# Chapter 2. Alternatives, Including the Proposed Action

## Introduction

This chapter describes and compares the alternatives considered for the Stonewall Vegetation Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., building roads then obliterating versus the use of skid trails) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of erosion caused by helicopter logging versus skidding).

## Alternatives Considered in Detail

The Forest Service developed three alternatives, including the no action and proposed action alternatives, in response to issues raised by the public. Table 8 displays treatments proposed by alternative.

### *Alternatives at a Glance*

**Table 8. Treatment Summary 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, | 0 | 25 | 0 |

| **GROUP #: BRIEF TREATMENT DESCRIPTION** HARVEST TREATMENT, FUELS TREATMENT | **ALT. 1 NO ACTION ACRES** | **ALT. 2 ACRES** | **ALT. 3 ACRES** |
|---|---|---|---|
| Handpile/Burn | | | |
| 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, 10, or 20 acres** | **0** | **410** | **36** |
| 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 | 8,041 | 6,155 |
| Total acres proposed for burning in designated IRAs | 0 | 4,845 | 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 |

## 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 (IRA) 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 Areas and on 664 acres (about 3.8 percent) within the Lincoln Gulch Inventoried Roadless Areas. To help facilitate management, outside of these IRAs approximately 2.6 miles of road would be built then obliterated immediately following timber removal.

Figure 15 displays the proposed action with INFISH buffers. This alternative represents the proposed action from scoping. Mapping corrections resulted in slight adjustments in acre and mile figures from scoping. Project design features are displayed in table 9.

### Treatment Descriptions

This section explains the treatments proposed for alternative 2 – proposed action by groups. See Figure 14 for a visual display.

**Group 1.** This group includes 18 treatment units comprising about 974 acres. Treatment objectives for this group are to develop mature, open forests comprised mostly of fire-resistant species. The proposed treatments would thin live trees, remove dead trees, and prescribe burn surface fuels. All tree thinning would be "from below" to favor retaining larger trees over smaller trees except that thinning regimes would favor retaining smaller trees of a more desirable species over larger trees of a less desirable species, and would favor keeping smaller, healthier and disease-free trees over larger, diseased trees. In general, the species preference for retention would be aspen, western larch, ponderosa pine, Douglas-fir, lodgepole pine, Engelmann spruce, and subalpine fir in descending order. This general order of preference may be modified for individual stands to address management objectives such as retaining species diversity, site factors, and other stand-specific factors such as relative species presence as noted in individual stand/unit prescriptions.

Trees would be thinned to an average spacing of 20 to 40 feet (109 to 27 TPA), but spacing could vary widely. Thinning would be by hand or machine.

All cut, live trees of a merchantable size would be removed for utilization. All merchantable dead trees would be removed, except those needed to meet other resource concerns (e.g., snag and downed large woody debris requirements).

Following thinning and removal, units would be underburned or jackpot burned to reduce fuels.

**Group 2**. This group includes 25 treatment units comprising about 1,132 acres. Treatments would thin small-diameter trees of little to no merchantable value. The thinning regime would generally be as described above for Group 1, except that post-thinning average tree spacing would range from 12 to 20 feet (109 to 303 TPA). Thinning would be by hand and/or machine, depending upon tree size. In several units, thinning slash would be piled by hand and burned.

**Group 3.** This group includes 19 treatment units comprising about 745 acres. Treatments proposed are seedtree and shelterwood harvest/regeneration systems (appendix B). Most trees, except as needed for shelter and seed production would be removed. In some of the shelterwood treatments, trees would be retained in groups; in others the remaining trees would be relatively evenly distributed. All cut, live trees of a merchantable size would be removed for utilization. All merchantable dead trees would be removed, except those needed to meet other resource concerns (e.g., snag and downed large woody debris requirements). Many of the units would be burned to reduce fuel loads and prepare sites for natural regeneration or planting. Many of the units may be planted with some combination of ponderosa pine, Douglas-fir, and western larch where needed to regenerate the stands to the desired seral and fire-resistant species.

**Group 4.** This group includes 11 treatment units comprising about 223 acres. Treatments proposed are clearcut harvest/regeneration systems in which all trees would be removed except for scattered clumps or individuals. Retained trees would mostly be Douglas-fir, ponderosa pine, or western larch. Remaining live and dead merchantable trees would be removed for utilization, except for those identified for other resource needs. Following cutting and removal, units would be prescribe burned, the type of burn varying by individual unit fuels reduction and site preparation treatment need. Natural regeneration by Douglas-fir and lodgepole pine is expected to occur to some degree and Douglas-fir, ponderosa pine, and western larch may be planted, the mixture differing by individual unit.

**Group 5.** This group includes two treatment units comprising about 25 acres. The treatments would remove dead and dying trees, slash non-commercial-sized trees, and reduce fuels by handpiling and burning. All cut merchantable trees would be removed for utilization using ground-based equipment except as needed to meet other resource concerns.

**Group 6.** This group includes three treatment units comprising about 449 acres. The treatments would cut small trees on portions of the treatment areas to create fuelbeds conducive to low-intensity prescribed burning. The prescribed burning would create openings less than 5 or 10 acres, the opening size depending upon the unit. Units would be prescribe burned to reduce fuels, cause additional mortality of undesirable trees, and preparing sites for natural regeneration.

**Group 7.** This group includes three treatment units comprising about 410 acres. The treatments would cut small trees on portions of the treatment areas to create fuelbeds conducive to low-intensity prescribed burning. Where the opportunity exists, small trees would be cut to create small openings around available whitebark pine, ponderosa pine, western larch, and Douglas-fir trees to enhance the regeneration of those species. Units would be prescribe burned to reduce fuels, cause additional mortality of undesirable trees, and prepare sites for natural regeneration. The treatments would create patches of mortality up to 5, 10, or 20 acres depending upon the treatment unit.

**Group 8**. This group includes seven treatment units comprising about 4,604 acres. The treatments would cut small trees on portions of treatment areas to create fuelbeds conducive to low-intensity prescribed burning. Where opportunity exists, small trees would be cut to create small openings around available whitebark pine, ponderosa pine, western larch, and Douglas-fir to enhance regeneration of those species.

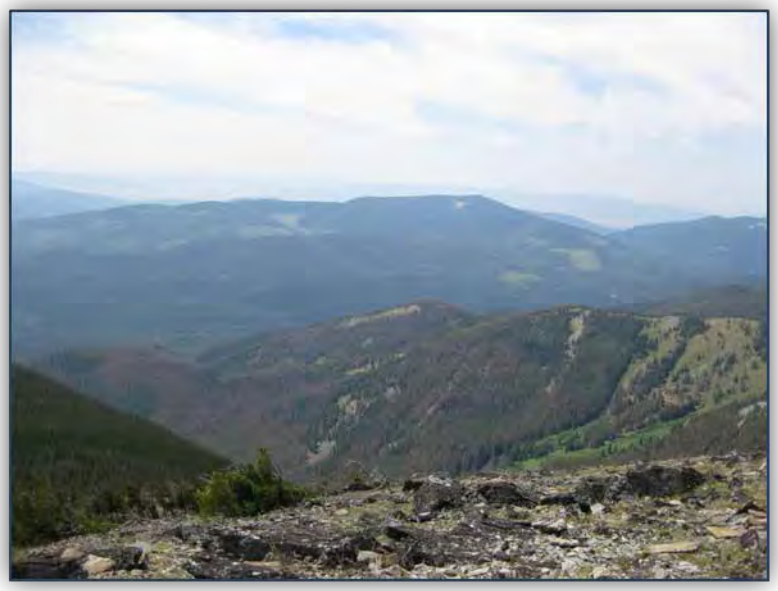

**Figure 12. View looking towards units 88 and 84 proposed for group 8 treatment**

Units would be prescribe burned to reduce fuels, cause additional mortality of undesirable trees, and prepare sites for natural regeneration. The treatments would create patches of mortality up to 30 or 75 acres depending upon the treatment unit.

**Aspen** is in a number of units proposed for treatment. The aspen can be considered seral to either subalpine fir or Douglas-fir, depending upon the unit and site. In many unit exams, the aspen is simply recorded as being present, as rare, or as a trace; while in several other units it comprises a substantial, although still minor, portion of the stocking, for example Unit 3. Comments concerning the aspen in unit exams range from "suppressed in the understory" to "vigorous in the overstory, but proportionally not much suckering." In general, we can characterize aspen in proposed units and the project area as (1) small clones, (2) heavily competing with—to suppressed by— conifers, and (3) a minor stand component (with a few exceptions).

