

APPENDIX A OTHER ISSUES

INTRODUCTION

A number of issues were considered, but not determined to be “significant” factors in the decision process for the proposed activities associated with the Smith Creek Vegetation Treatment Project (See pp. 2-7 through 2-15). Following are the analyses/discussions of these issues.

A. Noxious Weeds

Affected Environment

Noxious weeds can have a long-term biological impact on the ecosystem: they can displace native plants; change fire frequency; increase soil erosion; and alter soil nutrient levels.

Control of noxious weeds is required by the *State of Montana County Noxious Weed Management Act*, by *The Federal Noxious Weed Act of 1974*, and by *Executive Order 13112, Invasive Species, February 3, 1999*. Also, the Gallatin Forest Plan (page II-28) requires the Forest to “confine present infestations and prevent establishing new areas of noxious weeds. ...Funding for weed control on disturbed sites will be provided by the resource which causes the disturbance.”

Table A-1 provides a list of the current weed species and estimated population size, within the proposed units and adjacent (within 500 feet) to the proposed units. Acres adjacent to the units may be counted twice due to the close proximity of other proposed units.

Table A-1. Current Estimated Weed Populations In Proposed Units

Unit Number	Species	Acres Inside Units With Weeds	Acres Adjacent to Units (500 feet) With Weeds
A-1	Canada thistle	2 ac	0 ac
A-2	None	0 ac	0 ac
B	Canada thistle	0 ac	2.11 ac
	Musk thistle	0 ac	2.11 ac
	Houndstongue	0 ac	2.11 ac
C	Canada thistle	3.17 ac	0 ac
	Musk thistle	3.17 ac	0 ac
	Houndstongue	3.17 ac	0 ac
D	None	0 ac	0 ac
E-1	None	0 ac	0 ac
E-2	None	0 ac	0 ac
F	Spotted knapweed	0 ac	11 ac
	Musk thistle	0 ac	11 ac
	Common tansy	0 ac	0.1 ac
G	Canada thistle	0 ac	6.34 ac
	Musk thistle	0 ac	6.34 ac
	Houndstongue	0 ac	7.34 ac
H	Spotted knapweed	5 ac	1.5 ac
	Musk thistle	5 ac	1.5 ac
I	none	0 ac	0 ac
J (Alt 3)	Canada thistle	0 ac	2 ac
	Musk thistle	0 ac	2.5 ac
	Houndstongue	0 ac	2.5 ac
	Spotted knapweed	0 ac	0.1 ac

Spotted Knapweed

Introduction: Originally from Eurasian, spotted knapweed has become well established throughout western United States. Spotted knapweed is a perennial that lives up to nine years, producing 5,000 to 40,000 seeds/m² per years. Seeds remain viable in the soil for more than seven years. Plant densities correlate to the degree of soil disturbance: the greater the disturbance, the higher the density. However spotted knapweed is also capable of invading non-disturbed areas.

The knapweed invasion is associated with reductions in biodiversity, wildlife and livestock forage, and increased soil erosion. “Spotted knapweed reduces livestock and wildlife forage. Watson and Renney (1974) found that spotted knapweed infestations decreased bluebunch wheatgrass (*Pseudoroegneria spicata*) yield by 88 percent. Elk use, as estimated by pellet groups/acre, was reduced by 98 percent on spotted knapweed-dominated range compared to bunchgrass-dominated sites (Hakim 1979).” (Sheley and Petroff. 1999. Page 351).

“Spotted knapweed dominance on bunch grass rangeland is also detrimental to water and soil resources. Lacey et al. (1989) determined that surface water runoff and stream sediment yield were 56 percent to 192 percent higher, respectively, for spotted knapweed-dominated sites compared to bunchgrass – dominated sites. Bare ground was greater and water infiltration rates were less on spotted knapweed sites than on bunchgrass sites (Lacey et al. 1989)” (Sheley and Petroff. 1999. Page 351).

Habitat at Risk: Spotted Knapweed occurs in all areas with open forest-grassland interface on well developed to dry soils, also forms dense stands in more moist well-drained soils. Knapweed has been observed at elevations ranging from 1,900 to 10,000 feet and in precipitation zones ranging from 8 to 79 inches (Sheley and Petroff. 1999. Page 351). Spotted knapweed plant is well adapted to this environment and capable of growing anywhere within the analysis area given sunlight and a seed source.

Canada Thistle

Introduction: Probably native to southeastern Europe and the eastern Mediterranean area, Canada thistle is now well established throughout North America. Canada thistle is an aggressive perennial weed that spreads by both seeds and by roots. “If left unmanaged, Canada thistle has the potential to form dense infestation. An individual seedling can spread rapidly, forming a large patch through vegetative reproduction of the root system.” (Sheley and Petroff, page 165).

Canada thistle displaces native forbs and grasses, decrease forage production, and limits recreation use due to the sharp spines of the leaves.

Habitat at Risk: Canada thistle has a wide habitat range and has been in the United States long enough to have spread to all areas in which it has adapted. It is found in open areas with moderate or medium moisture levels. Canada thistle grows in areas with temperature range of 32 to 90 degree Fahrenheit, with precipitation of 16 to 30 inches, and in clay to sandy soils. This species is so prevalent in this area that active management is limited to isolated roadside treatments.

Musk Thistle

Introduction: Originally from Europe, Musk thistle has become well established throughout western United States. Musk thistle is an aggressive biennial (can also be an annual) that depends upon seed production for reproduction and spread. Seeds may survive in the soil a decade or more. “Musk thistle germination is favored on poorly vegetated sites; seedlings establish only on bare soils (Feldman et al. 1968, Doing et al. 1969)” (Sheley and Petroff, page 152). It reduces forage production and utilization. Cattle will not graze on musk thistle allowing for it to compete strongly with grasses and other desirable plants for water, light and nutrients.

Musk thistle is commonly found along roadsides, railroad rights-of-way, fence borders, unimproved areas and in pastures and hay meadows. The economic impact of musk thistle is greatest in pastures and rangeland. Moderate infestations of musk thistle have been reported to reduce pasture yields an average of 23 percent. Livestock won't graze around musk thistle plants or in heavily infested areas (Jennings, Lorenz, Boyd, Steinkraus and Kring, paragraph 8).

Habitat at Risk: Musk thistle has been known to occupy habitats ranging from saline soils in low altitude valleys to acidic soils in elevations ranging from 8,000 to 10,000 feet. Musk thistle will germinate and grow under a wide range of environmental conditions. It is commonly found in pastures, roadsides, and waste places. It prefers moist, bottom land soil, but can be found on drier uplands, also.

Houndstongue

Introduction: Houndstongue is native to Eurasia and has spread throughout the United States and Canada. It is found in Washington, Oregon, Wyoming, and Montana. Hounds tongue is a strong competitor with native vegetation. The seeds have the ability to attach to people, livestock and vehicles, enabling the plant to spread great distances. The plant is also poisonous to cattle and especially horses. No information is available about toxicity to wildlife, however, the plant is considered non-palatable under range conditions and livestock will avoid it. Hounds tongue plants are able to resist mowing and severe drought.

Habitat at Risk: Hounds tongue prefers hot, dry summers and cold winters and soils ranging from well drained, relatively course, alkaline soils to clay subsoil in open coniferous forest. It is shade tolerant plant and thrives in wetter grasslands. It is frequently found on roadsides, meadows and disturbed places. It is carried by livestock and wildlife into many suitable habitats and can be found in scattered and remote locations.

Common Tansy

Introduction: Originally native to Europe, this plant has a long history of medicinal uses. It is an invader of disturbed sites and is commonly found on roadsides, fence rows, pastures, stream banks and waste areas throughout North America (LeCain and Sheley, page 2). It is well established throughout most of the northern US and Canada. Common tansy mainly depends on seed production for reproduction and spread, but it can also reproduce by creeping rhizomes. This plant contains alkaloids that are toxic to humans, wildlife and livestock.

Habitat at Risk: Common tansy grows at low- mid-elevations along roadsides, stream banks, in disturbed habitats, and pastures. It grows best in full sun and in fertile, well-drained soil. It may threaten the ecological health through reduction in livestock forage, wildlife habitat and species diversity.

Direct and Indirect Effects

The potential effects of the proposed treatment units to the spread of noxious weeds are of two types: direct and indirect. The “direct effects” would be those effects that would result in spreading weed seeds or root fragments into the treatment units. For example, moving equipment from one unit to the next (without cleaning), could directly result in the spread of weeds. An effective mitigation would be to wash off-road equipment prior to moving to each unit.

“Indirect effects” would be those effects that create habitat susceptible to invasion of noxious weeds. Removing the forest canopy and creating soil disturbance next to an established population of weeds could indirectly result in the spread of weeds. Most of the invasive weeds in the project area are along roadways and in areas where the plant community lacks closed tree canopy. Given the close proximity of seed and root sources to the proposed treatment units, creating a forest with an open crown canopy makes the establishment of new weed patches possible for some of the proposed units.

Table A-2 provides a summary of the current weeds and the risk of weed invasion for each unit (Alternative 3 is the same as Alternative 2 with the addition of the Meadow Creek burn unit). The presence or absence of weeds is based on the most current weed inventory. The determination of Habitat Suitability is based on literature review. The determination of Risk of Invasion is based on a combination of the these three variables: “Very High” equals a “Yes” for all three variables; “High” is when the weeds are present and the habitat is suitable; “Low” is when the habitat is suitable but no weeds are present in the vicinity; “None” is when the habitat is not suitable.

Units that have a “Very High” risk of weed invasion are the following: Unit H. Units that have a “High” risk of weed invasion include: Unit A1, B, C, F, G and J. Units that have a “Low” include: Units A-2, D, E-1, E-2 and I.

Table A-2 Summary of Weed Risk for Each Unit and Species of Concern

Unit #	Species	Weeds Present Within Unit	Weeds Present Adjacent to Unit	Habitat Likely for Weed Expansion	Risk of Weed Invasion
A-1	Spotted knapweed	No	No	Yes	Low
	Musk thistle	Yes	Yes	Yes	High
	Canada thistle	Yes	Yes	Yes	High
	Houndstongue	Yes	yes	Yes	High
	Common tansy	No	No	Yes	Low
A-2	Spotted knapweed	No	No	Yes	Low
	Musk thistle	No	No	Yes	Low
	Canada thistle	No	No	Yes	Low
	Houndstongue	No	No	Yes	Low
	Common tansy	No	No	Yes	Low
B	Spotted knapweed	No	No	Yes	Low
	Musk thistle	No	Yes	Yes	High
	Canada thistle	No	Yes	Yes	High
	Houndstongue	No	Yes	Yes	High
	Common tansy	No	No	Yes	Low
C	Spotted knapweed	No	No	Yes	Low
	Musk thistle	Yes	No	Yes	High
	Canada thistle	Yes	No	Yes	High
	Houndstongue	Yes	No	Yes	High
	Common tansy	No	No	Yes	Low
D	Spotted knapweed	No	No	Yes	Low
	Musk thistle	No	No	Yes	Low
	Canada thistle	No	No	Yes	Low
	Houndstongue	No	No	Yes	Low
	Common tansy	No	No	Yes	Low
E-1	Spotted knapweed	No	No	Yes	Low
	Musk thistle	No	No	Yes	Low
	Canada thistle	No	No	Yes	Low
	Houndstongue	No	No	Yes	Low
	Common tansy	No	No	Yes	Low
E-2	Spotted knapweed	No	No	Yes	Low
	Musk thistle	No	No	Yes	Low
	Canada thistle	No	No	Yes	Low
	Houndstongue	No	No	Yes	Low
	Common tansy	No	No	Yes	Low
F	Spotted knapweed	No	Yes	Yes	High
	Musk thistle	No	Yes	Yes	High
	Canada thistle	No	No	Yes	Low
	Houndstongue	No	No	Yes	Low
	Common tansy	No	Yes	Yes	High
G	Spotted knapweed	No	No	Yes	Low
	Musk thistle	No	Yes	Yes	High
	Canada thistle	No	Yes	Yes	High
	Houndstongue	No	Yes	Yes	High
	Common tansy	No	No	Yes	Low

Unit #	Species	Weeds Present Within Unit	Weeds Present Adjacent to Unit	Habitat Likely for Weed Expansion	Risk of Weed Invasion
H	Spotted knapweed	Yes	Yes	Yes	Very High
	Musk thistle	Yes	Yes	Yes	Very High
	Canada thistle	No	No	Yes	Low
	Houndstongue	No	No	Yes	Low
	Common tansy	No	No	Yes	Low
I	Spotted knapweed	No	No	Yes	Low
	Musk thistle	No	No	Yes	Low
	Canada thistle	No	No	Yes	Low
	Houndstongue	No	No	Yes	Low
	Common tansy	No	No	Yes	Low
J	Spotted knapweed	No	Yes	Yes	High
	Musk thistle	No	Yes	Yes	High
	Canada thistle	No	Yes	Yes	High
	Houndstongue	No	Yes	Yes	High
	Common tansy	No	No	Yes	Low

Alternative 1 – No Action

With Alternative 1 (No Action), existing trees would continue to grow and provide more shade (assuming no stand replacing wildfire disturbance). Since most weeds do not grow as well in shaded areas, allowing the trees to form a closed canopy would slightly reduce the amount of habitat suitable for weeds. This alternative, however, would not significantly change the presence of weeds from the current situation.

As displayed in Table A-2, some units have a moderate risk for weed spread. These units currently have established weeds and the crown canopy has small openings, which allow the weeds to grow. Once the weeds are present in the ecosystem, there is always a risk that the plants will spread.

However, should a stand replacing fire occur and result in a very open crown canopy, the weeds could spread throughout the entire area until they become shaded from conifer regeneration that would establish over time.

Alternative 2 - Proposed Action

As displayed in Table A-2, Unit H has a “very high” risk of spread. A rating of “Very High” means that weeds are already present in the area and that the proposed vegetation treatment may open enough of the forest canopy to increase the susceptibility of the unit, which may allow the weeds to spread throughout the area.

Units A1, B, C, F, and G are at “High” risk of invasion. A rating of High means that weeds are present within a 500 foot radius of the proposed project areas. The combination of opening up the forest canopy and creating some amount of soil disturbance next to an established population of weeds could indirectly result in the spread of weeds. Weed populations would, however, be treated with herbicide, and would continue to receive treatment until the plants are eradicated.

Units A-2, D, E-1, E-2 and I are at “low” risk to weed invasion because they are not in close proximity to an existing weed patch. Washing off road equipment prior to entering these units would mitigate the risk of introducing weeds from treatment activities.

Three packages for improving roads within the project area are being proposed. Treatment A would be a mandatory item to be implemented with the project, and Treatments B and C would be implemented if sufficient funding was generated.

Treatment A would include roadside clean-up and blading of roads post-treatment, and installation and removal and rehab of a temporary culvert on Bear Mountain View Road to access Unit B. These treatments are not designed to significantly upgrade the overall road surfaces to improve access. Pre-treating all weed infestations along road ways before road treatments would help to reduce the risk of introducing weeds into the project area.

Treatments B and C would improve Smith Creek Road #991, Goat Mountain Road # 6636, and East Fork Smith Creek Road #6635 to a three season standard including 6” surfacing on residential access roads and 4” spot surfacing on seasonally gated roads. These treatments would improve access in the Smith Creek drainage during spring and fall allowing less adventurous recreationists to use the area. With these treatments, use only certified weed free surfacing and pre-treat existing weed infestations along roadsides to mitigate for new infestations into the project area.

Small populations of Canada thistle, musk thistle, houndstongue, spotted knapweed and common tansy can be contained at current level if these areas are not disturbed (avoid driving equipment through the infected area and leave cover around the perimeter of the patch). These areas are currently being treated with herbicide, and would continue to receive treatment until the plants are eradicated.

Preventing weeds from expanding into the proposed treatment areas would require annual monitoring and treatment of the proposed units. Funding for these types of activities would be available from the value of the timber removed with this project. Monitoring and weed treatments are mandatory with implementation of this alternative.

Alternative 3 - Proposed Action and Meadow Creek Burn

With Alternative 3, the direct and indirect effects would be the same as Alternative 2 with the exception of the Meadow Creek burn unit (Unit J). This unit is at a “High” risk of weed invasion. A rating of High means that weeds are present within a 500 foot radius of the proposed project area.

The effects of burning on the proliferation of weeds varies depending on burn intensity, time of year, weeds present, soil moisture at time of burn and other factors. In general, prescribed burning without any associated ground disturbance (road building and timber harvest) results in far less weed expansion than in burning associated with ground disturbing activities. If burning removes the entire overstory canopy (stand replacing wildfire), and burn intensities are high, a large percentage of weed seeds may also be burned. Under these conditions, native herbaceous plants may also have been damaged and may be slow to recover, colonize bare ground, combat hydrophobic soils and compete with non-native species.

It is anticipated that the spread of weeds from treatment activities in this burn unit would be relatively low, since there are no known weed infestations and no roads within this unit. However, as stated above, there are documented weed infestations within 500 feet of this project, mainly along road ways. Most of the infestations along roads are currently being treated by the Forest Service.

Preventing the weeds from expanding into the proposed treatment area would require annual monitoring and treatment of the proposed units, which would be required with implementation of either of the action alternatives (Alternatives 2 & 3).

Cumulative Effects Analysis

The following past, current, and future activities within the proposed project area boundary for the cumulative effects analysis have introduced weeds to several disturbed sites. Past harvest activities on National Forest and private land; Smith Creek Fire 1994; grazing allotments; private residences; recreation opportunities such as trailheads, ATV use, trails; 2007 road maintenance treatments, private land treatments and road and trail closures (Travel Plan Decision). All of these areas either currently contain weeds or have the potential to spread weeds. In turn, these areas pose a threat in introducing weed seeds to freshly disturbed areas within close proximity.

Alternative 1 – No Action

This alternative would leave the forest canopy intact, acting somewhat as a vegetative barrier, and would help to contain the weeds to the current infestation areas. Infestations created from past activities would likely continue to be present in various areas. Funding for herbicide spraying would be dependent on district range and weed dollars. New soil disturbance from utilization of mechanical equipment would not occur; therefore susceptibility to invasion by certain weed

species may be somewhat less. Reduction of noxious weeds through treatment, on National Forest, would continue as sites are identified and as funding allows.

Alternative 2 (Proposed Action) & Alternative 3 (Proposed Action and Meadow Creek Burn

The proposed Smith Creek Vegetation Treatment Project is adjacent to previously harvested areas that contain some weed infestations. Removing the forest canopy could allow some weeds to spread from the current locations into some of the proposed units. However, with the mitigation measures such as (but not limited to) winter logging, pre and post spray treatments, and reseeding, the impacts of the proposed vegetation treatments to the rate of spread and density of weeds in the project area may stay the same or even decrease. No other vegetation management projects are currently proposed on National Forest lands. Weed mitigation and effectiveness of such is outlined on pp. 2-33 & 2-34.

Applicable laws, regulation, and Forest Plan Guidance

Noxious weed prevention and control procedures are described in Forest Service Region 1 Supplement to Forest Service Manual 2080 and the Final Environmental Impact Statement and Record of Decision for the Gallatin National Forest Noxious and Invasive Weed Treatment Project (June 2005). These guidelines outline responsibilities and methods to manage noxious weeds at Forest and District levels. They include numerous best management practices to be followed during activities associated with the Smith Creek Vegetation Project. The Manual implements an integrated approach of education, prevention, suppression, and monitoring.

Control of noxious weeds is required by the State of Montana County Noxious Weed Management Act, by The Federal Noxious Weed Act of 1974, and by Executive Order 13112, Invasive Species, February 3, 1999. Also, the Gallatin Forest Plan (page II-28) requires the Forest to “confine present infestations and prevent establishing new areas of noxious weeds. Funding for weed control on disturbed sites will be provided by the resource which causes the disturbance.” Alternatives 2 & 3 would comply with these laws, regulations, policy and Forest Plan direction. Funding for weed control would come from the value of the timber harvested in conjunction with this project.

B. Livestock Grazing

Affected Environment

Proposed vegetation treatments could directly, indirectly or cumulatively affect livestock grazing allotments. Livestock grazing has been an important use of lands within and around the Gallatin National Forest since the 1800's. Grazing has been authorized since the formation of the Gallatin National Forest in the early 1900's and it continues to be an important part of our region's economy today. The Smith Creek Fuels Reduction project is located on the west side of the Crazy Mountains within the upper Shields River watershed. Vegetation types range from open, rolling grasslands and sagebrush to areas of forested range.

The Three Peaks Grazing Allotment and the currently vacant Meadow Creek Allotment lie within the immediate project area with the Smith Creek Allotment to the north. A recent Decision Notice (Upper Shields Range Allotment EA and Decision 2006) was issued for these allotments allowing for adaptive management techniques to be utilized in managing these allotments if necessary.

The Gallatin Forest Plan (GFP) set goals and objectives for management of rangeland habitats and livestock grazing. Overall goals are to maintain or improve the forage resources and provide for a small increase in livestock grazing (FP, p. II-1).

Direct and Indirect Effects

The potential effects of the proposed treatment units on the livestock grazing allotments are of two types: direct and indirect. Treatments that are likely to occur in the winter when livestock are absent are not expected to have any direct effects. Treatments that may occur while livestock are present, can directly effect their distribution throughout the allotment.

An "indirect effect" would be those effects that would change distribution of the cattle within the grazing allotments or effect forage production quantity and quality.

Alternative 1 - No Action

With the No Action Alternative, there would be no direct or indirect effects on livestock grazing (assuming that there are no large wildfires). The existing allotments would continue under current management as described in the Upper Shields Allotment Decision Notice and Environmental Assessment (2006).

Alternative 2 - Proposed Action

The Three Peaks Allotment is the only grazing allotment within the project area that contains treatment activities. There are six proposed units within the grazing allotment: Units A-1, A-2, B, C, D and G. All of these proposed treatments have several objectives, one of which would directly affect livestock grazing (enhancement of aspen regeneration). Removing conifers within these aspen stands would help enhance regeneration; this would also remove some barriers allowing for wider distribution of cattle; possibly causing trampling and browsing of new aspen plants. Pre-treatment livestock exclosures may be used to determine effects of grazing vs. non-grazed areas. If livestock grazing is determined to have major effects on the aspen regeneration, then adaptive management techniques such as post-treatment fencing, changes in livestock grazing strategies utilizing, and/or non-use of the Three Peaks Allotment would be implemented. The potential of utilizing these adaptive management techniques has been discussed with the permit holder. The allotment permittee will be notified when and where project related activities will commence and when activities are finished.

Units A-1, B, D and G are proposed to be primarily treated during the winter months, allowing for no direct effect on livestock grazing. Indirect effects may include different grazing patterns and distribution due to the possibility of some amount of follow-up hand treatments of residual fuels in these units that could occur outside of the winter months.

Units A-2 and C are hand treatment units that could be treated during the summer months, which may directly affect the distribution patterns of the cattle using the allotment. Gates would be kept closed at all times. If livestock are found where they don't belong, the Livingston Ranger District Range Manager or range specialist would be immediately contacted and the situation resolved with the permittee.

Three treatments for improving roads within the project area are proposed. Treatment A would be mandatory to complete with implementation of Alternatives 2 or 3. Treatments B and C would be implemented if sufficient funding was generated by the sale of products from the project or by other funding (See Map, M-6 and Table A-24). None of these Treatments would affect livestock grazing within the allotments.

Alternative 3 - Proposed Action and Meadow Creek Burn

With Alternative 3, the direct and indirect effects would be the same as with Alternative 2. There would be no additional direct or indirect effects from the proposed prescribed burn within the Meadow Creek Allotment to livestock grazing since the allotment is currently vacant and is proposed to be closed.

Cumulative Effects Analysis

The following past, current, and future activities within the proposed project area boundary for the cumulative effects analysis would have effects to livestock grazing: Past harvest activities on National Forest and Private Land; Smith Creek Fire 1994; Private Residences; Recreation opportunities such as trailheads, ATV use, trails; 2007 road maintenance treatments, Private Land treatments and Road and Trail Closures (2007 Travel Plan Decision). All of these activities have caused or may cause livestock to behave differently (i.e. different grazing patterns, avoiding recreationists, etc.).

Alternative 1 - No Action

Alternative 1 would leave the forest canopy intact with high risk for a stand replacing wildfire that could cause major changes to the vegetation types and livestock grazing patterns. It is anticipated that private land fuel treatments will continue into the future. These treatments, however, would not be large enough to have effects on livestock grazing unless they occur directly within the grazing allotment.

Alternative 2 - Proposed Action & Alternative 3 - Proposed Action and Meadow Creek Burn

The above mentioned activities in conjunction with the activities proposed by Alternatives 2 and 3 could or would likely vary livestock behaviors such as different grazing patterns. Although the grazing patterns may change, adaptive management techniques available from the Upper Shields Environmental Assessment (2006) will help to protect the natural resources while accommodating livestock grazing.

Applicable laws, regulation, and Forest Plan Guidance

The Gallatin Forest Plan provides overall management direction in the form of objectives, guidelines and standards. The objectives for range resources include: Improved forage management will be used to maintain or enhance the range environment and to provide for increased animal unit months (AUMs); Development and use of available forage will depend upon the livestock industry's ability and desire to make the necessary investments and the Plan calls for continuing to administer about 15,000 AUMs of grazing use on private lands that are intermingled with National Forest lands within grazing allotments. There are several guidelines and standards from the Forest Plan (FP, p. II-20). The main guideline applicable to this project is: Structural and nonstructural improvements to increase forage production will be planned and scheduled through the allotment management process. Both of the action alternatives would increase forage production for ungulates. All of the alternatives would be in compliance with Gallatin Forest Plan standards.

C. Recreation (Includes Trails, Roadless and Unroaded Discussions)

Affected Environment

The Smith Creek drainage is heavily roaded and includes several Forest Service trails. The area has thus become popular with motorized recreationists; especially users of ATVs. The presence of many closed roads makes management of ATVs particularly difficult in the Smith Creek drainage. The Gallatin National Forest Travel Plan (Dec. 2006) identifies designated motorized routes in the drainage. All other routes currently in use will become closed to motorized use. National Forest System Trails or Road systems currently used by recreationists in the project area include Scab Rock Trail #261, Lower Scab Rock Trail #262, East Fork of Smith Creek Road, and the Main Smith Creek Road. National Forest System Trails or Road systems currently used by recreationists in the project area are described in Table A-3 below. Changes in travel management in the Smith Creek area due to the new Gallatin National Forest Travel Plan include:

- New seasonal restrictions on Goat Creek Road #6636 starting in the southwest corner of Section 1 : closed Dec 2 - June 15
- East Fork Smith Creek Road #6635 - lower gated closed Oct 15 - Jun 15 (change from Jan1 - Apr 30)
- Smith Creek Road #991 - new gate where road enters southern border of Section 31. Gate closed Dec 2 - June 15
- East Fork Smith Creek / Bitter Creek area - new designated ATV/Motorcycle/Mtn bike trails
- Honey Run Trail #130 - the portion of the trail along the ridge of Bald Ridge will be closed to motorized
- 10-20 miles of uninventoried motorized routes in the Smith Creek and Shields drainage will not be designated as motorized routes and thus closed to motorized use.

Table A-3 Descriptions of NFS Trails/Roads Used for Recreational Purposes

Trail/Road	Description
Scab Rock Trail #261	This trail begins at the end of Goat Mountain Road #6636 and connects to Smith Creek Road #991. The trail is 2.0 miles long. The trail was designed for ATV users and utilizes old road prisms. Hikers, horses, mountain bikes, motorcycles and ATVs all utilize this trail. There is a trailhead bulletin board at the trailhead.
Lower Scab Rock Trail #262	This trail begins approximately 0.5 miles southeast along Goat Mountain Road #6636 from the Scab Rock Trail Trailhead. The trail is 0.7 miles long and connects to the Scab Rock Trail #261. Hikers, horses, mountain bikes, motorcycles and ATVs all utilize this trail. The trail was designed for ATV users and utilizes old road prisms.
East Fork Smith Creek Road	This road begins at the Smith Creek Road #991 and continues for 6.9 miles. Motorized users use this road to access the East Fork of Smith Creek drainage, the Meadow Creek drainage and the Lodgepole Creek drainage.

