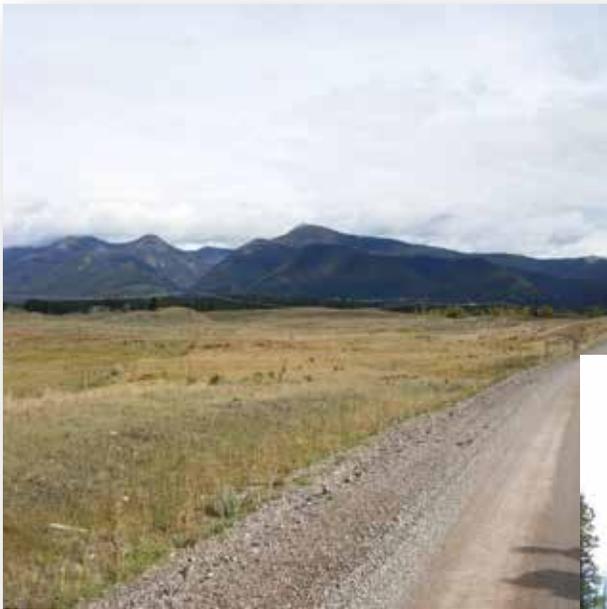




United States Department of Agriculture

Stonewall Vegetation Project

Final Environmental Impact Statement - Volume 1



Forest Service

Helena
National Forest

Lincoln
Ranger District

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**Stonewall Vegetation Project
Final Environmental Impact Statement
Lewis and Clark and Powell Counties, Montana**

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Abstract: The Lincoln Ranger District of the Helena National Forest proposes to treat stands within an analysis area of about 24,010 acres to improve long-term forest health and reduce fuels within the Stonewall Vegetation project area. The Forest Service developed three alternatives, including: the no action (alternative 1), the proposed action (alternative 2) and an additional alternative created in response to issues raised during public scoping (alternative 3). Several other alternatives were considered but dropped from detailed analysis (see chapter 2). Treatments were designed to improve the mix of vegetation composition and structure across the landscape that is diverse, resilient, and sustainable to wildfire and insects, and modify fire behavior to enhance community protection while creating conditions that allow the reestablishment of fire as a natural process on the landscape.

Alternative 2 proposes a total of 8,564 acres (about 36 percent of analysis area) of commercial and noncommercial treatments. Harvest treatments (regeneration harvest, intermediate harvest, and precommercial thinning) are proposed on a total of 3,099 acres. Fuels treatments would follow timber removals, including slashing, pile burning, jackpot burning, and underburning. In addition to post-harvest burning, prescribed fire is also proposed within the inventoried roadless areas (IRAs) to promote ecological restoration of a mix of vegetation composition and structure across the landscape. Prescribed fire is proposed on 4,182 acres (about 0.5 percent) within the Bear Marshall Scapegoat Swan Inventoried Roadless Area and on 664 acres (about 3.8 percent) within the Lincoln Gulch Inventoried Roadless Area. Outside of the IRAs, approximately 2.6 miles of road would be built then obliterated immediately following timber removal. Treatments proposed under alternative 2 would reduce elk hiding and thermal cover in both the Beaver Creek and Keep Cool Creek herd units, whereas the amount and distribution of forage would increase. Neither herd unit would meet Forest Plan standard 3 or 4a. This alternative would require a site-specific, nonsignificant forest plan amendment for standards 3 and 4(a) for the reductions in elk hiding cover and thermal cover.

Alternative 3 proposes a total of 6,564 acres (about 27 percent of analysis area) of commercial and noncommercial treatments. Harvest treatments (regeneration harvest, intermediate harvest, and precommercial thinning) are proposed on a total of 2,298 acres. Fuels treatments would follow timber removals, including slashing, pile burning, jackpot burning, and underburning. In addition to post-harvest burning, prescribed fire is proposed within the Bear Marshall Scapegoat Swan Inventoried Roadless Area to promote ecological restoration of a mix of vegetation composition and structure across the landscape. Prescribed fire is proposed on 3,565 acres (about 0.4 percent) within the Bear Marshall Scapegoat Swan Inventoried Roadless Area. The Lincoln Gulch Inventoried Roadless Area would not be treated. Outside

of the IRAs, approximately 0.4 mile of road would be built then obliterated immediately following timber removal. Treatments proposed under alternative 3 would reduce elk hiding and thermal cover in both the Beaver Creek and Keep Cool Creek herd units, whereas the amount and distribution of forage would increase. Neither herd unit would meet Forest Plan standard 3 or 4a. This alternative would require a site-specific, nonsignificant forest plan amendment for standards 3 and 4(a) for the reductions in elk hiding cover and thermal cover.

Preferred Alternative

Alternative 3 is the Preferred Alternative. This alternative was developed to address issues raised during scoping regarding reducing potential impacts to habitat for threatened, endangered and sensitive species and designated critical habitat; management indicator species (MIS); big game hiding cover, thermal cover, and security cover. Treatments were reviewed and adjusted to reduce impacts to habitat.

Alternative 3 proposes a total of 6,564 acres of commercial and noncommercial treatments. Harvest treatments (regeneration harvest, intermediate harvest, and precommercial thinning) are proposed on a total of 2,298 acres. Fuels treatments would follow timber removals and include slashing, pile burning, jackpot burning, and underburning. In addition to post-harvest burning, prescribed fire is proposed within the Bear Marshall Scapegoat Swan Inventoried Roadless Areas to promote ecological restoration of a mix of vegetation composition and structure across the landscape. Prescribed fire is proposed on 3,565 acres (about 0.4 percent) within the Bear Marshall Scapegoat Swan Inventoried Roadless Areas. The Lincoln Gulch Inventoried Roadless Areas would not be treated under this alternative. To help facilitate management, outside the IRAs approximately 0.4 mile of road would be built then obliterated immediately following timber removal.

This proposed project would implement the Helena National Forest, Forest Plan; it is not authorized under the Healthy Forest Restoration Act. This proposed project is subject to 36 CFR 218 subparts A and B, and will be subject to the objection process pursuant to 36 CFR part 218.

Summary

The Helena National Forest, Lincoln Ranger District, is proposing the Stonewall Vegetation Project in response to public interest to work with the Forest Service conducting landscape management activities. The area affected by the proposal includes approximately 24,010 acres (approximately 23,670 acres are National Forest System lands) within Lewis and Clark and Powell Counties, Montana. The project area is on the Lincoln Ranger District, approximately 4 miles north and west of the town of Lincoln, Montana. Proposed activities would include using commercial and noncommercial treatments to move towards desired conditions. Proposed actions include: regeneration harvest, intermediate harvest, precommercial thinning, and prescribed burning. The proposed action includes using prescribed fire and tree slashing to promote ecological restoration of a mix of vegetation composition and structure across the landscape within the Bear-Marshall-Scapegoat-Swan and Lincoln Gulch Inventoried Roadless Areas (IRA). Prescribed fire is proposed on up to 4,182 acres (about 0.5 percent) within the Bear Marshall Scapegoat Swan Inventoried Roadless Area, and up to 664 acres (about 3.8 percent) within the Lincoln Gulch Inventoried Roadless Area. Commercial timber harvest and road construction would not occur in the two roadless areas. Outside the roadless areas, approximately 2.6 miles of road would be built then obliterated immediately following timber removal.

This action is needed to address differences between the existing conditions and desired conditions described in the Forest Plan (pg. II/1 and II/2 goals 4, 10, 11, 14 and 16) (USDA Forest Service 1986). See chapter 1 management direction and existing condition descriptions. Existing conditions within the greater watershed area includes declines of ponderosa pine, western larch, and aspen habitats, elevated fuels in the wildland urban interface, and a landscape-level departure from natural fire processes. After the 2003 Lincoln Complex Fires that burned approximately 36,000 acres and required a partial evacuation of the community of Lincoln, residents expressed a desire to see forest management designed to reduce the risk of future catastrophic events. The fire risk and fuels concerns for this area were also identified in the Community Wildfire Protection Plan (Tri-County Fire Working Group 2005) as the highest priority need for treatment.

Development of the Proposed Action

The Lincoln Restoration Committee (LRC) of the Montana Forest Restoration Committee (MFRC) is a group of private citizens with diverse community interests who came together in 2008 (formerly as the Lincoln Working Group) with the purpose of developing recommendations for restoration projects on the Lincoln Ranger District, while working within the framework developed by the MFRC. The Helena National Forest has been working with the LRC in compliance with Executive Order 13352 of August 2004—Facilitation of Cooperative Conservation.

The proposed action was developed over time involving three areas. Two areas were brought forward to the Forest Service by the LRC, and the third area was developed after Forest Service specialists reviewed conditions within the entire watershed (Cole 2009a, b; Cole 2010; Farley 2009; Heinert 2009a, b; Ihle 2010; Kurtz 2009; Lundberg and Alvino 2006; Marr 2009; Milburn et al. 2006; Milburn 2009; Olsen 2010a, b, c; Randall 2009; Shanley 2009, 2010; Sitch 2009; USDA Forest Service 2010; Walch 2010; Wyatt 2009). This analysis covers all three areas. The recommended actions associated with the three areas are consistent with the goals in the Forest Plan (see table 1. Crosswalk of MFRC Principles with Forest Service direction).

In addition, a Forestwide landscape-level assessment of insect conditions and predictions was done in 2008 (Gibson 2008) that identified the Stonewall area as a high priority for management. The Lincoln community is very aware of the mountain pine beetle epidemic and high levels of western spruce

budworm activity across the landscapes in the Upper Blackfoot Valley and west side of the Continental Divide.

Benefits anticipated as an outcome of proposed actions include: restoration of ponderosa pine, dry Douglas-fir, and western larch sites to a more natural fire regime; maintain or improve vigor and restore aspen groves and whitebark pine; and enhance wildlife habitat conditions.