**Whitebark pine** can be found in several units from Group 6, 7, and 8. In general, the whitebark pine in the project area is considered highly infected by white pine blister rust, and can be considered seral to subalpine fir. On sites where it is a seral species in the Northern Rocky Mountains, whitebark pine depends upon fire to maintain its dominance or presence (Arno 2001, Keane 2001, Kendall and Keane 2001, Morgan and Murray 2001). In the absence of fire, subalpine fir has increased in presence, and the combination of increased subalpine fir and whitebark pine mortality, and lack of regeneration due to white pine blister rust and mountain pine beetle have resulted in a decline in whitebark pin.

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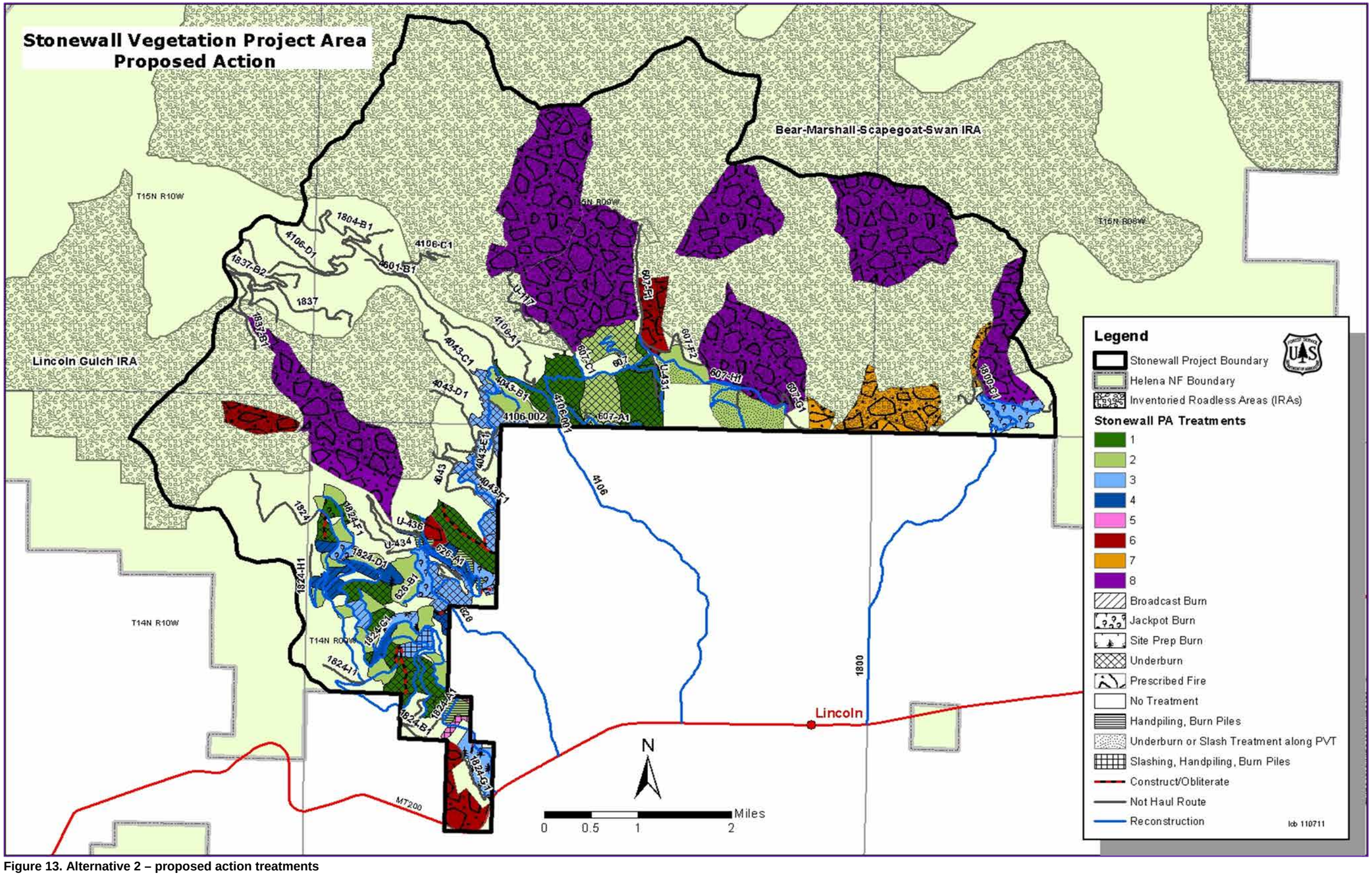


**Figure 13. Alternative 2 – proposed action treatments**

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## *Alternative 3 – Preferred*

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 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. To help facilitate management, outside the IRAs approximately 0.4 mile of road would be built then obliterated immediately following timber removal.

Figure 16 displays alternative 3 treatment units with INFISH buffers. Project design features are listed in table 9.

### Treatment Descriptions

**Groups 1-8.** Under Alternative 3, treatments for units in Groups 1-8 would be the same as discussed above under Alternative 2. The treated areas would change from that discussed in Alternative 2 because under Alternative 3 several units are not proposed for treatment and 12 units are proposed for treatment under new groups—Groups 9 and 10. Treatment acreages for alternatives 2 and 3 are displayed in table 8.

**Group 9.** Under alternative 3, about 1,040 acres would be treated with a low-intensity and low-severity prescribed burn (underburn). The purposes of the underburn would be to reduce surface and ladder fuels (small trees) and so modify future fire behavior while minimizing impacts to stand overstory and mid-story stocking from the prescribed burn.

**Group 10**. This group includes units 46a and 47a. Treatments would be designed in a mosaic pattern to maintain cover and forage for wildlife while promoting ponderosa pine and aspen, and reducing ladder fuels. Portions of the stands would be thinned to (1) reduce understory competition from around large ponderosa pine trees, (2) thin heavily-stocked groups of trees on sites historically dominated by ponderosa pine, and (3) remove conifer competition from within and around quaking aspen. Treatment guidelines are as follows:

- Reduce understory competition around large ponderosa pine, move areas toward or maintain multi-storied ponderosa pine structure, within 50 feet of ponderosa pine trees larger than 17 inches d.b.h. remove all but two trees. Retained trees should be varied size and age classes.
- In areas dominated by ponderosa pine, but lacking live trees greater than 17 inches d.b.h., trees would be thinned to 48 to 109 trees per acre depending upon tree size.
- Ponderosa pine snags greater than 17 inches d.b.h. would be favored for retention to meet Forest Plan direction for snags.
- Conifers less than 17 inches d.b.h. would be removed up to 100 feet of existing aspen patches.
- Post-thinning, slash would be jackpot burned or hand-piled and burned to reduce fuels.
- Treatments would affect up to 50 percent of these units.

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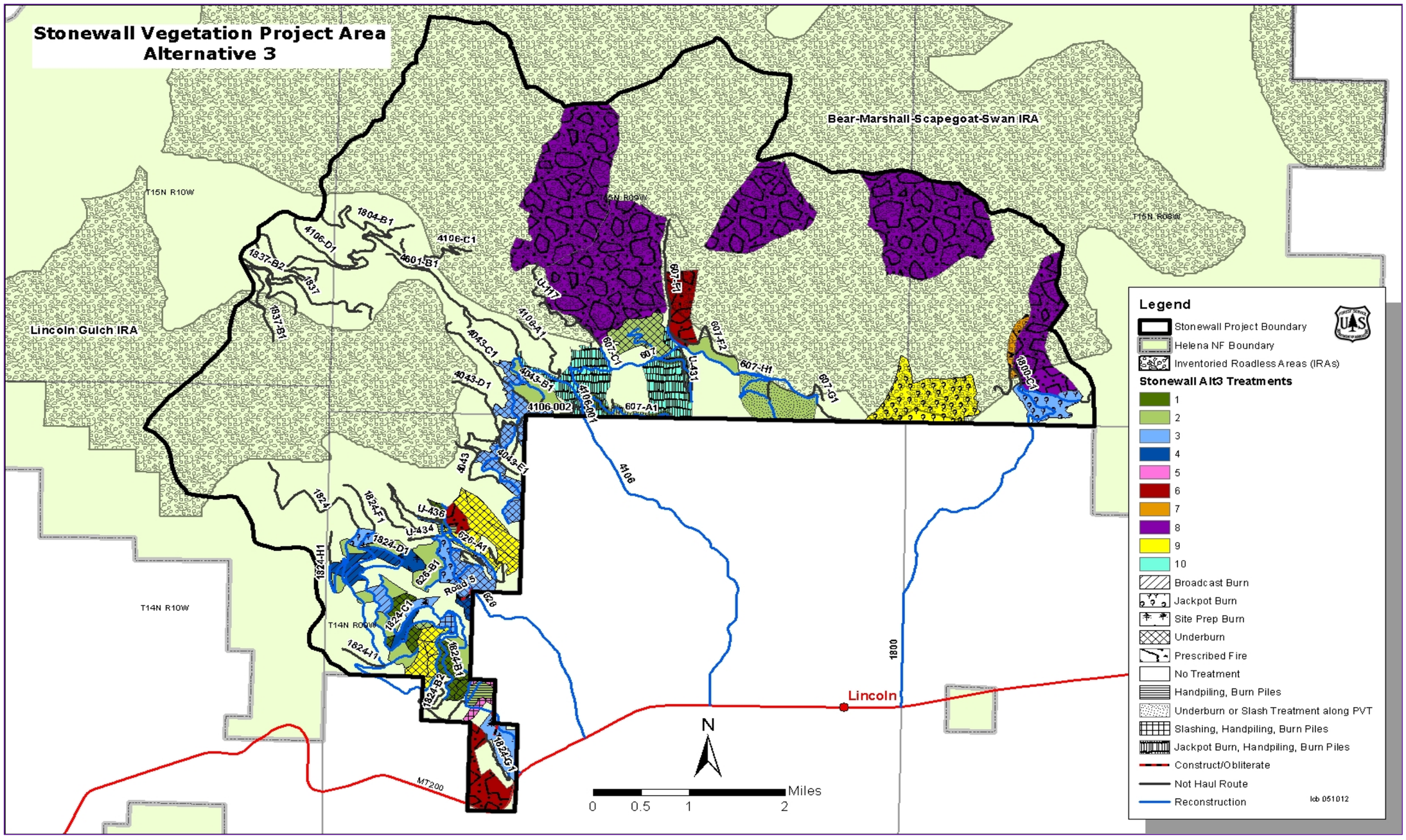