Goals, objectives and standards are further defined in the 2006 Travel Plan by Travel Planning Area. The Shields Travel Planning Area includes the Smith Creek Vegetation Treatment Project area.

The goals for summer recreational use include:

“to provide opportunities for summer recreation use with an emphasis on regulated motorized/mountain bike use in the Smith Creek portion of the Travel Planning Area”

The goals for winter recreational use include:

“to provide opportunities for winter recreation use including both snowmobiling and cross-country skiing”.(TP, Detailed Description of the Decision, II-164).

Objectives include achieving the goals stated above through the route-by-route-decisions made through the Travel Plan. Future proposed changes to the uses specified in the Travel Plan will be done in consideration of the targeted recreation setting to be provided (TP, Detailed Description of the Decision, II-164). The targeted recreation setting for summer recreation in this area of Smith Creek is Roaded Natural. The targeted recreation setting for winter recreation in this area is Motorized Semi- Primitive (Recreation Opportunity Spectrum maps, October 2006).

Roaded Natural Settings are generally characterized as mostly natural-appearing environments with moderate evidence of the sights and sounds of man. Resource modification and utilization practices are evident but harmonize with the natural environment. All of the proposed treatment areas are in Roded Natural areas in the summer.

Motorized Semi-Primitive Settings are predominately natural-appearing environments where there is often evidence of other users and moderate probability of solitude. Vegetation alterations are very small in size and number and are widely dispersed and visually subordinate. This setting characterizes the majority of the Smith drainage in the “winter” season when snow covers the landscape. The roads are not plowed during the winter season. Some dispersed snowmobiling occurs in the drainage during the winter but is generally limited to owners of cabins in the area. All of the proposed treatment areas are in Semi Primitive Motorized areas in the winter.

Recreational/scenic driving is one of the most popular recreational uses on Forest Service roads in the Smith Creek drainage. Dispersed camping occurs at several sites along the main Smith Creek Road #991. Camping in the area is especially popular during the September–November hunting seasons. The conditions of the Smith Creek Road #991, East Fork of Smith Creek Road #6635 and Goat Mountain Road #6636 affect the recreational access to the project area. All three roads have no base material and little surfacing. During wet periods the roads become muddy, rutted and very slippery thus reducing access during the fall hunting period and spring months. Resource damage has occurred at one site along the East Fork of Smith Creek where it intersects Smith Creek Road #991.

Some snowmobiling occurs during the winter months in the Smith Creek drainage. There are no marked or groomed snowmobile routes in the area but many owners of cabins on private land in the drainage use snowmobiles for access to their cabins and for recreation in the drainage. The Smith Creek drainage is also popular with horsemen, hikers and to a lesser extent, mountain bikers. Many of these users have cabins on the adjoining private property. The public also utilizes the Smith Creek area for firewood gathering. There are currently no outfitters permitted by the National Forest operating in the Smith Creek drainage and there are no rental cabins, developed campgrounds, recreational residences or organizational camps.

The Smith Creek drainage is also popular with horsemen, hikers and to a lesser extent, mountain bikers. Many of these users have cabins on the adjoining private property. The public also utilizes the Smith Creek area for firewood gathering. There are currently no permitted outfitters operating in the Smith Creek drainage.

Roadless Areas: An inventory of roadless lands has been maintained on the Forest since the early 1970's. The current inventory was displayed most recently in the Roadless Final Rule (36 CFR 294, USDA 2001) and may also be found in Appendix C of the Gallatin Forest Plan EIS (USDA 1987).

The Smith Creek drainage includes portions of the Box Canyon Roadless Area. The Box Canyon Roadless Area includes the headwaters of Smith Creek and Sixteenmile Creek, including Bald Ridge, and an area on the Lewis and Clark National Forest.

Roadless areas are to be analyzed to determine the effects of any proposed activity that would substantially alter the roadless characteristics of IRAs so as to render them unsuitable for future designation as wilderness. Roadless qualities and characteristics to be evaluated under this mandate include:

Remoteness: Remoteness is a perceived condition of being secluded, inaccessible, and out of the way. Physical factors that can create a "remote" setting include topography, vegetative screening, difficulty of travel, and distance from human impacts such as roads and structures. A user's sense of remoteness in an area is also influenced by the presence of roads, their condition, and whether they are open to motorized vehicles.

Solitude: Solitude is a personal, subjective value defined as isolation from the sights, sounds, and presence of others and human development. Common indicators of solitude are the number of individuals or parties one may expect to encounter in an area during the day, or the number of parties camped within sight and sound of other visitors. Solitude is directly related to remoteness of an area and primitive, unconfined recreational opportunities.

Natural Integrity: Natural integrity of an area is related to its physical setting and the extent to which long-term ecological processes are intact and operating. Impacts to natural integrity are measured by the presence and magnitude of human-induced change to the area. Possible impacts include physical developments (e.g. roads, utility rights-of-way, fences, lookouts, cabins), recreation developments, domestic livestock grazing, mineral developments, wildlife and fisheries management activities, vegetative manipulation, and fire suppression activities.

Apparent Naturalness: The apparent naturalness of an area means the environment looks natural to most people using the area. It is a measure of importance of visitors' perceptions of human impacts to the area.

Special Features: Special features are those unique geological, biological, ecological, cultural, or scenic features that may be located in the roadless portion of the project area.

Manageability of Boundaries: This relates to the ability of the Forest Service to manage an area to meet the size criteria (minimum size requirement of 5,000 acres for wilderness) and the five elements discussed above.

None of the proposed treatment areas are within the Box Canyon Roadless Area and all treatment areas are at least a mile outside of the Roadless Area boundary. Thus, the proposed actions would not alter the potential eligibility of the area for inclusion into the Wilderness system.

Unroaded Areas: The Roadless Area Conservation FEIS (2000) defines “unroaded” areas as any areas without the presence of classified roads, and of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. “Unroaded” areas do not overlap with Inventoried Roadless Areas (IRA) nor are they located within designated Wilderness. We do not find “unroaded” or additional “inventoried roadless” resources to be an issue in the Smith Creek WUI Fuels Reduction Project area.

The U.S. Ninth Circuit Court of Appeals, in a Region 1 briefing paper entitled “NEPA Analysis of Unroaded Areas”¹ indicates that site-specific parameters used to consider Wilderness and Roadless qualities and characteristics are useful in assessing the effects of site-specific projects on “unroaded” resource values. Specifically, impacts to Remoteness, Solitude, Natural Integrity, Apparent Naturalness, Special Features, and Manageability and Boundaries and the effects of any proposed activity that would substantially alter these characteristics as to render the area as unsuitable for future wilderness designation. Also considered are effects to:

1. High quality or undisturbed soil, water and air,
2. Sources of public drinking water,
3. Diversity of plant and animal communities,
4. Habitat for threatened and endangered species,
5. Primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation,
6. Reference landscapes,
7. Natural-appearing landscapes with high scenic quality,
8. Traditional cultural properties and sacred sites and,
9. Other locally defined unique characteristics.

All treatment areas associated with the action alternatives fall within roaded areas of past timber harvest. Many are also bounded by developed private property. These strips and chunks of “unroaded” lands are not of a sufficient size or configuration to allow the protection of the inherent characteristics associated with an “unroaded” condition and therefore do not contain “unroaded” resource

¹ This paper references a 12/2/03 decision in the Sierra Club vs. Austin (Lolo Post Burn EIS). “ The court indicated the FS should analyze the unique values of unroaded areas based on the 9 roadless characteristics (from 36 CFR Part 294.11)”.

values. Furthermore, the current condition of the “unroaded” portion of the proposed project area does not have the features that would make it suitable for wilderness recommendation in Forest planning.

Most proposed treatment areas are bisected or are adjacent to existing roads and/or are interspersed within past cutting units, and private property. The presence of these developments dictates that the project area currently doesn’t provide apparent naturalness, remoteness, or solitude. No unique special features are known to exist in the treatment areas.

Direct and Indirect Effects

Direct Effects are those that alter recreation use or opportunities at Forest Service recreation facilities and in dispersed areas. Indirect effects would cause changes to the area’s setting, including ambiance and sense of place, which is usually caused by the change in scenery and screening from vegetative treatment.

Alternative 1 - No Action Alternative

Alternative 1 would not affect existing recreation opportunities, settings, or activities. The existing landscape character and sense of place would remain the same unless there was a stand replacing wildfire in the area.

Alternative 2 - Proposed Action Alternative

When considering the effects to recreation opportunities and use, it is important to recognize the relation between the effects on visual quality and the recreational setting or sense of place to recreationists. The recreational setting includes the amount of screening vegetation that would be modified due to vegetation treatments. For more information please see the Visuals section in this chapter on pp. A-24 through A-30.

The proposed fuels management activities are not outside the scope of what could be expected to take place in a recreation area such as this. Roaded Natural settings are generally characterized as mostly natural-appearing environments with moderate evidence of the sights and sounds of man. Resource modification and utilization practices are evident but harmonize with the natural environment. All existing recreation opportunities will continue to be available but in a modified visual setting. Fuel treatments located near recreational facilities will occur during the winter and thus will not impact summer recreational use of the facilities. Winter recreation will be disrupted in several areas, including the plowing of Smith Creek Road #991. The area’s long-term recreation opportunity is not expected to be affected.

All proposed activities are within the Roaded Natural category during the summer months. (Refer to the recreation setting description above.) Roaded Natural settings by definition are environments where cultural modifications have taken place and will continue. All winter proposed activities are within the Semi Primitive Motorized recreation setting. Semi Primitive Motorized settings also by definition are environments where cultural modifications have taken place and will continue.

Forest Service recreation facilities are located within proposed fuel treatment units (See Table A-4 below) and may be temporarily affected by this alternative. Public use of some recreation sites such as trails, trailheads, and heavily-used dispersed sites may be temporarily curtailed during treatment due to safety concerns from equipment, logging operations, and other fuels activities.

During treatment, the surrounding area will be less natural appearing due to on-going fuel treatment activities and machinery use. Ultimately, this will result in more open and visible areas throughout the drainage. Noise from logging, slashing, and piling, etc. will temporarily provide less solitude for recreationists. Logging and hauling, especially in summer, has the potential of creating hazardous situations for recreationists and road users. By conducting most unit treatments and hauling during the winter (November through mid-May), and providing adequate warning signs, public exposure to potential hazards and effects would be minimized.

Dispersed use such as hunting may be temporary impacted within active treatment areas. Removal of the vegetative cover also has the potential of affecting the way hunters ultimately use the area.

Snow removal on the Smith Creek Road and Goat Mountain Road is anticipated to allow for hauling during winter months. This would allow better access for winter users such as snowmobilers and skiers and also access to private cabins.

Table A-4 lists treatment units and the Forest Service recreation facilities found within those units for Alternatives 2 & 3.

Table A-4 Recreational Facilities Within Proposed Treatment Units

Unit	Forest Service Recreation Facility Found Within Unit
A-1	Lower Scab Rock Trailhead, Lower Scab Rock Trail #262 (on west boundary)
A-2	Lower Scab Rock Trail #262
B	Scab Rock Trail #261 and user created routes on road beds in northern portion of unit
C	Several dispersed camping sites
D	Goat Creek Trailhead and Scab Rock Trail #261
E1	None
E2	None
F	None
G	None – user created ATV trail in need of rehab/closure
H	None
I	None
J	None

Although it is not the goal of this analysis to address recreation impacts on private lands within the Forest boundary; it can be assumed they will to be similar to those on the National Forest. Mitigation, found on pp. 2-37 & 2-38, were identified to reduce the effects of the proposed actions to public and private recreationists.

Effects of Road Improvements: Three treatment packages for improving roads within the project area are proposed. Treatment A would be mandatory with both of the action alternatives. Treatments B and C would be implemented if sufficient funding is generated by the sale of products from the project or if other outside funding are found.

Treatment A is not designed to significantly upgrade the overall road surfaces to improve access for recreationalists or private land owners. Thus, these improvements would not directly affect recreation opportunities or use in the Smith Creek drainage.

Treatments B and C would improve Smith Creek Road #991, Goat Mountain Road # 6636, and East Fork Smith Creek Road #6635 to a three season standard including 6” surfacing on residential access roads and 4” spot surfacing on seasonally gated roads. These treatments would improve access for recreation opportunities in the Smith Creek drainage during spring and fall and could have the indirect effect of increasing user numbers. For locations and descriptions of road treatments, see Map M-6 and Table A-24.

Alternative 3 - Proposed Action and Meadow Creek Prescribed Burn

Alternative 3 includes the proposed action plus a prescribed burn in the Meadow Creek drainage (Unit J). There are no recreational facilities in the Meadow Creek drainage so this activity would impact only dispersed recreationists such as hunters. A spring burn would have visual effects on dispersed recreationists, but few people use the area during the spring. A fall burn may impact dispersed use such as hunting by temporarily eliminating some hiding cover. All other effects of this alternative regarding recreation would be the same as Alternative 2.

Cumulative Effects

Roadless: The timeframe considered for cumulative effects analysis goes back to 1987. The Forest Plan identified inventoried lands with roadless character. Of concern are the actions that have occurred since that time that would lead to reconsideration of the inventory. The future timeframe for consideration is limited to actions that are proposed or are currently in the NEPA process or in which a proposal is made on adjacent ownerships.

The analysis area is restricted to the immediate environment of the proposed units within the Smith Creek drainage. All units are outside the Box Canyon Roadless Area and more than a mile from its boundary. See project area map that shows roadless boundary and relationship to proposed units. Since all units are more than a mile outside an inventoried Roadless Area there would be no cumulative effects from any of the alternatives.

Recreation: The timeframe considered for cumulative effects analysis is 1960 to 2012. Changes in the drainage have been most pronounced during extensive harvesting between 1960 and 1993 and the land exchanges in 1993 and 1999. It is difficult to predict future changes beyond the next five years thus 2012 was selected. Since effects to recreation relate to specific recreation facilities and opportunities on the ground, the spatial bounds of this analysis by the project area.

Past, present and foreseeable future actions analyzed include: past timber harvesting on public and private lands, past wildfire activity, past fisheries projects, past and present wildlife management activities, private land development and vegetation treatments, livestock grazing, existing road/trail system and travel management, current recreational usage, weed treatments, the Shields Road Improvement project, travel management plan changes, Forest Plan Amendments for Grizzly Bear Habitat Conservation, and the Northern Rockies Lynx Amendment

Alternative 1 - No Action Alternative

Chances for catastrophic wildfire would continue to be a high threat in the drainage, possibly causing major changes to recreation opportunities and settings in the future. It is anticipated that private land fuel treatments would continue. These treatments would have no affect to the Forest's recreation opportunities. Private land treatments could, however, cause additional impacts to the recreation setting and sense of place in Smith Creek by making private developments more visible.

Alternatives 2 & 3 - Proposed Action and Proposed Action with Meadow Creek Prescribed Burn

Past harvest practices have largely shaped the current recreational opportunities in the Smith Creek drainage. Recreationalists use roads created for timber harvest to recreate with highway vehicles, ATVs, motorcycles, mountain bikes and horses. Many closed roads are still used by the above users. The implementation of the Gallatin National Forest Travel Plan will restrict motorized users to designated trails; shrinking the number of motorized opportunities in the Smith Creek area. The proposed units may create skidding routes attractive to motorized users limited by the new restrictions. Mitigations such as rehabilitating new skid trails and slashing of old skid trails will be used to discourage off trail use by motorized users.

The 2007 pre-activity road treatments will help to improve drainage on portions of the Smith Creek and East Fork of Smith Creek. Cumulatively with the road treatments proposed with this project will help improve road conditions and access, especially in the spring when the current conditions are subject to extreme rutting.

Past fires have had short term (up to 1 year) temporal impacts on recreation if areas are closed due to the fire but no long term effects. Thus there will be no cumulative effects from past wildfire and the proposed project on recreation.

In the summer of 2005, a fishery improvement project occurred in reaches of an unnamed tributary of Smith Creek. Root wads and large woody debris was placed into the creek to enhance fishery habitat. The fisheries project had only a potentially positive effect for recreational fishing if habitat improves and fish become more abundant. The proposed project is not spatially located where it would impact the improved recreational fishing opportunity (Appendix A, Fisheries Effects)

Wildlife management of big game populations by permit has evolved to present day hunting permits, seasons, and protections. Wildlife populations and thus game management is not expected to change as a result of the proposed action (Appendix A, Wildlife Effects) thus there will be no cumulative effects on recreational hunters.

Some of the private landowners have conducted thinning activities and/or other fuel reduction activities on their private lands. Private land development and vegetation treatments are not expected effect recreation opportunities since public recreation

does not occur on private property (spatial bounds do not overlap) thus there would be not cumulative effects to recreation associated with these activities.

Livestock grazing effects to recreation in the project area were analyzed in the Upper Shields Allotment EA (July 2006). Grazing was found to have no significant effects on recreation in this area. Thus the cumulative effects of grazing and this proposal should have no significant effects on recreation.

Applicable Laws, Regulation, and Forest Plan Guidance

Gallatin National Forest Plan – Forest-Wide Goals, Objectives, and Standards

The Gallatin National Forest Plan directs the Forest to provide for a broad spectrum of recreation opportunities in a variety of Forest settings (FP, pg. II-1). The Forest Plan recognizes objectives for recreation settings by incorporating the Recreation Opportunity Spectrum (ROS), which provides a framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities (FP, pg. II-2). Furthermore, the Plan specifically identifies as objectives activities that will be managed 1) to provide for users' safety, 2) that existing recreational hunting opportunities will be maintained, 3) that recreation trails will provide safe public access, and 4) to continue the cabin rental program (FP, pg. II-2-3). All of the alternatives would comply with this direction provided by the Gallatin Forest Plan

Gallatin National Forest Travel Plan (December 2006)

The Gallatin National Forest Travel Plan (December 2006) contains language updating and further defining the forest-wide goals, objectives and standards for recreation. The Travel Plan recognizes the goal of “providing for a variety of recreation opportunities on the road and trail system that allows for the enjoyment of the Forest’s backcountry, wilderness, rivers, lakes, topography, wildlife, snow and historical assets” (TP, Detailed Description of the Decision, I-1).). All of the alternatives would be consistent with direction provided by the Travel Plan.

D. Visuals

Affected Environment

The Smith Creek project area is located in the northern portion of the Crazy Mountains, an isolated range that is visually spectacular, topographically dramatic, and has been the backdrop for Hollywood movies, such as “The Horse Whisperer”. However, the section of the Crazy Mountains where this fuels reduction project is proposed offers scenery that is more typical to many mountainous areas in Montana. In the view-sheds specific to this project, there are some visually scenic topographic landmarks, such as Goat Mountain, Scab Rock and Bear Mountain. Dense conifer stands cover the flat and rolling terrain, intermittently broken by open meadows and

some talus slopes on ridges. There are infrequent stands of deciduous trees such as aspen or cottonwood, especially in wetter areas and along the streams that add visual interest and variety. In some areas, old, large mature individual aspen tree trunks contrast with the mature conifers that tightly surround them. In a few places, large numbers of small single stem aspen whips visually blend in with the other plants that cover the forest floor. When viewed from the roads or residential areas, visual penetration into the forested areas is generally fairly shallow, due to the combination of angled trunks of leaning trees, crowns of younger trees, lower deadfall and the upper story crowns creating shade.

For the public driving through the area, it is often difficult to distinguish which land is private and which is National Forest, since the two are interspersed. Visible in many portions of the project area, on both private and National Forest system land, are old, but still easily distinguishable timber harvest units along with the associated old roads, old slash, and stubs of old roads. The presence of unsigned roads makes driving through the area a bit confusing to the general public, unless they are familiar with the area. The roads themselves are not well surfaced and thus vehicles usually pass through the area at a fairly low rate of speed. Private houses and the roads that access them are also visible, in some places mostly hidden by trees and understory vegetation, but in other places very obvious and close to the main public access roads.

View-sheds from along some of the public access road segments are confined to a narrow corridor by the adjacent conifer forests. Along other segments, there are more open views across meadows or creeks or up to ridges. In general, most viewing distances to proposed units, from the public access roads, community roads and houses, range from within the immediate foreground to the close middle ground of up to approximately one mile.

Relative to many other areas on the Gallatin National Forest, this project area is not heavily visited by the public. Viewers of the scenery may be fairly equally divided between residents and the recreating public. Many of the recreating public are already familiar with the area and enjoy hunting and ATV riding.

The spatial bounds used for analyzing the effects to the scenery were determined by the edges of the view-sheds from the public access roads, designated trailheads and from the groupings of private residences. The view-sheds are established in some places by topographic barriers, like ridges, and in other places by the visual barrier of the trees themselves. For the temporal bounds and analyzing compliance with the Forest Plan standards for visual quality, this analysis used the time frame of one year, following the completion of the harvesting and subsequent work specified as part of this project. This time frame of one year is consistent with the Forest Service Visual Quality Management System's time frame for meeting the Visual Quality Objective of Partial Retention. (National Forest Landscape Management, Vol. 2, Ch. 1, The Visual Management System, 1974, FS USDA, Ag Handbook, Number 462, page 32).

The Gallatin National Forest Plan emphasizes the visual resource by providing direction for management activities that alter the natural landscape (FP, pg. II-3). Forest-wide direction is to “Provide visitors with visually appealing scenery” (FP, pg. II-1). Within the Smith Creek project area, the Forest Plan VQOs of Retention and Modification apply. The definitions of these VQOs, as shown on page VI-44 of the Gallatin National Forest Plan, are as follows:

Retention (R): means that human activities are not evident to the casual Forest visitor.

Modification (M): Land that appears moderately altered, where human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color and texture.

Table A-5 lists the assigned Forest Plan Visual Quality Objective (VQO) for the area where each proposed unit is located.

Table A-5– VQOs For Individual Smith Creek Units (Alternatives 2 & 3)

Smith Creek: Proposed Unit	VQO for area where each unit is proposed:
A1	Section 1 was acquired as part of the Goat Creek Land Exchange in 1999 after completion of the current Forest Plan. The NF land to the north and to the south of Section 1 was assigned Forest Plan VQOs of <u>Modification</u> , which is also appropriate for the eastern 2/3 of this section where Units A, A1, B, & D are located.
A2	Same as for Unit A1
B	Same as for Unit A1
C	M
D	Same as for Unit A1
E1	M
E2	M
F	M
G	R
H	M
I	M
J	R

To determine the effects of this proposal on the scenery resources, the proposed units were viewed from those most common observation points from where the recreating public and the local residents would be viewing the units. This included the Forest Service roads, the community roads and some of the backyards of the residences.

Direct and Indirect Effects

Alternative 1 – No Action

With Alternative 1, no fuel reduction work would be accomplished and the scenery would remain as it currently is in the short term and mid-term. Over time the aspen

component would likely continue to decline and be less visible and the conifer component would likely become denser and more tangled. Meadows would likely continue to fill in with conifers.

If fuels are not reduced, these forests and view-sheds would be more at risk for unusually large crown fires. Large crown fires could result in not only the loss of houses and other structures, but extensive areas of blackened shrubs and trees and eventual loss of their needles and foliage. A widespread change such as this that dominates specific key view-sheds is often considered to be undesirable by people who live in, recreate in, use, and view those forested areas, especially when all overstory is lost and roads or houses that were initially hidden or shaded by foliage become exposed.

Alternative 2 (Proposed Action) & Alternative 3 (Proposed Action & Meadow Creek Burn)

The proposed fuel reduction activities associated with Alternatives 2 & 3 could affect the scenery in two ways:

- A) By lowering the quality of the scenery as a result of effects that are residual in the long term after the fuel removal work is completed, such as unnatural-appearing vegetation patterns, visually dominant stumps, slash piles, or skid and temporary road corridors

- B) By improving the scenic quality by adding desirable diversity or opening up vistas.

Units A1, A2, B, C, D, H, and I are located in areas that were assigned the VQO of Modification by the Gallatin National Forest Plan. With the exception of Units A2, C, and H that would be hand-thinned, the remaining units are proposed for fuel reduction work using ground-based heavy equipment. These units would be visible, to varying degrees, from local public access roads or ATV routes. The primary observation points for Units A1 and A2 are from the row of private houses that immediately back onto the east sides of those units. Currently providing an open view behind many of these houses is a natural meadow that is surrounded by a non-uniformly textured mix of conifers and aspens. By removing up to 90% of the conifers in these areas next to the meadow, the expansiveness of this meadow would be increased and the visual character would become much more open-appearing, allowing the residents to see much farther into the units and opening up views to Scab Rock. By leaving the existing aspen trees, some strong conifer clumps, and a few full-crowned individual conifers standing, the units would appear much more open in the short term. After the first year and with each succeeding year, the foliage on the young aspen whips would most likely continue to respond to the increased sunlight by filling out. Overtime, as those whips mature and grow taller; the area would eventually appear more similar to an aspen forest, interspersed with conifers, instead

of the reverse. By implementing the mitigation listed on p. 2-36, these units would meet the Forest Plan Visual Quality Objective of Modification.

Unit G is located in an area that was assigned a VQO of Retention by the Forest Plan. The primary observation points into this unit are from two or three houses that look into its southwest side, across a natural meadow. The unit's western edge, which is also the edge of the meadow, is a non-uniformly textured mix of conifers with a few aspen trees. Between the southern edge of this unit and the adjacent private neighborhood road is an approximate 300 foot deep strip of private, mostly conifer-forested land. Because this unit is proposed for heavy thinning to enhance aspen regeneration, the visual character, as viewed from those few houses to the southwest would appear much sparser, although some clumps of conifers and individuals would be retained, along with the existing aspen. The strip of private land along the southern edge would also serve as a visual buffer. Over time, the existing aspen whips would most likely respond to the increased sunlight and decreased competition from the conifer trees and fill in these open areas. When this occurs, the view from the southwest would eventually appear more like an aspen forest with some conifers. Mitigation has been designed (See p. 2-36) to assure that this unit would continue meet the Forest Plan VQO of Retention.

Units E1, E2, and F are located in areas that were assigned the VQO of Modification by the Forest Plan. All three of these units are proposed to be thinned using helicopters and would be on slopes tilted towards viewers traveling along Forest Road #6635. These units are located in and adjacent to fairly uniform textured stands that contain some natural openings. The southeast edge of Unit F when viewed from the road is a fairly straight, natural edge formed by a talus slope. Utilizing this established line and texture, thinning should be transitioned, where possible, into the adjacent uniform canopy in order to meet the intent of the VQO of Modification. This would involve thinning the heaviest or removing all trees around existing openings, such as those created by mountain pine beetle killed trees. It would also involve shaping and sizing openings to avoid uniformity. By incorporating these measures and the mitigation described on p. 2-36, these units would meet the Forest Plan Standard of Modification for visual quality.

Unit J, proposed solely as a prescribed burn, is located in an area that was assigned the VQO of Retention by the Forest Plan. The visual effects of the proposed burning in this unit would be more dependent upon natural factors, such as the location of moister or dryer fuel pockets, the presence of early or late season snow, denser underbrush, standing bug killed trees, and open grassy meadows. Thus, the visual patterns of the resulting prescribed burning and crown mortality would appear as natural elements of the landscape. While the proposal is to blacken kill about 30% of the trees, mortality would occur in a mosaic pattern. The resulting blackening of herbaceous material (especially in meadow areas) would mostly disappear within a year, once the grasses, forbs, and shrubs start to green up. The proposed 30% tree mortality would appear as red-needled trees through the first or second year. Once those needles fall, the increased sunlight to the ground would further encourage

additional herbaceous grasses and forbs. Most likely, the prescribed burning would result in groupings of dead trees. The visual effects of such would meet the Forest Plan standard for visual quality of Retention.

Cumulative Effects

Alternative 1 – No Action

Based upon the past, present, and reasonably foreseeable future activities in this area, there would be no short-term cumulative effects to the scenery resource associated with Alternative 1. However in the long term, if fuel reduction activities were not accomplished on either National Forest land or adjacent private land, the risk for a scenery character-changing wildfire event would, most likely, continue to increase.