Public Involvement

We published the Notice of Intent (NOI) in the *Federal Register* on January 13, 2010 (75 FR 1748). The NOI asked for public comment on the proposal to be received by February 22, 2010. We sent about 700 letters explaining the proposal and asking for comment to interested individuals, groups and agencies on January 15, 2010. In addition, as part of the public involvement process, we held an open house on February 3, 2010, and project information was available on the Forest website at www.fs.usda.gov/helena/. The project has been listed in the Forest's Schedule of Proposed Actions since April 1, 2010. Appendix A of the draft environmental impact statement included the content analysis of the scoping comments received.

We received a total of 80 scoping responses via email, public comment form and letters; 30 were in support of the proposed project activities. The majority of responses suggested information to include in the analysis documents, identified language to clarify, or listed elements pertaining to a specific resource to include in the effects analyses. The resource specialists' reports include this information as well as the analysis of the project effects on the various resources. The resource specialists' reports are filed in the project record and incorporated by reference and summarized in Chapter 3 – Affected Environment and Environmental Consequences, of this draft EIS.

Eight responses expressed concerns or suggestions regarding travel management of area roads and motorized, winter recreation opportunities. The Stonewall Vegetation Project is not a travel planning project and does not propose to change the permanent road system in the project area. Travel management of existing routes is addressed in the “Blackfoot-North Divide Winter Travel Plan” and the “Blackfoot Travel Plan (Non-Winter)” analyses.

A few responses included items of literature to be considered, some noted as opposing science information. As part of the analysis for this project, resource specialists reviewed and considered relevant scientific literature, including submitted articles. The literature review is included in the project record and available on the forest website www.fs.usda.gov/helena/.

Using the comments from the public, and other agencies the interdisciplinary team developed a list of issues to address.

The Notice of Availability of the DEIS was published in the *Federal Register* on May 3, 2013 (78 FR 26027). The Notice of Availability started the 45-day comment period on the DEIS. We sent about 240 letters and electronic mail attachments announcing the availability of the DEIS to interested and affected individuals, groups and agencies on April 30, 2013. A legal notice announcing the opportunity to comment on the Stonewall Vegetation Project DEIS was published in the Helena Independent Record on May 6, 2013.

Appendix A of this FEIS lists the names of the individuals, organizations, and agencies that provided comments during the opportunity to comment period for the DEIS for the Stonewall Vegetation Project, on the Helena National Forest. Appendix A includes a copy of the letters received commenting on the DEIS, followed by the Forest Service response.

Issues

All of the comments received as a result of scoping and meetings were reviewed by the interdisciplinary team and responsible official and used to identify those which may have a significant cause-effect relationship with the proposal. Specialists analyzed effects in their reports comparing trade-offs for the decision-maker and public to understand. These issues were used to:

- ◆ Formulate alternatives
- ◆ Prescribe specific design feature to reduce undesired effects
- ◆ Provide clarification in specialist reports or evaluate the comparative merits of the effects of alternatives

Formulate Alternatives

These are issues regarding the action and its effects on a particular resource or group of resources that are unresolved or renders the action less effective in accomplishing the purpose and need for this project.

Wildlife Habitat: Proposed vegetative removal and burning treatments may reduce the quality change structure and composition of vegetation or availability of habitat for threatened, endangered and sensitive species and designated critical habitat; management indicator species (MIS); big game hiding cover, thermal cover, and security cover. The public expressed concern with fragmentation of habitat from roads (habitat connectivity) and viability of old-growth and snag-dependent species.

Indicators:

- Changes in grizzly bear security cover and potential conflicts with humans. Core habitat, Open Road Density (ORD) and Total Road Density (TRD) are specific measures used to evaluate changes within the grizzly bear management units (Arrastra and Red Mountain sub units) that overlap the project area
- Habitat suitability changes within the Lynx Analysis Units (LAU's bl-7 and bl-8) Acres of lynx habitat affected is evaluated according to the Northern Rocky Mountain Lynx Management Direction (NRMLMD) standards and guidelines.
- Changes in availability of the number of snags and tons of downed woody debris
- Acres of suitable MIS and sensitive species habitat impacted
- Acres of elk hiding cover, thermal cover, and security habitat within the project area and elk herd units
- Maintaining or providing habitat connectivity
- Acres of old growth affected and effects to snag-dependent species

Addressed by Design Features or Evaluated for Comparison

In addition to the issue identified above, we analyzed the effects of the proposed action and alternatives based on implementing design criteria and disclose the differences of effects between alternatives for the following:

Weed Spread/Infestation: Proposed actions, including harvest disturbance and use of haul routes in areas with weeds present, may disturb landscapes allowing existing weed populations to expand or allowing additional species to become established.

Treatment of existing weed infestations would occur under the guidance of the Forest-wide effort and treatments to prevent the spread of weeds is included in design features to reduce potential spread.

Use of roads that would be built then obliterated immediately following timber removal, and use of existing roads: Comments indicated concern that roads built then obliterated immediately following timber removal, road reconstruction, and use of existing roads would adversely impact soils through compaction, water quality and fisheries through sedimentation, and associated wildlife habitat.

Amount of Prescribed Fire: Concern that the Forest Service has limited experience implementing prescribed fire in mixed-severity fire regimes. Concern with the amount of acres proposed for prescribed burning; proximity to private land and timing of burns introduce risk to private lands (e.g., loss of homes, buildings, smoke effects to air quality).

Pretreating areas with vegetation removal adjacent to private land boundaries is designed to remove potential fuels prior to prescribed burning. Pile burning is proposed to more closely manage areas to receive active burning.

The issues led the agency to develop alternatives to the proposed action.

Alternatives Considered in Detail

Alternative 1 - No Action

Under the no-action alternative, current management plans would continue to guide management of the project area. No timber removal, fuels reduction, or prescribed burning for forest restoration would be implemented to accomplish project goals.

Alternative 2 - The Proposed Action

This alternative represents the proposed action from scoping. Mapping corrections resulted in slight adjustments in acre and mile figures from scoping.

Alternative 2 proposes a total of 8,564 acres of commercial and noncommercial treatments. Harvest treatments (regeneration harvest, intermediate harvest, and precommercial thinning) are proposed on a total of 3,099 acres. Fuels treatments would follow timber removals, including slashing, pile burning, jackpot burning, and underburning. In addition to post-harvest burning, prescribed fire is proposed within the inventoried roadless areas (IRAs) to promote ecological restoration of a mix of vegetation composition and structure across the landscape. Prescribed fire is proposed on 4,182 acres (about 0.5 percent) within the Bear Marshall Scapegoat Swan Inventoried Roadless Area and on 664 acres (about 3.8 percent) within the Lincoln Gulch Inventoried Roadless Area. To help facilitate management, outside these IRAs approximately 2.6 miles of road would be built then obliterated immediately following timber removal.

Alternative 3

This alternative was developed to address issues raised during scoping regarding reducing potential impacts to habitat for threatened, endangered and sensitive species and designated critical habitat; management indicator species (MIS); big game hiding cover, thermal cover, and security cover. Treatments were reviewed and adjusted to reduce impacts to habitat (figure 14).

Alternative 3 proposes a total of 6,564 acres of commercial and noncommercial treatments. Harvest treatments (regeneration harvest, intermediate harvest, and precommercial thinning) are proposed on a

total of 2,298 acres. Fuels treatments would follow timber removals and include slashing, pile burning, jackpot burning, and underburning. In addition to post-harvest burning, prescribed fire is proposed within the Bear Marshall Scapegoat Swan Inventoried Roadless Area to promote ecological restoration of a mix of vegetation composition and structure across the landscape. Prescribed fire is proposed on 3,565 acres (about 0.4 percent) within the Bear Marshall Scapegoat Swan IRA. The Lincoln Gulch IRA would not be treated. To help facilitate management, outside these IRAs approximately 0.4 mile of road would be built then obliterated immediately following timber removal.

Alternatives at a Glance

Table S- 1. Acres of proposed harvest and fuels treatments by alternative

GROUP #: BRIEF TREATMENT DESCRIPTION HARVEST TREATMENT, FUELS TREATMENT	ALT. 1 NO ACTION ACRES	ALT. 2 ACRES	ALT. 3 ACRES
Group 1: Intermediate Harvest to Promote Mature Open Forests	0	974	232
Improvement Cut, Jackpot Burn	0	36	0
Improvement Cut, Underburn	0	938	232
Group 2: Intermediate Harvest to Thin Young Forests	0	1,132	822
Precommercial Thin	0	523	409
Precommercial Thin, Handpile Underburn	0	0	29
Precommercial Thin, Handpiling, Burn Piles	0	78	50
Precommercial Thin, Underburn	0	289	141
Precommercial Thin, Underburn or Slash Treatment along PVT	0	242	193
Group 3: Regeneration Harvest in Areas of High Mortality Retaining Seed and Shelter Trees	0	745	664
Seedtree with Reserves, Broadcast Burn	0	29	29
Seedtree with Reserves, Jackpot Burn	0	73	41
Seedtree with Reserves, Slashing, Handpiling, Burn Piles	0	18	18
Seedtree with Reserves, Underburn	0	223	207
Shelterwood (Group) with Reserves, Jackpot Burn	0	137	137
Shelterwood (Group) with Reserves, Site Prep Burn	0	96	96
Shelterwood (Group) with Reserves, Slashing, Handpile/Burn	0	25	0
Shelterwood (Group) with Reserves, Underburn	0	114	114
Shelterwood with Reserves, Site Prep Burn	0	30	22
Group 4: Regeneration Harvest in Areas of High Mortality Retaining Rare Live Trees	0	223	152
Clearcut with Reserves, Broadcast Burn	0	98	80
Clearcut with Reserves, Jackpot Burn	0	53	0
Clearcut with Reserves, Site Prep Burn	0	54	54
Clearcut with Reserves, Underburn	0	18	18
Group 5: Intermediate Harvest to Remove Minor Amounts of Dead/Dying Trees	0	25	25
Sanitation, Slashing, Handpiling, Burn Piles	0	25	25
Total Harvest Treatments (acres)	0	3,099	1,895
Group 6: Low Severity Prescribed Fire to Create Mortality Patches 5 to 10 acres	0	449	326
Low Severity Fire, Openings <5 acres	0	326	326
Low Severity Fire, Openings <10 acres	0	123	0
Group 7: Mixed Severity Fire to create mortality patches up to 5,	0	410	36