**Figure 14. Alternative 3 treatments**

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## *Project Design Features, Best Management Practices and Mitigation for the Action Alternatives*

The Forest Service developed the following mitigation measures and project design features that apply to all of the action alternatives.

**Table 9. Project design features, best management practices and mitigation**

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| **AIR-** | **Air Quality Design Feature** | |
| AIR-1 | All prescribed burning would be implemented in full compliance with the Montana Department of Environmental Quality (MDEQ) air program with coordination through the Montana/Idaho Airshed Group and reported to the Airshed Coordinator during active burning periods. | All alternatives, all burn units |
| AIR-2 | Burning would be dependent upon site conditions and weather conditions. Notice of the pile and prescribed burning timeframes, or burn windows, would be shared with the public through paper notices and announcements on the Forest website. | All alternatives, all burn units |
| **ARCH-** | **Archaeology Quality Design Feature** | |
| ARCH-1 | Create a 30-meter buffer (approximately 100 feet) around known sites with flagging tape for avoidance. No mechanical thinning within buffered boundaries. Directionally fell trees away from sites. Do not pile burn on sites. Hand control line as necessary to prevent burning over sites. | All alternatives, affected units |
| ARCH-2 | If any 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. | All alternatives, all units |
| **BOT-** | **Botany Design Feature** | |
| BOT-1 | If sensitive plant populations are located within the project area appropriate mitigation (e.g., site avoidance, avoid concentration of fuels on sites to be burned) would be followed upon consultation with a Forest Service botanist. | All alternatives, all units |
| **FUEL-** | **Fire Fuels Design Feature** | |
| FUEL-1 | Prior to burning slash piles, logging areas may be open to public firewood gathering after the sale is closed, if wood is available. Other resource values, such as wildlife snags, down logs, and soils, would be protected. Notify the public of firewood opportunities after timber removal activities are completed. | Harvest units along existing open roads, all alternatives |
| FUEL-2 | Prescribed burning control lines would be constructed as needed for holding actions and/or to protect resource area concerns. This includes black line, fireline, pruning, saw line and hose lays. Existing roads, trails, creek drainages, wet meadows, rocky outcrops and other natural barriers would be used as control lines where possible. | All burn units, all alternatives |
| FUEL-3 | Obliterate the appearance of fire lines and skid trails adjacent to or that intersect existing roads and trails to reduce the potential for unauthorized motorized use. | All alternatives, all burn units |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| FUEL-4 | All burning would take place under the guidelines set forth in a prescribed fire burn plan developed specifically for this project area. Prescribed burn plans address parameters for weather, air quality, and contingency resources. | All alternatives, all burn units |
| FUEL-5 | Hand piling and pile burning of natural and activity fuels may occur in portions of units adjacent to private land to reduce fuel loading levels prior to jackpot and underburning. | Alternative 2 units: 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 47, 49, 51, 73;<br>Alternative 3 units: 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 47a, 47c, 51, 73 |
| FUEL-6 | Reduce fuel loading of CWD to approximately 10 tons/acre, where possible. | Alternatives 2 and 3<br>Units: 76, 88. |
| FUEL-7 | Reduce fuel loading of CWD to 10-15 tons/acre | Alternatives 2 and 3 unit: 78. |
| FUEL-8 | Slash understory fuels using chainsaws where needed to create burnable fuel bed. | Alternative 2 units: 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88;<br>Alternative 3 units: 78, 80, 81, 82, 83, 84, 85, 86, 87, 88 |
| **NOX-** | **Noxious Weed Design Feature** | |
| NOX-1 | Incorporate all relevant guidance from FSM 2081.2 and the Environmental Protection Measures from the Helena National Forest Weed FEIS Record of Decision. | All alternatives, all units |
| NOX-2 | All landings, skid trails or other activity areas ( e.g., hand lines, control lines, burn piles) that have over 30 percent ground cover removal/soil surface disturbance due to the activity would be recontoured and seeded with a prescribed native seed mixture as soon as appropriate following the cessation of activities. Where slopes are under 15 percent, surfaces would be left rough to provide microtopography for seed and water catchment. Woody debris would be spread on the surface at a rate of 1 to 5 tons per acre in these areas to provide site stability as well as additional microsites. Where slopes are over 15 to 20 percent, surfaces would be left rough to provide microtopography for seed and water catchment. Woody debris would be spread on the surface at a rate of 5 to 10 tons per acre in these areas to provide site stability as well as additional microsites. | Timber harvest units in Alternative 2 units: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 18, 21, 29, 47, 49, 51, 73;<br>Alternative 3 units: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 18, 21, 29, 47a, 47c, 51, 73 |
| NOX-3 | Recommended certified weed seed free native seed mixtures are located in Appendix F of the Helena National Forest Plan. | Units with underburning for restoration would not be seeded |
| NOX-4 | Where feasible for restoration of disturbed ground (e.g., hand lines, control lines, burn piles), cover bare soils with a thin layer of duff from adjacent sites, if available. It is important to leave some duff on adjacent sites where cover material is collected. | In units identified for pile burning throughout the unit:<br>Alternative 2 units: 3, 4, 9, 14, 18, 21, 29;<br>Alternative 3 units: 3, 9, 14, 18, 21, 29<br>In addition, this applies to portions of the following units where pile burning is proposed along the Forest boundary:<br>Alternative 2 units: 1, 2, 4, 5, 7, 8, 10, 11, 12, 47, 49, 51, 73; |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| | | Alternative 3 units: 1, 2, 4, 5, 7, 8, 10, 11, 12, 47a, 47c, 51, 73 |
| NOX-5 | Only herbicides approved for use under the Helena National Forest Noxious Weed Record of Decision (2006) would be applied. All herbicides would be applied in accordance with label restrictions under that decision. | All alternatives, all units |
| NOX-6 | The portions of the haul route that require road work (e.g., reconditioning, maintenance, construction) prior to haul should be treated with herbicides prior to the reconditioning early in the growing season to prevent seed set, and again in the fall following reconditioning to limit the effect of the ground disturbance. | Roads proposed for work, all alternatives |
| NOX-7 | A 100-foot buffer around any sensitive plant species would be required when herbicides are applied. Within this buffer only hand pulling of weeds would be allowed, (Environmental Protection Measure #22 from the Helena National Forest Noxious Weed FEIS and Record of Decision 2006). | All alternatives, all units |
| **RNG-** | **Range Design Feature** | |
| RNG-1 | Protect existing livestock management fencing, or repair if damaged during operations. | All alternatives, where needed. |
| RNG-2 | Fencing, temporary herding, or other techniques may be used to protect conifer regeneration where needed. | All alternatives, where needed. |
| RNG-3 | Fence construction may be needed along allotment boundaries that would have natural barriers removed due to the project. This would primarily be of concern along the Stonewall allotment boundary on the west and east boundaries. Design all improvements for livestock management, such as fencing and water developments, in cooperation with a wildlife biologist. | All alternatives, where needed |
| **REC-** | **Recreation and Roadless Design Feature** | |
| REC-1 | No project activities would occur the week prior to, or during the first 2 weeks of the General Big Game Hunting rifle season or on weekends for the remainder of the General Big Game Hunting season. | All alternatives, all units |
| REC-2 | No hauling on weekends and major holidays to minimize conflicts with the public users | All alternatives, all units |
| REC-3 | Coordinate project implementation with recreation staff, Forest Public Affairs Officer and Law Enforcement to ensure the public is well informed of treatment schedules and potential impacts. Provide public notifications at of project activities (e.g., logging, hauling, prescribed burning) at major access roads, in local newspapers and on the Forest webpage. | All alternatives, all units |
| REC-4 | Work with local snowmobile groups and Forest Service biologist to identify alternative groomed snowmobile routes where winter operations are considered. Snowmobile trails are groomed from December 1 through April 1.<br>(Note: Alternative routes may be a groomed path along the side of a haul route that would be safe for snowmobiles, or allowing the user group to groom an approved "detour" type route along existing roads to provide trail connections or loop riding opportunities that | All alternatives |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| | may have otherwise been impacted by hauling activity.) | |