Alternatives 2 (Proposed Action) & 3 (Proposed Action & Meadow Creek Burn)

Some residents on private property adjacent to the proposed units may decide to thin their own forested land. While this may make their structures more visible to neighbors or the public passing through the area, it may also serve to decrease the any discernible differences between thinned areas on National Forest land and the denser private areas. Neither the possible future fuel reduction on private land, nor any of the other actions listed on pp. 3-3 through 3-6 would cumulatively create effects that would result in the units, as they are proposed, to not meet Forest Plan standards for visual quality.

Applicable laws, regulation, and Forest Plan Guidance

The Gallatin National Forest Plan emphasizes the visual resource by providing direction for management activities that alter the natural landscape (FP, pg. II-3). Forest-wide direction is to “Provide visitors with visually appealing scenery” (FP, pg. II-1).

During the development of the current Forest Plan, a Visual Management System inventory (VMS) (USDA Forest Service, 1974 National Forest Landscape Management, Vol. 2, Ch. 1, Ag Handbook #462) was conducted on the Forest. That survey considered three factors: the sensitivity of the observation points (which is the concern level of viewers); the distance of the landscape from the observation points; and the landscape character and variety class (which are the physical characteristics and visual diversity of the landscape). The resulting Forest Plan Visual Quality Objectives, (VQOs) are a blending of the results from the VMS Inventory and other resource considerations. The VQOs serve as the Forest Plan standards for visual quality that provide large-scale guidance for the degree of acceptable landscape change for all management initiated landscape-altering activities (FP, pg. II-16). The five VQOs that are assigned to specific land polygons in the Forest Plan are Preservation, Retention, Partial Retention, Modification, and Maximum Modification.

Within the Smith Creek project area, the Forest Plan VQOs of Retention and Modification apply. The definitions of these VQOs are shown on page VI-44 of the Gallatin National Forest Plan. By implementation of the mitigation and design criteria outlined on pp. 2-36 & 2-37, all of the alternatives associated with this project would meet Forest Plan standards for visual quality.

E. General Wildlife Species

Affected Environment

There is a concern that the action alternatives may affect wildlife, fish, birds, and/or amphibians including threatened, endangered and sensitive species; management indicator species; and migratory birds. Removal of vegetation that supports a species life history (foraging, denning/ nesting, hiding cover) and results in changed habitat conditions can result in positive or negative effects depending on many variables. Disruptions associated with human activities can disturb and/or displace wildlife.

It is unrealistic to individually analyze every species that may be present within the defined analysis areas. Therefore, for the purpose of this project, threatened, endangered, and sensitive, as well as other identified species, are analyzed to represent those that utilize similar habitats. Relative to the requirements per the regulatory framework, the species that were considered are displayed in the following table. The species that will be further addressed in this EA include those species listed as threatened and endangered (Gray wolf, bald eagle, and Canada lynx), which will be analyzed in the BA with a summary in the EA. No analysis is needed for grizzly bear in the Crazy Mountain Range, north of I-90; the project area is not located within a Bear Management Unit in the Recovery Plan or in occupied habitat. This species will not be addressed further. Other species to be addressed include wolverine, flammulated owl, Townsend's big-eared bat, Yellowstone cutthroat trout, western toad, northern leopard frog (sensitive); elk, northern goshawk, and pine marten (MIS); and migratory birds. The northern goshawk was recently removed from the sensitive species list for the Northern Region (Project Analysis Letter from the Regional Forester Tidwell, July 17, 2007), but will still analyzed as an MIS species. The Smith Creek project area does not provide suitable habitat, or will not effect habitat for, the peregrine falcon, black-backed woodpecker, trumpeter swan, harlequin duck, arctic grayling, or westslope cutthroat trout so these species are not addressed in this EA for potential impacts from the proposed project. Table A-6 summarizes the wildlife, fish, and amphibian species that were considered for this project.

Table A-6 T&E, Sensitive, & MIS Species Considered for the Smith Creek Project

Species	Habitat or Species Present in the Project Area	Effects Determination and Summary Conclusion of Effects
Gray Wolf (non-essential experimental)	Habitat generalists that prefer low road densities and need abundant prey. There are no known established territories, denning, or rendezvous sites in the project area.	<i>Not likely to jeopardize</i> ; there will be no impact to prey base or open road density. Overall, population objectives for the recovery of the gray wolf have been met.
Bald Eagle (threatened and management indicator species)	Require nesting trees near lake or major river system and available fish and water bird species prey. There are no known bald eagle nesting territories within the project area.	<i>No effect</i> ; no known nests. Project activity would not affect nesting or foraging habitat.
Canada Lynx (threatened)	Coniferous forest from 6,000 to 8,800 feet elevation with habitat types where spruce or subalpine fir is the indicated climax species. Habitat present; not considered occupied per the Conservation Agreement Amendment (USDA and USDI 2006).	The project is within identified potential habitat. Project meets LCAS habitat standards <i>except for</i> removal of sub merchantable material having an adverse affect on foraging habitat. No consultation is required in unoccupied lynx habitat.
Peregrine falcon (sensitive)	No cliffs or potential hack sites in the vicinity.	<i>No impact</i> ; no suitable habitat within the project area. Not addressed further.
Wolverine (sensitive)	Large areas of unroaded habitat; secure denning habitat at upper elevations, ungulate carrion in winter; known to exist in a variety of habitat types.	<i>May impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species</i> ; this project would not impact foraging or denning habitat to a measurable degree. No change in available ungulate carrion.

Species	Habitat or Species Present in the Project Area	Effects Determination and Summary Conclusion of Effects
Townsend's Big-eared bat (sensitive)	Roosts in caves, mines, rocks, tree bark, and buildings. Forages over tree canopy, over riparian areas or water. Suitable habitat may be available within the project area.	<i>May impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.</i> Mature canopy cover providing roosting reduced by thinning; snag and down woody material standards followed. Cave habitat not impacted. No net change in riparian foraging.
Flammulated Owl (sensitive)	Prefer seral and late successional forest with abundant moth species prey; no ponderosa pine but Douglas fir and aspen may be used. Migratory owl species. Conducted surveys in adjacent Shields River drainage yielded no evidence of presence.	<i>May impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species;</i> suitable habitat within the project area would be treated. Aspen treatment may benefit long-term. Snag and down woody material standards followed. Winter activity would not affect this migratory owl.
Trumpeter Swan (sensitive)	Habitat requirements include fairly large bodies of water such as large lakes. There are no large lakes within the vicinity.	<i>No impact;</i> no suitable habitat within the project area. Not addressed further.
Harlequin Duck (sensitive)	Found near large, fast flowing mountain streams. The streams within the project area are small and are not typical of their preferred habitat.	<i>No impact;</i> no suitable habitat within the project area. Not addressed further.
Black-backed Woodpecker (sensitive)	Primary cavity nesters that prefer disturbed landscapes of burned or wind throw forest with numerous snags containing wood boring insects. There is limited habitat within the project area; some habitat was made available when the Smith Creek fire of 1996 burned about 1,000 acres in upper Smith Creek.	<i>No impact;</i> no burned or substantial amounts of dead trees providing snags for nesting and feeding in the project area. Not addressed further.

Species	Habitat or Species Present in the Project Area	Effects Determination and Summary Conclusion of Effects
Arctic Grayling (sensitive)	Not native to the Yellowstone River Drainage	<i>No impact</i> ; Not addressed further.
Westslope Cutthroat Trout (sensitive)	Not native to the Yellowstone River Drainage	<i>No impact</i> ; Not addressed further.
Yellowstone Cutthroat (sensitive)	Streams throughout the project area are within historically occupied habitat	<i>No Impact during vegetation treatments, Beneficial Impact once road related sediment impacts decline and stabilize</i>
Northern Leopard Frog (sensitive)	Inhabit aquatic habitats, preferring shallow areas and mud bottoms.	<i>No Impact</i> , Treatments are not proposed in wetland areas.
Western Toad (sensitive)	Inhabit aquatic habitats, preferring shallow areas and mud bottoms.	<i>No Impact</i> , Treatments are not proposed in wetland areas.
Northern Goshawk (management indicator species)	Forest Plan indicator for dry Douglas fir old growth. Modeled habitat revealed limited habitat with optimal characteristics. Conducted surveys did not indicate goshawk presence. No known nesting territories.	Douglas fir and lodgepole stands that exhibited potential habitat would be treated (Units B and E2). Over-mature Forest adjacent to proposed treatments where there is a diversity of Forest and grassland conditions would not be affected. Snag and down woody material standards followed.
Elk (management indicator species)	Habitat generalist. Project area provides habitat for spring and fall periods and during migration. Upper Smith Creek vicinity provides summer range. Winter range in lower elevations on private lands. Archery hunting season is popular and critical to help meet harvest objectives & facilitate mitigation.	Existing road access and road densities would not change with this project. Hiding cover, security cover and habitat effectiveness, cover/ forage ratio would not change substantially. Some temporary displacement may occur during summer in the East Fork of Smith Creek during helicopter operations.

Species	Habitat or Species Present in the Project Area	Effects Determination and Summary Conclusion of Effects
Pine marten (management indicator species)	Forest Plan indicator for moist spruce old growth. There is suitable habitat within the project area.	All treatments and related disturbance will occur within relatively close proximity to developed recreation ATV trails, private homes or outbuildings, or roads that receives use by the public yearlong. Spruce old growth available in adequate amount and distribution across the Smith Creek drainage. Snag and down woody material standards followed.
Migratory Birds	Migratory birds utilize a vast array of habitats for nesting and foraging from grassland/ shrublands, conifer forests, riparian areas, and deciduous trees and shrubs. Habitats found in the analysis area are grasslands, shrub-steppe, conifer forest, riparian, and aspen.	The aspen treatments would improve age and structural diversity leading to increased nest success. Conifer thinning treatments may decrease nesting opportunities for some species and improve foraging and nesting opportunities for other species. Different migratory bird species respond differently to vegetation treatments. Snag and down woody material standards followed.

Direct/Indirect/Cumulative Effects for Wildlife Species for All Alternatives

Impacts to wildlife species were first evaluated by assessing whether suitable habitat exists within the immediate project area to be affected. It was determined that many species would not be addressed further in this analysis (See Table A-6 above). Quantitative factors relative to habitat change; e.g. loss of denning/ nesting/ foraging habitat, loss of hiding/thermal cover, etc. were analyzed. Other qualitative factors such as potential for displacement were also considered. These factors and their relevance are displayed below by individual wildlife species.

F.1 Threatened and Endangered Species

Threatened and endangered species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management Act (PL 94-588). Section 7 of the Endangered Species Act directs Federal departments and agencies to ensure actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of their critical habitats (16 USC 1536). Forest Service policy requires that all Forest Service programs and activities need to be reviewed for possible effects on threatened or endangered species (FSM 2672.4). In addition, the Gallatin Forest Plan identifies management standards for Threatened and Endangered Species (p. II-18, section 6.b.all.).

The Fish and Wildlife Service (FWS) concurred with the Gallatin Forest Programmatic Biological Assessment for Activities that are *Not Likely to Adversely Affect* Listed Terrestrial Species (USDA 2004, USDI 2004 and 2006). The programmatic biological assessment was developed by the Level 1 Team to facilitate consultation. Any proposed action implements a screening process to determine which proposed projects properly fit within a programmatic approach to consultation on simple, straightforward projects that would result in a ‘not likely to adversely affect’ determination. The screening process also provides rationale for ‘no effect’ projects; however, these are not subject to consultation. Not all of the project types described in the programmatic BA are eligible for this programmatic assessment since some are either ambiguous or may result in an adverse effect. If the programmatic screening concurrence process does not apply, the standard section 7 process is required. The proposed action and alternatives for the Smith Creek project fit within the programmatic screening process and is the basis for the discussion of bald eagle and gray wolf. The US Fish & Wildlife Service recently removed the threatened Canada lynx from their list of species that may be present on the Gallatin Forest north of I-90. The Forest Service and US Fish and Wildlife Service jointly determined that the Crazy Mountains are not occupied by lynx. Consultation with the US Fish and Wildlife Service is not required for projects in “unoccupied” habitat. The species list was confirmed through the FWS website (last updated January 16,

2007):

http://montanafieldoffice.fws.gov/Endangered_Species/Listed_Species/Forests/Gallatin_in_sp_list.pdf

Canada Lynx

Affected Environment

The Canada lynx was listed as a threatened species under the ESA in March 2000. The lynx is a medium sized cat associated with forested environments. Lynx require a range of habitat conditions for survival and reproduction. Forest cover is preferred for travel, resting and hunting. In general, lynx habitat on the Gallatin National Forest is defined as coniferous forest in the elevation range between 6,000 and 8,800 feet with habitat types where spruce or subalpine fir is the indicated climax species. The Smith Creek watershed provides habitat for lynx. Unconfirmed track locations were reported (2000) in Bennett and Sunlight drainages, outside the project area. According to an amendment to the Canada Lynx Conservation Agreement between the US Forest Service and the US Fish and Wildlife Service (USDA and USDI 2006) which defined Occupied Mapped Lynx Habitat, “occupied” habitat requires verified observations or records of lynx consisting of physical remains, live-captured animals, or DNA samples. In addition, portions of some Forests that had disjunct mountain ranges were removed from occupied status. The entire Gallatin Forest was listed as occupied in the amendment although the attached map indicated that the Crazy Mountains (and Bridger/ Bangtail Mountains) were unoccupied. The conservation agreement does not apply to Forest lands mapped as unoccupied alleviating the need for standard consultation. Even if the Crazy Mountains are validated as unoccupied, the LCAS would be followed until such time the Forest Plans are amended.

A Forest-wide lynx habitat analysis was conducted in 2000, and again reviewed in 2005, which designated existing Lynx Analysis Units (LAUs). The Smith Creek Vegetation Treatment project is located within the West Crazies LAU and includes the entire west flank of the Crazy Mountain Range from Smith Creek south to Rock Creek. This LAU is comprised of 68,378 acres of National Forest. Of this, 44,029 acres or 64% of the LAU is considered potential lynx habitat. Much of the unit is in good condition and provides snowshoe hare habitat due to past logging and a diversity of successional stages in forested areas.

The LCAS (Ruediger and others 2000) is the primary basis for evaluating federal actions relative to lynx habitat conditions and analyzing the effects of planned projects on lynx and lynx habitat. There are no specific methodologies for determining effects to lynx other than guidelines and standards identified in the LCAS. The interagency Conservation Agreement (USDA and USDI 2005, USDA and USDI 2006) committed the Forest Service to use the LCAS in determining the effects of actions on lynx until the Forest Plans are amended. Standards serve as conservation measures to address risk factors (or limiting factors) that can affect lynx productivity and survival. LCAS planning standards that apply to the action alternatives for the Smith Creek Vegetation Treatment

project include:

- In the absence of guidance from a broad-scale assessment of landscape patterns, limit disturbance within each LAU as follows: if more than 30 percent of lynx habitat within an LAU is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities by federal agencies (p. 7-3).
- Within a LAU, maintain denning habitat in patches generally larger than 5 acres, comprising at least 10% of lynx habitat (p. 7-4).
- Maintain habitat connectivity within and between LAUs (p. 7-4).
- Management actions (e.g. timber sales, salvage sales) shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period (p. 7-5).
- In lynx habitat, pre-commercial thinning will be allowed only when stands no longer provide snowshoe hare habitat (p. 7-6).
- In aspen stands within lynx habitat in the Northern Rocky Mountains..., apply harvest prescriptions that favor regeneration of aspen (p. 7-6).
- Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components. Delay livestock use in post-fire or post-harvest created openings until successful regeneration of the shrub and tree component occurs.
- Manage grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.

The following additional standards apply to Alternative 3:

- Design burn prescriptions to regenerate or create snowshoe hare habitat (e.g. regeneration of aspen and lodgepole pine) (p. 7-7).
- Design burn prescriptions to promote response by shrub and tree species that are favored by snowshoe hare (p. 7-7).
- Design burn prescriptions to retain or encourage tree species composition and structure that will provide habitat for red squirrels or other alternative prey species (p. 7-7).
- Consider the need for pre-treatment of fuels before conducting management ignition (p. 7-7).

To address compliance with those LCAS habitat standards that are quantitative, effects to Canada lynx were evaluated by assessing project contribution to the proportion of unsuitable lynx habitat and impacts to lynx denning habitat. Results of data queries conducted for the Smith Creek Vegetation Treatment project are shown in Table A-7 below.

Table A-7 LAU Habitat Baseline within the Project Area

LAU Name	LAU Total Size	Acres of Lynx Habitat in LAU	Acres of Lynx Habitat in Smith Creek Project Area and % of LAU	Estimated Unsuitable Acres in LAU & % of LAU *	Estimated Denning Acres in LAU & % of LAU **
West Crazies	68,378	44,390	9,063 A; 20%	1,678 A; 4%	18,269 A; 41%

* Approximately 614 acres (1 %) of the total unsuitable acres are in Smith Creek project area.

** Approximately 3,336 acres (8%) of the total denning acres are in Smith Creek project area.

Based on TSMRS GIS queries approximately 4% of the West Crazies LAU is unsuitable. Considering only the Smith Creek project area, there are approximately 614 acres of unsuitable habitat or 7% of lynx habitat *in the project area* (1% of LAU). The unsuitable habitat within the Smith Creek project area is located north of the proposed treatment units in the Bitter Creek drainage, in the East Fork of Smith Creek and in another tributary of Smith Creek. The standard of no more than 30% unsuitable acres within a LAU is not exceeded.

Denning habitat for the LAUs in the vicinity consists of mature lodgepole pine with at least 70% canopy closure, and pole-sized or older spruce/subalpine fir forest with canopy closure of 40% or greater. A majority of proposed treatment units E2, G, and F contain denning habitat. The LCAS standard for denning habitat requires maintaining at least 10% denning habitat within the LAU. Based on TSMRS GIS queries, approximately 18,269 acres or 41% of the LAU provides denning habitat. Considering only the Smith Creek project area, there are approximately 3,336 acres of denning habitat or 37% of lynx habitat in the project area. Denning habitat within the Smith Creek project area is well distributed in patches. This meets the standard of maintaining at least 10% denning habitat within a LAU.

There are no specific standards in the LCAS relative to maintaining certain quantitative levels of lynx foraging habitat. However, foraging habitat is an important component of lynx habitat, particularly its distribution relative to available denning habitat. Past harvest activities and natural processes of forest succession have produced the available foraging habitat within the project area. The majority of these harvested areas, similar to proposed vegetation treatment units C and H, have regenerated enough due to their advanced age resulting in inadequate stem density and age class conditions for optimal snowshoe hare habitat such that they don't constitute foraging habitat. Older forest habitat also provides potential for foraging on alternative prey species such as red squirrels and grouse. Foraging habitat does not appear to be limiting in this LAU and in the Smith Creek project area and is well distributed in proximity to available denning habitat.

Maintaining habitat connectivity between and within LAUs is another project planning standard in the LCAS to be addressed. According to Craighead (2002), Koehler (1990) and Koehler and Brittell (1990), when moving between denning and foraging habitats, lynx select areas of high canopy closure and avoid open areas, which may disrupt movement patterns if greater than 100 m in width. Conversely, Ruggiero and others (1999), Squires and Laurion (1999) and Aubry and others (1999) found that lynx move across fragmented landscapes and have documented lynx movements crossing open valley bottoms and large rivers concluding that these landscape features are not absolute barriers to dispersal. Landscape connectivity may be provided by narrow forested mountain ridges, plateaus, or forest stringers that link more extensive areas of lynx habitat (Ruediger and others 2000). Currently, lynx habitat appears to be mostly contiguous across the project area. The largest risk to habitat connectivity is the development of adjacent private lands and additional public access.

Direct/Indirect/Cumulative Effects

Alternative 1 – No Action

The No Action Alternative would not directly, indirectly, or cumulatively affect the lynx as a “threatened” species. No acres of existing vegetation would be manipulated to an unsuitable condition and no disturbance or displacement would occur. There would be no change in unsuitable, denning, or foraging habitat attributes. Habitat connectivity would also remain unchanged.

Alternative 2 –Proposed Action

The LCAS standards applicable to the proposed project were evaluated for all activities associated with the proposed vegetation treatments, road treatments, and potential stewardship projects. Table A-8 below summarizes the quantitative effects of the proposed vegetation treatments on lynx habitat.

Table A-8 LAU Habitat Attributes Associated With Alternative 2

LAU Name	LAU Total Size	Acres of Lynx Habitat in LAU	Acres of Lynx Habitat in Smith Creek project area and % of LAU	Estimated Unsuitable Acres in LAU & % of LAU *	Change from Alt 1 (%)	Estimated Denning Acres in LAU & % of LAU **	Change from Alt 1 (%)
West Crazies	68,378	44,390	9,063 A; 20%	2,571 A; 6%	2%	17,902 A; 40%	1%

The number of acres of potential lynx habitat would not change in the LAU or in the Smith Creek project area. Approximately 893 acres would be treated with this alternative. Prescriptions in units B, D, F, H, and I that emphasize overstory thinning with understory fuel removal would change the suitability of habitat and the potential to provide denning or foraging habitat. Proposed thinning, including hand treatments and heavy equipment or helicopter removal, would reduce the suitability of lynx habitat for a minimum of ten years until trees, shrubs, grasses, and forbs regenerate sufficiently to provide forage and cover values for lynx and snow shoe hare prey. Aspen treatments in units A1, A2, C, G, while removing all conifers within units, would meet standards to enhance prey habitat. Units E1 and E2 would not remove additional understory fuel. However, for the purpose of this analysis, all acres were included in the total counting toward unsuitable as a conservative measure. Unsuitable habitat would increase from 4% to 6% within the LAU. This would meet the LCAS standards that management actions shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period. In addition, the 30% standard would still be met.

The amount of denning habitat would decrease with the proposed vegetation treatments by 1%. Those units that currently provide some denning habitat would no longer have the characteristics to support structurally diverse areas (i.e. large downed wood, seedling/sapling thickets in the under story) that may provide optimum lynx denning. Given the Crazy Mountains are considered unoccupied per the Conservation Agreement amendment (USDA and USDI 2006), there is little chance of disturbing any individuals during the denning period when at least some of the proposed activities would occur. Assuming that the proposed treatments would limit this function in those units where denning habitat currently exist, the analysis indicated a decrease of approximately 367 acres in alternative 2. The standard of maintaining a minimum of 10% denning habitat within the LAU would still be met at 40%.

There would be some modification in the quality of habitat relative to providing vegetation characteristics for prey species (foraging habitat). According to the LCAS, pre-commercial thinning would not be allowed when stands provide snowshoe hare habitat. Pre-commercial thinning is defined as “a thinning that does not yield trees of commercial value, usually designed to reduce stocking in order to concentrate growth on the more desirable trees” (Ruediger and others 2000). There would be removal of non-merchantable material in all proposed treatment units except E1, E2, and F. Units E2 and F would provide lynx habitat long-term as lodgepole regenerates and the remaining shrub layer releases with additional sunlight. This would provide foraging opportunities adjacent to denning habitat.

Of the units where non-merchantable material would be removed, approximately 60 acres are mapped as young foraging habitat. Young foraging stands were defined as exhibiting sapling or pole sized cover with a canopy closure of 70% or greater and also included unthinned regeneration units that were logged between 15 and 40 years ago such that at least 2500 stems per acre would be available to snowshoe hare during the winter. The sixty acres of young foraging habitat within the proposed treatment units (particularly C and H) mirror past harvest units that have not been thinned. However, field observation indicated that these stands did not have the minimum number of stems per acre, had limited availability of accessible boughs, and/or no snowshoe hare sign was found. Sub merchantable material would be removed within mature forest in units B, D, H, and I (459 acres) to a spacing of 20-25 feet for all age classes with approximately 10% of each unit left in untreated clumps (units B and D only). The purpose of this type of removal in the Smith Creek project area is to reduce fuel loadings within the wildland urban interface in order to modify potential fire behavior and provide for firefighter and public safety in the event of a wildland fire. According to the Canada Lynx Conservation Agreement between the US Forest Service and the US Fish and Wildlife Service, which committed the Forest Service to use the LCAS in determining the effects of actions on lynx until the Forest Plans are amended (USDA and USDI 2005, USDA and USDI 2006), exceptions may be made when a project reduces the risk to human health or safety. The Healthy Forest Restoration Act (HFRA) (Public Law 108-148 of December 2003) provides processes and authorities to expedite hazardous fuel treatment projects. A part of the purpose and need of this project is “to begin modifying potential fire behavior by creating vegetation and fuel conditions that provide for firefighter and public safety in the event of a wildland fire”. The proposed treatments largely focus on evacuation routes, adjacency to structures on private land, and creating heat sinks (aspen treatment). The treatments in those units currently providing some level of foraging habitat for snowshoe hare or red squirrel would meet this intent and therefore be consistent with the intent of the Conservation Agreement.

There would be modification of the lynx habitat arrangement that may affect the quality of habitat connectivity. Landscape connectivity may be provided by narrow forested mountain ridges, plateaus, or forest stringers that link more extensive areas of lynx habitat (Ruediger and others 2000). Forested stringers along riparian areas would not be treated such that hiding cover would be compromised. Prescriptions for thinning would reduce the canopy cover releasing understory shrubs that would contribute to replacement hiding cover. As part of the implementation of the interagency Canada Lynx Conservation Agreements, lynx linkage areas were identified. These linkage areas are meant to aid in movement and dispersal of individuals separated by areas of non-habitat (McAllister 2003). The lynx linkage areas pertinent to the project area include Castle Mountains to northern Crazy Mountains area, Crazy Mountains to the Absaroka Mountains area, and the Crazy Mountains to Bridger Range area.

There is no specific direction of how to manage for these linkage areas relative to travel planning, development, or habitat manipulation. In the recently published Federal Register, the US Fish and Wildlife Service (USDI 2003) concluded that there is low threat to the contiguous United States lynx population to maintain connectivity between habitats in Canada and the United States. They state their belief that all historic habitats, including boreal forest that exists in patches or is of marginal quality, is still available to dispersing lynx except for areas where development has encroached on the boreal forest or is isolated from source lynx populations. Connectivity among and between local habitats will be maintained. Higher quality habitats located in the unroaded and roadless portions of the project area will not be impacted.

Treatment of proposed Units A1 and G, and to a limited extent Units B, C, and D, would serve to enhance the aspen component of lynx habitat. According to the LCAS, livestock may reduce forage resources available to snowshoe hares and other prey species in these habitats if it alters the structure or composition of native plant communities (Ruediger and others 2000). Proposed mitigation addresses livestock impacts through annual consultation with the permittee regarding alternate grazing strategies including rest, timing, fencing, etc. minimizing adverse affects to aspen regeneration. Monitoring of aspen regeneration would be completed to determine if, when, where, and what type of fencing is necessary to ensure protection and survival.

The stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental cumulative effects to lynx habitat.

Alternative 3 – Proposed Action & Meadow Creek Burn

The proposed project effects of this alternative on lynx habitat would be similar to Alternative 2. The proposed treatment of an additional unit J would create a mosaic pattern of forested and non-forested habitats. The reintroduction of fire on the landscape is consistent with the historical fire regime. Burn prescriptions would target mortality of smaller age classes consistent with the desired condition of affected forest and non-forest communities. Shrubs would respond favorably in the Douglas fir types as would lodgepole tree regeneration in subalpine fir types. The unit is located on a south to southeast facing slope. The majority of the unit is not considered lynx habitat. However, for the purposes of this analysis, the entire unit acreage was used to measure against LCAS standards. Table A-9 displays habitat attributes associated with Alternative 3.

Table A-9 LAU Habitat Attributes with Alternative 3

LAU Name	LAU Total Size	Acres of Lynx Habitat in LAU	Acres of Lynx Habitat in Smith Creek project area and % of LAU	Estimated Unsuitable Acres in LAU & % of LAU *	Estimated Denning Acres in LAU & % of LAU **
West Crazies	68,378	44,390	9,063 A; 20%	2,821 A; 6%	17,805 A; 40%

Relative to the entire West Crazies LAU, the amount of acres in proposed treatment Unit J, most of which is not lynx habitat, is small. Quantitative habitat parameters would not be measurably different between Alternatives 2 and 3. The amount of unsuitable habitat would move from the existing 4% to 6%. Denning habitat would decrease from 41% to 40%.