GROUP #: BRIEF TREATMENT DESCRIPTION	ALT. 1 NO ACTION ACRES	ALT. 2 ACRES	ALT. 3 ACRES
HARVEST TREATMENT, FUELS TREATMENT			
10, or 20 acres			
Mixed Severity Fire, Openings <5 acres	0	36	36
Mixed Severity Fire, Openings <10 acres	0	48	0
Mixed Severity Fire, Openings <20 acres	0	326	0
Group 8: Mixed severity fire to create mortality patches up to 30 or 75 acres	0	4,604	3,265
Mixed Severity Fire, Openings <30 acres	0	3371	2032
Mixed Severity Fire, Openings <75 acres	0	1233	1233
Group 9: Low Severity Prescribed Fire	0	0	638
Jackpot Burn	0	0	326
Underburn	0	0	312
Group 10: Intermediate Harvest to Promote Mature Open Forests	0	0	403
Improvement Cut, Jackpot Burn			403
Grand Total Project Treatments (acres)	0	8,564	6,564
Logging Systems			
Tractor logging (total acres)	0	1,944	1,834
Skyline logging (total acres)	0	663	491
Hand treatments			
Intermediate Harvest – Precommercial Thin (acres)	0	493	285
Prescribed fire (acres)	0	5,463	3,954
Burning Treatments			
Total area proposed for burning treatments (acres)	0	8,039	6,053
Total area proposed for burning in designated IRAs (acres)	0	4,846	3,565
Roads			
Roads Built for Project Use then Obliterated (miles)	--	2.6	0.4
Road Maintenance (miles)	--	45.6	43.8
Total Road Miles Used	--	48.2	44.2
Timber Volume (Ccf)	--	22,022	14,299

In addition to the alternatives considered in detail, public comments received in response to the proposed action provided suggestions for alternative methods for achieving the purpose and need. Six additional alternatives were considered, but dismissed from detailed consideration. Some of these alternatives were outside the scope of restoration, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm.

Major Conclusions Include:

- ◆ Effects related to the significant issues and project purpose and need

A brief summary of the effects as related to the significant issues and purpose and need identified for the Stonewall Vegetation Project follows in the Comparison of Alternative Effects Section.

Decision Framework

The environmental impact statement is not a decision document; it discloses the environmental consequences of implementing action alternatives or no action at this time. Based upon the effect of the alternatives, the responsible official will decide on the following main points:

- ◆ Whether or not to implement the proposed action or an alternative to the proposed action and appropriate mitigation
- ◆ What monitoring requirements are appropriate to evaluate implementation of this project
- ◆ Whether a Forest Plan amendment is necessary e.g. reductions in big game habitat

In addition to deciding whether the above activities occur, the responsible official will also choose the degree to which (if at all) activities are implemented. The final decision will be based on the information in this document and the supplementary information contained in the project record, consideration of public comments, how well the selected alternative meets the purpose and need for the project and whether the selected alternative complies with agency policy, applicable State and Federal laws, and Forest Plan direction.

Preferred Alternative

Alternative 3 is the Preferred Alternative. This alternative was developed to address issues raised during scoping regarding reducing potential impacts to habitat for threatened, endangered and sensitive species and designated critical habitat; management indicator species (MIS); big game hiding cover, thermal cover, and security cover. Treatments were reviewed and adjusted to reduce impacts to habitat.

Comparison of Alternative Effects

This section provides a summary of the effects of implementing each alternative.

Vegetation

Vegetative conditions within the project area are described in chapter 1 and chapter 3. Proposed treatments address the purpose and need of the project. Following is a summary of the vegetative effects

Purpose and Need: Enhance and Restore Aspen, western larch, and ponderosa pine species and habitats

Whether a treatment would result in an increase in a particular tree species depends upon the type of treatment, the characteristics of the tree species, and the current presence of the tree species in the area receiving the treatment. Treatments vary widely in the opportunity they provide to manipulate the presence of a particular species. Intermediate treatments provide a great deal of control through tree selection preferences applied during thinning if the tree species is present and regeneration treatments provide a great deal of control through control of seed sources and planting of preferred species. Prescribe burns provide opportunities to increase fire-tolerant or shade-intolerant early seral species such as ponderosa pine, western larch, and quaking aspen through killing competing fire-intolerant species and through creating open areas for regeneration although the degree of control is not great simply due to the variable nature of prescribed burning.

The effects of the three alternatives upon within-stand tree species compositions by treatment group and as a proportion of the landscape are displayed in chapter 3 (Table 29. **Alternative comparisons for ponderosa pine, western larch, whitebark pine, and aspen**).

Alternative 1 would continue the current condition in which the four species have declined in presence within stands and upon the landscape due to succession and the recent mountain pine beetle epidemic. In the long term, those four species would continue to decline as succession continues. Alternatives 2 and 3 would result in an increase in the presence of all four species, with alternative 2 leading to the greatest

increase due to the greater treatment area involved, and the greater area in regeneration and intermediate treatments which have the greatest potential for modifying species composition at the stand level.

Purpose and Need: Improve the mix of vegetation composition and structure across the landscape that is diverse, resilient, and sustainable to wildfire and insects

The expected effects of the three alternatives on within-stand species compositions are displayed in chapter 3 (Table 30. **Alternative comparisons for stand structures**).

Under alternative 1, the current condition would persist, and the general track of tree species on the landscape would be toward increases in Douglas-fir, subalpine fir, and Engelmann spruce and decreases in the early seral species—ponderosa pine, quaking aspen, western larch, whitebark pine, and lodgepole pine. Lodgepole pine would regenerate in many areas in which it was a major component before the mountain pine beetle epidemic, becoming a component in mixed-species stands with Douglas-fir, Engelmann spruce, and subalpine fir. Treatments in both alternatives 2 and 3 would modify the current condition and increase ponderosa pine, western larch, quaking aspen, and whitebark pine as discussed above. Both alternatives would improve the mix of tree species in treated areas, resulting in tree species mixtures that would be more diverse and resilient. Alternative 2 would result in greater effects than Alternative 3 due to the greater acreage treated, and the greater acreage treated with intermediate and regeneration treatments.

The effects of the three alternatives on stand structures in terms of tree diameter distributions for proposed treatment type groups are displayed in chapter 3 (Table 30. **Alternative comparisons for stand structures**).

Alternative 1 would continue the current condition in the short term and long term; stand understories would become denser and the stands more closed. Stand diameter distributions would remain the same in the short term and in the long term would tend to become more steeply weighted toward smaller diameters due to ingrowth and natural mortality of the larger diameter classes. Treatments in both alternatives 2 and 3 would modify the track that the stands are on with the degree and nature of the effects depending upon the type of treatment. Intermediate harvests (Groups 1 and 10) would “flatten” the diameter distributions by thinning small and mid-sized trees while retaining the largest trees—creating open multi-story structures. Precommercial thinning (Group 2) would create open, single-story stands by pre-commercially thinning even-aged, closed, single-story plantations. Regeneration treatments (Groups 3 and 4) would create even-aged stands with a small number of older and larger trees present as seed sources, shelter, or retention trees. Removing dead and dying trees and slashing undesirable understory trees (Group 5) would create stands that are open and almost single-story. Low-intensity prescribed burns (Groups 6 and 9) would flatten the diameter distributions due to killing many of the smaller diameter trees and would create stands that are more open and still multi-story. Mixed-severity prescribed burns (Groups 7 and 8) would create areas that are mosaics of structures including open and closed single-story, open and closed multi-story, and early-seral grass/forb/shrub openings. The effects of all treatments would last into the long term but eventually the stands would become more closed and multi-story as trees grow and as the stand understories fill in.

The effects of the three alternatives on stand structures at the landscape level by comparing the proportion of change within Biophysical Setting/vegetation fuel class combinations are displayed in chapter 3 (Table 31. **Alternative comparisons for landscape-level stand structures**).

Under alternative 1 in the short term the current condition would persist, which in general is below desired in (1) early seral and mid-seral open for all biophysical settings, (2) mid-seral closed in the two subalpine fir biophysical settings, and (3) in late-seral open for the two Douglas-fir and the ponderosa

pine/Douglas-fir Biophysical Settings. Vegetation-fuel classes are above desired in all other combinations. Long-term trends under Alternative 1 would be: decreasing early seral, mid-seral closed, mid-seral open, and late-seral open in almost all biophysical settings due to tree growth and filling in of stand understories. Both alternative 2 and alternative 3 would: (1) increase area in early seral for all BpS, (2) decrease area in mid-seral closed for all BpS, (3) increase area in mid-seral open for all but upper subalpine BpS, (4) increase area in late-seral open for all BpS, and (5) decrease area in late-seral closed in all Bps. Alternative 2 would bring about greater change than alternative 3 due largely to the greater acreage treated. Both alternatives 2 and 3 would move the vegetation-fuel classes toward the reference condition, but largely due to the small portion of the analysis area proposed for treatment there would still be relatively great differences between present and reference condition for many BpS/vegetation-fuel class combinations.

Purpose and Need: Forest health in terms of reduced susceptibility (increased resistance) of individual stands and the landscape to diseases and insects found within the project area of concern

In chapter 3 (Table 32. **Alternative comparison for insects and diseases**), we compare the three alternatives in terms of susceptibility to several insects and diseases that are impacting stands in the project area

Under alternative 1, in the short term there would be little change from the current condition, which in general is (1) low and long-term decreasing risk for those insects and diseases dependent upon early seral trees such as the pines (e.g., mountain pine beetle), (2) higher and long-term increasing risk and impacts from those dependent upon Douglas-fir, subalpine fir, and Engelmann spruce, and (3) relatively low but long-term increase in susceptibility to armillaria which affects all conifers but for which pines and western larch are more resistant than the other conifers. Both alternatives 2 and 3 would generally reduce susceptibility to insects and diseases in treated stands and on the landscape. Exceptions to this would be white pine blister rust, for which we cannot say that the treatments would directly reduce the disease and Douglas-fir beetle for which the prescribed burning may increase risk in the treated areas to a small degree and short period of time. Over the landscape, both alternatives would increase resistance to insects and diseases by increasing tree species diversity and age class diversity, reducing stocking and so increasing individual tree resistance, and modifying structures. Alternative 2 would reduce susceptibility to a greater degree than alternative 3, largely because a greater area is being treated.