| REC-5 | Prioritize treatments adjacent to the Pine Grove Dispersed Camping Area/Trailhead and Arrastra Creek trailhead to limit the amount of time these areas may be closed to the public. | All alternatives, unit: 46 |
| REC-6 | Protect recreation facilities including: picnic tables, fire-rings, toilets, signs, bulletin boards, hand pumps, fences, etc. | All alternatives, unit: 46 |
| REC-7 | Cut stumps as flush as possible to the ground within the Pine Grove Dispersed Camping Area/Trailhead and Arrastra Creek trailhead area. | All alternatives, unit: 46 |
| REC-8 | Within the Pine Grove Dispersed Camping Area/Trailhead and Arrastra Creek trailhead areas, leave 10 to 12 tons per acre of coarse woody material (greater than 3 inches diameter) from harvest activities. | All alternatives, units: 46 |
| **RDS-** | **Roads Design Feature** | |
| RDS-1 | Roads would be maintained in accordance with direction provided in FSH 7709.15 (Transportation System Maintenance Handbook) and would be at a level commensurate with the need for the following operational objectives; resource protection, road investment protection, user safety, user comfort, and travel efficiency. | Roads proposed for work |
| RDS-2 | Remove danger trees, approximately one and a half tree lengths from the roadway, as needed, along roads used for hauling and project implementation. | Roads proposed for work |
| RDS-3 | Roads that would be built then obliterated immediately following timber removal and road reconstruction would be the minimum density, cost, and standard necessary for the intended need, user safety, and resource protection. | Roads proposed for work |
| RDS-4 | Roads built then obliterated immediately following timber removal would be closed (e.g., gates, barricades) during operations to limit use to administrative use only. | Roads proposed for work |
| RDS-5 | Upon project completion roads built then obliterated immediately following timber removal would be decommissioned and rehabilitated. Intersections with roads would be blocked by rocks, wood, or berms and would be slashed in and or ripped and covered with slash or seeded within site distance of open roads to reduce potential for use after the project harvest activities are completed. | Roads proposed for work |
| RDS-6 | Provide warning and other signing in accordance with Forest Service signing standards and restrict or temporarily close roads in active project areas to provide for public safety. | Roads proposed for work |
| RDS-7 | A wetting agent (water or other dust-reduction material) would be applied as needed to decrease or eliminate dust generated from timber hauling on aggregate and native surface roads to provide for air quality and public safety. | Roads proposed for work. |
| RDS-8 | Road design would be addressed in clauses in the contract package. At a minimum, the following items would be included in the design considerations: location, width, drainage, stream crossings, closures, decommissioning and rehabilitation. | All units, all alternatives |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| RDS-9 | Existing open routes would be left in similar condition and drainage structures shall be left in functional condition. | Roads proposed for use, all alternatives. |
| RDS-10 | For roads built then obliterated immediately following timber removal that cross a drainage, associated temporary structures, and fills shall also be removed to the extent necessary to permit normal maximum flow of water and stream crossings restored to their original dimensions and contours. | Alternative 2 and 3, road #5 between units 10 and 11 |
| **SILV** | **Silviculture Design Feature** | |
| SILV-1 | Conifers suppressing aspen clones would be thinned from within and around suppressed aspen. Cut-tree diameter limits and cutting distance from aspen would be established and defined in stand and unit prescriptions. However in general, conifers would be cut up to 18 inches d.b.h. in units where commercial-sized trees are proposed for removal, and up to 9 inches d.b.h. in units where precommercial-sized trees are proposed for cutting, up to a distance of about 120 feet from the outside edge of the aspen clone | Alternatives 2 and 3 units: 14,15,16,18,21,23,24,26, 28,3,30,31,32,33,4,44,45, 48,47,48,49,50,51,54,55,59, 6,61,62,63,64,65,66,67,68, 69,7,70,71,72,73,75, 46b,47b,47c,61a |
| SILV-2 | Assess low- and mixed-severity prescribed burning units containing groups or stands of whitebark pine to determine if areas need pre-burn treatments to protect whitebark pine from damage during burning, and to create openings to serve as nutcracker caching sites. If needed, pre-burn treatments should take place a year prior to the proposed landscape burning. The pre-burn treatments could include cutting and directional felling of conifer trees to increase fuel loadings, improve continuity of the fuelbed, and reduce fuel loads around whitebark pine trees. Treatment areas around mature whitebark pine trees designed to serve as nutcracker caching sites should be cut near-circular areas of 1 to 5 acres. | Alternative 2 units: 76,79,81,82,83,84,88 Alternative 3 units: 79,82,83,84,88 |
| SILV-3 | Where the opportunity exists in prescribed burning units where pre-burning tree cutting is proposed, thinned areas should be located around large ponderosa pine, Douglas-fir, western larch and aspen to protect the trees and to promote the regeneration of those species. | Alternatives 2 and 3 units: 76,77,78,79,80,81,82,83,84, 85,86,87,88, 80a |
| SILV-4 | All merchantable dead trees would be removed except as needed to meet other resource criteria. | Alternatives 2 and 3 units: 4, 5, and all regeneration and commercial thinning units. |
| **S/WS/F-** | **Soils, Watershed and Fisheries Design Feature** | |
| S/WS/F-1 | Maintain adequate soil cover following management treatments to reduce the risk of erosion. As a rough rule of thumb, at least 50 percent soil cover should be maintained on slopes less than 35 percent, and greater soil cover should be maintained on steeper slopes. Soil cover includes vegetation, plant litter and duff, rocks (greater than 2 inch diameter), and woody material. | All alternatives, all units |
| S/WS/F-2 | Conduct vegetation management activities using partial or full-suspension yarding methods (i.e. skyline cable yarding) | All skyline Units: |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| S/WS/F-3 | For vegetation management activities in forested ecosystems, retain 5 to 20 tons per acre of coarse woody material (greater than 3-inch diameter) for warm, dry types, and 10 to 20 tons per acre for other types following vegetation treatments (Graham et al. 1994; Brown et al. 2003). The purpose of this BMP is to sustain long-term soil nutrient cycling> | 5-20 tons per acre coarse woody material: Alternative 2 units: 2, 6, 7, 15, 16, 26, 30-33, 44, 50, 54, 55, 73, 75, 76, 78, 80, 81, 84-86;<br>Alternative 3 units: 2, 6, 7, 15, 16, 30a, 31a, 32a, 44a, 50, 73, 75b, 78, 84, 85<br>(Balance of units 10-20 tons per acre coarse woody material) |
| S/WS/F-4 | Re-use existing skid trails where practical. Before use, skid trail locations would be approved by Forest Service personnel. | All alternatives, all units |
| S/WS/F-5 | Where operations are restricted to the winter conditions, winter conditions guidelines are as follows:<br>0 inches of frozen soil−Need 10 inches of settled snow<br>2 inches of frozen soil−Need 6 inches of settled snow<br>4 inches of frozen soil−No snow cover<br>If necessary, pre-pack snow on designated routes before work commences. This allows soil to freeze and the snow road to solidify. | Alternative 2 Units: 1, 4, 5, 9-13, 17, 19, 20, 28, 29, 43, 45-47, 57, 58, 62, 63<br>Alternative 3 Units: 1, 4, 5, 9-13, 43, 46b, 47b, 47c, 57, 58, 62, 63 |
| S/WS/F-6 | For prescribed fire management activities in the timber removal treatment areas, design burn prescriptions to burn when the forest floor is moist.<br>Note: Proposed prescribed burns are designed to maintain some duff on the forest floor. | All alternatives |
| S/WS/F-7 | Harvesting and skidding operations would be limited to time periods when dry soil conditions exist (summer operating period). | All units NOT treated in the winter |
| S/WS/F-8 | Skid trails would be designated with an average spacing of 100 feet. | All tractor treated units |
| S/WS/F-9 | Following harvesting and skidding operations that result in the removal or displacement of litter, duff, soil, or coarse woody debris from the skid trail surface, the following activities would be conducted:<br>Litter, duff, soil, and woody debris displaced from the trail would be placed on the skid trail.<br>Slash and coarse woody debris that is placed on the skid trail would be compacted so that it is in contact with the soil surface.<br>Slash placed on skid trails would be placed over 65-70% of the skid trail surface to a depth of 2-3 inches (approximately 22-25 tons/acre). | Units requiring restoration:<br>Alternative 2 Units: 1, 11-13, 29, 43, 46, 47;<br>Alternative 3 Units: 1, 11-13, 43, 46b, 47b, 47c |