Summary of Effects by LCAS Conservation Measures

Table A-10 summarizes the applicable LCAS conservation measures discussed in the analysis methodology section and the extent to which the action alternatives meet them.

Table A-10 Relationship of Alternatives to Conservation Measures

Standards and Guidelines	Action Alternative Meets LCAS
Programmatic Planning (7-3)	Y/N
Prepare a broad-scale assessment of landscape patterns comparing historical and current ecological processes and vegetation patterns, such as age-class distributions and patch size characteristics; in the absence of guidance developed from such an assessment, limit disturbance within each LAU: if more than 30% of lynx habitat within a LAU is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management by Federal agencies	Yes – Alt 2 and 3; unsuitable habitat increases to 6% for the LAU
Project Planning (7-4)	Y/N
Within each LAU, map lynx habitat; identify potential denning and foraging habitat (hares, squirrels, etc.), and topographic features important for lynx movement (major ridge systems, prominent saddles, and riparian corridors); identify non-forest vegetation (meadows, shrublands, grasslands, etc.) adjacent to and intermixed with forested lynx habitat providing habitat for alternate lynx prey species	Yes – Alt 2 and 3; map identifying lynx habitat including foraging and denning is located in the electronic files in the Gallatin GIS library
Within each LAU, maintain denning habitat in patches generally larger than five acres comprising at least 10% of suitable lynx habitat.	Yes – Alt 2 and 3; denning habitat occupies 41% of LAU

Standards and Guidelines	Action Alternative Meets LCAS
Maintain habitat connectivity within and between LAUs.	Yes – Alt 2 and 3; forested stringers not treated and contiguous hiding cover provide Treatments for movement outside treatment units. Within treatment units, slash left for down woody debris, understory shrubs, and/or leave trees of all age classes would contribute to screening.
Timber Management (7-4)	Y/N
Management actions (e.g., timber sales, salvage sales) shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period.	Yes – Alt 2 and 3; unsuitable habitat increases from 4% to 6% (2% net change)
In lynx habitat, pre-commercial thinning will be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes have eliminated snowshoe hare cover and forage availability during winter conditions with average snow pack).	Yes and No – Alt 2 and 3; field observation indicates that those units targeted for pre-commercial thinning are no longer providing foraging habitat; units removing sub merchantable materials contribute to adverse affects
In aspen stands within lynx habitat in the... Northern Rocky Mountains..., apply harvest prescriptions that favor regeneration of aspen.	Yes – Alt 2 and 3; Units A1, B, C, D, G incorporate treatment objectives and prescriptions to enhance aspen regen.
Wildland Fire Management (7-6 to 8)	Y/N
Design burn prescriptions to regenerate or create snowshoe hare habitat (e.g., regeneration of aspen and lodgepole pine).	Not applicable to Alt 2. Alt 3 – Yes; regeneration of lodgepole pine and existing aspen are expected to increase.
Design burn prescriptions to promote response by shrub and tree species that are favored by snowshoe hare.	Not applicable to Alt 2. Alt 3 – Yes; regeneration of shrub layer is expected to increase.
Design burn prescriptions to retain or encourage tree species composition and structure that will provide habitat for red squirrels or other alternate prey species.	Not applicable to Alt 2. Alt 3 – Yes; prescribed burn would provide mosaic of habitats for alternate prey species.
Consider the need for pre-treatment of fuels before conducting management ignitions.	Not applicable to Alt 2. Alt 3 – Yes; burn plan would identify phases that would be done to meet objective.

Standards and Guidelines	Action Alternative Meets LCAS
Recreation Management (7-8 to 9)	Y/N
In lynx habitat, ensure that federal actions do not degrade or compromise landscape connectivity when planning and operating new or expanded recreation developments in lynx habitat	Yes – Alt 2 and 3; landscape connectivity would not be impacted by the proposed optional toilet
Forest/Backcountry Roads and Trails (7-9 to 10)	Y/N
Determine where high total road densities (>2 miles per square mile) coincide with lynx habitat, and prioritize roads for seasonal restrictions or reclamation in those areas.	Yes – Alt 2 and 3; based on the Gallatin Travel Plan FEIS, summer routes did not exceed 2.0 mi/ sq mi guideline for the West Crazyes LAU.
Minimize roadside brushing in order to provide snowshoe hare habitat.	Yes – Alt 2 and 3; this is a design criteria
Limit public use on temporary roads constructed for timber sales. Design new roads, especially the entrance, for effective closure upon completion of sale activities.	Yes – Alt 2 and 3; all ground disturbed areas would be rehabilitated
Livestock Grazing (7-10 to 11)	Not Applicable
Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components. Delay livestock use in post-fire and post-harvest created openings until successful regeneration of the shrub and tree components occurs.	Yes – Alt 2 and 3; livestock management would be managed to protect regeneration
Manage grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.	Yes – Alt 2 and 3; same as above plus monitoring

Biological Assessment Determination for Canada Lynx

No consultation is required for lynx habitat considered to be unoccupied. Therefore, no determination was made for lynx. All applicable standards in the LCAS would be met under all alternatives for the project except for removal of sub merchantable material within mature forest, adversely affecting foraging habitat. However, HFRA and the interagency Canada Lynx Conservation Agreement allow for exceptions to this standard where human health and safety would otherwise be compromised. The purpose and need for this project relative to firefighter and public safety, for which the proposed vegetation treatments were developed to meet, satisfies the intent of this allowed exception. Implementation of the proposed vegetation and stewardship treatments do not occur in occupied habitat and should result in no cumulative effects to lynx.

Bald Eagle

Affected Environment

The Upper Shields allotment revision project area lies within the Bighorn Recovery Zone as identified in the Montana Bald Eagle Management Plan 1994 (USDI 1994), which has a target of 11 nesting pairs. The target was achieved several years ago.

The bald eagle is typically associated with large lakes (> 80 acres) and major river courses (USDI 1994). They feed primarily on fish and carrion. There are no known bald eagle nesting territories within the project area. Bald eagles have been sighted in the Smith Creek vicinity during nesting season but no nest has been located (Lemke personal communication). The project area does not offer good foraging opportunities. Bald eagles are known to occur during both summer and winter in the Shields River valley, located southwest of the project area. Active nest territories occur on the main stem and tributaries of the Shields River.

Direct/Indirect/Cumulative Effects

Effects to bald eagles were evaluated by assessing project impacts to bald eagle nesting habitat and foraging habitat. Per the Programmatic Biological Assessment for Activities that are Not Likely to Adversely Affect Listed Terrestrial Species (USDA 2004), use of decision screens, and concurrence letter (USDI 2004 and 2006), there would be ‘no effect’ on the bald eagle. There are no bald eagle nest site management zones within the Smith Creek project area, no alternative would permit structures that pose a risk to bald eagles or their prey within foraging areas, and there would be no increased road kills in foraging habitat. The decision screens, programmatic BA with concurrence letter, and the Consultation Summary Sheet for Programmatic Biological Assessment from the FWS are located in the project file. The bald eagle exceeds recovery criteria and is protected by adherence to the Montana Bald Eagle Management Plan. Therefore, the effect of vegetation treatments and stewardship items on bald eagle is not an issue.

Biological Assessment Determination for Bald Eagle

Impacts associated with this proposal would have “no effect” on the bald eagle and/or its nesting or foraging habitat. The project would have no direct or indirect effects to bald eagle winter foraging habitat. Implementation of the projects that meet the screening criteria for a “no effect” determination would result in no cumulative effects to bald eagle.

Gray Wolf

Affected Environment

The Gray Wolf Recovery Plan was approved in 1987 (USDI 1987). The plan delineated 3 recovery zones within Idaho, Montana and Wyoming. Gray wolves were reintroduced to the Greater Yellowstone Ecosystem in 1995 and 1996 as a non-essential, experimental population under the Endangered Species Act. The Livingston Ranger District is within the Greater Yellowstone Wolf Recovery Area and wolves were listed as a non-essential experimental population. Since the original animals were released in Yellowstone National Park, they have begun to spread throughout the ecosystem as expected.

Habitat is available in the Smith Creek project area for wolves and their primary prey, elk. Asher (personal communication) confirmed tracks of a single wolf in a calving pasture on private land outside of the Wilsall area southwest of the project area. No wolf depredations have occurred on National Forest or been reported on private lands. To date no known wolves have established a territory in this area along the west flank of the Crazy Mountain Range although sightings have been reported over the years; there are no denning or rendezvous sites known to occur in the project area or immediate vicinity. There are two packs established in the Boulder and West Boulder drainages south of the project area in the Absaroka Range. Overall, population objectives for the recovery of the gray wolf have been met.

Direct/Indirect/ Cumulative Effects

Effects to gray wolves were evaluated by assessing project impacts to known den or rendezvous sites, and impacts to important wolf prey areas such as big game winter range. Gray wolves are habitat generalists, and make use of a wide variety of habitat types throughout the course of their lives. Management emphasis for gray wolves is directed at maintaining sustainable populations of wolf prey species, primarily ungulates. The decision screen and the programmatic BA (USDA 2004, USDI 2004 and 2006) apply to the non-essential experimental population within the project area. The major component of the wolf screen was whether the population is wild or experimental and whether the proposed project has any relationship with den or rendezvous sites during spring/ summer, the prey base and/or livestock grazing. Per the Programmatic Biological Assessment for Activities that are Not Likely to Adversely Affect Listed Terrestrial Species (USDA 2004), use of decision screens, and concurrence letter (USDI 2004 and 2006), there would be ‘non-jeopardy’ determination for the gray wolf. The proposed vegetation treatment is not expected to have any detrimental effects on elk or its habitat. The elk population within the project area and hunting district is at the highest ever recorded. Elk habitat within the project area and surrounding landscape would still be available on National Forest and adjacent private land.

The decision screens, programmatic BA with concurrence letter, and the Consultation Summary Sheet for Programmatic Biological Assessment from the FWS are located in the project file. The gray wolf has reached recovery criteria and is being considered for delisting. Therefore, the effect of vegetation treatments and stewardship items on gray wolf is not an issue.

Biological Assessment Determination for Gray Wolf

Direct or indirect impacts associated with this proposal are “not likely to jeopardize the continued existence” of the gray wolf or its habitat. The project would have no effects to den or rendezvous sites or to wolf prey species. Implementation of projects that meet the screening criteria for a “not likely to jeopardize” determination would result in no cumulative effects to gray wolf.

F.2 Sensitive Wildlife, Fish, and Amphibian Species

There is a concern that the action alternatives may affect sensitive wildlife species. Sensitive species are those animal species identified by a Regional Forester for which population viability is a concern as evidenced by a significant current or predicted downward trend in population numbers, density, or in habitat capability that will reduce species’ existing distribution (FSM 2670.5.19). Removal of vegetation that supports a species life history (foraging, denning/ nesting, hiding cover) and results in changed habitat conditions can result in deleterious effects. Disruptions associated with human activities can also disturb and/or displace wildlife.

Protection of sensitive species and their habitats is a response to the mandate of the National Forest Management Act (NFMA) to maintain viable populations of all native and desired non-native vertebrate species (36 CFR 219.19). The sensitive species program is intended to be pro-active by identifying potentially vulnerable species and taking positive action to prevent declines that will result in listing under the Endangered Species Act. Forest Service Manuals (FSM 2670) provide policy under which Forest Service projects are designed to maintain viable populations of sensitive species and to ensure that those species do not become threatened or endangered due to Forest Service actions.

As part of the National Environmental Policy Act (NEPA) decision-making process, proposed Forest Service programs or activities are to be reviewed to determine how an action would affect any sensitive species (FSM 2670.32). The goal of the analysis should be to avoid or minimize impacts to sensitive species. If impacts cannot be avoided, the degree of potential adverse effects on the population or its habitat within the project area and on the species as a whole needs to be assessed.

As indicated in Table A-6 (pp. A-31 to A-34), the Smith Creek Vegetation Treatment project area does not provide suitable habitat, or will not effect habitat for, the peregrine falcon, trumpeter swan, harlequin duck, black-backed woodpecker, arctic grayling, or westslope cutthroat trout so these species are not addressed in this EA for potential impacts from the proposed project.

Wolverine

Affected Environment

Wolverines are medium sized forest carnivores thought to be secretive and to stay in forest cover as much as possible. During summer wolverines are associated with high elevation and alpine areas. Denning females remain in these areas during the winter while males and non-denning females occupy areas wherever prey or carrion is available. Wolverine are basically habitat generalists with an opportunistic foraging strategy, making it difficult to define foraging habitat. Food availability may be the primary factor in determining movements and habitat use; thus, they occupy a variety of habitats depending on the time of year. Foraging opportunities, including small, medium and large prey animals, carrion, insects, berries and bird eggs exist within the immediate project area but are very limited due to the age and structure of forested habitat and lack of winter range. Generally speaking, wolverines are opportunistic omnivores in summer and primarily scavengers in winter.

Denning habitat occurs at relatively high elevations in mature and old growth forests, as well as large-boulder talus fields and mountain cirques. Deep, soft snow is often used for tunneling and den construction. There is no potential denning habitat within the area of influence of the proposed action.

Unconfirmed evidence from surveys conducted in the winters of 1998/ 1999 and 1999/ 2000 indicates use of the upper Shields River drainage by wolverine. There is no element occurrence data of wolverine in this area recorded with the Montana Natural Heritage Program. While trapping records indicate the presence of wolverine, their abundance and distribution remains uncertain.

Direct/Indirect/Cumulative Effects

Effects to wolverine were addressed by evaluating project impacts to denning and foraging habitat. Road densities were not considered, as no new roads would be required to implement any of the action alternatives. Habitat alteration of approximately 893 and 1,143 acres for Alternative 2 and 3 respectively would alter the habitat of numerous wolverine prey species including small mammals, birds and insects. Some species would benefit from the vegetation treatments while others may have at least short-term detrimental impacts. Alternative 1 would have similar indirect effects as succession would benefit some species and not others. The amount of acres to be disturbed would not reduce populations of prey species to any measurable degree. There is no denning habitat according to modeling rules for optimal conditions that wolverine would choose to use. Potential, but more marginal, available denning habitat within the Smith Creek project area is approximately 504 acres. These acres are almost entirely located well above the project treatment units. Relative to foraging habitat, the proposed vegetation treatment units are not likely substantial contributors to the forage base for wolverine due to the proximity to public roads and structures on private land

and their associated activity.

The proposed vegetation treatment in Alternative 2 and 3 (and Alternative 1) would not alter or remove any suitable wolverine denning habitat. There is no denning habitat available for this species in the proposed project area of influence due to past habitat alterations from roads and timber harvests, relatively low elevations, and lack of cirque basins and structural diversity.

The stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to wolverine foraging or denning habitat. None of the alternatives would result in adverse modification of wolverine or its associated habitat.

Townsend's Big-eared Bat

Affected Environment

Townsend's big-eared bats forage for insects at night, often in and above open-grown mature forests or over riparian areas. They are very sensitive to human disruption of roosts and hibernacula. Limestone cliffs and rock outcrops may provide roosting and hibernating habitats which are not known to occur within the proposed project area of influence. Individuals may also roost in snags and old trees. Suitable habitat may be available within the project area. There are no element occurrence data of Townsend's big-eared bat in this area recorded with the Montana Natural Heritage Program.

Direct/Indirect/Cumulative Effects

There are no known direct effects to Townsend's big-eared bat due to vegetation treatments or stewardship items. Alternative 1 would have no direct or indirect impacts on foraging or roosting habitat. Minor indirect effects of the action Alternatives 2 and 3 may occur due to alteration of the bat's prey base (insects). Water sources would be protected during project activities through the implementation of identified mitigation measures which would minimize impacts to foraging opportunities. Except for Units E1, E2, and F, vegetation treatments of merchantable trees would take place during the winter when these bats are hibernating. Other indirect effects would include the removal of potential roosting habitat. This is not considered a limiting factor and mature trees within adjacent untreated areas and riparian areas would continue to offer roosting habitat.

The stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to bat habitat. None of the alternatives would result in adverse modification of Townsend big-eared bat habitat.

Flammulated Owl

Affected Environment

Associated with seral and climax late-successional forests, these owls are a secondary cavity nester which feed almost exclusively on insects (particularly moths). Dependent on insects, they are a migratory owl species. They have been observed in a variety of habitats but seem to prefer mature, open-grown stands of ponderosa pine and Douglas fir. Flammulated owls are strongly associated with open ponderosa pine habitat, which does not occur within or near the project area. The forested cover consists primarily of a conifer mix of lodgepole pine, Douglas fir, spruce, and subalpine fir. However, aspen and dry open Douglas-fir habitats are present and may also be used by flammulated owls. To date, no occurrences have been documented within the project area. No flammulated owls were detected during survey efforts in 2005 conducted in the adjacent Shields River drainage. There are no element occurrence data of flammulated owls in this area recorded with the Montana Natural Heritage Program.

Direct/Indirect/Cumulative Effects

No direct effects on this migratory owl are anticipated. The proposed vegetation treatments may have some indirect effects on potential nesting, foraging, and roost sites. Modeling revealed approximately 744 acres of potential nesting habitat scattered throughout the project area where Douglas fir dominated. Of this total, approximately 96 acres occur within potential treatment units (Unit E1 and J). Vegetation treatments in Units E1 and J (Alternative 3 only) may improve flammulated owl habitat by maintaining the open, park-like conditions of dry, Douglas fir and removing lodgepole. Forest Plan standards for snag management would be met under the action alternatives. Forest/ grassland edges are preferred foraging. Minor indirect effects of the action Alternatives 2 and 3 may occur due to alteration of the owl's prey base (insects). Similarly, Units A1 and G (and to a smaller extent A2, B, C, D) would increase habitat opportunities by enhancing aspen. Alternative 1 would not achieve these beneficial effects to potential habitat. Proposed vegetation treatments in other units would open forested stands potentially creating more favorable conditions but occur in mixed conifer forest that is not preferred by flammulated owl.

The stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to flammulated owl foraging, nesting, or roosting habitat. None of the alternatives would result in adverse modification of flammulated owl or its associated habitat.

Samson (2006) recently conducted a region-wide conservation assessment for the northern goshawk, black-backed woodpecker, pileated woodpecker, flammulated

owl based on a principle-based approach to PVA. For each species, he used peer-reviewed science, all known inventory/observation data, vegetation data from Forest Inventory and Analysis (FIA), scientific information on the minimum dispersal distances for species, their home range and body sizes, and well known conservation principles to assess the availability of suitable habitat, calculate a habitat threshold, and ultimately assess short- and long-term viability on each Forest in Region One. According to Samson (2005), short-term viability of the flammulated owl in the Northern Region is not an issue given the following: 1) no scientific evidence exists that the flammulated owl is decreasing in numbers; 2) increases in the extent and connectivity of forested habitat have occurred since European settlement; 3) well-distributed and abundant flammulated owl habitat exists on today's landscape; 4) the level of timber harvest of the forested landscape in the Northern Region is insignificant; and 5) the barred owl represents a significant threat to the flammulated owl.

Yellowstone Cutthroat Trout

Affected Environment

Streams throughout the project area are within historically occupied habitat for Yellowstone cutthroat trout. Yellowstone cutthroat trout surveys have been conducted in all streams throughout the project area (see Affected Environment narrative for Issue #2 Fisheries).

Direct/Indirect/Cumulative Effects

Based on the detailed effects analysis outlined in Chapter 3, Issue #2 Fisheries, the following determinations for Yellowstone cutthroat trout were reached. For Alternative 1, there would be *no impact* on YCT. For Alternatives 2 and 3, there would be *no impact* during the initial vegetation treatment phase, and a *beneficial affect* once road related sediment inputs decline and stabilize. Detailed rationale for this determination is included in the fishery effects analysis on pp. 3-31 through 3-51.

Western Toad

Affected Environment

Western toads inhabit all types of aquatic habitats ranging from sea level to 12,000 in elevation (Maxell 2000). They breed in lakes, ponds, and slow streams, preferring shallow areas with mud bottoms (Maxell 2000). Western toads breed from May to July, laying long, clear double-strings of eggs (Maxell 2000). Tadpoles metamorphose in 40 to 70 days (Maxell 2000). Because of their narrow environmental tolerance (10-25 C throughout the year), adults must utilize thermally buffered microhabitats during the day, and can be found under logs or in rodent burrows (Maxell 2000). Adults are active at night and can be found foraging for insects in warm, low-lying areas (Maxell 2000). Western toads

overwinter in rodent burrows and underground caverns. . Boreal toads have not been found on the east side of the Gallatin range (Atkinson and Peterson 2000), with no observations in the project area. Suitable habitat exists throughout the project area, but additional surveys are needed to validate their distributional range and presumed absence from the project area.

Direct/Indirect/Cumulative Effects

Surveys for the western toad suggest that they are not present, but additional surveys are needed to validate their distributional range. Habitat degradation for this amphibian species is not likely to occur because little riparian disturbance will occur. Treatment in wetlands is not proposed. Thus, it has been determined that Alternatives 1 through 3 will have *no impact* on individuals or habitat and would have no direct, indirect or cumulative effects to western toad habitat.

Northern Leopard Frog

Affected Environment

Northern leopard frogs breed from mid-March to early June (Maxell 2000). Mating occurs when males congregate in shallow water and begin calling during the day (Maxell 2000). Eggs are laid at the water surface in large, globular masses of 150 to 500 (Maxell 2000). Young and adult frogs often disperse into marsh and forest habitats, but are not usually found far from open water (Maxell 2000). Overwintering habitat is the bottom of permanent water bodies, under rubble in streams, or in underground crevices. During a Gallatin National Forest survey in 1999, northern leopard frogs were found only on the Bozeman Ranger District with a second potential sighting on the Gardiner Ranger District. None have been found in the Smith Creek drainage or elsewhere throughout the project area, but additional surveys are necessary to validate their distributional range and presumed absence from the project area. Suitable habitat exists throughout the project area.

Direct/Indirect/Cumulative Effects

Surveys for the northern leopard frog suggest that they are not present, but additional surveys are needed to validate their distributional range. Habitat degradation for this amphibian species is not likely to occur because little riparian disturbance will occur. Treatment in wetlands is not proposed. Thus, it has been determined that Alternatives 1 through 3 will have *no impact* on individuals or habitat and would have no direct, indirect or cumulative effects on northern leopard frog habitat.

F.3 Management Indicator Species

Management indicator species (MIS) are wildlife species whose habitat is most likely to be affected by management practices thereby serving as indicators of habitat quality. The Gallatin Forest Plan directs that habitat is provided for identified management indicator species and those native indigenous species that use special or unique habitats. Five terrestrial species are identified as MIS in the Gallatin National Forest Plan 1987:II-19 (USDA 1987). These are the grizzly bear, bald eagle, Northern goshawk, marten and elk. The bald eagle and goshawk are also threatened or sensitive species and was analyzed in those sections. No analysis is needed for grizzly bear in the Crazy Mountain Range, north of I-90; the project area is not located within a Bear Management Unit in the Recovery Plan or in occupied habitat. Pine marten and elk are discussed below. Migratory birds are used as an indicator group to measure effects on those habitats such as grassland, forested, and aspen habitats potentially impacted by vegetation treatment.

Northern Goshawk

Affected Environment

The Gallatin Forest Plan lists the northern goshawk as the management indicator species (MIS) for dry Douglas-fir old growth habitats. However, there are no Forest Plan standards for the management of goshawk habitat.

A systematic random survey in Region 1 in 2005 showed that the goshawk is relatively common and well-distributed in the Northern Region (Kowalski 2006). Samson (2006) conducted a region-wide conservation assessment for the northern goshawk. According to Samson (2005) short-term viability of the goshawk in the Northern Region is not an issue given the following: 1) No scientific evidence exists that the goshawk is decreasing in numbers; 2) Increases in the extent and connectivity of forested habitat have occurred since European settlement; 3) Well distributes and abundant goshawk habitat exists on today's landscape; 4) The level of timber harvest of the forested landscape in the Northern Region is insignificant; 5) The barred owl represents a significant threat to the northern goshawk; and 6) Suppression of natural ecological processes has increased and continues to increase amounts of northern goshawk habitat. In summary, the northern goshawk and its habitat appear abundant and well distributed across Region 1 of the Forest Service.

The analysis area for goshawk was defined as the project area. This area is approximately 17,000 acres located in the Smith Creek watershed. The effects of the Smith Creek Vegetation Treatment Project were assessed relative to goshawk, using information on population status and distribution; occurrence records from inventory efforts; informal observation; modeling of the vegetation database for potential habitat; and scientific literature.

In the Northern Region, the species breeds in mountainous or coniferous regions throughout western and southern Montana, as well as north and north central Idaho. Goshawks winter throughout their breeding range with a portion of the population wintering outside of regularly used areas (Brewer et. al 2007). In “The Northern Goshawk Status Review,” the US Fish and Wildlife Service (USFWS) found that goshawk typically use mature forests or larger trees for nesting habitat, however, they are considered a forest habitat generalist at larger spatial scales (USDI-FWS 1998). The Service found no evidence in its finding that the goshawk is dependent on large, unbroken tracts of “old-growth” or mature forest (63FR35183 June 29,1998).

Goshawk home ranges consist of at least three levels of habitat during the breeding season – the nest area (stand), post-fledgling area (PFA), and some amount of general habitat used for foraging, with the diversity of forest vegetative composition,, age and structure increasing beyond the nest area (i.e. Reynolds et al 1992, Kennedy et al. 1994, McGrath et. al. 2003, Squires and Kennedy 2006). Habitat structure and prey abundance appear important in the goshawk’s selection of PFAs and nest acres in the home range.

In summary:

- Goshawks nest in a variety of forest types throughout their range (i.e. summarized in Squires and Reynolds 1997, USDI Fish and Wildlife Service 1998, Samson 2006a, and Squires and Kennedy 2006)
- In general, the nest area vegetation is described by a comparatively narrower range of structural characteristics than the PFA and foraging area: mature forests with larger trees relatively closed canopies (50-90%) and open understories (Ibid).
- Average size of the nest area varies based on local habitat conditions and has been reported as ranging from 1 to 148 acres (30 acres recommended by Reynolds et. al. (1992) in the southwestern US, a range of 1 to 32 acres reported by Squires and Reynolds (1996) in Wyoming, 40 acres reported by Clough (2000), in west central Montana, 80 acres reported by Patla (1997) in Idaho, and 148 acres reported by McGrath et al. (2003) in northeastern Oregon and central Washington.

No evidence exists that the goshawk is dependent on large, unbroken tracts of “old growth” or mature forest (Federal Register 63: 35183, June 29, 1998) or specifically selects for “old growth” forest (McGrath et al. 2003). This is also substantiated at a more local level by Clough (2000), who in a random sample of available vegetative types in west central Montana, found goshawks selected for nest stands of mature and older forest that were approximately 40 acres in size, surrounded by a mix of younger forest and non-forested openings, and more recently, by Canfield (2006) who looked at vegetative patterns in 1700-acre random sampling units where goshawks were detected in a random survey in the

Northern Region of the Forest Service.

Samson (2006a) developed a goshawk nesting habitat relationship model for each Ecological Province using vegetation attributes collected at goshawk nest sites found in Region 1. He characterized the habitat on the Gallatin National Forest as depicted in Table A-11.

