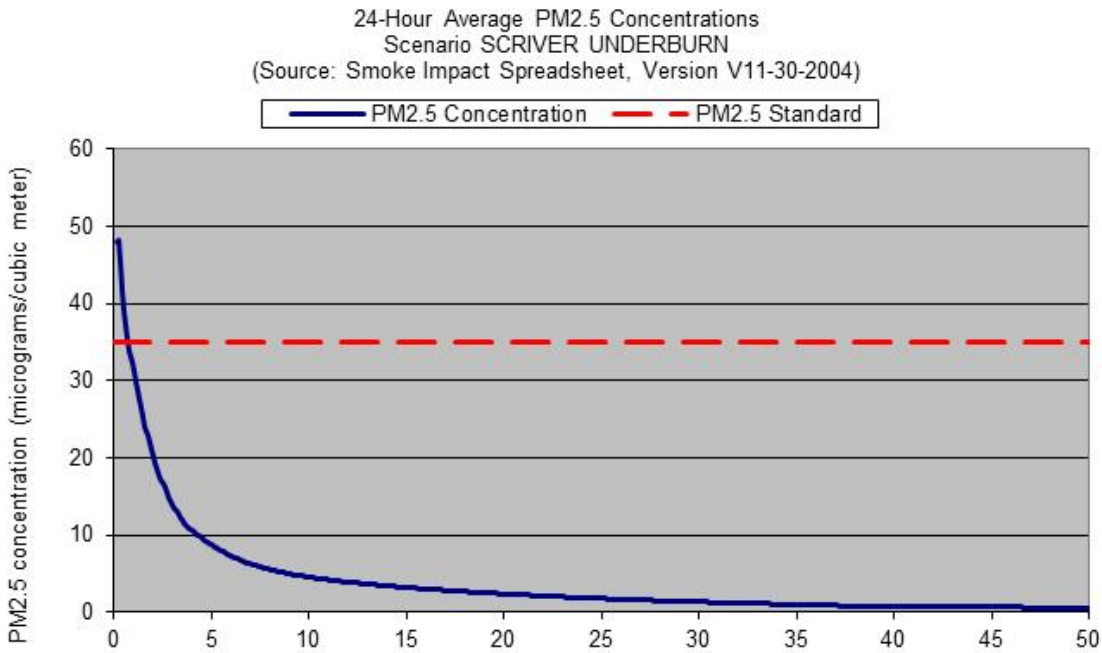

Figure 3-43. Scriver Creek Integrated Restoration Project Underburn 24-hour $PM_{2.5}$ Standard SIS Results of Proposed Underburn Activities in Micrograms Per Cubic Meter (y axis) and Distance from Source in Miles (x axis)