| S/WS/F-10 | Landings would be de-compacted and/or scarified as part of site preparation.<br>Mulch and fine debris from on-site would be spread over the landing.<br>Grass or trees would be seeded or planted on the disturbed site.<br>Slash would be placed over 65-70% of the landing surface to a depth of 2-3 inches (approximately 22-25 tons/acre). | Units requiring restoration:<br>Alternative 2 Units: 1, 11-13, 29, 38, 40, 42, 43, 46, 47;<br>Alternative 3 Units: 1, 11-13, 38, 40, 42, 43, 46b, 47b, 47c |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| | Slash would be compacted so that it is in direct contract with the soil surface. | |
| S/WS/F-11 | Where practicable, slash would be piled and burned in areas where detrimental soil disturbance already exists (i.e., abandoned log landings, skid trails, and roads associated with past activity).<br>Handpiles would be constructed so they are no larger than approximately 6 feet in diameter and 4 feet high.<br>Prior to hand piling, slash would be left through one winter after cutting to allow for initial decomposition and nutrient leaching.<br>(Exception: units adjacent to private land or those identified in the silviculture prescription with insect concerns may be piled and burned as soon as possible to reduce fire hazard.) | Units requiring restoration: Alternative 2: 14, 29 51; Alternative 3: 14, 51 |
| S/WS/F-12 | Where practical, burn piles would be covered with on-site mulch, fine debris, and slash. Burn piles would be seeded or planted with the appropriate grass or tree species. | Units requiring restoration: Alternative 2: 14, 29 51; Alternative 3: 14, 51 |
| S/WS/F-13 | In skyline corridors, place on-site mulch, fine debris and slash. Also seed or plant with the appropriate grass or tree species. | Units requiring restoration: Alternative 2: 15, 53; Alternative 3: 15, 53 |
| S/WS/F-14 | Precommercial thin (PCT) units would be hand thinned. | Alternative 2: 2, 3, 14, 16, 18, 21, 48-51, 59-61, 64-73, 75-88 Alternative 3: 2, 3 14, 16, 17a, 19a, 20a, 29a, 30a, 31a, 32a, 44a, 45a, 46a, 47a, 48, 50, 51, 59, 61a, 66-73, 75b, 78, 79, 80a, 82-85, 87, 88 |
| S/WS/F -15 | Installation, removal or replacement of culverts would be restricted to periods when stream channels are dry or would be avoided from May 1 to August 1 to reduce the risk of affecting cutthroat trout eggs in stream gravels. | As needed |
| S/WS/F -16 | INFISH (USDA 1995) Riparian Habitat Conservation Areas (RHCAs) would be marked in the locations where dead tree removal is to occur between the road and the stream. A clear means of identifying trees that are to be cut and removed, cut and left in place, or left standing would need to be recognized. As provided for with INFISH (USDA 1995) standard RA-2, dead trees cut that are not needed for woody debris recruitment or floodplain needs, can be removed. Green commercial trees within the RHCA that have not been attacked by beetles and are not otherwise at risk of dying in the immediate future would remain. Avoid locating log landings in RHCAs. | See Figure 15, RHCA map with INFISH buffers |
| S/WS/F -17 | Additional areas requiring INFISH buffers are likely to be found during vegetation unit layout that are not currently identified on project area maps. These areas would be identified during implementation and the appropriate buffers and mitigations applied to them to meet INFISH (USDA 1995) and Helena Forest Plan standards.<br><br>**RHCA boundaries**<br>-**Category 1--**Fish bearing streams have a RHCA width of 300 feet either side of the stream or the 100-year floodplain whichever is greater. | See Figure 15, RHCA map with INFISH buffers |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| | **-Category 2**--For perennial streams not supporting fish, the RHCA is 150 feet either side of the stream.<br>**-Category 3**-- For lakes and wetlands greater than one acre, the RHCA is a minimum of 150 feet but can be larger and extend to the outer limits of riparian vegetation, the extent of seasonally saturated soil, the extent of highly unstable areas, or the distance equal to the height of one site-potential tree.<br>**-Category 4**--For Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides and landslide prone areas, the RHCA boundary is one-half site potential tree from the edges of the stream channel, wetland, landslide, or landslide prone area, or a 50-foot slope distance, whichever is greatest.<br><br>**The following documents the specific treatment of trees within INFISH Categories 1-4 RHCAs associated with streams.**<br>*Situations where dead or insect infested trees may be removed while still meeting INFISH standard RA-2.*<br>If the tree is between the creek and the road, within a tree length of the road, leaning toward the road or standing straight, and is not within a tree length of the creek and does not fall into what is considered a wider floodplain category (the situation where side channel development is possible) then the tree may be felled and removed<br>If the tree is between the creek and the road, within a tree length of the road, not within a tree length of the creek, is on a bench elevated above the floodplain, and is standing either straight or leaning toward the road the tree can be removed.<br>Salvage trees within the RHCA can be removed in the situation where the road is between the creek and the tree, as these trees are not potential contributors to large woody debris or stream channel form and function. The exception would be when the road is immediately adjacent to the stream. In this situation, the tree can be removed if the portion of the tree bole exceeding four inches would not span the stream should the tree fall toward the creek.<br>For the separate situation where the road parallels a stream and then crosses a tributary to the stream, the salvage trees on the uphill side of the road, including those within a tree length of the tributary, can be cut and removed unless leaning directly toward the tributary.<br>Precommercial thinning of green trees is allowed with hand treatment.<br>Prescribed burning is allowed as long as it meets state SMZ rules. | |
| S/WS/F -18 | The State of Montana Stream Management Zone (SMZ) Law (2007) prohibits broadcast burning in SMZs (see Rule 3 (26.6.603), specific to prescribed burning). During broadcast or underburning, no ignition would take place in an SMZ; however, some fire may back into the SMZ. | SMZ portions of units |
| S/WS/F-19 | Follow all standard Forest Service timber contract road Best Management Practices. All cross drain culverts on | All alternatives, all units |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| | existing roads to be used for hauling in the project area would need to brought up to standard for functionality. Follow all applicable road and harvest BMPs listed in the FS Soil and Water Conservation Practices Handbook (USDA 2010) | |
| S/WS/F-20 | Avoid hauling and other heavy-equipment traffic during conditions where the road surface is at or near saturation. | All alternatives, all units |
| S/WS/F-21 | Avoid snowplowing on any road adjacent to a stream as much as possible. At stream crossings, avoid sidecasting of snow into the stream. Leave drainage points in the snow berm to avoid concentration of snowmelt on the road surface. | Identify specific sections of road |
| S/WS/F-22 | Avoid use of heavy equipment in any wetland identified during unit layout. | All alternatives, all units |
| S/WS/F-23 | Minimize cleaning of vegetated roadside ditches that are providing adequate road drainage. | All alternatives, all units |
| S/WS/F-24 | Areas cleared of vegetation such as landings or road side drainage ditches would be seeded with an approved native seed mix. | All alternatives, all units |
| S/WS/F-25 | Erosion control and drainage improvement BMPs would be used to reduce sediment at stream crossings. Sediment filtering devices (e.g., filter fence and weed-free straw bales) would be used as needed to limit erosion and delivery of disturbed material into all streams or ephemeral drainages. | All alternatives, all units |
| S/WS/F-26 | Sediment sites 607-E-01on Stonewall Creek and 626-B1-01 on a tributary to Lincoln Creek would have sediment-filtering devices installed combined with gravel surfacing to reduce erosion. | Alternatives 2 and 3 |
| **VIS-** | **Visual Design Feature** | |
| | **Intermediate and Regeneration Harvest and Precommercial Thin** | |
| VIS-1 | Along roadways boundaries and private property, vary unit sizes, widths, shapes and distance from the center line.<br>Consider leaving single trees and/or groups of trees to visually connect with the unit's edges.<br>Utilize natural breaks in topography and vegetation type to delineate treatment edges.<br>Edges would be shaped and/or feathered to avoid a shadowing or edge effect in the cut unit.<br>Where the unit is adjacent to denser forest including private land, the percent of thinning within the transition zone would be progressively reduced toward the outside edge of the unit. In addition, vary the width of the transition zone.<br>Where the unit interfaces with an opening, the percent of thinning within the transition zone would be progressively increased toward the outside edge of the unit. In addition, vary the width of the transition zone.<br>Soften edges by thinning adjacent to existing unit boundaries, removing larger trees and favoring smaller ones, where applicable. This would reduce a vertical wall or edge effect. | Alternative 2 - 1, 10, 13, 17, 20, 39, 40, 41, 46<br>Alternative 3 - 1, 10, 13, 17a, 20a, 39, 40, 41, 46a, 46b |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| | **Road, Skid Trail, and Landing Construction** | |