Table A-11 Habitat Relationship Model (Samson 2006a)

Ecological Province	Species of Nest Tree	Canopy Cover	Vertical Structure	Basal Area Weighted by Diameter Class
Southern Rocky Mountains (Gallatin & Custer NF)	Douglas-fir, ponderosa pine, lodgepole pine	60%+	1,2	10.0'+

The PFA surrounds the nest area and, based on studies of the family movement patterns, is defined as the area used by the family group from the time the young fledge until they are no longer dependent on the adults for food (Reynolds et al. 1992, Kenward et al. 1993, Kennedy et al. 1994, Kennedy and Ward 2003). Studies that corroborate the existence of a PFA, characterize potential or known function and habitat characteristics were summarized in Squires and Kennedy (2006) and include:

- The PFA may represent the defended portion of the home range (Reynolds et al. 1992).
- The PFA may serve as an area where young birds develop flying and hunting skills as well as protection/cover from predators (food (Reynolds et al. 1992, Kennedy et al. 1994, Squires and Kennedy (2006):
- The size, 198 to 494 acres (80 to 200 ha), shape, habitat composition, and functional importance of the PFA may vary with local conditions, such as habitat composition, disturbance history, prey availability, and risk of predation (Squires and Kennedy, 2006).
- The area of continuous, non-fragmented forest in the PFA that surrounds the nest may also vary with local conditions. For example, studies in different parts of the country have found areas of continuous forest surrounding the nest site out to a variety of distances, such as 981 feet in west central Montana (Clough 2000), 1640 feet in Oregon and Washington (McGrath et al. 2003), 2116 feet in Arizona (LaSort et al. 2004), and 2402 feet in New Mexico (Kennedy et al. 1994). In R1, Canfield examined nest sites found during surveys of random units and

noted that nest stands were found in a variety of habitat mosaics.

- Structural components, late-seral forest, >50% canopy cover, and structural diversity in the understory appear to be important at the PFA scale (i.e. Finn et al. 2002, McGrath et al. 2003, Samson 2006a, Squires and Kennedy 2006).

Some studies have suggested that goshawks need a narrow range of habitat conditions in the foraging area, similar to those found in the nest area (i.e. Beier and Drennan 1997, Finn et al. 2002, Greenwald et al. 2005). However a larger number of studies have reported that goshawks use a broad-range of habitat conditions in the foraging area (i.e. Kenward 1982, Reynolds et al. 1992, Bright-Smith and Mannan 1994, Hargis et al. 1994, Beier and Drennan 1997, and summarized in Squires and Kennedy 2006). Boal et al. noted that even habitats that goshawks do not appear to use (such as dense spruce/fir or small diameter, dense lodgepole pine) may be important areas for producing prey species (i.e. snowshoe hares). Goshawks have been reported hunting along edges of forest/riparian, forest/clearcut, and forest/grassland-sage; in nonforested openings a long distance from cover; in dense, closed-canopy forest; and in open-canopied forest.

Potential nesting habitat was modeled from the TSMRS database using protocols from Samson (2005). This modeling effort indicated a total of 549 acres of suitable habitat across the project area. These forested stands are not all contiguous and many individual stands are not large enough to serve as a nest stand, much less a home range. Approximately 88 acres of modeled habitat was within proposed treatment units (Units B and E2).

Goshawk surveys were conducted in 2005-2006 in the area modeled as potential habitat in Unit B using Kennedy and Stahlecker (1993) protocol. No responses were documented. The amount of potential habitat in E2 was considered too small (4 acres) to serve as a nest stand. There are no documented nest stands, historical or current, in the project area. Surveys have also been conducted in Sunlight Creek, which is immediately to the south of the project area and no goshawks were located. Historically, nests have been found along the west flank of the Crazy Mountains. There is one documented element occurrence in the western Crazy Mountains recorded with the Montana Natural Heritage Program of the Northern goshawk, but the occurrence is well outside of the project area.

Direct/Indirect/Cumulative Effects

The implementation of Alternative 2 or 3 would have little, if any, direct affect on goshawks. Indirect affects would also be minimal as modeled habitat revealed limited habitat with optimal characteristics for nesting. There was approximately 84 acres of Douglas-fir and lodgepole stands potentially suitable as nesting habitat in Units B and E2. Treatment of aspen and/or the over-stocked Douglas-fir in Units A1, B, D, E1, G, and J may benefit goshawk in the long-term by increasing foraging habitat and associated prey base. Under any of the alternatives,

including no action, nesting habitat is limited in the short-term. However, forested stand adjacent to proposed treatments, where there is a diversity of Forest and grassland conditions, would not be affected and may serve as potential nesting habitat in the long-term. Snag and down woody material standards would be followed, providing habitat for prey species.

There is low potential for goshawks to use the project area for nesting. However, if a nest was located during project implementation, approximately 40 acres around the nest would be buffered from ground disturbing activities and/or vegetation manipulation and no treatment activities would be allowed from April 15 to August 15 within the area representing the PFA around a active nest site.

The associated stewardship projects including aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to goshawk foraging or nesting habitat. None of the alternatives would result in adverse modification of the goshawk or its associated habitat. Forest Plan standards for snags and down woody material would be met under the action alternatives.

Samson (2006) recently conducted a region-wide conservation assessment for the northern goshawk, black-backed woodpecker, pileated woodpecker, flammulated owl based on a principle-based approach to PVA. For each species, he used peer-reviewed science, all known inventory/observation data, vegetation data from Forest Inventory and Analysis (FIA), scientific information on the minimum dispersal distances for species, their home range and body sizes, and well known conservation principles to assess the availability of suitable habitat, calculate a habitat threshold, and ultimately assess short- and long-term viability on each Forest in Region One.

According to Samson (2005), short-term viability of the goshawk in the Northern Region is not an issue given the following: 1) no scientific evidence exists that the northern goshawk is decreasing in numbers; 2) increases in the extent and connectivity of forested habitat have occurred since European settlement; 3) well-distributed and abundant northern goshawk habitat exists on today's landscape; 4) the level of timber harvest of the forested landscape in the Northern Region is insignificant; 5) the barred owl represents a significant threat to the northern goshawk; and 6) suppression of natural ecological processes has increased and continues to increase amounts of northern goshawk habitat. In addition, recent R1 goshawk surveys (Kowalski 2006) indicate that this species and its habitat appear abundant and well distributed across Region 1 of the Forest Service.

Elk

Affected Environment

Elk are the MIS species designated as the indicator for big game habitat. The Forest Plan has designated elk as a MIS for big game habitat under the premise that by managing for productive elk habitat, we will be managing for most big

game species. These include mountain goat, moose, bighorn sheep, and mule deer. Mule deer and moose are also present in the project area. Forest Plan standards for big game include standards for evaluating impacts to elk habitat components including winter range, security areas, hiding cover, foraging areas, thermal cover, migration routes, and hunting opportunity.

Hiding and thermal cover are not limiting in the Smith Creek watershed. Vegetative structure diversity analysis indicates that approximately 70-90% of the area provides forested cover. Additional modeling indicates that approximately 62% of the area is at or above 40% canopy cover. A conservative estimate for forage cover would be 38%, not counting forage available in forested stands that also provide hiding cover. There were no areas of concern identified for big game species for this project.

Use of the area by elk occurs during the spring and fall seasons and during migration. Hunting, particularly bow hunting, is popular during the fall migration period when elk are moving from summer range to winter areas. Elk are generally out of the area before or during the early portion of the general season. Therefore, harvest during the bow season is an important time period in meeting population objectives. Summer habitat is generally located in the upper Smith Creek area at elevations above the project area of influence although they can be found throughout the project area depending on the proximity to structures, roads, motorized trails and associated human activity. Winter range is primarily in lower elevations on private lands. Elk spend winters divided between the Reese Hills and Oil Hills winter range areas.

The project area is within Hunting District (HD) 315 which is basically the west flank of the Crazy Mountains that includes all the proposed vegetation treatment units plus the remaining west side of the Crazies south to Rock Creek; the east flank makes up HD 580, also part of the Crazy Mountain Elk Management Unit (EMU). Elk numbers increased during the 1990's throughout the EMU. According to results from Montana Fish, Wildlife, and Parks (MFWP) elk surveys for HD 315, the number of elk observed during the 2006 winter trend survey was the highest count since surveys began in 1974 with 1,562 elk observed. The 2006 count is slightly higher than the three previous counts of 1,488-1,523 elk (Lemke, office memorandum).

Elk population objectives for the entire Crazy Mountain EMU (including both HD 315 and 580) is to maintain a post-season population of 1,580-2,370, or within 20% of 1,975 elk according to the Montana State Elk Plan (Montana Department of Fish, Wildlife, and Parks 2004). This is further broken down to objectives by each HD. The objective for HD 315 is 20% of 1,000 or 800-1,200 elk. Elk population goals have been met for this EMU and are considered to be healthy and widely distributed. As elk numbers have increased so have harvest levels. The last reported elk harvest for HD 315 during 1999-2003 was estimated a mean of 282 elk, an increase by 36% from the previous 4-year average.

Issues addressing big game vulnerability and security cover were analyzed. The

analysis indicated that the Shields Travel Plan Area (TPA), of which the Smith Creek project area is only a part, had an open road density of 0.91 miles per square mile. In HD 315 the Habitat Effectiveness Index (HEI) had an HEI of 58%, which is well below the recommended level 70%. A vulnerability analysis was also conducted for HD315 indicating that 36% of the hunting district met the Hillis model (Hillis and others 1991) for elk security cover. The Hillis paradigm defines security areas as blocks of habitat at least 250 acres in size and at least ½ mile from an open road; they recommend at least 30% of the elk analysis unit be considered secure cover. The proposed action alternatives include road improvements such as hardening culverts and upgrading the surface but would not change the road configuration. Since there are no new roads or changes in access that would increase open road density, these factors relative to elk vulnerability were not analyzed further.

Direct/Indirect/Cumulative Effects

Effects to elk were addressed by evaluating project impacts to elk hiding cover and forage availability. With the implementation of Alternative 2 or 3, there would be no measurable changes in cover/ forage ratios. Assuming that the proposed vegetation treatment eliminated all cover in these two alternatives, hiding cover would be reduced to 57% and 55% respectively. However, this is a liberal estimate of the decrease in cover as the individual unit prescriptions would not reduce hiding cover to an unacceptable level. The vegetative structural diversity analysis indicates a 1% decrease in the pole, mature, and old growth structural classes. However, this analysis focused on the project area and not the entire HD 315, also generating a liberal estimate of hiding cover loss.

Thinning in Units A2, B, C, D, E1, E2, H, and I would retain a canopy cover and structure of various age classes that would still serve as hiding cover. Units A1 and G would remove more material to enhance aspen regeneration but existing aspen boles of all age classes would remain. Increasing aspen extent would provide greater availability of browse. Monitoring of browse levels by both native and domestic ungulates would occur to determine the need for physical protection of sprouts for overall successful aspen regeneration. Unit F would eliminate all merchantable material in small patches. Unit J (Alternative 3 only) would increase foraging opportunities for big game. These units would serve to provide foraging areas near security cover potentially increasing the attractiveness and suitability of these sites across the larger landscape that elk utilize. Alternative 1 would not change the cover components for big game. Successional advancement would reduce forage availability long-term across the landscape.

Existing road access and road densities would not change with this project. There is no proposed temporary or permanent road construction. Roads used for project implementation activities would remain open to the public. Mitigation for discouraging use on skid trails or other access points created by the proposed treatments would ensure these levels of security long-term.

Other qualitative factors such as potential for displacement were also considered.

Alternative 1 would not result in any increases in displacement. Alternative 2 would have some potential to displace big game at least temporarily. Units A1, B, C, D, G, and I propose removal of merchantable material during the winter. Mitigation to conduct winter logging would benefit elk. Units proposed to be treated in the winter may cause displacement of moose that winter in the area. Moose would have the opportunity to move into adjacent drainages during this localized winter activity. Summer helicopter logging proposed in Units E1, E2, and F may also displace big game but is also localized and are adjacent to secure areas. Implementation of Unit J in Alternative 3 may displace elk during the spring and fall when prescribed burning would take place. Big game species are doing well in this area, and population viabilities have not been identified as a concern.

Thermal cover was not determined because no harvest will occur on winter range. Elk move to winter range prior to winter and most years prior to general hunting season. Mitigation was recommended to provide quality bow hunting opportunities, to better meet population harvest objectives, and to facilitate fall migration to winter range. The mitigation restricts harvest or hand treatment of vegetation from September 1 through October 15. The stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to ungulate habitat. Key components such as cover, security areas, and road densities would remain unchanged with the proposed action or any of the alternatives. None of the alternatives would result in adverse modification of big game or its associated habitat.

Pine Marten

Affected Environment

The pine marten is the Forest Plan indicator for moist spruce old growth and is known to prefer structurally complex conifer forests. The Forest Plan standard for snags and down woody debris is critical management direction to ensure habitat components key to pine marten are provided within forested areas. Stumps and downed logs are critical components. Martens select mature to old growth forests because these habitats produce large amounts of coarse woody debris, which provide thermal cover, security from other predators and habitat for prey species (Buskirk and Ruggiero 1994). Foraging and denning sites are generally dominated by spruce and subalpine fir with large-diameter deadfall and ground cover that supports red squirrels, mice and voles.

There is suitable habitat within the project area. Modeling for preferred habitat consisting of only spruce and subalpine fir forests indicated there was approximately 492 acres available in the Smith Creek watershed. In addition, the old growth analysis indicated that approximately 171 acres of the total 492 acres of spruce and subalpine fir old growth occur in Compartment 221 which is closely aligned to the entire project area. The occurrence of this type of old growth is disconnected across the landscape with relatively small patch sizes from <20 to 75

acres mostly following stream corridors.

Further modeling for potential suitable, but somewhat marginal, habitat including Douglas fir, lodgepole, and mixed Douglas fir/ lodgepole revealed an additional 4,727 acres of potential habitat. This is most likely a liberal estimate as past harvested second or third growth stands do not provide enough down woody debris for thermal cover, security from other predators, and habitat for prey species. Modeled habitat patches do not appear to be contiguous but exist in clumped patterns across the landscape. Therefore, pine marten probably occur at low densities.

Home range sizes are variable, particularly among males and may range from approximately 150 - 8,000 acres (Coffin and others 2002, Buskirk and McDonald 1989, Buskirk and Ruggiero 1994). Based on this research, the analysis area could likely support from 0 to 34 marten home ranges.

Marten are managed as a furbearer species by the State of Montana Fish, Wildlife, and Parks. Furbearer trapping season dates for District 3, which includes the project area, are December 1 to February 15. There is no limit on the number of marten that may be taken. According to the furbearer trapping and harvest report last updated in 2002, there were 43 marten reportedly taken in Park County; there were no reports for Meagher County (<http://fwp.mt.gov/hunting/planahunt/harvestreports.html#furbearer>). There is no global, state, or agency ranking that indicates a concern for the viability of this species.

Direct/Indirect/Cumulative Effects

No direct effects on the pine marten are anticipated under any of the alternatives. Open road density would not be increased by treatment activities; therefore trapper access would not increase.

Indirect effects to denning and foraging habitat would occur with Alternative 2 from the removal of overstory and understory trees that could eventually contribute to coarse woody debris, a habitat component important to martens for den sites and prey habitat. Maintaining woody structure provides access beneath the snow, as well as habitat for prey species. Thompson and Colgan (1994) found that marten preferred older forests because of a greater rate of prey capture compared with that in more open habitats in logged forests. Thompson (1994) also found that marten preferred older forests because of a lower risk of predation; resident marten in uncut forests had higher mean ages, were more productive, and had lower mortality rates due to trapping.

Modeling revealed that portions of units contain either preferred or suitable habitat. Approximately 74 acres of preferred habitat, of which 22 acres is designated spruce and subalpine fir old growth, would be affected. An additional 130 acres of suitable habitat for a total of 204 acres of potential habitat would be affected by the proposed treatments. These acres are not contiguous and do not represent a home range. There may be some effect to individual home ranges but

this is expected to be minor. Management recommendations for supporting viable populations of pine marten and marten prey (Warren 1990) call for leaving 40% of marten home ranges in mature and old growth. The above treatments are assumed to reduce available snags, downed woody debris and overhead cover for marten. However, the analysis area meet recommendations of Warren (1990) post treatment.

The prescribed burning in Alternative 3 could enhance ground vegetation for both pine marten as well as its prey species. Fine fuels would be consumed during the burning actions, but most of the larger fuel would remain. There would be unburned patches where most of the live overstory would be retained.

Forest Plan standards for snag and down woody debris management would be met under both the action alternatives. There would be 10-15 tons per acre of woody material 3” and greater left on the ground after treatment. This is particularly pertinent in units A1, B, C, and D where currently there is not that much material on the ground due to past harvest slashing activities such that they do not meet the Forest Plan standards. Alternative 1 would have no indirect effects as no treatment would occur. In the short-term Units A1, B, C, and D would continue to not meet the Forest Plan standards for snags and down woody debris. Long term succession in these relatively younger stands would continue to provide forest structure that eventually produce snags and down woody material.

The stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to pine marten foraging or denning habitat. None of the alternatives would result in adverse modification of pine marten or its associated habitat.

The project will maintain viable populations of marten on the Forest because the project is consistent with all Forest Plan standards for wildlife, including snag and down woody debris; the project is consistent with habitat recommendations of Warren 1990 for maintaining marten populations; old growth is well distributed in the project area; and trapping mortality will not increase from the project.

F.4 Migratory Birds

Affected Environment

Migratory birds are protected under the Migratory Bird Treaty Act (16 USC 703-711) which requires federal agencies to ensure that environmental analyses of federal actions evaluate the effects of actions and agency plans on migratory birds. Migratory birds are a diverse group including raptors, waterfowl, shore birds, game birds, and songbirds utilizing a vast array of habitats for nesting and foraging. There are currently no Forest Plan standards specific to migratory birds.

Habitats found in the analysis area are grasslands, shrub-steppe, riparian, conifer forest of various structural and age classes, and aspen. Much of the grassland areas in the project area are mesic to wet and associated with seeps or riparian

areas. Non-forested areas that would be considered grasslands occur less frequently. Some of this may be attributed to geologic substrates and some to colonization by coniferous trees due to lack of fire. Shrubs within a grassland matrix do not represent a major component in the project area. Streamside habitats, wet meadows, seeps, and springs all attract birds. Riparian areas are used as foraging sites, nesting habitat, and cover. These habitats may be in areas where drainage bottoms broaden, in micro-meadows in the timber, or on otherwise dry slopes. All of these types of riparian habitat occur throughout the project area but would not be impacted. Mitigation includes buffering existing springs from treatment and avoiding ground disturbance in wetland areas. The proposed treatment units focus on conifer forest and aspen stands. Migratory birds that occur in grassland, shrubland, and riparian areas will not be analyzed in detail. There were no key issues related to these habitats as it pertains to this proposal. The emphases for analysis of migratory birds are those habitats associated with conifer forest and aspen.

Forested types are extensive within the project area. Coniferous habitat is not limiting. Conifer forests provide nesting for ground nesters, canopy nesters, and cavity nesters; foraging niches are also provided for ground or aerial, insect or seed eaters. Much of the project area has been logged and now supports lodgepole pine regeneration in various stages of growth. Clear cutting was used extensively as a harvest method, which reduced overall snag availability in the project area. Habitat in these areas may be limited due to the lack of structural and species diversity, single age classes of overstory trees, and minimal understory cover and structure. Douglas fir, subalpine fir, and spruce also occur in the project area in various structural and age classes as discussed above. Older forest types typically provide the best habitat for snag-dependent species due to the availability of snags. Fire and other disturbances can also create snags. Some post-fire snag habitat was created after the Smith Creek fire of 1996 burned about 1,000 acres in upper Smith Creek.

With the exception of riparian areas, aspen is considered the most biologically diverse ecosystem in the Intermountain West. Aspen provides forage, cover, shade, and nesting habitat for birds. Aspen provides habitat for many species of birds, some of which utilize the stand year-round while others use aspen during only a portion of the year (DeByle 1985b). Birds breeding in aspen stands include shrub or tree canopy nesters, cavity nesters, or ground nesters. Aspen trees offer more structural diversity than conifer forests (Johnson 2005). Snags provide perches for birds of prey and sites for cavity nesters. Bird communities vary with the size, age, and grazing history of aspen clones (Kay 1997).

Aspen occurs in the project area in small, isolated clones or, in many cases, single trees. One exception to this is the Unit A1 portion of the proposed vegetation treatments which contains a substantial amount of aspen. The relative health of the aspen is variable with some clones expressing a diversity of age and structure and other stands appearing as single storied and over-mature due to colonization by conifers. Browsing from livestock, moose, elk, and deer is evident. Aspen in this area appears to be more at risk by conifer encroachment, disease, and the

absence of fire, than by ungulate use. Maintaining and restoring aspen is important because of its exceeding high biodiversity (Kay 1997).

The project area is most likely used by a low diversity of generalist and/ or common bird species such as the American robin, back-billed magpie, common raven, gray jay, Townsend's solitaire, and dark-eyed junco. If these species are present in enough numbers, predatory raptors such as red-tailed hawk, sharp-shinned hawk, or Cooper's hawk, may use the project area of influence for foraging. There are four documented element occurrences recorded with the Montana Natural Heritage Program of the olive-sided flycatcher, a species of concern. This species nests in boreal forests and is an aerial insectivore. Another species of concern that occurs in the project area is the great gray owl. This large, somewhat diurnal raptor inhabits dense conifer forest adjacent to meadows where they hunt for small mammals. Both of these species are ranked S3, considered to be at risk due to limited or declining numbers, range, or habitat within Montana.

Globally, they are ranked G4 and G5 (the olive-sided flycatcher and great gray owl respectively). The olive-sided flycatcher is globally ranked as a G4 which means that this species is uncommon but not rare; although this species is not vulnerable in most of its range, there is cause for its viability long-term. The olive-sided flycatcher has declined significantly on western Breeding Bird Survey Routes between 1968 and 1991 (Hejl 1994). Olive-sided flycatchers use grass/ forb and shrub/ sapling seral stages during their life history but do not nest in these young stands. According to Meslow and Wight (1975), nesting occurs in older second growth and mature stands, 41-120+ years of age. Research since that time has suggested that the breeding census data is a misleading indicator of nest success (Hutton and Young 1999). They postulate that timber harvest provides a general appearance of a preferred habitat but do not provide the components for reproductive success. Olive-sided flycatchers are clearly a post-fire dependent bird species under natural conditions (Hutto 1995).

The great gray owl is globally ranked as a G5 which means that it is common and not vulnerable to extirpation although it may be rare in parts of its range. While not completely migratory, great gray owls have been known to have variable movement patterns to lower elevations or to distant areas. Dispersal is influenced by prey availability and stability of prey biomass, and snow levels (Duncan and Hayward 1994). They use habitats from the extremes of the successional spectrum (Hayward 1994). Nesting occurs in all types of forest including Douglas fir forests with patches of aspen, Douglas fir/ lodgepole, or lodgepole/ spruce but always in the vicinity of meadows. Broken-topped snags, stumps, or old raven nests are used for nest sites; they do not build nests and are limited to available nest sites. Foraging habitat is described as relatively open and grassy and includes natural meadows, logged areas, and open forests; they avoid hunting in timbered stands. Pair formation for breeding occurs as early as January with egg laying in April.

An additional species to consider is the ruffed grouse. Ruffed grouse are closely tied to aspen and the quality of habitat requirements for drumming, nesting, brood

rearing, and wintering. Management of aspen such as rejuvenation of decadent stands provides necessary habitat components through intensive suckering and subsequent natural stand thinning. The quality of habitat declines with succession after disturbance. Currently, ruffed grouse are somewhat uncommon due to the decadence and limited extent of aspen.

Direct/Indirect/Cumulative Effects

Different migratory bird species respond differently to impacts. The individual response is based on the type of habitat affected, the type of nest structure used by that species, and the type of foraging requirements. Some species respond negatively to vegetation treatment, some positively, while others show an inconsistent or weak response to vegetation treatment.

Effects to migratory bird species were addressed by qualitatively evaluating impacts to nesting and foraging habitat for those species potentially affected by the proposed action. Because the olive-sided flycatcher and the great gray owl are species of concern, the discussion will focus on them and be more general for other migratory species.

The proposed vegetation treatments in Alternative 2 and 3 would have both negative and positive impacts to foraging, nesting, and roosting habitat of migratory birds depending on the individual habitat niches each species require along the successional pathway. Conifer habitat is not limiting within the project area. What may be limiting are the appropriate species composition, patch size, structure, and age class. Species generalists, as mentioned above, would do better than those specialists with narrow habitat requirements. Hutto and Young (1999) discuss how unnatural conditions created by timber harvest serve as ecological traps wherein birds are attracted to these areas in which suitability for reproduction and survival are poor due to lack of food resources, predation, and parasitism. Birds like the Olive-sided flycatcher are initially attracted to these harvested areas that are superficially similar (yet fundamentally different) and actually show considerably higher probabilities of detection in the short-term but poor survivability in the long-term. Assuming the postulation that timber harvest creates an ecological trap that promotes presence but does not facilitate reproductive success or survival, the proposed vegetation treatments in Alternative 2 would be detrimental to olive-sided flycatchers. Unit J in Alternative 3 may provide more natural conditions and therefore be beneficial to this species.

Promoting aspen regeneration in Alternatives 2 and 3 would provide a long-term array of opportunities for shrub, tree, and cavity nesters. This would lead to greater nest success over time. An increase in age and structural diversity would also provide habitat for other species such as small mammals and insects. These improved foraging opportunities would lead to an increase in biodiversity.

Great gray owls would benefit from the enhanced foraging opportunities. However, nesting opportunities would decrease with the proposed vegetation treatment, particularly in Units A1 and G. While timber harvest may increase

foraging opportunities, nesting habitat would be removed. Nesting habitat has been degraded through past forest management within the project area. Because great gray owls do not construct their own nest, factors affecting the availability of nest sites directly affect great gray owl breeding habitat (Duncan and Hayward 1994). There may be an increase in nest site availability long-term if forestry practices promote the growth of large trees for future primary nest building species or by leaving snag and snag replacements. Forest Plan standards for snags and down woody debris would be followed. Mitigation would restrict harvest if active great gray owl nesting is observed and located. In addition, reserve clumps in Units A1, B, D, and G would be designed to retain nesting structure and opportunities.

Ruffed grouse would benefit from the treatments in those units where aspen enhancement is prescribed. Prescriptions would regenerate very decadent stands and maintain even-aged healthier stands, creating a diversity of habitat components. After initial profuse suckering, stems begin to self-thin until trees have reached recruitment age. Ruffed grouse would extensively utilize this cover for fall, winter, and spring cover. Mitigation would require the creation of drumming logs to increase the breeding success and protect birds from predators during this critical time.

Alternative 1 would continue to see declining aspen distribution and extent across the landscape. This decline could lead to significant declines in nest success for birds (Struempf and others 2001). The lack of vegetation treatment would eliminate any displacement from human activity and associated habitat alteration from occurring. Great gray owls would retain older forest structure for nesting but would not benefit from enhanced foraging opportunities created through aspen enhancement and enlarging meadows. Loss of natural meadows and grasslands to encroachment of conifers and increased canopy with subsequent decrease in understory in forest types reduces habitat quality resulting in diminished foraging for great gray owls (Hayward 1994). Ruffed grouse would not benefit from the aspen treatment and would become increasingly uncommon in the project area.

The stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to migratory bird habitat. None of the alternatives would result in adverse modification to migratory bird habitats or to population viability.

Applicable laws, regulation, and Forest Plan Guidance

Endangered Species Act of 1973

The Endangered Species Act (ESA) of 1973 mandates that the effects of land uses and management activities be evaluated as part of the biological assessment (BA) process for listed species. Provisions of the Endangered Species Act require that federal agencies insure that their actions are not likely to jeopardize the existence of species federally listed as "threatened" or "endangered". All of the alternatives would

comply with the Endangered Species Act.

National Forest Management Act of 1976 (NFMA)

The National Forest Management Act (NFMA) of 1976 requires that the US Forest Service maintain sufficient habitat to sustain viable populations of native species (See FSM 2670 below). All of the alternatives would maintain sufficient habitat to sustain viable populations of native species.

National Environmental Policy Act of 1969 (NEPA)

The National Environmental Policy Act (NEPA) of 1969 requires an assessment of the impacts of human activities upon the environment. All of the alternatives comply with NEPA.