Transportation

Under the no-action alternative, no changes would be made to the existing transportation network on and adjacent to the project area. There would be no changes to effects or impacts on the project transportation network.

Alternatives 2 and 3 would use approximately 48.2 and 44.3 miles, respectively, of roads would access vegetation treatment units and connect with Montana State Highway 200. Existing roads would serve as project access and haul routes on nearly 45.6 miles under alternative 2 and 44.3 miles under alternative 3. Under alternative 2 another 2.6 miles of new roads would be constructed to access treatment units. Under alternative 3 approximately 0.4 mile of road would be built then obliterated immediately following timber removal. These roads would be closed (e.g., gates, barricades) during operations to limit use to operators only, and obliterated or rehabilitated immediately following vegetation treatments.

Cumulative effects of past, present, and foreseeable actions are expected to have minor impacts on the project transportation network. Project haul routes would be maintained and improved in accordance with BMPs to accommodate haul vehicles. Sediment sites would be mitigated to reduce long-term sediment

delivery. Annual road maintenance activities would also occur on National Forest System roads and also on adjacent State and private roads.

Fire and Fuels

The mechanical treatments proposed would reduce surface fuels, raise canopy base heights by reducing ladder fuels and stand density, resulting in modified fire behavior potential. The result would be safer, more efficient and direct initial attack of unwanted fires by fire suppression forces.

The prescribed burn treatments would reduce fuels and break up contiguous vegetation to create a heterogeneous fuelscape so that areas with high fire behavior potential are interspersed with areas of mixed and low fire behavior potential, thereby limiting the potential for high-intensity crown fire to spread towards the WUI. Fire management has evolved over time and fire managers look for opportunities to manage fire for multiple objectives. Reintroducing fire to the landscape and allowing it to occur as a natural process is desired in order to move the landscape toward the desired condition as outlined in the LRMP.

The Stonewall Vegetation Project would be important to the success of future fire suppression efforts and complements past treatments and those currently occurring or being proposed on adjacent federal, state and private lands.

The following analysis issues or concerns were identified for this project during the scoping period. The alternatives will address the issues as follows.

1. **Wildland Fire and Homes:** Proposed treatments may be inefficient and ineffective in reducing home losses due to fire.

Proposed treatments would reduce surface, ladder and crown fuels and change the fuel model profile, thereby decreasing the area with potential for flame lengths greater than four feet and reducing potential crown fire risk. In addition, alternative 2 or 3 would reduce the risk of wildfire impacts to adjacent private lands and other resource values. By treating these areas, they become more resilient to stand-replacing wildfire and allow greater protection within the WUI zone.

2. **Fire Behavior:** Proposed fuels reduction work would not reduce fire behavior.

Fire modeling suggests the proposed treatments would effectively reduce fire behavior. Following implementation of a chosen alternative, the treated areas should exhibit surface fire under the modeled conditions, making fire suppression efforts safer and more effective. With these alternatives, desired fuel loadings and fire behavior characteristics would be achieved and natural or prescribed fire could occur with less risk.

3. **Prescribed Burning:** Concerns over risk of fire escaping burn boundaries during prescribed burning operations.

All prescribed burning would occur when weather and fuel conditions are favorable. All burning would take place under the guidelines in the prescribed fire burn plan developed specifically for project-related burning activities. Prescribed burn plans address parameters for weather, air quality, contingency resources and potential escapes.

Air Quality

Wildfires are known to result in high levels of emissions and associated National Ambient Air Quality Standards (NAAQS) violation and worst visibility. Vegetation management treatments provide the opportunity on a long-term basis to reduce the magnitude of wildfire air quality problems. According to

(Wiedinmyer and Hurteau 2010) wide-scale prescribed fire application can reduce CO₂ fire emissions for the western US by 18 to 25 percent. The total amount of pollutants released by prescribed burning under alternative 2 and 3 would be spread out over several years and would occur when emissions would be unlikely to have significant adverse effects on human health and visibility. After implementation, it is estimated that subsequent wildfires in the project area could produce less pollutants due to less fuel available to burn.

All prescribed burning would be implemented in full compliance with Montana Department of Environmental Quality (MDEQ) air program with coordination through the Montana/Idaho Airshed Group. All action alternatives would meet Forest Plan Standards for air quality by following coordination requirements. The project complies with the Federal Clean Air Act.

Habitats of Special Concern

Snags

The forested landscape will experience additional bark beetle mortality from the ongoing mountain pine beetle (MPB) epidemic. The levels of additional mortality are a matter of speculation, but available research indicates that mountain pine beetle epidemics continue until the available bark beetle habitat is sufficiently reduced that epidemic levels can no longer be sustained (Cole and Amman 1969, Cole and Amman 1980, Klein et al. 1978, Mitchell and Preisler 1991). Mountain pine beetles strongly favor infesting the trees of larger diameter each year and over the life of the infestation infesting smaller trees each year until the average host tree diameter declines to a point that the tree habitat cannot produce sufficient numbers of beetles to maintain the outbreak (Cole and Amman 1969, Cole and Amman 1980). The outbreaks are relatively short, lasting about 6 years (Cole and Amman 1969, Cole and Amman 1980). Given the magnitude of the mortality that has occurred in the project area as of the writing of this report, we suspect that the epidemic is declining.

The lodgepole pine snags would start falling in 3 to 5 years after death (Bull 1983, Mitchell and Preisler 1998). Snag fall rates depend on tree species, tree size, cause of death, and environmental conditions that could affect the speed of bole decay (Bull 1983, Mitchell and Preisler 1998). For lodgepole pine, Bull (1983) found that 8 years after death about 75 percent of the snags less than 25 cm had fallen and 42 percent of the snags greater than 25 cm had fallen. Mitchell and Preisler (1998), in their study of mountain pine beetle-killed snags in Oregon, found that tree size was not a factor in unthinned stands and that in unthinned stands, 50 percent were down in 9 years and 90 percent were down in 14 years.

In the short term, snag numbers would be very high, but in the long term, snag numbers would decline greatly as the lodgepole pine snags fall down.

As discussed and displayed above, given the recent mountain pine beetle epidemic, snags in the project area are abundant and far exceed forest plan requirements. Under alternative 2, the intermediate and regeneration treatments would reduce snag levels to the forest plan requirements within the treatment units and the mixed-severity prescribed burns would increase snag levels within the burn units. After the treatments are done, snag levels would slightly decrease in the 3rd-order drainage 0203, slightly increase in the 3rd-order drainage 0204A, and slightly increase in the project area. They would still exceed 19 times the forest plan requirements. Under alternative 3, the intermediate and regeneration treatments would reduce snag levels to the forest plan requirements and the prescribed burns would increase snag levels. After the treatments are done, snag levels would slightly decrease in the 3rd-order drainage 0203, slightly increase in the 3rd-order drainage 0204A, and slightly increase in the project area. They would still exceed 20 times the forest plan requirements.

Old Growth

Effects to designated old growth in the two 3rd-order drainage are the same under all alternatives because no activities are proposed in designated old growth in these drainages. Following the process described above, about five percent of each 3rd-order drainage is designated to manage as old growth. All old growth would continue to develop successional under all alternatives. Changes would be slight in the short term, but could be substantial in the long term. Single-story and two-story stands would become more multi-story. Closed canopies would remain closed, and open stands would become closed over time. Down woody fuels would continue to accumulate.

About 63 percent of the designated old growth is Douglas-fir type. With continuing succession, more small trees would become established with the species composition trending toward subalpine fir (Fischer and Clayton 1983). These stands are susceptible to Douglas-fir beetle (DFB), western spruce budworm (WSB), and root disease. ADS data appears to indicate that DFB has consistently declined in recent years, while WSB infestation was extensive in 2009, substantially less was recorded in 2010 (Amell and Higgins 2014). Douglas-fir beetle tends to infest large and old Douglas-fir and heavily stocked stands. Their impacts can also be affected by weather conditions, for example droughts that reduce host tree vigor. With increasing stocking, tree size and age over time, we can expect DFB to continue to impact the stands to some degree, increasing with the next droughty period. Since forests in the area, including the old growth stands, are progressing toward dominance by Douglas-fir and subalpine fir, we can expect the impacts of WSB to continue if not increase. Diseases would continue to impact stands at current levels.

In the long term, dense forest conditions with multiple-layer stands and increasing surface fuels would support increasingly intense fire behavior and severe fire effects (Buhl 2015). Stand-replacement fire would become more likely on the landscape and old-growth stands more susceptible to the impacts.

No designated old growth in 3rd-order drainages would be treated under any alternative. Forest Plan direction regarding old growth would be met. Under alternative 2 outside of the 3rd-order drainages, three stands (42201139, 42201147, and 42201152) that may potentially be old growth would be prescribed burned; one stand that has been verified by a recent stand exam (41502089) would be prescribed burned, and one stand that has been verified by a recent stand exam (42303103) would be thinned and prescribed burned. Under alternative 3 outside of the 3rd-order drainages, one stand that has been verified by a recent stand exam (41502089) would be prescribe burned, and one stand that has been verified by a recent stand exam (42303103) would be partially thinned and the fuels burned.

Stands proposed for treatment would be changed by the treatments, with species compositions “pushed” toward dominance by seral fire-tolerant conifers, and stand structures “pushed” to or toward open, but still multi-story, structures with relatively flat diameter distributions. Treated potential and verified old growth stands would still qualify as old growth following the treatments.