| VIS-2 | Where feasible, locate and orient roads to minimize cut and fill.<br>Cut and fill banks would be sloped to accommodate natural revegetation.<br>Cut and fill slopes would be revegetated with native species where ever possible. | All alternatives, all roads built then obliterated |
| VIS-3 | Side cast topsoil during the construction of roads built then obliterated immediately following timber removal, to use topsoil for obliteration and recontouring. | All alternatives, all roads built then obliterated |
| VIS-4 | Where roads built then obliterated immediately following timber removal and skid trails meet a primary travel route, they should intersect at a right angle and, where feasible, curve after the junction to minimize the length of route seen from the primary travel route. | Alternative 2 - 13 and 46<br>Alternative 3 -13, 46a, 46b |
| VIS-5 | Where feasible, retain screening trees one tree-height below roads and landings (including cable landings) when viewed from below. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing. | All alternatives, all roads built then obliterated, all landings |
| VIS-6 | When viewed from above, retain, screening trees one tree-height above roads and landings and/or prescribe a higher leave basal area. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing. | All alternatives, all roads built then obliterated, all landings |
| VIS-7 | Log landings, roads, and bladed skid trails should be minimized within sensitive view sheds. | Alternative 2 - 1, 13, and 46<br>Alternative 3 – 1, 13, 46a, 46b |
| | **Slash Treatment** | |
| VIS-8 | In sensitive foreground areas, stumps should be cut to 8 inches or less in height, where possible. Slant stumps away from visually sensitive areas (travel routes, use areas, and water bodies, where possible | Alternative 2 - 2, 13, 46, 73, 76, 77, 79, 80, 81, 82, 83, 84, 85, 87, 88<br>Alternative 3 – 2, 13, 46a, 46b, 73, 79, 80, 82, 83, 84, 85, 87, 88 |
| VIS-9 | All burn piles would be completely burned, or residual burnt material would be scattered within sensitive viewsheds. | Alternative 2 - 1, 13, and 46<br>Alternative 3 – 1, 13, 46a, 46b |
| | **Unit Marking** | |
| VIS-10 | Use cut tree (as opposed to leave tree) marking or species designation, where appropriate to minimize the amount of marking in visually sensitive areas. | Alternative 2 - 1, 13, 16, 17, 46<br>Alternative 3 - 1, 13, 16, 17a, 46a, 46b |
| VIS-11 | Unit boundaries would be marked with water based paint. | Alternative 2 - 1, 13, 16,17, 46<br>Alternative 3 – 1, 13, 16, 17a, 46a, 46b |
| VIS-12 | Prescribed Fire<br>See FUEL-2 | Alternative 2 – 46<br>Alternative 3 – 46a, 46b |
| VIS-13 | **Tree Planting**<br>Tree planting should be completed in an irregular pattern with clumping to mimic future islands similarly found in the characteristic landscape. | All alternatives, all units |
| **WL-** | **Wildlife Design Feature** | |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| WL-1 Roads | Existing roads which are currently closed or restricted and utilized for this project would be retained in their pre-project road status. | All alternatives |
| WL-2 Roads | To retain habitat for snag dependent species and species dependent on large diameter trees, the location of roads to be built then obliterated immediately following timber removal, skid trails and cable corridors would ensure, whenever practical, that veteran and relic survivor trees and snags would not be removed during construction. | Alt 2 – Roads 3-9, Alt 3 – Roads 5, 7 and 8 |
| WL-3 Roads | To maintain habitat for snag-dependent species, the timber sale contract or contract administrator would ensure, whenever practical, that the design of skid trails and cable corridors avoid veteran and relic trees and snags | To be determined during implementation |
| WL-4 Snags | The Forest Plan (1986) specifies that snags should be managed at 70 percent of optimum (2 snags/acre) within each 3rd-order drainage. | All alternatives, all units |
| WL-5 Snags | Larch, ponderosa pine, Douglas-fir, spruce, and subalpine fir, in that priority, are the preferred species for snags and replacement trees (live trees left to replace existing snags). | All alternatives, all units |
| WL-6 Snags | The following numbers and sizes of snags should be retained in cutting units if available.<br>In units with snags, keep a minimum of 20 snags and 10 replacement trees per 10 acres, if available. If 20 snags are not available, then any combination totaling 30 should be left by the following d.b.h. classes.<br>13 snags and 6 replacement trees 7-11”<br>5 snags and 3 replacement trees 12-19”<br>2 snags and 1 replacement tree 20+”<br>In units – except those of pure lodgepole without snags, keep a minimum of 30 wind firm trees per 10 acres, if available, by the following d.b.h. classes:<br>21 trees from 7-11”<br>7 trees from 12-19”<br>2 trees from 20+”<br>In pure lodgepole stands without snags, all non-merchantable material greater than 9 inches d.b.h. should be left on site, when it is consistent with fuel objectives. | All alternatives, all units |
| WL-7 Snags | In order to maintain habitat for snag-dependent species, leave refugia of untreated snag habitat (of several acres) well distributed throughout the project area. | All alternatives, all units |
| WL-8 Woody Debris | Forest Plan wildlife coarse, woody debris objectives would be met through retention guidelines under S/WS/F-3. The following measure would be implemented to ensure larger diameter material is left on site:<br>Where they are present on site, maintain at least 4 down logs per acre at least 12 inches diameter (at large end) and 20 feet long.<br>During burning, avoid the consumption of large coarse woody debris (e.g., logs greater than 10 inches in diameter at midpoint) to the extent possible. Where feasible and when consistent with fuel reduction | |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| | objectives, use control lines and/or firing techniques to maintain pockets of understory vegetation and shrubs retained during timber harvest and small pockets of understory vegetation at scattered locations in un-harvested burn units | |
| WL-9 | Avoid harvest and road construction in and immediately adjacent to elk wallows, streams, wet meadows, rock outcrops, known raptor nest sites, and other key wildlife habitats. | |
| WL-10 Elk | Areas of elk calving activity would be closed to motorized use during peak use (Late May through July). These areas would be determined annually through coordination with the MFWP. | All alternatives, all units |
| WL-11 Elk | In order to minimize impacts to elk security, logging operations would be limited to one drainage at a time. | All alternatives, all units |
| WL-12 Elk | No timber harvest would occur within 150 ft. of any elk wallow identified during project layout. Also during prescribed burning, ignition would be implemented in a manner that would maintain cover within 150 ft. of identified wallows. | All alternatives, all units |
| WL-13 Aspen | Promote and protect existing aspen as needed during implementation. | All alternatives, all units |
| WL-14 Shrubs | In order to maintain a shrub component and where feasible and when consistent with fuel reduction objectives, use control lines and/or firing techniques to maintain 30 to 50 percent of existing shrubs in a patchy mosaic. | Alternatives 2 and 3, Unit 88 |
| WL-15 Safety | Snags greater than 20 inches diameter of any species would be retained unless they pose a specific safety or operability concern | All alternatives, all units |
| WL-16 Goshawk | Within active goshawk territories, maintain a 40-acre (minimum) no-activity buffer around known nests. Restrict ground-disturbing activities inside Post-fledgling Areas (420 acres) between April 15th and August 15th. | Alternatives 2 and 3 units: 46 (46a,b), 47 (47a,b), 72, 80 and in units if any new nests are discovered |
| WL-17 Raptors | If raptor nests are identified during project implementation, a wildlife biologist would be contacted and appropriate buffers and Limiting Operating Periods established. | All alternatives, all units |
| WL-18 MIS | If nest sites for MIS and/or Migratory Birds are discovered during the layout or implementation of the proposed action, the wildlife biologist would be notified to determine appropriate protection measures. | All alternatives, all units |
| WL-19 TES | If any threatened, endangered or sensitive species are located during project layout or implementation, a wildlife biologist would be notified. Management activities would be altered, if necessary, so that protection measures can be taken. | All alternatives, all units |
| WL-20 Bald Eagle | Project prescribed burn plans would consider the Beaver Creek Eagle Nest as sensitive and ensure that smoke is adequately dispersed away from the nest during the nesting season (January 1 through July 15th). | All Alternatives all burning units |
| WL-21 | Aircraft associated with proposed burning shall not be | All Alternatives all burning units |