Forest Service Manual (FSM 2670)

Forest Service Manual (FSM 2670) provides policy under which Forest Service projects are designed to maintain viable populations of sensitive species. Sensitive species are those animal and plant species identified by the Regional Forester for which population viability is a concern as evidenced by a significant current or predicted downward trend in population numbers, density, or in habitat capability that will reduce a species' existing distribution (FSM 2670.5.19). Protection of sensitive species and their habitats is a response to the mandate of the National Forest Management Act (NFMA) to maintain viable populations of all native and desired non-native vertebrate species (36 CFR 219.19). In accordance with the Forest Plan, a biological evaluation (BE) must be completed prior to implementation of activities that have the potential to affect sensitive species. As part of Forest Service Region 1 streamlining policy (August 17, 1995), we are no longer required to produce a "stand alone" biological evaluation for sensitive species. Affects of the proposal to sensitive species are therefore only disclosed in this section. All of the alternatives comply with FSM2670.

Gallatin Forest Plan

Gallatin Forest Plan directs that habitat is provided for identified management indicator species and those native indigenous species that use special or unique habitats. Effects of the proposal to management indicator animal species, big game, and other non-game species are addressed in this EA. The Forest Plan also provides specific direction for management of wildlife habitat by various management emphasis areas (MAs). The proposed vegetation treatments would occur within two MAs and are consistent with the direction provided for them. A description of these MAs was given in Chapter 1, Section VIII, Forest Plan Direction.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.4 – Use the Montana Cooperative Elk-Logging Study for analyzing elk habitat security and conduct [HEI] analysis. In HD 315 the Habitat Effectiveness Index (HEI) had an HEI of 58%, which is well below the Forest Plan standard of 70%. A Hillis (Hillis and others 1991) model vulnerability analysis was also conducted for HD315. This

indicated that 36% of the hunting district met the Hillis model for elk security cover (30% is recommended). Mitigation would ensure these levels of security long-term.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.5 – Maintain hiding cover associated with key habitat components. Hiding cover was estimated at approximately 70-90% of the area and is not limiting. There were no areas of concern identified for big game species for this project. The vegetative structural diversity analysis indicates a 1% decrease in the pole, mature, and old growth structural classes, maintaining acceptable levels of hiding cover. Identified mitigation measures would facilitate fall migration to winter range.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.7 – Standards for snag and down woody material will be utilized. Snag habitat needs were considered for Townsend's big-eared bat, flammulated owl, Northern goshawk, pine marten, and migratory birds. Forest Plan standards for snag and down woody debris management would be met under both the action alternatives. Snag habitat would remain well distributed across the landscape within all forest types.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.8 – Emphasis will be given to the management of special and unique wildlife habitats such as wallows, licks, talus, cliffs, caves, and riparian areas. Key components such as cover, security areas, and road densities would remain unchanged with the proposed action or any of the alternatives. None of the alternatives would result in adverse modification of big game or its associated habitat. Elk population goals have been met for this EMU and are considered to be healthy and widely distributed.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.11 – Roads and forest cover will be managed to provide habitat security and diverse hunting opportunity. In HD 315 the Habitat Effectiveness Index (HEI) had an HEI of 58%, which is well below the Forest Plan standard of 70%. A Hillis (Hillis and others 1991) model vulnerability analysis was also conducted for HD315. This indicated that 36% of the hunting district met the Hillis model for elk security cover (30% is recommended). Forest cover is not limiting in this project area and there are no new roads or changes in access. Identified mitigation measures would provide quality bow hunting opportunities and to better meet population harvest objectives.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.12 – Habitat that is essential for species identified in the Sensitive species list developed for the Northern Region will be managed to maintain these species. Sensitive species were addressed as part of the analysis for proposed vegetation treatment in the Smith Creek project area. All terrestrial sensitive species were dismissed or analyzed in detail. Mitigation measures were identified as appropriate.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.13 – Indicator species will be monitored. Indicator species were identified and addressed as part of

the analysis for proposed vegetation treatment in the Smith Creek project area. Mitigation measures were identified as appropriate.

Forest Plan Standard for Threatened and Endangered Species, page II-18, section 6.b.all. Threatened and endangered species were addressed as part of the analysis for proposed vegetation and stewardship treatments.

The Smith Creek project area proposed vegetation units are all located within Forest Plan Management Area (MA) 8 (timber management). Standards relative to wildlife within this MA includes providing for wildlife habitat improvement when consistent with MA goals and to incorporate considerations for wildlife in the project planning process. Improvement of specific wildlife habitats were integrated into the purpose and need for this project.

Migratory Bird Treaty Act (16 USC 703-711)

Finally, Migratory bird species are protected from harm under the Migratory Bird Treaty Act (16 USC 703-711). On January 10, 2001, President Clinton signed an Executive Order titled “Responsibilities of Federal Agencies to Protect Migratory Birds”. On January 17, 2001, the USDA Forest Service and the USDI Fish and Wildlife Service signed a Memorandum of Understanding to complement the Executive Order. All alternatives are compatible with direction provided in the Migratory Bird Treaty Act.

F. Sensitive Plants

Forest Service Manuals (FSM 2670) provide policy under which Forest Service projects are designed to maintain viable populations of sensitive species and to ensure that those species do not become threatened or endangered due to Forest Service actions. As part of the National Environmental Policy Act (NEPA) decision-making process, proposed Forest Service programs or activities are to be reviewed to determine how an action would affect any sensitive species (FSM 2670.32). The goal of the analysis should be to avoid or minimize impacts to sensitive species. If impacts cannot be avoided, the degree of potential adverse effects on the population or its habitat within the project area and on the species as a whole needs to be assessed.

Impacts to sensitive plant species were first evaluated by assessing whether suitable habitat exists within the immediate project area to be affected. Previous surveys in the project area were reviewed and additional surveys were then conducted to determine presence.

Affected Environment

There are currently nineteen plant species designated as sensitive on the Livingston Ranger District. If these plants did occur within the project area of influence where ground disturbance would take place, the proposed vegetation treatment and

stewardship activities may impact local sensitive species populations.

Table A-12 lists those plants currently listed as sensitive species on the Gallatin National Forest. No sensitive plants have been found in other surveys in the Crazy Mountains. There is potential habitat for 5 species in the project area: Small-flowered columbine (*Aquilegia brevistyla*), small yellow lady’s slipper (*Cyroripedium calceolus* var. *parviflorum*), Northern rattlesnake plantain (*Goodyera repens*), Alpine meadowrue (*Thalictrum alpinum*), California false hellborine (*Veratrum californicum*). These species were targeted during field surveys.

Table A-12 Sensitive Plant Species for the Gallatin National Forest

Plants	Habitat	Elevation (in feet)	Potential Habitat Available? Species Present?
Musk root <i>Adoxa moschatellina</i>	forest, moist mossy slopes, rock crevices	4,400-5,400	No – area of influence above this elevational range
Small flowered columbine <i>Aquilegia brevistyla</i>	open woods and streambanks, limestone sites, northern aspect	5,000-6,000	Yes - area of influence barely within this elevational range; requisite habitat features not in area of ground disturbance; not found during survey
Large leafed balsamroot <i>Balsamorhiza macrophylla</i>	open hills, bunch grass	7,000-8,500	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
Small yellow lady’s slipper <i>Cyroripedium calceolus</i> var. <i>Parviflorum</i>	Bogs, damp mossy woods, seeps, moist forest meadow ecotones	3,000-6,200	Yes - area of influence within this elevational range; requisite habitat features in area of ground disturbance; not found during survey
Giant hellborine <i>Epipactis gigantea</i>	Thermal or Perennial springs, boggy organ fens	2,000-5,750	No - area of influence above this elevational range
English sundew <i>Drosera anglica</i>	Bogs	3,000-9,000	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance

Plants	Habitat	Elevation (in feet)	Potential Habitat Available? Species Present?
Beaked spikerush <i>Eleocharis rostellata</i>	Bogs	2,700-6,100	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
Slender cottongrass <i>Eriophorum gracile</i>	Peatland (fen) species	3,000-7,600	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
Hiker's gentian <i>Gentianopsis simplex</i>	Mountain bogs, meadows, seeps	4,400-8,400	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
N. rattlesnake plantain <i>Goodyera repens</i>	Open mossy forests, mountains, limestone, shale	5,700-6,800	Yes - area of influence within this elevational range; requisite habitat features in area of ground disturbance; not found during survey
Discoïd goldenweed <i>Haplopappus macronema</i>	Rocky, open or sparsely wooded slopes, talus, above timberline	7,640 +	No - area of influence below this elevational range; requisite habitat features not in area of ground disturbance
Hall's rush <i>Juncus hallii</i>	Moist to dry meadows and slopes, montane	6,900-8,400	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
Mimulus nanus Dwarf purple monkeyflower	Dry gravelly or sandy slope; may prefer bare areas with minimal competition	6,565 (one known population)	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance

Plants	Habitat	Elevation (in feet)	Potential Habitat Available? Species Present?
Austin's knotweed <i>Polygonum douglasii</i>	Open, gravelly, shale soils with eroding slopes and banks in montane	5,800-6,600	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
Jove's buttercup <i>Ranunculus jovis</i>	Sage to forested slopes	7,500-9,500	No - area of influence below this elevational range; requisite habitat features not in area of ground disturbance
Barratt willow <i>Salix barrattiana</i>	Cold, moist soil near or above timberline	6,800-10,500	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
Shoshonea <i>Shoshonea pulvinata</i>	Open, windswept limestone outcrops, ridgetops	6,800-9,000	No - area of influence within this elevational range; requisite habitat features not in area of ground disturbance
Alpine meadowrue <i>Thalictrum alpinum</i>	On hummocks w/shrubs in moist, alkaline meadows in montane, subalpine	6,500-7,000	Yes - area of influence within this elevational range; requisite habitat features in area of ground disturbance; not found during survey
Calif. False hellborine <i>Veratrum californicum</i>	Wet meadows and streambanks in montane and subalpine, alpine. Meadows, spruce, Doug fir	5,000-8,500	Yes - area of influence within this elevational range; requisite habitat features in area of ground disturbance; not found during survey

Direct/ Indirect Effects for All Alternatives

Impacts to sensitive plant species were first evaluated by assessing whether suitable habitat exists within the immediate project area to be affected. Previous surveys in the project area were reviewed and additional surveys were then conducted to determine presence. No sensitive plants were found in any of these surveyed areas. Therefore, it is unlikely that any of the action alternatives in the project area would affect sensitive plants.

Cumulative Effects for All Alternatives

Potential habitat and surveys were considered to determine that vegetation treatment or the stewardship items of aspen fencing, weed treatment, rehabilitation of roads and trails, toilet placement, and additional road upgrades would not result in detrimental effects to sensitive plant species or its habitat. There would be “no impact” on sensitive plant species suspected or known to occur on the Gallatin National Forest and will not be further addressed.

Applicable laws, regulation and Forest Plan Guidance

National Forest Management Act of 1976 (NFMA)

The National Forest Management Act (NFMA) of 1976 requires that the US Forest Service maintain sufficient habitat to sustain viable populations of native species (see 4 below). All of the alternatives will comply with NFMA requirements.

Forest Service Manual (FSM 2680)

Forest Service Manual (FSM 2670) provides policy under which Forest Service projects are designed to maintain viable populations of sensitive species. Sensitive species are those animal and plant species identified by the Regional Forester for which population viability is a concern as evidenced by a significant current or predicted downward trend in population numbers, density, or in habitat capability that will reduce a species' existing distribution (FSM 2670.5.19). Protection of sensitive species and their habitats is a response to the mandate of the National Forest Management Act (NFMA) to maintain viable populations of all native and desired non-native vertebrate species (36 CFR 219.19). In accordance with the Forest Plan, a biological evaluation (BE) must be completed prior to implementation of activities that have the potential to affect sensitive species. As part of Forest Service Region 1 streamlining policy (August 17, 1995), we are no longer required to produce a "stand alone" biological evaluation for sensitive species. Affects of the proposal to sensitive species are therefore only disclosed in this section.

G. Old Growth/Vegetative Diversity

Affected Environment

The Forest-wide standard for vegetative diversity (FP standard 6.c., page II-19 and 20), states: “(1) Forest lands and other vegetative communities such as grassland, aspen, sagebrush and whitebark pine will be managed by prescribed fire and other methods to produce and maintain the desired vegetative conditions; (2) In order to achieve size and age diversity of vegetation, the Forest will strive to develop the following successional stages in timber compartments containing suitable timber: 10% grass-forb, 10% seedlings, 10% sapling, 10% pole, 10% mature and 10% old growth.

Currently, the project analysis area (Compartment 221, which includes both private and public lands includes 14,487 of forest acres) meets the Forest Plan standard for all of the following structural stages; sapling (17%), pole (17%), mature (35%) and old growth (21%). The present vegetative condition (shown in Table A-13) is below the standard for forest grasslands (1%) and seedlings (9%). See Structural Stage Map, M-8 for approximate locations of each forest stage.

Because old growth is often an issue of concern above and beyond the Forest-wide standard for vegetative diversity, old growth is addressed in more detail.

Approximately 3,108 acres or 21% of the forested area in Compartment 221 is old growth as defined by Region 1 Guidelines (USDA, Green et. al.). Old growth stands were queried using ArcView and the TSMRS and SILC3 databases as well as field review. Presently this compartment is well above the 10% standard. The analysis for both old growth and vegetative diversity were developed from data gathered from the Timber Stand Management Resource System (TSMRS) and SILC3. TSMRS stores practically all information related to individual forest stands delineated by human photo interpretation. Information such as slope, aspect, forested cover type, elevation, and activities completed (logging, precommercial thinning, stand exams, etc.) are stored in this database. The SILC3 classification system was started in the early 1990s using satellite imagery to create regional land cover types (including tree size and canopy cover) and also defines slope, aspect and elevation. For this project, SILC3 data was used where private lands exist and no TSMRS data is available. Based part on field exams and part from photo interpretation, old growth and other forest successional types were identified.

Forest-wide on the Gallatin National Forest (using Forest Inventory Analysis (FIA) data) the amount of old growth (USDA, Green et al.) calculated is approximately 28% (with a confidence limit at the .90 level of 24% to 32%). For the Crazy Mountain Range, (including the Lewis and Clark National Forest) old growth averages (using FIA data) 13% with a confidence limit at the .90 level of 5% to 22%.

The Douglas-fir old growth type (code 1) for the East-side Montana zone occurs where Douglas-fir is the seral and climax dominant. Prior to 1900, cool underburns at 5 to 20 year intervals on dry sites and at 35 to 40 year intervals on the moist sites promoted open, single-storied stand conditions. Single-storied stands are common during seral stages or in climax stands with frequent fires. The average litter and duff depth for the Douglas-fir old growth types is approximately 3 inches.

Lodgepole pine old growth (code 6) for the East-side Montana zone has been observed on mostly subalpine fir habitat types. Lodgepole pine is a seral species on these habitat types. Subalpine fir old growth (code 9) for the east side of Montana is the climax species on these subalpine fir types, while whitebark pine old growth (code 11) for eastern Montana is found on mostly subalpine habitats where whitebark pine is a seral coniferous species. Lodgepole pine old growth is found at all elevations and aspects and has had a natural fire frequency that ranged from thinning fires on a 35 to 40 year frequency to stand replacing fires spaced around 150 to 200 years. Without periodic disturbances like fire, subalpine fir will eventually dominate. Subalpine fir old growth is found at all elevations and aspects, also and has had a natural fire frequency that ranged from thinning fires on a 35 to 40 year frequency to stand replacing fires spaced around 150 to 200 years. Without periodic disturbances like fire, subalpine fir will eventually dominate, but where fire disturbance occurs lodgepole pine will often dominate. Whitebark pine old growth is found at the higher elevations, but on all aspects. Because of the range of fire frequency (reported from 35 to 300 years from a few trees to an entire stand), the concept of fire frequency does not apply well in these upper elevation stands (Fisher and Clayton, 1983). On these higher elevation sites whitebark pine will eventually be overgrown by subalpine fir if no fire disturbances occur.

Douglas-fir old growth is defined as stands with the following minimum characteristics:

- 4 trees per acre 17 inches DBH or more,
- Large trees 200 year old or more,
- Basal area 60 square feet per acre or more,
- Down log pieces (low to moderate probability of abundant material), and 4 to 18 snags per acre (Green et al. 1992).

Lodgepole pine old growth is defined as stands with the following minimum characteristics:

- 12 trees per acre 10 inches DBH or more,
- Large trees 150 year old or more,

- Basal area 50 square feet per acre or more,

Subalpine fir old growth is defined as stands with the following minimum characteristics:

- 10 trees per acre 13 inches DBH or more,
- Large trees 160 year old or more,
- Basal area 60 square feet per acre or more

Whitebark pine old growth is defined as stands with the following minimum characteristics:

- 11 trees per acre 13 inches DBH or more,
- Large trees 150 year old or more,
- Basal area 60 square feet per acre or more

The forested land successional stages for timber compartment 221 are shown in Table A-13 below.

Table A-13 Forested Successional Stages Compartment 221 (forested lands)

SUCCESSIONAL STAGES	COMPARTMENT 221
**Forested Grass	1% 110 acres
**Seedling	9% 1,270 acres
Sapling	17% 2,470 acres
Pole	17% 2,468 acres
Mature	35% 5,061 acres
Old Growth	21% 3,108 acres

** Below the 10% Forest Plan Standard

Direct and Indirect Effects:

Alternative 1 - No Action

Alternative 1 would not directly change the diversity of vegetation in the area (See Table A-13). Indirectly, natural successional processes would continue with most lodgepole pine stands remaining lodgepole pine cover (at least for the next 100 years). Only in units E-2 and I would see sites convert to subalpine fir/lodgepole pine cover and eventually to pure subalpine fir forests if little to no disturbance was to occur for many years (over 100 years). Where disturbance does occur (such as fire or insect attacks), most sites presently dominated by subalpine fir or lodgepole pine would be converted to pure lodgepole pine cover. Douglas-fir cover types would continue to be dominated by Douglas-fir, but in the absence of disturbance subalpine fir and some Engelmann spruce would begin to dominate (this slow conversion to subalpine fir and Engelmann spruce would occur decades from today). Quaking aspen will continue to decline without disturbance (fire, etc.) and increase with disturbance (particularly fire and or logging).

Alternatives 2 & 3 –Action Alternatives

Alternatives 2 & 3 will only slightly change the overall forested vegetative structural composition in the project area (see Tables A-14 through A-17 for more details on specific effects to structural changes). As evident in these tables, a small amount of old growth (0.8% or 112 acres) will be affected by either of the action Alternatives 2 or 3. Forest grasslands would increase by 165 acres in alternative 2 and 215 acres in alternative 3 (1.1% to 1.5%, respectively). Even with the creation of additional forest grasslands, neither one of the action alternatives will increase the forest grasslands to the level needed to meet the 10% forest plan standard. Mature forest types will decline by 0.4% (alternative 2) to 0.7% (alternative 3) or 53 to 103 acres respectively and remain well above the forest plan standard.

Compositionally, stands dominated by Douglas-fir, Douglas-fir/lodgepole pine or lodgepole pine will continue to be dominated by that species mix.

Structurally, many of the mature/pole lodgepole pine units have canopy coverage that varies from 65% to 70% in the overstory; after thinning canopy coverage will vary from 40% to 50%. In the younger stands of lodgepole pine (classified as sapling) canopy coverage will change from 55% in the primary size class to a post-thinning canopy coverage of 25% to 30%. For the Douglas-fir stands, the silvicultural prescription to thin to about 30' X 30' spacing will reduce the canopy coverage by lowering it to between 5% and 30%.

Table A-14 Alternative 2 Structural Stage Changes After Treatments

Compartment	Project Acres by Structural Stage Before Treatment	Project Acres by Structural Stage After Treatment	Summary of Structural Stage Acreage Changes
221	For Grass: 110 Seedling: 1,270 Sapling: 2,468 Pole: 2,468 Mature: 5,061 Old Growth: 3,108	For Grass: 275 Seedling: 1,270 Sapling: 2,468 Pole: 2,468 Mature: 5,008 Old Growth: 2,996	For grass: +165 Seedling: 0 Sapling: 0 Pole: 0 Mature: -53 Old Growth: -112

Table A-15 Alternative 2 Structural Stage Amounts After Treatment

SUCCESSIONAL STAGES	COMPARTMENT 221
**Forested Grass	2% (increase by 1.1%) 275 acres
**Seedling	9% 1,270 acres
Sapling	17% 2,470 acres
Pole	17% 2,468 acres
Mature	34% (dropped by 0.4%) 5,008 acres
Old Growth	21% (dropped by 0.8%) 2,996 acres

*** Below the 10% Forest Plan Standard*

Table A-16 Alternative 3 - Structural Stage Changes After Treatments

Project Area	Compartment Project Located	Project Acres by Structural Stage Before Treatment	Project Acres by Structural Stage After Treatment	Summary of Structural Stage Acreage Changes
Smith Creek	221	For Grass: 110 Seedling: 1,270 Sapling: 2,468 Pole: 2,468 Mature: 5,061 Old Growth: 3,108	For Grass: 325 Seedling: 1,270 Sapling: 2,468 Pole: 2,468 Mature: 4,958 Old Growth: 2,996	For grass: +215 Seedling: 0 Sapling: 0 Pole: 0 Mature:-103 Old Growth:-112

Table A-17 Alternative 3 - Structural Stage Amounts After Treatment

SUCCESSIONAL STAGES	COMPARTMENT 221
**Forested Grass	2% (increase by 1.5%) 275 acres
**Seedling	9% 1,270 acres
Sapling	17% 2,470 acres
Pole	17% 2,468 acres
Mature	34% (dropped by 0.7%) 4,958 acres
Old Growth	21% (dropped by 0.8%) 2,996 acres

*** Below the 10% Forest Plan Standard*

Table A-18 shows the likely vegetative response for some common understory species after the thinning treatments. In general, shade tolerant and disturbance sensitive plants will temporarily be reduced under the action alternative.

Table A-18 Vegetative Response for Plant Species Found in the Analysis Area

Plants that Increase After Disturbance	Plants that Decrease After Disturbance	Plants that Respond Neutrally After Disturbance
Pachistima myrsinites	Juniperus communis	Vaccinium globulare
Ribes lacustre	Pyrola sedunda	Vaccinium scoparium
Sheperdia Canadensis	Thalictrum occidentale	Berberis repens
Arctostaphylos uva-ursi	Artemesia tridentate	Smilacina racemosa
Calamagrostis rubescens		Festuca idahoensis
Carex geyeri		Agropyron spicatum
Arnica Cordifolia		
Galium triflorum		
Bromus tectorum		

*** The assumption is that disturbance will be kept to a minimum by using designated skid trails and where burning occurs it will be relatively light so little of the duff layer is consumed.*

Cumulative Effects

Alternative 1 – No Action

Because Alternative 1 does not specify any vegetative altering activities, it would have no cumulative effect on old growth or vegetative diversity.

Alternative 2 - Proposed Action & Alternative 3 - Proposed Action and Meadow Creek Burn

There are some private developments within the analysis area. These private lands are scattered throughout the Smith Creek drainage area and have had a measurable effect to the structural diversity and old growth percentage found on the forested lands within Compartment 221. It is likely that some changes to forested structure types will occur into the future, but it is expected that such changes will not significantly alter the current percentage of structure types within this area and violate the Forest Plan Standard of 10%. The analyses completed above (in the direct and indirect effects section) include past and present changes to forested stages on both public and private lands and include actions proposed with this project.

There is virtually no change to structural diversity as it relates to the dominant size class in a stand, so the consequential cumulative effect is also minimal. The project area is much smaller than the compartment that is being analyzed for this issue. The project scope was defined to allow treatment of areas adjacent to residences. Within the scope of this project there is very little opportunity to affect notable change to the structural diversity of Compartment 221 as a whole.

Due to the minimal level of effects related to these issues, no further analysis is warranted for vegetative structural diversity and old growth.

Applicable laws, regulation and Forest Plan Guidance

The Forest-wide standard for vegetative diversity/old growth (FP standard 6.c., page II-19 and 20), states: “(1) Forest lands and other vegetative communities such as grassland, aspen, sagebrush and whitebark pine will be managed by prescribed fire and other methods to produce and maintain the desired vegetative conditions; (2) In order to achieve size and age diversity of vegetation, the Forest will strive to develop the following successional stages in timber compartments containing suitable timber: 10% grass-forb, 10% seedlings, 10% sapling, 10% pole, 10% mature and 10% old growth. Not enough treatment would be accomplished with any of the alternatives to bring the grass-forb or seedling successional stages up to 10%, however, progress would be made in that direction. The other successional stages would be in compliance with the Forest Plan Standards with all alternatives.

H Heritage Resource

Affected Environment

The Smith Creek Vegetation Treatment Project consists of the reduction of fuel loads on the Gallatin National Forest lands near private structures and access roads located in a Wildland/Urban Interface (WUI) in the Smith Creek drainage. The time frame (temporal bounds) for the project would be five years beginning in the spring of 2007. The area considered for effects analysis includes the areas of the treatment units as well as the access routes and staging areas to be used in conjunction with the removal/reduction of fuels within those units. One archaeological site is located along F.S. Road 261 in Treatment Unit A1 that could possibly be impacted by this undertaking.

Prehistoric sites are rare in the lower elevations of the Crazy Mountains with most prehistoric sites occurring at high prominences with several sites recorded around the project area but not nearby. There is potential for historic sites related to early shepherding, homesteading, and logging operations, but none have been documented.

Direct and Indirect Effects

Alternative 1 – No Action

With Alternative 1 (No Action), there would be no ground or vegetative disturbing activities so there would be no direct or indirect effects to heritage resources.

Alternative 2 - Proposed Action & Alternative 3 - Proposed Action and Meadow Creek Burn

With implementation of Alternatives 2 or 3, the project can be completed without any direct or indirect effects to heritage resources if mitigation measures are implemented. The mitigation necessary includes:

- 1) An archaeologist and the sale administrator should flag off the known site when work would be in the site vicinity such that the site would be avoided by any disturbing activities. The fuel reduction actions can easily be completed and still avoid the site as long as the operators and sale administrator know where the site is located.
- 2) If any additional heritage assets should be encountered during the project then disturbing actions should be halted immediately and an archaeologist contacted.

Cumulative Effects

Alternative 1 – No Action

With Alternative 1, there would be no ground or vegetative disturbing activities so there would be no cumulative effects to heritage resources.

Alternative 2 - Proposed Action & Alternative 3 - Proposed Action and Meadow Creek Burn

Implementation of the above mentioned mitigation measures would result in no direct or indirect effects to heritage resources, so it is unlikely that there would be any cumulative effects

Applicable laws, regulation, and Forest Plan Guidance:

The Forest Service is mandated to comply with the National Historic Preservation Act (as amended 1993) [Public Law 89-665], (26CFR800.1) on such undertakings that affect properties included in or eligible for inclusion to the National Register of Historic Places (NRHP). NRHP eligible sites affected by an undertaking must either be protected in-place or adverse impacts must be mitigated. By implementing mitigation designed for the project, all of the alternatives would comply with the National Historic Preservation Act.

I. Smoke Emission

Affected Environment

The geographic and temporal scale of the air quality analysis consists of air quality modeling of each burn area at 0.1 mile to 5.0 miles with consideration to sensitive receptors at private residences in Smith Creek. Air quality within the Smith Creek area is normally excellent with very limited local emission sources and consistent wind dispersion. Existing sources of emissions in the Smith Creek area include occasional construction equipment, vehicles, road dust, residential wood burning, wood fires, and smoke from logging slash disposal. Emissions are very limited with no local visible sources of impairment. Wind dispersion throughout the entire Smith Creek area is robust, with no visible inversions or localized concentrations of emissions. Down valley drainage is frequently robust during nighttime and early morning hours. The Smith Creek area is primarily within the southern part of Montana airshed 8B (Montana DSL, 1988, p D-15). The entire the Smith Creek area is considered to be in attainment by the Montana DEQ. The nearest non-attainment area is Butte for PM₁₀ (108 miles to the west). All of the area and the entire Gallatin NF is a Class II (for PSD purposes). The nearest Class I area is Yellowstone National Park which is 84 miles to the south.