Wildlife

Overview of Issues

The following issues were identified as a result of public scoping and used to develop alternatives to the proposed action. Also, these issues as well as other issue indicators identified to measure potential impacts to wildlife from alternatives considered in the project environmental impact statement are displayed in the following table. Effect indicators are collectively used to assess species viability or population changes.

- Restoration of vegetation communities

- Grizzly bear habitat impacts
- Elk security cover and the LRMP standard.
- Lynx habitat: Designated Critical Habitat and Stand Initiation Phase acreage
- Wildfire hazard, risk, and fuels
- Habitats including ponderosa pine, western larch and aspen: maintenance or restoration
- Road impacts to elk and grizzly bear habitat as well as disturbance factors

Species	Indicator
Threatened and Endangered Species	
Grizzly Bear	Effects to individuals and changes in security cover and potential conflicts with humans. Security Core habitat, Open Road Density (ORD) and Total Road Density (TRD) are specific measures used to evaluate changes within the recovery area, whereas changes in cover and forage within and outside the NCDE are assessed.
Canada Lynx	Effects to individuals and acres of stand initiation, multi-story and mid-seral habitat affected in Lynx Analysis Units (LAUs bl-7 and bl-8). Compliance with the Northern Rocky Mountain Lynx Management Direction (NRLMD) standards and guidelines.
Wolverine	Effects to individuals and acres of natal denning and foraging habitat. Availability of remote and dispersal habitat and changes in connectivity and human access.
Sensitive Species	
Gray Wolf	Effects to individuals and changes in big game. Den, rendezvous and foraging habitat affected.
Fisher	Effects to individuals and acres of den, rest and foraging habitat. Changes in human access.
Townsend's Big-eared Bat	Effects to individuals and acres of and effect to foraging habitat.
Bald Eagle	Effects to individuals, suitable nest habitat affected, effects to reproduction and nest and foraging habitat availability.
Black-backed Woodpecker	Effects to individuals, acres of suitable habitat, changes in quality and distribution of suitable snag habitat.
Flammulated Owl	Effects to individuals and acres of suitable habitat. Short and long-term changes in the quality of suitable open-canopy habitat, availability of large diameter (>=19 inches) snags.
Western Toad	Effects to individuals, acres of breeding and upland habitat affected.
Management Indicator Species	
Northern Goshawk	Effects to individuals and reproduction. Acres of nest and foraging habitat, nest, foraging and post-fledgling habitat affected, landscape level changes in habitat. Ability of the project area to support nesting pairs.

Species	Indicator
Pileated Woodpecker	Effects to individuals and reproduction. Acres of old growth habitat, existing and affected suitable habitat, changes in quality of foraging and nesting habitat, large snag (>=20 inches d.b.h.) availability and changes in project area distribution and use.
Hairy Woodpecker	Effects to individuals and reproduction, acres of suitable habitat, acres of suitable habitat affected, changes in quality of suitable habitat, snag (all size classes) availability. Changes in project area distribution and use
American Marten	Effects to individuals and reproduction. Existing and affected suitable habitat. Changes in the quality of den and foraging habitat, project area distribution and use, and snag and downed woody debris (DWD) availability.
Commonly Hunted Species	
Elk	Acres of hiding and thermal cover, habitat effectiveness, acres of security habitat, changes in access and mortality, acres of foraging habitat, and compliance with the Montana logging study. Changes in hunting opportunity.
Mule Deer	Acres of hiding and thermal cover, acres of foraging habitat, changes in project area distribution and use and hunting opportunities.
Migratory Species	
Migratory Birds	Changes (acres) in available habitat (Biophysical settings), compliance with MBTA.

Effects Determinations

Effects determinations for wildlife species by alternative are displayed in the following table

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Threatened and Endangered Species			
Grizzly Bear	The risk of stand-replacing wildfire remains high, but no direct effects are anticipated and in the absence of wildfire, grizzly habitat would be largely unchanged. Because whitebark pine would likely continue to decline, implementation of alternative 1 may affect but is not likely to adversely affect grizzly bear.	Improve landscape-level foraging habitat, maintain whitebark pine, results in short- and long-term reductions in cover and increase the risk of bear/human interaction. Overall project implementation is not anticipated to adversely affect grizzly bears. However, due to the current degraded baseline of the Red Mountain subunit it is the determination of the analysis that short-term road use within the subunit for implementation of alternative 2 may affect, likely to adversely affect grizzly bear.	Improve landscape-level foraging habitat, maintain whitebark pine, results in short- and long-term reductions in cover and increase the risk of bear/human interaction. Overall project implementation is not anticipated to adversely affect grizzly bears. However, due to the current degraded baseline of the Red Mountain subunit it is the determination of the analysis that short-term road use within the subunit for implementation of alternative 3 may affect, likely to adversely affect grizzly bear.
Canada Lynx	No effect. The risk of wildfire remains high, however, because there are no direct effects and considering winter foraging and den habitat remains largely unchanged, implementation of alternative 1 would have no effect on Canada lynx.	All treatments fall within the WUI, meet exceptions for VEG S5 and VEG S6, and comply with VEG G10. Treatments comply with VEG S1 and VEG S2, and fuel treatment projects that do not meet VEG S1, VEG S2, VEG S5 and VEG S6 occur on less than 6 percent of the available habitat on the Helena Forest. Proposed treatments comply with Northern Rockies Lynx Management Direction (USDA Forest Service 2007b), and there are no effects anticipated that were not considered in the BO (USDI Fish and Wildlife Service 2007b). As a result implementation of alternative 2 may affect, likely to adversely affect Canada lynx.	All treatments fall within the WUI, meet exceptions for VEG S5 and VEG S6, and comply with VEG G10. Treatments comply with VEG S1 and VEG S2, and fuel treatment projects that do not meet VEG S1, VEG S2, VEG S5 and VEG S6 occur on less than 6 percent of the available habitat on the Helena Forest. Proposed treatments comply with Northern Rockies Lynx Management Direction (USDA Forest Service 2007b), and there are no effects anticipated that were not considered in the BO (USDI Fish and Wildlife Service 2007b). As a result implementation of alternative 3 may affect, likely to adversely affect Canada lynx.
Canada Lynx Critical Habitat	No effect.	All treatments are consistent with the NRLMD (USDA Forest Service 2007b). While some treatments within winter foraging habitat would occur within the WUI, treatments were designed	All treatments are consistent with the NRLMD (USDA Forest Service 2007b). While some treatments within winter foraging habitat would occur within the WUI, treatments were designed

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
		considering standards to promote lynx conservation and collectively application of the standards for vegetation management are expected to avoid adverse effects to lynx (USDI Fish and Wildlife Service 2007b p. 43). May affect, likely to adversely affect Critical Habitat	considering standards to promote lynx conservation and collectively application of the standards for vegetation management are expected to avoid adverse effects to lynx (USDI Fish and Wildlife Service 2007b p. 43). May affect, likely to adversely affect Critical Habitat
Sensitive and Federal Candidate Species			
Wolverine	Although recent fires have reduced wolverine foraging and den habitat, suitable habitat would continue to be available. While the risk of future wildlife is greatest under this alternative, there is no way to predict if or when wildfire would occur. As a result and based on the above analysis and the following rationale, implementation of alternative 1 would no impact upon wolverine.	The Stonewall project was analyzed for effects to wolverines based on vegetation changes, movements across the landscape, and the distribution from human activities associated with the project. Based on the analysis provided and the following rationale, it is determined that implementation of the Stonewall Veg Management Project May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.	The Stonewall project was analyzed for effects to wolverines based on vegetation changes, movements across the landscape, and the distribution from human activities associated with the project. Based on the analysis provided and the following rationale, it is determined that implementation of the Stonewall Vegetation Management Project May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
Gray Wolf	Suitable wolf habitat, including remote areas for denning and big game populations would remain largely unchanged. As a result, and considering that human use and access is not expected to increase, implementation of alternative 1 would have no impact on wolves.	No known den or rendezvous sites would be affected. Disturbance to foraging wolves during implementation could occur, but would involve short-term disturbance during implementation. Big game populations and wolf foraging opportunities would be maintained in the short term and increased in the long term. The likelihood of stand-replacing wildfire is lowest under this alternative. Alternative 2 has the potential for short-term impacts to foraging or dispersing wolves. However, based on the analysis and the above rationale, implementation of alternative 2 May	No known den or rendezvous sites would be affected. Disturbance to foraging wolves during implementation could occur, but would involve short-term disturbance during implementation. Big game populations and wolf foraging opportunities would be maintained in the short term and increased in the long term. The likelihood of stand-replacing wildfire would be reduced across the landscape, but at a reduced level from that of alternative 2. Alternative 3 has the potential for short-term impacts to foraging or dispersing wolves. However, based on the analysis and the above rationale, implementation

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
		<p>Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.</p>	<p>of alternative 3 May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.</p>
Fisher	<p>Suitable habitat would be largely maintained. Risk of stand-replacing wildfire is greatest under this alternative. Because there are no direct effects anticipated and considering suitable fisher habitat would remain relatively unchanged, implementation of alternative 1 would have no impact on fisher.</p>	<p>Approximately 88 percent of the existing suitable habitat would be maintained. Preferred riparian habitat and travel corridors as well as prey availability would be maintained and the risk of stand-replacing wildfire is lowest under this alternative. The action alternatives would reduce fisher habitat by 11 to 12 percent and alter the structural conditions on approximately 38 percent of the existing fisher habitat. Based on the above analysis and the following rationale, implementation of alternative 2 May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.</p>	<p>Approximately 91 percent of the existing suitable habitat would be maintained. Preferred riparian habitat and travel corridors as well as prey availability would be maintained and the risk of stand-replacing wildfire would be reduced under this alternative when compared to no action. The action alternatives would reduce fisher habitat by 9 to 10 percent and alter the structural conditions on approximately 24 to 25 percent of the existing fisher habitat. Based on the above analysis and the following rationale, implementation of alternative 3 May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.</p>
Townsend's Big-eared Bat	<p>No impact. Hibernacula, swarming and roost habitat would not be affected and foraging habitat would be largely unchanged. The risk of stand-replacing wildfire is highest under this alternative.</p>	<p>The action alternatives would affect suitable habitat on 35 percent of the project area. Based on the above analysis and the following rationale, implementation of alternative 2 May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. Hibernacula, swarming and roost habitat would not be affected. A total of 8,562 acres of suitable foraging habitat would be affected by treatment. No</p>	<p>The action alternatives would affect suitable habitat on 27 percent of the project area. Based on the above analysis and the following rationale, implementation of alternative 3 May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. Hibernacula, swarming and roost habitat would not be affected. A total of 6,562 acres of suitable foraging habitat would be affected by treatment. No mortality is anticipated although</p>