| DESIGN FEATURE | STONEWALL VEGETATION PROJECT DESIGN FEATURE | APPLICABLE UNIT/ALTERNATIVE |
|---|---|---|
| Bald Eagle | permitted within 1,000 ft. of the Beaver Creek nest between January 1 and August 31. | |
| WL-22 Lynx | Cutting of brush along low speed (closed) roads would be done to the minimum amount necessary to maintain public safety | All Alternatives all burning units |
| WL-23 Grizzly | Due to the importance of white bark pine regeneration to grizzly bear, existing white bark pine regeneration would be retained to the extent possible during burning. Utilize modified unit boundaries, pre-treatment surveys, low intensity burns, or internal line construction to accomplish this. (See SILV-2 for additional whitebark pine measure), | Alternative 2 units: 76, 77, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88;<br>Alternative 3 units: 79, 80, 82, 83, 84, 85, 87, 88 |
| WL-24 Grizzly | In order to reduce impacts to Grizzly Bears, no mechanical treatment activities and hauling or prescribed burning would occur above 6,000 ft. elevation during the denning season (December 1 through March 31). | Alternative 2 Units: 37, 55, 56, 76, 79, 81-85, 88<br>Alternative 3 Units: 37, 79, 82-85 |
| WL-25 | To promote and maintain important habitat characteristics where treatments are proposed, treatments would be designed and laid out in coordination with a Forest Service wildlife biologist. | Alternative 2 units: 40, 41, 42, 43, 46, 47;<br>Alternative 3 units: 40, 41, 42, 43, 46a, 47a |
| WL-26 | Stands classified as potential old growth - would be burned with a low-intensity prescribed burn to minimize mortality to trees greater than 19 inches DBH. | Alternative 2 unit 81 |
| WL-27 | Ignition patterns would be modified to minimize burning in areas classified as multiple-story lynx habitat. | Alternative 2 units 81, 82, 83, 84, 88 |