No specific monitoring information is available concerning existing air quality within the Smith Creek area. The nearest particulate data is from the East Boulder Mine EIS (MSDL, USFS, DHES; 1992, p 3-63) documented PM₁₀ at the East Boulder mine site at an annual geometric mean of 9 ug/m³ and a maximum 24hr PM₁₀ concentration of 35 ug/m³. The Montana DEQ has estimated that for southwest Montana, including the Crazy Mountain Range, a PM₁₀ background of 5 ug/m³ (annual average) is appropriate. No other sources of industrial emissions occur in the analysis area.

The nearest non-attainment areas is Laurel and Billings (90 miles and 104 miles east of the project area) which have 7 major SO₂ and particulate sources including the Exxon oil refinery, Conoco oil refinery, Montana Power coal fired electric power generating facility, Western Sugar beet factory, Yellowstone Energy Limited Partnership coke fired cogeneration power plant, Montana Sulphur and Chemical sulfur recovery facility, and the Cenex oil refinery. The Billings and Laurel sources

are currently permitted for 1,928 tons of PM₁₀/year and 16,481 tons of SO₂ year. Currently Billings is in non-attainment for carbon monoxide and SO₂ and Laurel is in non-attainment for SO₂. The predominant west to southwest winds carry most of the Billings/Laurel emissions to the east and away from the project area. No other sources of industrial emissions occur in the analysis area other than very small local sources.

The major source of emissions in the Shields and Yellowstone valleys are the cities of Big Timber and Livingston with vehicle exhaust, wood burning smoke, and road dust although both communities are in compliance with National Ambient Air Quality Standards (NAAQS). Smaller amounts of emissions occur from Clyde Park and Wilsall and from vehicles on State highway 89. Big Timber and Livingston emissions visibly do not impact the Smith Creek area and are strongly dispersed by predominant and robust S and SW wind direction with frequently very strong wind gradients. Other types of emissions in the Shields valley include vehicle and agriculture equipment exhaust, road dust, wood smoke from residential, smoke from pile burning, broadcast burning, and wildfires. Wildfires in the Crazy Mountain Range within the last 20 years have had a low frequency (Smith Creek fire in 1994, Slippery Rock fire in 2003). Regional wildfire smoke has accumulated within the area during periods of extensive wildfire activity in 1988, 1994, 2000, 2005, and 2006. The prime source of wildfire emissions is from central and southern Idaho, and SW Montana. Smoke can also impact the Smith Creek area from large wildfires in Yellowstone National Park as occurred in 1988.

Generally the project area does not develop temperature inversions, which trap smoke and reduce smoke dispersal. Dispersion of emissions within the project area is very high due to the mountainous terrain and high wind activity. The Wind Energy Resource Atlas of the U.S. (Elliott et.al., 1986) shows Smith Creek as an area of high wind energy. The Smith Creek area has some potential for cumulative concentrations of smoke and residential and transportation emissions but visible inversion conditions do not occur. Up valley winds during daytime and down valley wind (cold air drainage) at night can dominate valley winds more than overall prevailing wind direction on ridge tops.

Direct and Indirect Effects

Alternative 1 - No Action

In the short term, the air quality effects from the no action alternative are less than with implementation of Alternative 2 since the emissions from the pile and understory burn would not occur. In the long term, Alternative 1 would not allow the opportunity to reduce the potential of wildfire ignition in the treatment areas. Wildfire in Smith Creek has the potential to result in extensive smoke and air quality impacts. The no action alternative would forgo the fuels management opportunity to reduce the likelihood of intensive short term air quality impacts of a large wildfire in Smith Creek.

Alternative 2 – Proposed Action

Potential air quality effects from the Smith Creek Fuels Reduction Project were analyzed using USFS R1 NEPA evaluation procedures for prescribed fire projects (Story and Dzomba, 2005) which can be downloaded from the USFS R1 air quality website at <http://www.fs.fed.us/r1/gallatin/air.index.shtml>. The decision analysis in the procedure document was not used in lieu of the Smoke Impact Spreadsheet (SIS) model (Air Sciences, 2003) which updates the modeling specified in the USFS R1 guidance. The SIS model uses an excel spreadsheet to link the Consume model for pile burn emissions, and the CalPuff model for dispersion modeling. The SIS model was run for the units which have piles. Air quality mitigation measures are listed in Chapter 2.

Direct effects of the burns include particulate emissions from pile burning. The pile burns would result in multiple plumes which can consolidate into a central plume. The Consume Pile Wizard was used for the pile burns (Table A-19). Model results include:

Table A-19 Modeling Results for the Burn Piles (Alternatives 2 & 3)

Unit	Acres	#s of Piles	Piles Per Day	PM _{2.5} Tons	PM _{2.5} Tons/day	PM _{2.5} 0.1mile ug/m ³	PM _{2.5} 0.5mile ug/m ³	PM _{2.5} 1.0mile ug/m ³	PM _{2.5} 5.0mile ug/m ³	Minimum Ambient Distance
A	67	105	200	1.9	.38	367	32	8.5	7.6	0.5
B	165	1650	200	3.2	.38	367	32	8.5	7.6	0.5
C	112	1120	200	2.1	.38	367	32	8.5	7.6	0.5
D	125	1800	300	3.5	.58	550	47	12	11.4	0.6
E	84	840	250	1.6	.48	458	39	11	9.5	0.6
F	143	1430	250	2.7	.48	458	39	11	9.5	0.6
G	28	420	200	0.8	.38	367	32	8.5	7.6	0.5
H	103	515	100	1.0	.19	183	16	4.2	3.8	0.4
I	66	660	200	1.3	.38	367	32	8.5	7.6	0.5
Total				18.1						

The modeling results include projected emissions from all of the units which total 18.1 tons of PM_{2.5} for pile burns for a total of 37.6 tons. The burning would be implemented over a period of 2-3 years so any 1 year of emissions would likely not exceed 20 tons. Pile burns would be done in the spring or fall. Direct effects of the burns include particulate emissions from pile burning. Actual concentrations would be about 4 to 10 ug/m³ greater depending on the background concentration of PM_{2.5}. The pile burns result in multiple plumes which can consolidate into a central plume.

The minimum ambient distance is the spacing from the burn the public would have access to the air when outside of a vehicle or residences. Public access to the air triggers the 24 hour average PM_{2.5} 35 ug/m³ standard. The pile burns have minimum ambient distances of 0.4 to 0.6 miles. Within the minimum ambient distances the public will be warned about high smoke concentrations and advised not to travel outside of a vehicle or residence during the time of burning. Pile burn units would be limited in any given

day to avoid cumulative smoke effects between units. All burns would disperse to low concentrations beyond 5-10 miles.

The pile burn smoke plume would likely also disperse to the north and east of the Smith Creek drainage. The $PM_{2.5}$ from burns would not likely be measurable in Livingston since the smoke would tend to disperse to the NE. Some concentration of smoke could be occur near the Smith Creek residences, particularly near units C, H, and E and if pile burn smoldering phase were trapped by nighttime inversions. These units are constrained to a minimum ambient distances of 0.4 to 0.5 miles to avoid $PM_{2.5}$ exceedences at the residences. Outside of the minimum ambient distances the smoke concentrations are expected to be within NAAQS and State of Montana air quality standards. The Smith Creek Fuels Project burn would be coordinated with the Montana/Idaho State Airshed Group (<http://www.smoke.org>). The operations of the Montana/Idaho State Airshed Group are critical to minimize cumulative smoke/ PM_{10} air quality impacts. The State Airshed Group, Monitoring Unit in Missoula, evaluates forecast meteorology and existing air quality statewide by individual airshed and specifies restrictions when smoke accumulation is probable due to inadequate dispersion.

Indirect effects would include some localized visibility reduction from the plumes. Some obscurement of visibility for driving along the Smith Creek road could occur in narrow bands during the pile burns. Dispersion of the plumes would be expected to quickly mix the project smoke to insignificant visibility impact levels.

Alternative 3 - Proposed Action and Meadow Creek Burn

Potential air quality effects from the Smith Creek Fuels Reduction Project were analyzed using USFS R1 NEPA evaluation procedures for prescribed fire projects (Story and Dzomba, 2005) which can be downloaded from the USFS R1 air quality website at http://www.fs.fed.us/r1/gallatin/air_index.shtml. The decision analysis in the procedure document was not used in lieu of the Smoke Impact Spreadsheet (SIS) model (Air Sciences, 2003) which updates the modeling specified in the USFS R1 guidance. The SIS model uses an excel spreadsheet to link to the FOFEM5 model for broadcast burn fuel loading, the Consume model for pile burn emissions, and the CalPuff model for dispersion modeling. The SIS model was run for the Meadow Creek prescribed burn mode and for the rest of the units which have piles. Air quality mitigation measures are listed in Chapter 2.

Direct effects of the burns include particulate emissions from pile burning and the understory burn. The Meadow Creek understory burn is expected to produce a centralized plume due to a concentrated burn area while pile burns result in multiple plumes which can consolidate into a central plume. The SIS model - FOFEM5 component was used for the understory burn (Table A-20) while the Consume Pile Wizard was used for the pile burns (Table A-19). Model results include:

Table A-20 Modeling Results for Meadow Creek Understory Burn (Alternative 3)

Unit	Acres	PM 2.5 Tons	PM 2.5 0.1 Mile ug/m3	PM 2.5 0.5 Mile ug/m3	PM 2.5 1.0 Mile ug/m3	PM 2.5 5.0 Mile ug/m3	Minimum Ambient Distance
Meadow Creek	300	19.5	64	34	22	10.7	0.5
Totals	300	19.5	64	34	22	10.7	0.5

The modeling results include projected emissions from all of the units which total 19.5 tons of PM_{2.5} for understory burns and 18.1 tons of PM_{2.5} for pile burns for a total of 37.6 tons. The burning would be implemented over a period of 2-4 years so any 1 year of emissions would likely not exceed 20 tons. Pile burns would be done in the spring or fall while the Meadow Creek broadcast burn would be attempted in the spring but could be done in the fall. Direct effects of the burns include particulate emissions from pile burning and understory burns. Actual concentrations would be about 4 to 10 ug/m³ greater depending on the background concentration of PM_{2.5}. The Meadow Creek broadcast burn would be expected to produce a centralized plume due to a concentrated burn area while pile burns result in multiple plumes which can consolidate into a central plume.

The minimum ambient distance is the spacing from the burn the public would have access to the air when outside of a vehicle or residences. Public access to the air triggers the 24 hour average PM_{2.5} 35 ug/m³ standard. The pile burns have minimum ambient distances of 0.4 to 0.6 miles. Within the minimum ambient distances the public will be warned about high smoke concentrations and advised not to travel outside of a vehicle or residence during the time of burning. Pile burn units would only be burned one unit at a time to avoid cumulative smoke effects between units. All burns would disperse to low concentrations beyond 5-10 miles.

Spring burns would likely occur during a period of more wind dispersion than the fall pile burning, due to longer spring daytime length, and higher mixing heights. The understory and pile burn smoke plume would likely also disperse to the north and east of the Smith Creek drainage. The PM_{2.5} from burns would not likely be measurable in Livingston since the smoke would tend to disperse to the NE. Some concentration of smoke could occur near the Smith Creek residences, particularly near units C, H, and E and if pile burn smoldering phase were trapped by nighttime inversions. These units are constrained to a minimum ambient distances of 0.4 to 0.5 miles to avoid PM_{2.5} exceedences at the residences. Outside of the minimum ambient distances the smoke concentrations are expected to be within NAAQS and State of Montana air quality standards. The Smith Creek Fuels Project burn would be coordinated with the Montana/Idaho State Airshed Group (<http://www.smoke.org>). The operations of the Montana/Idaho State Airshed Group are critical to minimize cumulative smoke/PM₁₀ air quality impacts. The State Airshed Group, Monitoring Unit in Missoula, evaluates forecast meteorology and existing air quality statewide by individual airshed and

specifies restrictions when smoke accumulation is probable due to inadequate dispersion.

Indirect effects would include some localized visibility reduction from the plumes. Some obscurement of visibility for driving along the Smith Creek road could occur in narrow bands during the Meadow Creek or pile burns. Dispersion of the plumes would be expected to quickly mix the project smoke to insignificant visibility impact levels.

Cumulative Effects

Alternative 1 - No Action

No vegetative treatment is associated with Alternative 1, so there would be no pile and/or underburning and no cumulative effects from such.

Alternative 2 - Proposed Action & Alternative 3 - Proposed Action and Meadow Creek Burn

Air resources are somewhat unique in that the past impacts to air quality are not usually evident or cumulative. The Smith Creek Fuels Project emissions would be cumulative only with the local emission sources described in the affected environment occurring at the time of burning. Smith Creek Fuels Project cumulative effects for air quality are very limited since there are very few sources of emissions in Smith Creek and the Shields valley. Cumulative concentrations from individual unit burns will not occur since only 1 broadcast burn unit or pile burn unit will occur at any one time with little potential for chronological overlapping. Cumulative effects would likely be the same as disclosed in the Direct and Indirect Effects and are constrained by the air quality mitigation measures in Chapter 2 Air Quality.

Applicable Laws, Regulations, and Forest Plan Guidance

Congress passed the Clean Air Act in 1963, and amended it in 1972, 1977, and 1990. The purpose of the act is to protect and enhance air quality while ensuring the protection of public health and welfare. The act established National Ambient Air Quality Standards (NAAQS), which must be met by state and federal agencies, and private industry. The NAAQS have been established for carbon monoxide, nitrogen oxide, and sulfur dioxide, lead, and PM_{2.5}. Particulate matter is the primary pollutant of concern for prescribed burn projects. States are given primary responsibility for air quality management. Section 110 of the Clean Air Act requires States to develop State Implementation Plans (SIP) what identify how the State will attain and maintain NAAQS, which are identical to the Montana standards for PM₁₀ (particulate mater with less than 10 microns). The PM_{2.5} standard requires concentrations of PM_{2.5} not to exceed a 24-hr average of 35 ug/m³ (micrograms per cubic meter). This standard was changed from previous 65 ug/m³ by the EPA on 9/21/06 <http://www.epa.gov/particles/fs20061006.html>. Average annual arithmetic PM_{2.5} concentrations are not to exceed 15 ug/m³. The SIP is promulgated through the Montana Clean Air Act and implementing regulations. The regulations provide specific

guidance on maintenance of air quality, including restrictions on open burning (ARM 16.8.1300). The act created the Montana Air Quality Bureau (now the DEQ) and the regulatory authority to implement and enforce the codified regulations.

The August 1977 amendments designated areas of the nation into PSD (Prevention of Signification Deterioration) classes. Class I airsheds are given the most protection from human caused air pollution in order to protect their pristine character. Class II airsheds allow for a greater amount of human caused pollution. The EPA has not yet identified any Class III airsheds.

The Montana DEQ is currently cooperating with the Western Regional Air Partnership (WRAP) to establish visibility goals, monitoring plans, and control measures to comply with regional haze visibility standards in all Montana Class I areas including Yellowstone National Park.

The Gallatin NF Forest Plan in Forest Wide Standards pp. II-23 requires that the Forest will cooperate with the Montana Air Quality Bureau (now DEQ) in the SIP and smoke management plan.

By limiting the timing, quantity, and intensity of the burning activities as described in the Chapter 2 (mitigation), all of the alternatives would comply with the air quality laws, guidelines and standards.

J. Project & Financial Feasibility and Economic Effects

The combination of small town and rural settings, along with people from a wide variety of backgrounds, provide a diverse social environment for the geographical region around the Gallatin National Forest (GNF). Local residents pursue a wide variety of life-styles, but many share a common theme; an orientation to the outdoors and natural resources. The management of the natural resources on the GNF has the potential to affect local economies. People and economies are an important part of the ecosystem. Use of resources and recreational visitation to the Forests generate employment and income in the surrounding communities and counties and generate revenues that are returned to the Federal treasury.

This section presents concepts used to delineate an affected area and methods used to analyze the economic effects of the Smith Creek Fuels Reduction project, including the project feasibility, financial efficiency and economic effects. Project feasibility and financial efficiency relate to the costs and revenues of doing the action. Economic impacts relate to how the action affects the local economy in the surrounding area.

The preparation of NEPA documents is guided by CEQ regulations for implementing NEPA (40 CFR 1500-1508). NEPA requires that consequences to the human environment be analyzed and disclosed. The extent to which these environmental factors are analyzed and discussed is related to the nature of public comments received during scoping. NEPA does not require a monetary benefit-cost analysis. If

an agency prepares an economic efficiency analysis, than one must be prepared and displayed for all alternatives (40 CFR 1502.23).

OMB circular A-94 promotes efficient resource use through well-informed decision-making by the Federal Government. It suggests agencies prepare an efficiency analysis as part of project decision-making. It prescribes present net value as the criterion for an efficiency analysis.

The development of timber sale programs and individual timber sales is guided by agency direction found in Forest Service Manual (FSM) 2430. Forest Service Handbook (FSH) 2409.18 guides the financial and, if applicable economic efficiency analysis for timber sales.

Affected Environment

The analysis area for the efficiency analysis is the project area located in the Smith Creek drainage located at the northern end of the Crazy Mountain range. The economic effects of the proposed alternatives were developed to provide decision-makers with an understanding about whether to proceed with project investments and in selecting the alternative that will achieve Forest Plan and land management objectives. The scope of the proposed actions identified will relate to the revenues collected from the sale of stumpage (the value of trees that contain a merchantable product) and would be available to compensate for work done that contributes to meeting the Purpose and Need and either yields no marketable products or entails costs in excess of return.

Timber management activities within the project area have the potential to impact the economic conditions of local communities and counties. To estimate the potential effect on jobs and income, a zone of influence (or impact area) was delineated. Counties were selected based on commuting data suggesting a functioning economy and where the timber is likely to be processed (log flows). The zone of influence ascribed to the Smith Creek Fuels Reduction Project is based mainly on recent (2004) information from the Bureau of Business and Economic Research (BBER) at the University of Montana about wood product processing in the Gallatin Forest area... The Gallatin Forest area is defined as Gallatin, Park, Sweet Grass, and Meagher Counties. The timber harvest from these counties in 2004 was 18,777 MMBF. Of this amount, 17,237 MMBF was live timber, and 1,450 MMBF was standing dead.

The zone of influence for this area includes the following counties: Broadwater, Carbon, Gallatin, Jefferson, Madison, Meagher, Park, Powell, Stillwater, and Sweet Grass counties in Montana; Fremont County, Idaho, and Park County, Wyoming. The types of processors in these counties include sawmills, post and pole manufacturers, house log/log home manufacturers, and log furniture manufacturers.

Gallatin County is located in south central Montana in the heart of the Rocky Mountains. The population of Gallatin County is approximately 78,000 people making it the most populated and fastest growing county in southwest Montana. Gallatin County covers over 2,500 square miles of mountain lands varying in

topography from temperate river valleys to snow-topped peaks and open ranch lands. Bozeman, the largest city of the county encompasses over 32,000 people, yet maintains a small town feel. Nearly half of all of Gallatin County is under public ownership by the Gallatin National Forest, State of Montana Land Management or the National Park Service.

Park County lies east of Gallatin County and maintains a population of about 16,000 people covering approximately 2,627 square miles. There are two incorporated cities, Livingston and Clyde Park and several communities. Livingston is the county seat as well as the gateway to Yellowstone National Park.

Sweet Grass County lies approximately 60 miles east of Bozeman, and encompasses a total of 1,904 square miles. The largest town and county seat in Big Timber, approximately 3,609 people reside in the county.

Meagher County lies north and east of Gallatin County and includes an estimated population of 1,944 in 2004 covering approximately 2,395 square miles.

The diverse economy for the Gallatin Forest area includes everything from agriculture, logging, mining, and recreation to new technical businesses. One in every 10 new businesses was formed during 2006 in Gallatin County making this area second in business growth in the state of Montana. Local residents pursue a wide variety of life-styles, but many share a common theme; an orientation to the outdoors and natural resources. The communities are closely tied to the National Forests in work, subsistence, and recreation, are directly affected by what happens on the Forests.

A comprehensive socio-economic analysis was completed during the development of the Forest Plan. The analysis estimated the relationship of Forest activities to communities. Short-term impacts were given primary emphasis with lesser consideration given to long-term effects. Many projects over a large area were consolidated so that socio-economic effects could be shown effectively (Gallatin Forest Plan FEIS, pp. II-100). Although activities within the project area influence local socio-economic conditions, these influences and effects cannot be effectively analyzed at the project level. The comprehensive analysis conducted at the Forest Plan level can more readily project effects to the local and regional communities.

Methodology

Four measures are appropriate for the economic analysis: project feasibility, financial efficiency, economic efficiency and economic impacts. These measures are described below, including methodologies.

Project Feasibility

Although the Smith Creek Fuels Reduction project has both a commercial and non-commercial component, project feasibility is only relevant to the commercial

component. Therefore, project feasibility was only analyzed for those units that had a commercial component.

Project feasibility is used to determine if a project is feasible – will it sell, given current market conditions. The Region 1 Transaction Evidence (TE) appraisal model was used to estimate the project feasibility. The model takes into account logging systems, timber species and quality, volume removed per acre, lumber market trends, costs for site preparation (burning, piling, etc.), tree-planting, environmental protection (slash disposal, erosion control, noxious weed control, etc.), and the cost for specified roads, temporary roads and road maintenance.

Financial Efficiency

The present net value (PNV) is one indicator for comparing the financial efficiency between alternatives. PNV is the difference between the present value of the revenues and present value of the expenses. PNV converts expenses and revenues over the entire time frame of the project into a single figure for a selected year. A positive PNV means that the project would generate more revenues than expenses. Costs for sale preparation, sale administration, regeneration, and ecosystem restoration are included. The expected revenue for each alternative is the corresponding predicted high bid from the transaction evidence appraisal equation. The PNV was calculated using Quicksilver, a program for economic analysis of long-term, on-the-ground resource management projects. A four percent discount rate (exclusive of inflation) was used over the five-year project lifespan (2007-2011).

Table A-21 summarizes the project feasibility and financial efficiency for each alternative. Because all costs of the project are not related to the timber sale, two PNV's were calculated. The PNV's include the following:

- **PNV(1)** - Includes the total stumpage revenue (predicted high bid times the volume) and all required design criteria costs associated with the timber harvest (e.g. sale preparation and sale administration).
- **PNV(2)** – Includes all revenues and costs for each alternative associated with the timber harvest (PNV1) plus ecosystem restoration activities proposed to be accomplished that are non-timber harvest related by alternative.

The restoration activities proposed may be accomplished with funds generated from the timber sale in accordance with Forest Service Handbook (FSH) 2409.19 Chapter 60 – Stewardship Contracting and/or cooperator contributions. See Table A-22 for a complete list of restoration activities.

Table A-21 – Project Feasibility and Financial Efficiency Summary (2006 dollars)

Category	Measure	Alternative 1	Alternative 2	Alternative 3
Timber Harvest Information	Acres Harvested	0	580	580
	Volume Harvested (ccf)	0	4,657	4,657
	Base Rates (\$/ccf)	0	\$6.00	\$6.00
	Predicted High Bid Rate (\$/ccf)	0	\$61.35	\$61.35
	Predicted High Bid Total Revenue (4% discount)	0	\$264,445.00	\$264,445.00
Timber Harvest & Required Design Criteria	PNV(1)	0	\$79,715.00	\$79,715.00
Timber Harvest & Restoration Activities	PNV(2)	0	-\$545,734.00	-\$545,734.00

Economic Efficiency

Economic Efficiency uses the cost and revenue estimates included in the financial analysis and adds other economic costs and benefits that are not part of Forest Service monetary transactions. This analysis considers the quantifiable market and non-market benefits and costs associated with implementing each alternative. As with financial efficiency, a PNV is calculated to determine efficiency. An example of a non-market benefit or cost is an increase or decrease in recreation. A value for recreation visitor use would be derived from local or regional studies. An economic efficiency analysis is not required (FSH 2409.18, 30), and would only be included in this analysis if it was a public issue and there are predicted changes to quantifiable non-market benefits or costs from the project.

Many of the costs and benefits associated with a project are not quantifiable. For example, the benefit to wildlife from habitat improvement or the cost associated with the reduction of visual quality from a project is not quantifiable. These costs and benefits are described qualitatively, in the individual resource sections of this document. Title 40, Code of Federal Regulation for NEPA (40 CFR 1502.23) indicates “For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are qualitative considerations.”

Economic Impacts

Timber harvest from this proposed project would have direct and indirect effects on local jobs and labor income. Economic impacts are estimated using input-output analysis. Input-output analysis is a means of examining relationships within an economy, both between businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period.

The economic impact effects are measured by estimating the direct jobs and labor income generated by the 1) processing of the timber volume from the project, and 2) work associated with all restoration activities of the project into the local economy affected by the treatments proposed. The direct employment and labor income benefit employees and their families and therefore directly affects the economic impact area. Additional indirect and induced, multiplier effects (ripple effects) are generated by the direct activities. Together the direct and multiplier effects comprise the total economic impacts to the local economy. The data used to estimate the direct effects from timber harvest is information provided by University of Montana's Bureau of Business and Economic Research. The economic effects tied to restoration activities and the multiplier effects (of both timber harvest and restoration activities) were estimated using the IMPLAN modeling system. The IMPLAN modeling system allows the user to build regional economic models of one or more counties for a particular year.

The analysis calculated the jobs and labor income associated with timber harvest reforestation, and restoration activities. In order to estimate jobs and labor income associated with timber harvest, it was assumed that the timber harvest would be processed by the sawmill sector of the wood products industry. In order to estimate jobs and labor income associated with reforestation and restoration activities, expenditures for these activities were developed for each alternative (see Table A-22).

Table A-22 - Other Ecosystem Restoration Activity Expenditures by Alternative over a five-year period (2006 dollars)

Restoration Activity	Alternative 1	Alternative 2	Alternative 3
REVENUES			
Predicted High Bid (\$)	0	\$264,445.00	\$264,445.00
Indicated Advertised Rate (\$)	0	\$138,080.00	\$138,080.00
RESTORATION ACTIVITIES			
Slash Treatment on existing Skid Trails	0	\$12,300.00	\$12,300.00
Treatment of Sub merchantable Timber	0	\$199,104.00	\$199,104.00
Aspen Exclosures	0	\$600.00	\$600.00
Weed Monitoring and Treatments		\$19,530.00	\$19,530.00
Rehab of User Created ATV Trails	0	\$3,000.00	\$3,000.00
Road Option C	0	\$310,576.00	\$310,576.00
Aspen Fencing	0	\$20,000.00	\$20,000.00
Toilet at the ATV Parking Area	0	\$15,000.00	\$15,000.00
Road Option D	0	\$218,832.00	\$218,832.00

Table A-23 displays both direct and total estimates for employment (part and full-time) and labor income that may be attributed to each alternative. Since the expenditures occur over a five-year period, the estimated impacts of jobs and labor income would be spread out over the life of the project. Most of the timber harvest and wood processing jobs would occur over the first two years of the project. These are not new jobs or income, but rather jobs and income that can be attributed to this project.

Table A-23 – Total Employment & Labor Income for the Entire Project (2006 dollars).

Analysis Item	Alternative 1	Alternative 2	Alternative 3
Direct Employment	0	30	30
Total Employment	0	70	70
Direct Labor Income (Thousands of \$)	0	\$1,017.7	\$1,017.7
Total Labor Income (Thousands of \$)		\$1,821.5	\$1,821.5

Definitions

1. Employment is the total full and part-time wage, salaried, and self-employed jobs in the region.
2. Labor income includes the wages, salaries and benefits of workers who are paid by employers and income paid to proprietors.

Direct and Indirect Effects

Alternative 1 – No Action

Under Alternative 1, the No Action Alternative, no timber harvest, fuels reduction, or road improvement would occur. The public would incur no costs, nor realize any benefits of timber harvest in this area. No action would yield a present net value of 0 for quantifying economic benefits beyond those identified at the project level. This value would ignore the risks to forest health, vigor, and fire resistance that would increase without implementation of this project, and the resulting losses in timber values and non-market benefits. Data limitations do not allow for the quantification of this risk, however, this risk would negatively affect present net value.