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
		<p>mortality is anticipated although short-term disturbance from smoke to foraging bats could occur. Available foraging habitat would be widespread and the risk of stand-replacing wildfire is lowest under this alternative.</p>	<p>short-term disturbance from smoke to foraging bats could occur. Available foraging habitat would be widespread and the risk of stand-replacing wildfire is reduced under this alternative.</p>
<p>Bald Eagle</p>	<p>No impact. No anticipated impacts to the existing eagle nest, although the risk of wildfire is highest under this alternative.</p>	<p>Existing habitat in the project area habitat would be largely unaffected. As a result alternative 2 May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. No direct effects to nesting birds or reproduction anticipated. Approximately 100 acres of potentially suitable nest habitat would be reduced. Foraging habitat would not be treated, although short-term disturbance to foraging birds could occur. Untreated nest and foraging habitat would continue to be widely available. Risks of wildfire are lowest under this alternative.</p>	<p>Existing habitat in the project area habitat would be largely unaffected. As a result alternative 3 May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. No direct effects to nesting birds or reproduction anticipated. Approximately 100 acres of potentially suitable nest habitat would be reduced. Foraging habitat would not be treated, although short-term disturbance to foraging birds could occur. Untreated nest and foraging habitat would continue to be widely available. Risks of wildfire would be reduced when compared to no action.</p>
<p>Black-backed Woodpecker</p>	<p>No impact. Suitable BBW habitat would continue to be widely available across the Forest.</p>	<p>May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. Suitable BBW habitat would continue to be widely available across the Forest.</p>	<p>May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. Suitable BBW habitat would continue to be widely available across the Forest.</p>
<p>Flammulated Owl</p>	<p>May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. Suitable flammulated owl habitat would continue to decline under this alternative. While large diameter nest</p>	<p>May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. Owl habitat would be restored or created on almost 4,200 acres or 31 percent of the dry forest community.</p>	<p>May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species. Owl habitat would be restored or created on almost 2,800 acres or 21 percent of the dry forest community. Treatments</p>

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
	trees would increase in the short term, availability would decline over the long term. The likelihood of high intensity wildfire is greatest under this alternative.	Treatments would promote ponderosa pine and potential nest trees across the landscape and the likelihood of stand-replacing wildfire is lowest under this alternative.	would promote ponderosa pine and potential nest trees across the landscape and reduce the likelihood of stand-replacing wildfire when compared to no action.
Western Toad	<p>No impact.</p> <p>Western boreal toads and their habitat would not be affected. The risk of stand-replacing wildfire and a long-term reduction in breeding and upland habitat is highest under this alternative.</p>	<p>May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.</p> <p>Suitable habitat would continue to occur on sites treated and long-term foraging habitat would be improved. The likelihood of impacts to breeding and upland habitat from high severity wildfire is lowest under this alternative.</p>	<p>May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.</p> <p>Suitable habitat would continue to occur on sites treated and long-term foraging habitat would be improved. The likelihood of impacts to breeding and upland habitat from high severity wildfire would be reduced when compared to no action.</p>
Management Indicator Species			
Northern Goshawk	<p>Not likely to cause a local or regional change in habitat quality or population status.</p> <p>Suitable nest habitat would increase, although landscape diversity associated with foraging and post-fledging habitat would be largely unchanged. Risk of stand-replacing wildfire and a reduction in suitable nest habitat is highest under this alternative.</p>	<p>Not likely to cause a local or regional change in habitat quality or population status.</p> <p>Suitable nest, forage and PFA habitat would occur in all affected drainages and landscape conditions resulting from treatment are consistent with goshawk use. The risk of stand-replacing wildfire and a reduction in suitable habitat is lowest under this alternative.</p>	<p>Not likely to cause a local or regional change in habitat quality or population status.</p> <p>Suitable nest, forage and PFA habitat would occur in all affected drainages and landscape conditions resulting from treatment are consistent with goshawk use. The risk of stand-replacing wildfire and a reduction in suitable habitat would be reduced.</p>
Pileated Woodpecker and Hairy Woodpecker	<p>Not likely to cause a local or regional change in habitat quality or population status for the pileated or hairy woodpeckers.</p> <p>Suitable snags and nesting and foraging habitat would be maintained and continue to be widely available.</p>	<p>Not likely to cause a local or regional change in habitat quality or population status for the pileated or hairy woodpeckers.</p> <p>A long-term reduction in habitat would occur on 540 acres, whereas the quality of suitable habitat would be reduced for 10 to 20 years on 2,666 acres. Over the long term, restoration of open grown ponderosa pine and western larch may improve habitat on 5,700 acres and the risk of stand-</p>	<p>Not likely to cause a local or regional change in habitat quality or population status for the pileated or hairy woodpeckers.</p> <p>A long-term reduction in habitat would occur on 200 acres, whereas the quality of suitable habitat would be reduced for 10 to 20 years on 1,920 acres. Over the long term, restoration of open grown ponderosa pine and western larch may improve habitat on 4,500 acres and the risk of stand-replacing wildfire is reduced</p>

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
		replacing wildfire is lowest under this alternative.	under this alternative.
American Marten	<p>Not likely to cause a local or regional change in habitat quality or population status. Existing habitat would be maintained. The risk of stand-replacing wildfire is highest under this alternative.</p>	<p>Not likely to cause a local or regional change in habitat quality or population status. Treatments would improve species and landscape diversity, and maintain 93 percent of the suitable habitat over the long-term. Also the risk of stand-replacing wildfire is lowest under this alternative.</p>	<p>Not likely to cause a local or regional change in habitat quality or population status. Treatments would improve species and landscape diversity, and maintain 96 percent of the suitable habitat over the long term. The risk of stand-replacing wildfire is reduced under this alternative.</p>
Commonly Hunted Species			
Elk	<p>In the Beaver Creek unit hiding cover would continue to be available to meet the 50 percent level of Forest Plan standard 3. Due to the effects of the 2003 Snow Talon fire, the Keep Cool unit is below and would continue to be below the 50 percent level of Forest Plan standard 3. With continued MPB mortality, hiding and thermal cover within both units would continue to decline. While forage availability may increase in some areas, due to continued fire suppression and overstocked stand conditions, overall forage availability would continue to be low. Due to the reduced cover conditions, neither herd unit meets Forest Plan standard 4a for big game security. Cover would continue to decline, however, it is expected that available habitat would continue to support desired levels of elk. Finally, due to increased fuel loading, the risk of a long-term loss of cover from stand-replacing wildfire is greatest under this alternative.</p> <p>Herd numbers would be largely</p>	<p>Treatments proposed under alternative 2 would reduce elk hiding and thermal cover in both herd units, whereas the amount and distribution of forage would increase. Neither herd unit would meet Forest Plan standard 3 or 4a. This alternative would require a site-specific, non-significant forest plan amendment for standards 3 and 4(a) for the reductions in elk hiding cover and thermal cover.</p> <p>Hunting opportunities would be maintained and based on the analysis presented above and the following rationale, adequate elk habitat would continue to be available within both units to support desired levels of elk.</p> <ul style="list-style-type: none"> • Implementation would result in both short- and long-term increases in available forage on approximately eleven percent of the combined herd units, including increases on summer, transition and winter range. The increase in forage is expected to maintain or improve herd health. • There would be no increase in 	<p>Treatments proposed under alternative 3 would reduce elk hiding and thermal cover in both herd units, whereas the amount and distribution of forage would increase. Neither herd unit would meet Forest Plan standard 3 or 4a. This alternative would require a site-specific, non-significant forest plan amendment for standards 3 and 4(a) for the reductions in e</p> <p>Hunting opportunities would be maintained and based on the analysis presented above and the following rationale, adequate elk habitat would continue to be available within both units to support desired levels of elk.</p> <ul style="list-style-type: none"> • Implementation would result in both short and long-term increases in available forage on approximately eleven percent of the combined herd units, including increases on summer, transition and winter range. The increase in forage is expected to maintain or improve herd health. • There would be no increase in public access or changes to elk security habitat. • Within the combined herd units,

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
	<p>unchanged. Effects of predation would be largely unchanged. The risk of a long-term reduction in cover from wildfire is highest under this alternative.</p>	<p>public access or changes to elk security habitat.</p> <ul style="list-style-type: none"> · Within the combined herd units approximately 89 percent of the existing hiding cover and 86 percent of the existing thermal cover would be maintained. Cover would continue to be available within and adjacent to treatment units and across the landscape. · Past wildfires have greatly reduced project area elk habitat and much of the remaining habitat is at risk. Implementation of alternative 2 would reduce future wildfire risk. <p>It is believed that active management is necessary to address fuel loading, species diversity and insect and disease concerns. Due to the predominance of mature forest, limited disturbance and reduced forage, some management is necessary to maintain herd health and increase elk populations within the elk management unit (MFWP 2004). Collectively, the treatments proposed under this alternative are designed to address these concerns and the long-term benefits associated with the increased forage availability and reduced wildfire risk, are believed to outweigh the risks associated with the anticipated reduction in cover.</p>	<ul style="list-style-type: none"> · approximately 93 percent of the existing hiding cover and 86 percent of the existing winter range thermal cover would be maintained. Cover would continue to be available within and adjacent to treatment units and across the landscape. · Past wildfires have greatly reduced project area elk habitat and much of the remaining habitat is at risk. Implementation of alternative 3 would reduce future wildfire risk. <p>It is believed that active management is necessary to address fuel loading, species diversity and insect and disease concerns. Due to the predominance of mature forest, limited disturbance and reduced forage, some management is necessary to maintain herd health and increase elk populations within the elk management unit (MFWP 2004). Collectively, the treatments proposed under this alternative are designed to address these concerns and the long-term benefits associated with the increased forage availability and reduced wildfire risk, are believed to outweigh the risks associated with the anticipated reduction in cover.</p>
<p>Mule Deer</p>	<p>Deer cover on winter, transition and summer ranges would be altered due to continued MPB mortality. Forage availability would increase somewhat but would continue to remain low, and over the long term, herd health would not be expected to improve. Adequate forage and cover would continue to be</p>	<p>Treatments proposed under alternative 2 would reduce deer hiding and thermal cover and increase deer forage. Based on the analysis presented previously and the following rationale, adequate cover would continue to be available to support existing populations, whereas foraging availability would increase</p>	<p>Treatments proposed under alternative 3 would reduce deer hiding and thermal cover and increase deer forage. Based on the analysis presented previously and the following rationale, adequate cover would continue to be available to support existing populations, whereas foraging availability would increase over the short</p>