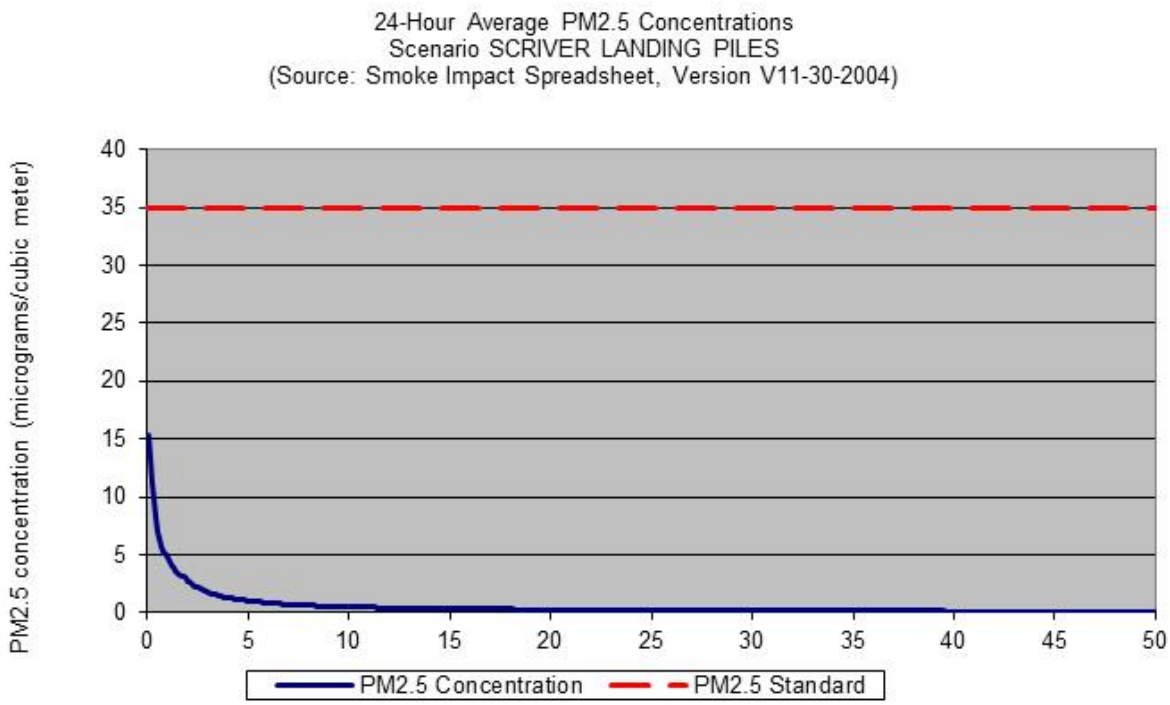

Figure 3-44. Scriver Creek Integrated Restoration Project Underburn 24-hour $PM_{2.5}$ Standard SIS Results of Proposed Landing Pile Burn Activities in Micrograms Per Cubic Meter (y axis) and Distance from Source in Miles (x axis)

Prior to any burning activities, the Emmett RD fuels specialist would prepare prescribed burn plans specifically addressing site, fuel moisture, and weather conditions. Burning activities would be coordinated with other entities that may impact the same airshed. In addition, coordination with the MT/ID Airshed Group would be required. As an active partner in the Airshed Group, the Forest must submit all planned prescribed burn projects prior to such activities taking place. Based on weather conditions and other proposed activities within the airshed, a decision is made by the Airshed Group as to whether or not a burn can be implemented on a given day.

3.5.3.1 Cumulative Effects

3.5.3.1.1.1 Past Activities

Appendix B, Table B 1 of this document outlines the past, ongoing, and foreseeable actions evaluated for inclusion in this analysis. The following activities in the analysis area that are identified in Appendix B may contribute to cumulative effects: past, present, and future vegetation management, prescribed burning, fire suppression as needed, and livestock grazing. No past burning activities, when combined with proposed activities, would result in a noticeable incremental change on air quality.

3.5.3.1.1.2 Present/Ongoing Activities

Present/ongoing activities which impact air quality would be expected to continue. These impacts include dust and vehicle emissions from present and/or ongoing activities, such as recreational uses, road use and maintenance, trail use and maintenance, livestock grazing, vegetation management activities, and fire suppression as needed.

3.5.3.1.1.3 Reasonably Foreseeable Activities

Reasonably foreseeable future actions considered in this cumulative effects analysis include burning activities associated with the present/ongoing timber sales (Frontier, Stolle 7, and Peacemaker) located to the northeast of the Project area. The fuel treatment activities with these sales would be limited to burning of landing piles. Other reasonably foreseeable future actions would include prescribed burning associated with the Rocky Canyon Prescribed Fire Project to the north and east of the Project area. Actions associated with this project would not be expected to cumulatively impact air quality when combined with any of the action alternatives given that burn activities would likely be carried out in different years and different seasons, the distance of this project from Project area, and the prevailing wind direction.

Smoke, dust, and vehicle emissions that result from any action alternative could combine with air pollutants from other projects, including other prescribed fires, wildfires, mining activities, and/or recreation uses on adjacent National Forest System, State, and private lands. Each of these activities is largely driven by seasonal opportunities or requirements that present similar parameters on resource managers, landowners, and users to conduct their activities simultaneously. Even though the impacts of these activities are largely unforeseen; of short duration; and widely spaced over vast, complex terrain, cumulative impacts to air quality could occur at localized sites, if activities are implemented at the same time.

The Forest is a member of the MT/ID Airshed Group and would use the services of their meteorologist and the most appropriate smoke monitoring unit to determine the appropriate day burning could be implemented and not exceed NAAQS. Should a cumulative airshed problem be detected, immediate action would be taken to curtail the Project’s contribution by delaying or coordinating timing of burning operations.