The No Action Alternative would not support direct, indirect and induced employment, or increased income to local economies. Declining trends in timber harvesting from National Forest lands would continue in the future and contribute to declines in wood products employment. Changes in the economic base and wood products infrastructure for the impact area would also continue to be influenced by fluctuations in market prices, international market conditions, changes in technology, and industry restructuring.

Direct/Indirect Effects Common to Alternatives 2 and 3

The harvest units proposed under Alternatives 2 and 3 have measurable economic recovery potential in terms of commercial material. Volumes for this material were estimated from a combination of field reconnaissance and stand exams. Additional material such as posts, poles, firewood, and house logs could potentially be harvested from these units if there is interest from buyers of these products at the time they would become available.

In both Alternatives 2, and 3, the predicted bid rate (\$/ccf) was determined by subtracting the costs associated with logging from the average market value and adjusted for the quality of the material and current market conditions. An average comparable sale defect estimate of 19 percent was used for estimations. It is important to note that the predicted bid rates may fluctuate by the volatility of the timber market. Prices would likely change in the future (e.g. when the actual sale appraisal occurs), depending on market conditions at that time. Therefore, these estimates should only be considered rough approximations of future conditions. As a

result, calculated bid rates were rounded to the nearest dollar. The real (exclusive of inflation) discount rate used was four percent.

Alternatives 2 and 3 would show a positive PNV for the harvest of timber. Market benefits that could occur as a result of the proposed activities include increases in forest productivity and value for the remaining trees by eliminating competitive stress and reducing the risk of growth limiting insect attack.

Alternative 2 and 3 also supports non-commercial treatments such as thinning small diameter products and prescribed burning to accomplish fuels reduction activities in the project area. This work will be accomplished with contracts or Forest Service personnel.

Positive timber revenues may be re-invested to complete proposed non-commercial ecosystem restoration projects (through stewardship contracting) thus contributing to meeting the Purpose and Need for the project and achieving land management goals. Restoration items may be prioritized and accomplished as revenue is made available from the timber sale. Additional funds for ecosystem restoration projects may also be obtained from cooperators, other agencies, and local donations.

Alternative 2: Proposed Action

Alternative 2 is a proposal to harvest approximately 4657 CCF on 580 acres. Two types of yarding systems would be used as follows: tractor 75% of harvest volume and helicopter 25% of harvest volume. As shown in Table A-21, this alternative would produce revenue, estimated at \$264,445.00. Its costs for design activities (sale administration, sale preparation) would be \$79,715.00. This would produce an estimated PNV of \$184,730.00 for the commercial component if the sale is sold for the predicted bid rate.

Alternative 2 would support existing jobs through timber harvest-related activities and restoration projects. Financially viable sales would be necessary to provide opportunities for timber harvest-related employment. As Table A-23 indicates, Alternative 2 would contribute approximately 100 total (direct and indirect) jobs and would generate \$1.8 million in total (direct and secondary) labor income resulting from the activities.

Alternative 3 – Proposed Action plus Meadow Creek Burn

This alternative has the same effects as those described with Alternative 2 for revenue, jobs and labor.

Alternative 3 proposes an additional 300 acres of prescribed burning (Unit J) to improve wildlife habitat, and reduce ladder fuels. This work is expected to be accomplished with Forest Service personnel and would not show a PNV benefit

Cumulative Effects

Alternative 1 – No Action

Selection of this alternative would not be without some associated cumulative economic effects. There would be future costs associated with the management of the National Forest resources. For example, the costs of controlling a stand replacement wildfire moving through the project area from or toward private land could be substantial, especially with adjacency of structures.

The selection of the No Action alternative has the potential to continue the decline of timber-related employment in the rural communities of the economic impact area. Continued declining trends in timber harvest from National Forest System lands could potentially impact wood product employment and associated indirect employment. Cumulative loss in timber-related jobs could affect the remaining infrastructure and capacity of the local rural communities, and could disrupt the dependent local goods and service industries. Because of the competitiveness of the timber market, and its global nature, the no action alternative would not affect prices, costs or harvest viability of other present or future sales in the economic impact zone.

Alternative 2 – Proposed Action

Management of the Gallatin National Forest has an impact on the economies of local counties. However, there are many additional factors that influence and affect the local economies, including changes to industry technologies, management of adjacent National Forests, and private lands, economic growth and international trade.

Additional fuels reduction activities on private lands may add cumulatively to the amount of timber harvested in or adjacent to the project area within the life of the Smith Creek Fuels Reduction Project and in the future.

The Proposed Action Alternative would provide some potential short-term economic relief by utilizing commercially thinned sawlogs. This material would be potentially be used to support the saw mills in the Livingston area. This would be determined by whether the purchaser is local or distant, what mills actually receive the logs, and the price of lumber. Non-commercial related projects may support contract work for a limited time.

Alternative 3 – Proposed Action plus Meadow Creek Burn

Cumulative effects are the same as in Alternative Two. No additional cumulative effects of the prescribed burn are anticipated.

Applicable laws, regulation, and Forest Plan Guidance

Economic and social analyses are described in Forest Service Manual (FSM) 1970. This guidance considers costs, benefits, and effects of proposed actions on the public. It also considers economic efficiency, along with other factor, in making decisions and in implementing and reviewing projects, programs and budgets.

Forest Service Handbook (FSH) 1909.17 – Economic and Social Analysis, Chapter 10, measures costs and outputs to consider for economic efficiency, ranking for alternatives.

Forest Service Manual (FSM) 2420 – Commercial Timber Sales, provides direction for preparing a financial and if necessary, economic analysis to verify the feasibility of a timber sale.

Forest Service Handbook (FSH) 2409.18 – Timber Sale Preparation Handbook, directs a financial efficiency to be included in the timber sale preparation process.

Forest Service Handbook (FSH) 2409.19 Chapter 60 – Stewardship Contracting, provides direction for applying revenues generated from timber sales to achieve restoration and land management activities.

The Gallatin Forest Plan (page II-1) directs the Forest to “Provide a sustained yield of timber products and improve the productivity of timber growing lands.”

L. Roads

The Smith Creek area has in the past been extensively roaded primarily for forest management and removal of forest products. Many roads are currently in-service and utilized for recreation, private land access, special use, administration of the national forest and forest management. Many are also out-of-service and currently closed and either revegetated or in the process of revegetating. Several sections within the project area were acquired in the 1990’s and were heavily roaded at the time of acquisition. Most of the roads in the area are part of the Forest Road System. Since the Smith Creek Fuel Reduction Project covers a sizeable acreage within the Smith Creek area, numerous roads and road systems fall within the project area.

Affected Environment

Roads play an essential part in any vegetation manipulation project. They provide general administrative access, access for sawyers and equipment, access for log hauling equipment, and access for emergency purposes. The goal of any road systems is to provide safe and efficient access for intended uses while minimizing effects to natural resources.

Many road use issues and their effects apply universally to entire road systems. These will be discussed as a whole for all action alternatives. Where issues or road treatment apply uniquely to an individual road, each road is addressed individually

for its ability to provide safe and efficient access. Improvements, maintenance, or management necessary to achieve this goal are identified (See Map M-6). If this project is accomplished by Stewardship Contract, a listing of possible projects to roads will be identified.

Direct and Indirect Effects

Alternative 1 –No Action

There are no additional effects to the road and trail system or its current users if Alternative 1 were chosen and the project were not to occur. Current road maintenance and management practices would continue monitoring the road system for its ability to meet its intended objectives. Users would see no additional road use related to the fuel reduction project. Trail uses would not be interrupted on Trail #261 by project activities.

Alternatives 2 - Proposed Action & 3 – Proposed Action and Meadow Creek Burn

Road issues and treatments common to both action alternatives (Alternatives 2 & 3) are discussed in this section. Where issues or road treatments apply uniquely to an individual road or by alternative, discussions will be under each alternative.

Road use will increase on a number of area roads due to the proposed project and its related thinning, harvesting, and administrative traffic. During the times when these new uses are anticipated, the existing users should be notified of the change in volume and type of traffic. Since harvest and hauling signs are not normally permanent installations on most forest roads, the project should install warning signs at key entrances and exits during the time of the activity and removed or covered during times of inactivity.

Most forest roads have been designed for low traffic volumes at low speeds (single lane with turnouts, tight curves, short sight distances, and irregular road surfaces). Most can handle mixed commercial and public traffic safely if traffic speeds are kept to 15-25 mph and the road has intervisible turnouts. Roads where significant increases of traffic are anticipated (increases >20 ADT) temporary speed limit signs should be installed. Specific road recommendations for these are covered in the discussion below.

Higher volumes of recreational traffic on many forest roads are typical during weekends. Curtailing or eliminating thinning/harvesting/hauling road activities on weekends should be considered for the most popular public road systems. Normal Timber Sale restriction clauses should be utilized on roads considered for closures during weekends and holidays.

Many of the roads lie adjacent to or within the thinning/harvesting units. If roads are open to the public during times of tree falling within two tree lengths of the side of the road, appropriate road management to alert users must occur. For roads scheduled to remain open to the public, traffic should be managed by advance signing

and flaggers. For roads scheduled to remain closed to the public, advance signing is adequate. Normal timber sale signing conventions should be used. Consider closing a road temporarily to the public by temporary gates if significant thinning/harvesting will occur along a considerable length of the road.

Temporary roads, when prescribed, are intended to minimize the cost of transporting logs and fuel consumption by transporting logs by more efficient log trucks rather than ground-based skidding and to protect adjacent resources such as sensitive soils and stream courses that would be adversely affected by repeated ground-based skidding. Temporary roads, by design, are a single entry access and not intended to be a permanent part of the road system and as such should be maintained to minimize investment, dirt moving, and disturbance. Following use, these roads should be permanently closed and rehabilitated to meet adjacent land management objectives with no regard to future access. Temporary roads are not constructed to safely accommodate mixed commercial and public traffic, so all temporary roads should be signed or gated as “closed to the public” during periods of harvest activity. Normal Timber Sale clauses for temporary road construction should be used for this project.

Roads are particularly vulnerable to damage during spring breakup as overly-saturated roadbeds from winter freezing are working to dry out. This typically occurs on the Gallatin between March 30 and June 1, but can vary depending on the severity of the winter and spring weather conditions. Unlike State Highways, most roads on the Gallatin are not constructed to resist damaging heavy truck traffic during spring break up. Heavy truck traffic should therefore be restricted during those sensitive periods. All Forest roads utilized by this project are vulnerable to spring break damage and should be restricted between March 30 and June 1.

Skid trails used for ground-based skidding and transport are not considered roads and are managed as part of the thinning/harvest unit.

Direct and Indirect Effects by Road and Trail for Alternatives 2 & 3

The following roads will be affected by the alternative as indicated in Table A-24 below. In order to provide a safe and efficient road system capable of responding to the additional road objectives imposed by this project, the following road management and treatments should be applied:

Table A-24 Road Management and Treatments by Individual Road

<p>Shields River Road #844 From MP 0.00 at the end of the paved Shields River County Road to MP 1.52 at the junction with the Smith Creek Road #991. Access to All Units, all alternatives. Anticipated project-related traffic will be composed of crew, service, log-hauling and administrative vehicles. Up to 2300 mbf may pass over this portion of the road, approximately 460 log truck loads and 3 times that number of service and administrative trips.</p>	
<p>Current Management</p>	<ul style="list-style-type: none"> ▪ Currently Maintenance Level (ML) 4 – maintained for passenger car vehicles at reasonable speeds and comfort. ▪ Medium duty road, aggregate surface, not capable of supporting heavy loads during spring breakup. ▪ Bladed routinely by the Forest Service. ▪ Open to the public yearlong without restriction – except for loads managed by the County on entrance roads. ▪ Plowed by the County for school bus access. ▪ Waiting on federal funding to upgrade to ML5, paved, two lane, heavy duty
<p>Pre-Project Road Maintenance Completed Summer of 2007</p>	<ul style="list-style-type: none"> ▪ None
<p>Road Management during Project Activities</p>	<ul style="list-style-type: none"> ▪ Activity signing on all entrances, exits, and approaches ▪ Weekend project-related traffic restrictions to reduce recreational conflicts ▪ Restrict truck hauling between March 30 and May 15 for road protection during spring breakup. ▪ Road maintenance (log hauling) – purchaser performance on blading, deposits for future FS performance ▪ Road surface replacement (log hauling) - purchaser deposits for future FS performance
<p>Post-Project Required Road work</p> <p>Treatment A</p>	<ul style="list-style-type: none"> ▪ Final surface blading – purchaser performance
<p>Possible Stewardship Road work</p> <p>Treatments B & C</p>	<ul style="list-style-type: none"> ▪ None proposed

<p>Smith Creek Road #991 From MP 0.00 at the Shields River Road to MP 5.16 at the junction with the Bear Mtn View #7110. Access to all Units, all alternatives. Anticipated project-related traffic will be composed of crew, service, log-hauling and administrative vehicles. Depending on where specifically the volume exists and the alternative, up to 2300 mbf may pass over the lower portion of the road, approximately 460 log truck loads and 3 times that number of service and administrative trips. Above the Goat Creek and East Fork junctions the volumes drop off.</p>	
<p>Current Management</p>	<ul style="list-style-type: none"> ▪ Currently ML 3 – maintained for passenger car vehicles at reduced speeds and comfort levels. ▪ Light duty road, native surface, not capable of supporting heavy loads during spring breakup or very wet conditions, ruts easily ▪ Bladed routinely by the Forest Service. ▪ Open to the public yearlong without restriction – except for loads managed by the County on entrance roads and the FS. ▪ Seasonally used by the recreating public, FS administrative, and approximately 45 seasonal private residences. ▪ Not plowed in the winter except in years when for private or FS timber management on occasion. Eventually, one of the residences will want yearlong access and will request permission to winter plow.
<p>Pre-Project Road Maintenance Completed Summer of 2007</p>	<ul style="list-style-type: none"> ▪ Install up to 27 armored drainage dips ▪ Surface road around 6 live stream crossings ▪ Road grading
<p>Road Management during Project Activities</p>	<ul style="list-style-type: none"> ▪ Activity signing on all entrances, exits, and approaches ▪ Weekend project-related traffic restrictions to reduce recreational conflicts ▪ Restrict truck hauling between March 30 and June 1 for road protection during spring breakup. ▪ Allow snow plowing when required for performance of project activities. Require a (or multiple) plowed public parking area near the end of the plowing to minimize parking congestion. ▪ Road maintenance (log hauling) – purchaser performance on blading, deposits for future FS performance ▪ Road surface replacement (log hauling) - purchaser deposits for future FS performance
<p>Post-Project Required Road work Treatment A</p>	<ul style="list-style-type: none"> ▪ Roadside cleanup – purchaser performance ▪ Final surface blading – purchaser performance

<p>Possible Stewardship Road work</p> <p>Treatments B & C</p>	<ul style="list-style-type: none"> ▪ Recondition entire road segment from MP 0.00 to MP 5.16 at approx \$975 per mile. ▪ Surface with 6” of crushed aggregate from MP 0.00 to MP 5.16 or any portion at approx average of \$37,000 per mile. ▪ Install one to six fish passage culverts on the 6 fish bearing stream crossings at an average of \$28,000 for each crossing (each varies depending on size of crossing).
<p>Goat Mountain Road #6636 From MP 0.00 at the Smith Creek Road to MP 2.64 at the junction with the Upper Scab Rock trailhead. Access to Units A-1, A-2, and D. Anticipated project-related traffic will be composed of crew, service, log-hauling and administrative vehicles. Depending on where specifically the volume exists and the alternative, up to 800 mbf may pass over this portion of the road, approximately 150 log truck loads.</p>	
<p>Current Management</p>	<ul style="list-style-type: none"> ▪ Currently ML 3 from the beginning of the road to MP 1.25 where the subdivision continues to the right. (MP 0.69 to MP 1.25 is a dedicated public road maintained by the local users – including the FS) – maintained for passenger car vehicles at reduced speeds and comfort levels. ▪ Currently ML 2 from MP 1.25 to the upper trailhead at MP 2.64 – maintained for high clearance vehicles at low speeds and minimal user comfort. ▪ Light duty road, native surface, not capable of supporting heavy loads during spring breakup or very wet conditions, ruts easily. Some aggregate was placed on the subdivision access portion of the road by the homeowners 1”-2” thick. Likely will disappear in time during wet period usage. ▪ Bladed infrequently by the Forest Service. ▪ Open to the public yearlong without restriction – except for loads managed by the County on entrance roads and the FS. ▪ Seasonally used by the recreating public, FS administrative, and approximately 21 seasonal private residences. ▪ Not plowed in the winter except in years when for private or FS timber management on occasion. Eventually, one of the residences will want yearlong access and will request permission to winter plow.
<p>Pre-Project Road Maintenance Completed Summer of 2007</p>	<ul style="list-style-type: none"> ▪ Install up to 14 armored drainage dips ▪ Surface road around 2 live stream crossings ▪ Road grading

<p>Road Management during Project Activities</p>	<ul style="list-style-type: none"> ▪ Activity signing on all entrances, exits, and approaches ▪ Weekend project-related traffic restrictions to reduce recreational conflicts ▪ Restrict truck hauling between March 30 and June 1 for road protection during spring breakup. ▪ Snowplowing when required for performance of project activities. Require a (or multiple) plowed public parking area near the end of the plowing to minimize parking congestion. ▪ Road maintenance (log hauling) – purchaser performance on blading, deposits for futureFS performance ▪ Road surface replacement (log hauling) - purchaser deposits for future FS performance
<p>Post-Project Required Road work Treatment A</p>	<ul style="list-style-type: none"> ▪ Roadside cleanup – purchaser performance ▪ Final surface blading – purchaser performance
<p>Possible Stewardship Road work Treatments B & C</p>	<ul style="list-style-type: none"> ▪ Recondition entire road segment from MP 0.00 to MP 2.64 at approx \$1000 per mile. ▪ Surface with 6” of crushed aggregate from MP 0.00 to MP 1.25 at approx average of \$40,000 per mile. ▪ Spot surface (~20%) with 4” of crushed aggregate from MP 1.25 to MP 2.64 at approx average of \$5300 per mile ▪ Install one fish passage culvert on the fish bearing stream crossing at approximately \$20,000 (low priority)
<p><u>East Fk Smith Creek Road #6635</u> From MP 0.00 at the Smith Creek Road to MP 2.30 near the end of the project. Access to Units I, H, F, E-1, and E-2. Anticipated project-related traffic will be composed of crew, service, log-hauling and administrative vehicles. Depending on where specifically the volume exists and the alternative, up to 940 mbf may pass over this portion of the road, approximately 180 log truck loads.</p>	
<p>Current Management</p>	<ul style="list-style-type: none"> ▪ Currently ML 3 from the beginning of the road to MP 0.64 where the subdivision continues to the left – maintained for passenger car vehicles at reduced speeds and comfort levels. ▪ Currently ML 2 from MP 0.64 to the end of the project at MP 2.30 – maintained for high clearance vehicles at low speeds and minimal user comfort. ▪ Light duty road, native surface, not capable of supporting heavy loads during spring breakup or very wet conditions, ruts easily. ▪ Bladed infrequently by the Forest Service. ▪ Open to the public yearlong without restriction – except for loads managed by the County on entrance roads and the FS. ▪ Seasonally used by the recreating public, FS administrative, and approximately 20 seasonal private residences. ▪ Not plowed in the winter except in years when for private or FS timber management on occasion. Eventually, one of the residences will want yearlong access and will request permission to winter plow.
<p>Pre-Project Road Maintenance Completed Summer of 2007</p>	<ul style="list-style-type: none"> ▪ Install up to 12 armored drainage dips ▪ Surface road around 3 live stream crossings ▪ Road grading

<p>Road Management during Project Activities</p>	<ul style="list-style-type: none"> ▪ Activity signing on all entrances, exits, and approaches ▪ Weekend project-related traffic restrictions to reduce recreational conflicts ▪ Restrict truck hauling between March 30 and June 1 for road protection during spring breakup. ▪ Snowplowing when required for performance of project activities. Require a (or multiple) plowed public parking area near the end of the plowing to minimize parking congestion. ▪ Road maintenance (log hauling) – purchaser performance on blading, deposits for futureFS performance ▪ Road surface replacement (log hauling) - purchaser deposits for future FS performance
<p>Post-Project Required Roadwork</p> <p>Treatment A</p>	<ul style="list-style-type: none"> ▪ Roadside cleanup – purchaser performance ▪ Final surface blading – purchaser performance
<p>Possible Stewardship Road work</p> <p>Treatments B & C</p>	<ul style="list-style-type: none"> ▪ Recondition entire road segment from MP 0.00 to MP 2.3 at approx \$1250 per mile. ▪ Surface with 6” of crushed aggregate from MP 0.00 to MP 0.64 at approx average of \$40,000 per mile. ▪ Spot surface (~25%) with 4” of crushed aggregate from MP 0.64 to MP 2.3 at approx average of \$7000 per mile ▪ Install one or two fish passage culverts on the fish bearing streams crossing at approximately \$25,000
<p>Billy Goat Road #6638 From MP 0.00 at the Smith Creek Road to MP 0.62 near the end of the project. Access to Unit C. Anticipated project-related traffic will be composed of crew, service, and administrative vehicles. No log hauling is anticipated.</p>	
<p>Current Management</p>	<ul style="list-style-type: none"> ▪ Currently ML 2 – maintained for high clearance vehicles. ▪ Rarely bladed. ▪ Open to the public. ▪ Secondary access to the landowners in section 5. They have requested the Forest allow them to have continued use of the road.
<p>Pre-Project Road Maintenance Completed Summer of 2007</p>	<ul style="list-style-type: none"> ▪ None
<p>Road Management during Project Activities</p>	<ul style="list-style-type: none"> ▪ Close to the public and landowners if needed. Alternate access is available for both groups. ▪ Allow snowplowing if requested, no additional public parking is required. ▪ Road maintenance (log hauling) – purchaser performance on blading, deposits for futureFS performance ▪ Road surface replacement (log hauling) - purchaser deposits for future FS performance

<p>Post-Project Required Road work</p> <p>Treatment A</p>	<ul style="list-style-type: none"> ▪ Roadside cleanup – purchaser performance ▪ Final surface blading – purchaser performance
<p>Possible Stewardship Road work</p> <p>Treatments B & C</p>	<ul style="list-style-type: none"> ▪ None proposed ▪ Since this road is essentially used as a secondary access for the landowners in section 5, any road upgrades and maintenance should be required of the landowners.
<p><u>Nanny Goat Road #7108</u> From MP 0.00 at the Smith Creek Road to MP 0.2 near the end of the project. Access to Unit C. Anticipated project-related traffic will be composed of crew, service, and administrative vehicles. No log hauling is anticipated.</p>	
<p>Current Management</p>	<ul style="list-style-type: none"> ▪ Currently ML 2 – maintained for high clearance vehicles. ▪ Rarely bladed. ▪ Open to the public. ▪ Secondary access to the landowners in section 5. They have requested the Forest allow them to have continued use of the road.
<p>Pre-Project Road Maintenance Completed Summer of 2007</p>	<ul style="list-style-type: none"> ▪ None required
<p>Road Management during Project Activities</p>	<ul style="list-style-type: none"> ▪ Close to the public and landowners if needed. Alternate access is available for both groups. ▪ Allow snowplowing if requested, no additional public parking is required. ▪ Road maintenance (log hauling) – purchaser performance on blading, deposits for future FS performance ▪ Road surface replacement (log hauling) - purchaser deposits for future FS performance
<p>Post-Project Required Road work</p> <p>Treatment A</p>	<ul style="list-style-type: none"> ▪ Roadside cleanup – purchaser performance ▪ Final surface blading – purchaser performance
<p>Possible Stewardship Road work</p> <p>Treatments B&C</p>	<ul style="list-style-type: none"> ▪ None proposed for this project ▪ Since this road is essentially used as a secondary access for the landowners in section 6, any road upgrades and maintenance should be required of the landowners.

<p>Bear Mtn View Road #7110 and the E-spur From MP 0.00 at the Smith Creek Road to MP 0.70 at the at the landing for Unit B. Access to Unit B. Anticipated project-related traffic will be composed of crew, service, log-hauling and administrative vehicles. Depending on where specifically the volume exists and the alternative, up to 750 mbf may pass over this portion of the road, approximately 150 log truck loads.</p>	
<p>Current Management</p>	<ul style="list-style-type: none"> ▪ MP 0.00 to the dispersed use area at MP 0.08 is currently ML 2 – maintained for high clearance vehicles. ▪ MP 0.08 to the landing on the e-spur is currently ML 1 – out of service as a road. Most of the route is used as a forest trail for multiple uses, including ATVs. ▪ To the dispersed site is rarely bladed. ▪ To the dispersed site is open to the public without restriction
<p>Pre-Project Road Maintenance Completed Summer of 2007</p>	<ul style="list-style-type: none"> ▪ None. <ul style="list-style-type: none"> ○
<p>Road Management during Project Activities</p>	<ul style="list-style-type: none"> ▪ Activity signing on all entrances, exits, and approaches including on the far end of the Forest Trail ▪ Close to the public if needed. Alternate access is available. ▪ Allow snowplowing if requested, no additional public parking is required. ▪ Restrict truck hauling between March 30 and June 1 for road protection during spring breakup. ▪ Road maintenance (log hauling) – purchaser performance on blading, deposits for future FS performance ▪ Road surface replacement (log hauling) - purchaser deposits for future FS performance
<p>Project-related and Post-Project Required Road work Treatment A</p>	<p>Pre-harvest</p> <ul style="list-style-type: none"> ▪ Beyond the dispersed site: <ul style="list-style-type: none"> ○ Install a temporary 18” culvert across the channel just beyond the dispersed site. Locate it just below the trail bridge, do not disturb the bridge. ○ Clear brush and regen on either side of the road to minimally accommodate log hauling ▪ Install 4 armored drainage dips with leadoff ditches <p>Post-harvest</p> <ul style="list-style-type: none"> ▪ To the dispersed site, roadside cleanup and final blading – purchaser performance ▪ From the dispersed site to the junction of the E-spur, close excess road width to 6-ft wide trail. Leave drainage dips and leadoff ditches. Remove temporary culvert, fills and approaches without damaging the trail bridge. ▪ Completely obliterate road and landing, install waterbars, rip and slash entire route with unit slash.
<p>Possible Stewardship Road work Treatments C&D</p>	<ul style="list-style-type: none"> ▪ none proposed

The following trails will be affected by both Alternatives 2 & 3... In order to provide a safe trail system to the public during project activities, the trail management and treatments found in Table A-25 below should be applied:

Table A-25 Trail Management and Treatments by Individual Trail

Lower Scab Rock Trail #261 Overlaps with Bear Mtn View road between MP 0.08 and 0.59.	
Current Management	<ul style="list-style-type: none"> ▪ Multipurpose summer trail managed primarily for ATVs and motorcycle, and mountain bikes between June 1 and October 15 of each year. Not specifically managed for winter use. ▪ Closed yearlong to highway type vehicles ▪ Closed to ATVs and motorcycles between Oct 15 and Nov 30. ▪ Closed to snowmobiling between June 1 and Nov 30.
Management during Project	<ul style="list-style-type: none"> ▪ During project activities, the trail should be closed to users for safety issues and signed as such. Process Forest Order closing this portion of the trail and post in all appropriate locations. ▪ During times of inactivity, even though the project may be active, the trail should remain open and in safe functioning condition by the purchaser.
Post-Project Required Trail work	<ul style="list-style-type: none"> ▪ See required work on the Bear Mtn Road – purchaser performance. ▪ Terminate Forest Order closing this portion of the trail.

Cumulative Effects

Alternative 1 – No Action

It is unknown when or if any of the road treatments would be implemented if the No Action Alternative is selected due to funding required for such treatments. There would not likely be any direct or indirect effects to the current road and trail system or its users, so there would not be any cumulative effects.

Alternatives 2–Proposed Action & 3–Proposed Action and Meadow Creek Burn

No cumulative effects to roads have been identified with implementation of either Alternative 2 or 3. The project, as proposed, would provide for its commensurate share of road treatment costs to maintain the roads in better condition than they currently are following the project.

No cumulative effects to trails have been identified. Trails would be restored to pre-project condition or better condition (additional armored drainage).