SPECIES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
	available to support existing populations and maintain hunting opportunities.	over the short and long term. Hunting opportunities would be maintained.	and long term. Hunting opportunities would be maintained.
Migratory Species			
Migratory Birds	Migratory bird habitat would remain largely unchanged. This alternative complies with the MBTA.	Project design features are in place to maintain migratory bird habitat and reduce potential mortality. This alternative complies with the MBTA.	Project design features are in place to maintain migratory bird habitat and reduce potential mortality. This alternative complies with the MBTA.

Plants

Alternative 1 would have no new soil disturbing activities that would disturb sensitive plant populations. However, alternative 1 does not propose activities that modify fire behavior to enhance community protection while creating conditions that allow the reestablishment of fire as a natural process on the landscape. Consequently, there remains a higher risk of a large, stand-replacing fire that could result in effects to herbaceous sensitive species habitat. Under alternative 1 whitebark pine would not increase in the short term and is expected to decline from present levels in the long term.

Alternatives 2 and 3 include soil disturbing activities with the potential to affect unknown herbaceous sensitive plant populations. Alternatives 2 and 3 address the purpose and need by proposing activities that modify fire behavior to enhance community protection while creating conditions that allow the reestablishment of fire as a natural process on the landscape. Alternative 2 would affect more acres than alternative 3. The proposed actions are designed to reduce potential for stand-replacing wildfire events in the treated stands. Reducing potential for stand replacing events may reduce wildfire impacts to specific resources. Proposed activities under alternatives 2 and 3 are consistent with recommendations for restoration of whitebark pine ecosystems, and in treated areas whitebark pine would increase in the short term with the increase extending into the long term.

There are no known occurrences of herbaceous sensitive plants in the project area and there is a project design feature in place to protect whitebark pine (SIL-2); therefore, direct and indirect effects are limited. Cumulative effects are not expected to contribute to change in status or viability of sensitive plants, under any of the alternatives. No downward trend in population numbers or density, or downward trend in habitat capability that would reduce the existing distribution of any of the sensitive plant species discussed in this analysis, is expected under any of the alternatives.

Summary of determination of effects to sensitive plant species are displayed in the following table.

Species Common name	Alternative 1	Alternative 2	Alternative 3
Roundleaf orchid	MII*	MII	MII
Scalloped moonwort	MII	MII	MII
Peculiar moonwort	MII	MII	MII
Lesser yellow lady's slipper	MII	MII	MII
Sparrow egg lady's slipper	MII	MII	MII
Howell's gumweed	MII	MII	MII
Hall's rush	MII	MII	MII
Missoula phlox	MII	MII	MII
Whitebark pine	MII	MII	MII

*May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

Noxious Weeds

While the spread of noxious weeds would continue under all alternatives, the rate of spread could potentially be faster in areas proposed for treatments, particularly areas to be thinned and burned. Potential impacts would be greatest under alternative 2 followed by alternative 3. Weed management would continue as in the past, however, activities proposed for the Stonewall Project add a layer of ground disturbance and therefore requires additional management for weeds. Areas of ground disturbance would be monitored for weed infestations and treated as appropriate, in accordance with the Helena National Forest Weed Treatment Project FEIS (USDA Forest Service 2006) and Best Management

Practices (BMPs) as specified in FSM 2080 (USDA Forest Service 2001), and the Forest Plan. Chemical weed treatment would be the primary treatment method in areas that are accessible by spray equipment. Biological control would apply in areas where the biological agents have optimal conditions for survival and expansion. In riparian areas, biological control would be emphasized where conditions for insect establishment are met. The effect of all treatment methods would be to control and contain existing and new infestations related to vegetation treatments.

Soil

The project area has a long management history that includes mining, grazing, and timber harvesting, which contributed to past ground disturbing activities that lead to the current conditions. The amount of detrimental soil disturbance in the units is mixed, but primarily is the result of past log landings and skid trails with the exception of four units that have residual effects from mining. The soils in the project area are generally coarse textured and resilient to compaction and erosion if operations take place during dry or frozen conditions. Ground cover is generally high in the project area and trending toward recovery where a thin organic layer exists. Coarse woody debris (CWD) levels also vary across units but are mostly within forest standards. There are multiple areas and units where large amounts of CWD signal a build-up of “locked-up” nutrients that are not plant or soil available.

Alternative 2 has the most proposed treatment acres, followed by alternative 3. The action alternatives would result in potentially detrimental soil disturbance. However, based on research and professional experience, the positive effects of reintroducing fire far outweigh negative potential effects from disturbing a larger acreage of land.

Watershed Resources

Primary water resource concerns stemming from this project include potential sediment conveyance to streams from project treatment units, and potential increased water yield due to removal of vegetation. Field sediment surveys identified road segments that were capable of delivering sediment to ephemeral, intermittent, or perennial stream channels. Under all project alternatives, overall reductions in sediment delivery to stream channels due to application of road BMPs and road obliteration are expected. Results suggest that under existing conditions, roughly 11 tons of sediment is delivered from roads to Lincoln, Beaver, and Keep Cool Creeks in an average year. With design features proposed in this project, sediment delivery from roads would remain one ton per year for Lincoln Creek, and reduce by about one ton each for Beaver and Keep Cool Creeks. Overall sediment delivery reduction for alternatives 2 and 3 during the project is estimated to be about 2 tons. While road improvement and road obliteration activities proposed in alternatives 2 and 3 may temporarily increase sediment delivery to stream channels, the design features proposed in this project would reduce sediment delivery to project area tributaries of the Blackfoot River over the long term, leading to improved conditions in project watersheds.

The project has the potential to increase water yield in Lincoln Creek, Beaver Creek, and Keep Cool Creek. A water yield increase above 10 to 15 percent may be of concern in that the flow increase could accelerate bank erosion. Water yield increase modeling results suggest a potential increase of 2 to 8 percent in the affected watersheds. The project, when combined with other recent past and reasonably foreseeable actions was predicted to result in a theoretical combined increase in water yield from project watersheds of about 5 percent at the confluence with the Blackfoot River. These levels are within State DEQ recommendations for TMDL and non-TMDL streams elsewhere on the Helena National Forest. If predicted water yield increases did occur, the modest additional flow would likely improve stream temperature and in-stream physical habitat, rather than cause any degradation. The project is unlikely to significantly affect the condition of riparian areas in the project area, given the 50- to 100-foot riparian no-ignition buffers in place for all action alternatives. The project is unlikely to affect the condition of any

wetlands found in the project area, in that these areas would either be avoided entirely, or would be treated only by hand crews or by equipment during winter operating conditions.

In summary, the proposed project would have relatively minor impacts to water resources in the project watersheds under the action alternatives. Through implementation of design features and application of BMPs, the project alternatives would most likely reduce short- and long-term sediment delivery to stream channels, improving or maintaining water quality in the Blackfoot River headwaters watershed. Alternatives 2 and 3 would also reduce long-term sediment delivery through improving road BMPs at stream crossings. Water yield change due to proposed project activities is predicted to be at the margins of detectability and is not anticipated to have any deleterious effects on channel stability or water quality.

Fish Habitat

Alternative 1 (no action) would not promote a change in existing conditions within the analysis area. While this alternative meets the Forest Plan direction of “no measurable effect”, it does nothing to help ensure movement toward desired conditions. Because many streams are currently nonfunctioning or functioning at risk, alternative 1, when considered with other current, past and reasonably foreseeable actions could work cumulatively with the management activities/natural events discussed above to limit the potential to achieve healthy population densities in certain populations.

Alternatives 2 and 3 would promote improvement in stream conditions through long-term reductions in sediment delivery and physical impacts to stream channels, which would promote positive shifts in stream function across the analysis area. Therefore, the effects of the Stonewall Vegetation Project proposed actions when considered cumulatively with other past, present and reasonably foreseeable actions should promote the attainment of better habitat conditions, and more abundant and resilient aquatic populations.

The analysis used a practical approach outlined in Ruggiero et al. (1994) and Region 1 guidance (Draft 01/30/2004) in conjunction with criteria established by Rieman et al. (1993). Selected habitat attributes considered both ecologically significant to fish and sensitive to land management disturbances are borrowed from Overton et al. (1995) and Region 1 guidance (Draft 1/30/2004). The population consists of both fluvial and resident components Pierce et al. (1997). Radio tracking of WCT indicates wide-ranging movements and use of various tributaries for spawning (Pierce et al. 2004). This analysis predicts a short-term change in substrate composition risks, some minor downward trend in incubation and fry emergence success (birth rate) to the population before recovering to an improved trend over baseline after 3 years. Western cutthroat trout recruitment is likely more than adequate to offset minor short-term sediment increases near the populations in Beaver Creek and Keep Cool Creek.

In the long term, treating hydrologically connected roads helps recover gravel quality slightly over baseline conditions. Therefore, there is some minimal risk to viability for this western cutthroat trout population in the short term with a long-term trend of maintaining reproductive habitat within the acceptable range of variation.

The Biological Effects Determination for westslope cutthroat trout and western pearlshell mussel, if implementing alternative 2 or 3 is: **May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.**

The Biological Analysis Determinations for bull trout and bull trout critical habitat is: **May effect, not likely to adversely affect.**

Recreation

Alternative 1, no action would have no direct or cumulative effects to recreation resources. The purpose and need for the Stonewall Vegetation Project “...improving the mix of vegetation and structure across the landscape so that it is diverse, resilient, and sustainable to wildfire and insects; modifying fire behavior to enhance community protection while creating conditions that allow the reestablishment of fire as a natural process on the landscape; enhancing and restoring aspen, western larch and ponderosa pine species and habitats; utilizing the economic value of trees through removal; and integrating restoration with socioeconomic considerations” would not be addressed. Potential long-term indirect effects to recreation resources would be due to the ongoing risk of severe wildfire that could lead to changes in the recreation settings, visual qualities and naturalness within the roadless expanse.

Alternatives 2 and 3 propose activities that would have short-term direct effects to recreation resources during project implementation such as limited access to specific areas and increased presence of people and noise within the project area. Project design features are in place to limit potential affects. The proposed treatments would address the purpose and need for the Stonewall Vegetation Project, resulting in a more diverse, resilient and sustainable Forest ecosystem with reduction in risk of negative impacts from severe wildfire. Alternative 2 treats more acres and would have more effects than alternative 3. The long-term indirect effects to recreation would be generally beneficial and help to maintain the existing recreation settings and scenic qualities within the project area.

Cumulative effects to recreation resources would generally be short term, occurring during project implementation, and would relate to an increased presence of people, vehicles and the associated noise that may affect the recreation experience. Longer-term cumulative effects would impact the Pine Grove dispersed camping area, such as hazard tree removal and fence construction for a riparian enclosure, in addition to the actions proposed in the Stonewall Vegetation Project. These effects would remain until vegetation growth obscures the visible stumps from the vegetation treatment activities, approximately 3-5 years, but would remain consistent with Roaded Natural ROS class (p.5).

There would be no effects to the Lincoln Gulch IRA and fewer acres treated within the Bear-Marshall-Scapegoat-Swan IRA.

Inventoried Roadless Areas

Alternative 1, no action would have no direct or cumulative effects to roadless resources. Potential long-term indirect effects to roadless resources would be due to the ongoing risk of severe wildfire that could lead to changes in the recreation settings, visual qualities and naturalness within the roadless expanse.

Alternatives 2 and 3 would have short-term direct impacts to roadless resources during project implementation such as increased presence of people and noise within the project area. Project design features are in place to limit potential effects. The proposed treatments would result in a more diverse, resilient and sustainable forest ecosystem with a reduction in risk of negative impacts from severe wildfire. The long-term indirect effects from the action alternatives to roadless resources would be generally beneficial and help to maintain the existing recreation settings and scenic qualities within the project area. Alternative 2 would treat more acres than alternative 3.

Cumulatively there may be short-term impacts to solitude and undeveloped character with long-term benefits to naturalness throughout the IRA. Additional management activities within the IRA including travel planning, weed treatments and livestock grazing would also occur. These activities are compatible with the management of roadless resources and may cumulatively represent short-term impacts to solitude throughout the IRA due to the presence of people.

Visual

The characteristic landscape is expected to continue to perpetuate. Management activity viewed disturbances would increase when considering all viewed units proposed for treatment. However, with the project design features the VQOs would be met. Units where dead trees would be removed would ultimately look similar to the end result of the natural decay cycle. This alternative would decrease the length of time the dead trees are viewed in the landscape. Cumulative effects for this alternative are expected to be similar to alternative 2, with fewer acres impacted by alternative 3. Both action alternatives would allow the VQOs to be met and would be in compliance with the Forest Plan and other regulations with the implementation of the visual design features.

Cultural

The no-action alternative would have an undesired effect on cultural resources. Most significant of these is the increased risk of damage to cultural resources from catastrophic wildfires resulting in artifact damage, wooden structure and feature loss, and loss of site integrity through erosion.

Alternatives 2 and 3 could have both negative and positive impacts on cultural resources within the project area. There would be no adverse or negative effects with implantation of project design features and mitigation measures. The negative effects are the possibility of cultural resources damage from ground disturbance from the use of heavy machinery, log and tree removal, road construction, and the heat damage to resources from prescribed fires. The loss of vegetation can indirectly lead to vandalism to cultural resources because of the increased visibility. Project design features would mitigate adverse effects to cultural resources within the project area. Positive effects include the reduction of fuels that could result in fire damaged cultural resources and increased erosion of archaeological sites.

Alternatives 2 or 3 would meet the Helena National Forest management goals for cultural resources by reducing the risk of fire. Damages to cultural resources from wildfires, suppression efforts and erosion, are irreversible losses of cultural resources. With project design features the project is anticipated to have no adverse effect.

If additional cultural resources are discovered during implementation of this project, work should cease in the area and a Forest Archaeologist would be contacted. Work in the area could only resume if mitigation measures can be determined and/or re-evaluated if necessary.

Economic Financial Efficiency

Project feasibility and financial efficiency indicates that both action alternatives are financially inefficient (negative Present Net Value (PNV)) when including all activities associated with the analysis. Both action alternatives are feasible when considering only timber harvest and the required design criteria. Alternative 2 has the highest PNV for the timber harvest and required design criteria at positive \$178 thousand, and negative \$1.2 million when considering all proposed activities. For alternative 3, the PNV for the timber harvest and required design criteria is positive \$68 thousand, and negative \$1.1 million for all proposed activities. The no-action alternative has no costs or revenues associated with it.

A reduction of financial PNV in any alternative as compared to the most efficient solution is a component of the economic trade-off, or opportunity cost, of achieving that alternative. The no-action alternative would not harvest timber or take other restorative actions and, therefore, incur no costs. As indicated earlier, many of the values associated with natural resource management (e.g., reduced fuel loadings for future reduced fire severity, improving vegetative species mix across the landscape) are nonmarket benefits.

Economic Impact

The no-action alternative would not change jobs or income because there are no proposed project activities associated with this alternative.

Alternative 2 proposes harvest of 22,022 hundred cubic feet (Ccf) of timber products and could result in a total of 171 jobs and labor income at \$7.7 million over the life of the project. On an annual basis, this would amount to approximately 38 jobs per year over a period of 10 years. Annual effects are greatest with this alternative since it has the most timber harvest. If the harvest takes longer than anticipated, the total impacts would remain the same, but the annual contributions would be reduced. Approximately 134 direct, indirect and induced jobs and \$6.6 million of labor income are associated with the proposed timber harvest activities, with the rest associated with restoration activities.

Alternative 3 proposes harvest of 14,299 Ccf of timber products could result in a total of 118 jobs and \$5.2 million in total labor income over the life of the project. On an annual basis, this would amount to approximately 25 jobs per year over a period of 10 years, and \$1.2 million annually in total labor income. Approximately 87 direct, indirect and induced jobs and \$4.3 million of labor income would be associated with the timber harvest activities, with the rest associated with restoration activities.

Environmental Justice

More employment and labor income opportunities would be created by alternatives 2 and 3 when compared to no action. Implementation of any of the action alternatives would not likely adversely affect minority or low-income populations. Implementation of the no-action alternative maintains the status quo and provides no additional employment or income in the economic impact area.

The Executive Order also directs agencies to consider patterns of subsistence hunting and fishing when an action proposed by an agency has the potential to affect fish or wildlife. There are no Native American Reservations or designated Native American hunting grounds located in or near the analysis area. None of the alternatives restrict or alter opportunities for subsistence hunting and fishing by Native American tribes. Tribes holding treaty rights for hunting and fishing on the Helena National Forest are included on the project mailing list and have the opportunity to provide comments on this project.

Summary of Changes from the Draft Environmental Impact Statement

Changes to the draft environmental impact statement (EIS) that led to the development of this document were based on new information and comments from the public and other agencies on the draft EIS (see appendix A). The more substantive changes include the following:

- Updates to wildlife habitat information based on new information and database updates, including grizzly bear, Canada lynx, big game habitat and road information effects
- Mapping corrections and corresponding acre corrections
- Clarification of project design features
- Incorporation of new information and consideration of additional literature
- Addition of the response to comments submitted for the DEIS, updating appendix A
- Soils analysis detrimental soil disturbance calculations were revised based on information gathered following national and regional soil monitoring protocols

Acronyms

ADS	Aerial Detection Surveys
BD	Bulk Density
BMPs	Best Management Practices
BpS	Biophysical Settings
CE	Cumulative Effects
CWD	Coarse Woody Debris
d.b.h.	Diameter Breast Height
DEIS	Draft Environmental Impact Statement
DFB	Douglas-fir Beetle
DSD	Detrimental Soil Disturbance
DWD	Down Woody Debris
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FIA	Forest Inventory Analysis
FP	Forest Plan
FRCC	Fire Regime Condition Class
FS	Forest Service
GHG	Greenhouse Gasses
HNF	Helena National Forest
INFISH	Inland Native Fish Strategy
IRA	Inventoried Roadless Area
LAU	Lynx Analysis Unit
LRMP	Land and Resource Management Plan
MAAQS	Montana Ambient Air Quality Standards
MDEQ	Montana Department of Environmental Quality
MFRC	Montana Forest Restoration Committee
MFWP	Montana Fish, Wildlife and Parks
MPB	Mountain Pine Beetle
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NNIS	Nonnative Invasive Species
NRLMD	Northern Rocky Mountain Lynx Management Direction
PFA	Post Fledgling Area
SWCC	Southwestern Crown Collaborative
TMDL	Total Maximum Daily Load
TPA	Trees per Acre
USDA	United States Department of Agriculture

USDI	United States Department of the Interior
USFWS	United States Department of Fish and Wildlife Service
WSB	Western Spruce Budworm
WUI	Wildland Urban Interface