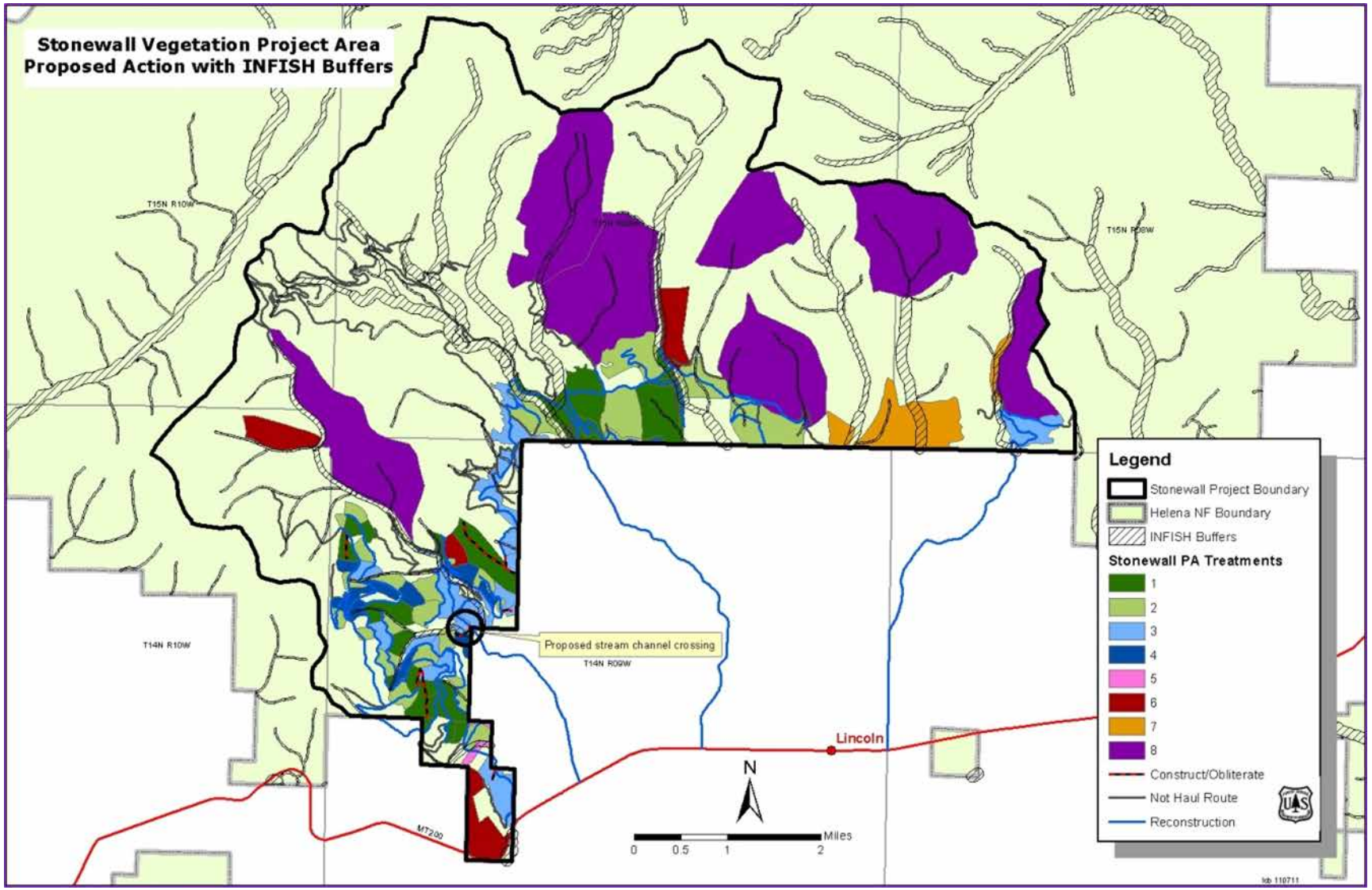


**Figure 15. Proposed Action treatments with INFISH buffers**

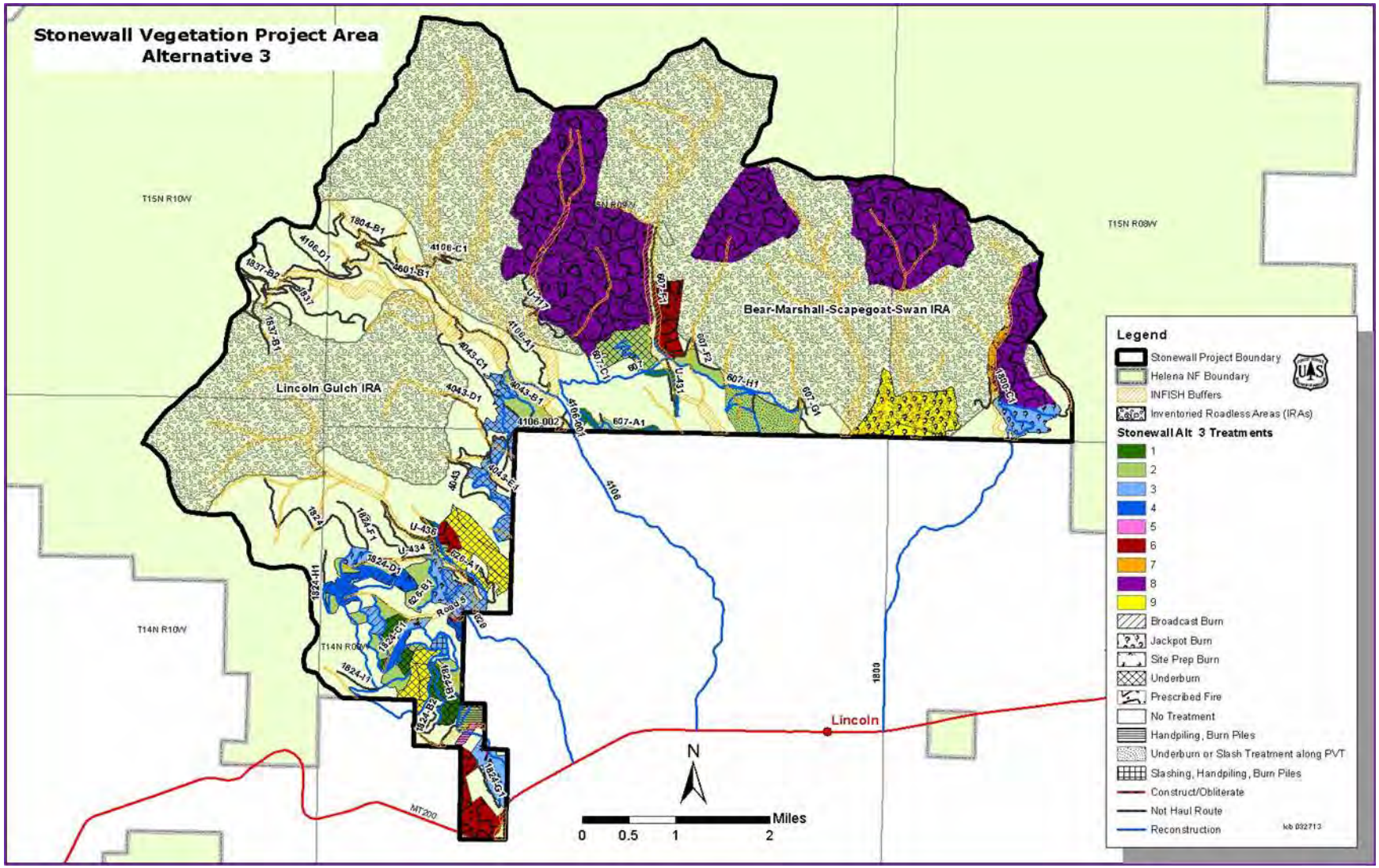


**Figure 16. Alternative 3 treatments with INFISH buffers**

## *Monitoring*

Noxious weed monitoring would consist of visually surveying all units that were previously infested. Areas that were not previously infested would be monitored for weeds by visually surveying the units in year one and year three following the disturbance and/or rehabilitation. If weed populations are found, those areas would be treated according to label guidelines and within the guidance provided in the HNF Weed Treatment Project FEIS (2006).

If additional sensitive plant populations are found during implementation, those populations would be monitored to insure mitigation measures are effective.

All landings, skid trails or other areas of disturbance due to the logging activities that have over 10 percent soil surface disturbance would be monitored for weed infestations each spring for three seasons following implementation. If any of the species on the Montana Noxious Weed list or County lists are located within the disturbed areas, the infestations would be treated using appropriate herbicides for three seasons following the harvest activity.

If it is determined that illegal off-highway vehicle (OHV) use is taking place in areas where treatments have occurred, steps should be taken to prohibit the use (i.e. signing, barrier installation, increased law enforcement).

Monitor National Forest System trail conditions following prescribed burning to determine if there is a need for increased trail maintenance for specific areas due to fallen trees or increased erosion.

Monitor all cultural sites within the APE for effects associated with the selected actions, to ensure that the mitigation measures are implemented. If any 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.

Roadless Area monitoring would consist of visually surveying units treated with prescribed fire to determine if illegal off-highway vehicle use is taking place in treated areas. If monitoring reveals this is happening, steps would be taken to eliminate the use (i.e. signing, barrier installation, increased law enforcement).

The following road management monitoring recommendations are suggested for road facilities:

- Complete the annual roads accomplishment report (RAR).
- Roads within the project area should be surveyed as needed to comply with Forest Service-assigned road condition, survey requirements for deferred maintenance needs and real property inventory.

Best management practices (BMPs) evaluations should be performed periodically by the sale administrator. Best management practices evaluations should focus on effectiveness and on whether BMPs were applied.

The Southwestern Crown Collaborative (SWCC), one of the original 10 Collaborative Forest Landscape Restoration Projects (CFLR) selected for funding, has agreed to allocate 10 percent of the CFLR funds received to monitoring. The SWCC is in the process of developing a Long-term Monitoring Plan, which is still in draft. The role of the SWCC monitoring is to determine the

effects of forest restoration efforts with the goal of validating or improving restoration methods to achieve restoration objectives. Goals for ecological, social, and economic monitoring for the SWCC were articulated both within the Forest Landscape Restoration Act (FLRA) and the SWCC proposal. Five major goal areas for monitoring over the 10-year life of the project are: fire and fuel dynamics; biodiversity of plants and animals; soil and water; economic impacts; and social implications.

Some of these monitoring efforts would likely occur in the Stonewall project; however, details of the SWCC's specific monitoring plans in the Stonewall area have not been finalized.

## Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the proposed action provided suggestions for alternative methods for achieving the purpose and need. (See appendix A, table A-2 for specific comments pertaining to alternatives, by letter (L) and comment number (c) (denoted by L#, c#).) Some of these alternatives may have been outside the scope of restoration, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

*Maximize timber harvest and fuels reduction activities, particularly in the Wildland Urban Interface. (L1, c2)*

The wildland urban interface (WUI) was identified during development of the "Tri-County Regional Community Wildfire Protection Plan" (2005). The proposed action was designed to address fuels concerns on National Forest System lands adjacent to private lands. Treatments on private lands are outside the scope of our proposed action, but past, current and planned treatments are considered in the individual specialist's cumulative effects reports, where applicable.

We reviewed the project area to identify potential vegetative treatments based on site conditions.

This alternative would be similar to the proposed action, and is analyzed in detail.

*The roadless areas within the project area were created by the Rare 2 process identifying possible additions to the wilderness system. Management should reflect this quality. In addition, burning whitebark pine seedling and sapling areas, present in the roadless areas, could reduce white bark pine habitat, an important food source for grizzly bears. Consider an alternative that does not include prescribed burning in the roadless areas, but allows for the use of natural prescribed fire without mechanical treatments, including cutting trees and brush, in the roadless areas. (L5 c7; L48 c8)*

The large prescribed burn units in the roadless areas are proposed to improve the mix of vegetation composition and structure across the landscape making it more diverse, resilient, and sustainable to wildfire and insects. In particular, the burns in the roadless areas would be designed to encourage whitebark pine regeneration in proximity to existing mature whitebark pine trees. Portions of some units are lacking adequate ground fuels to carry fire across the desired burn unit

locations. Without the prep work, burn prescriptions could not be implemented and fire lines could not be prepared.

For any action alternative, design features are incorporated to exclude large concentrations of whitebark pine regeneration from burning, and protect mature whitebark trees that may provide seed sources.

The no action alternative does not include slash treatments or prescribed burning in the roadless area but would address this issue. Implementing no management in these areas would allow the continuing trend regarding the reduction of whitebark pine and aspen.

This alternative would not address the purpose and need to improve the mix of vegetation composition and structure, or modify fire behavior to create conditions that allow the reestablishment of fire as a natural process across the roadless area portions of the landscape. This alternative was eliminated from detailed analysis.

*Burning activities proposed may char merchantable timber and decrease its value in areas managed for timber products. Consider an alternative that does not include prescribed burning in areas managed for timber products. Prescribed fire units in management areas T1-5 include all of units 2 and 78, and portions of units 77, 79, 80, 81, 84, 85, 86 and 87. (L79, c2, c3)*

The Forest Plan identifies prescribed burning as an appropriate tool for vegetation and fuels management (pages II/33 - 34), and the Forest Fire Management Plan direction in place at the time of implementation would be followed. The no-action alternative does not include controlled burning in areas managed for timber products.

This alternative would not address the purpose and need to modify fire behavior to enhance community protection while creating conditions that allow the reestablishment of fire as a natural process on the landscape. Therefore, this alternative was eliminated from detailed analysis.

*Proposed actions may disturb landscapes allowing existing weed populations to expand or allowing additional species to become established. Consider an alternative that eliminates units that have noxious weeds present on roads within units from fire management proposals. (L5 c2)*

The Forest Weeds FEIS (USDA Forest Service 2006) identified most of the roads in the project area for weed monitoring and treatment due to the presence of weeds. Appropriate preventive measures incorporated in the project design features include post treatment spraying of landings within the first year after mechanical treatment, and monitoring in the third and fifth years with retreatment if needed.

The no action alternative addresses this suggestion and is analyzed.

Eliminating units with noxious weeds would eliminate fire management treatments in all units in the WUI accessed by existing roads. Not treating areas within the WUI would not enhance community protection. This alternative would not meet the purpose and need for the project of modifying fire behavior to enhance community protection while creating conditions that allow the reestablishment of fire as a natural process on the landscape.

Eliminating the units within the WUI would not meet the purpose and need for the project of modifying fire behavior to enhance community protection. In addition, the appropriate project design and mitigation of relevant best management practices are incorporated in the action alternatives. Therefore, developing an alternative that eliminates units that have noxious weeds

present on the roads within them from fire management proposals is not necessary. This alternative was eliminated from detailed analysis.

*Public comments noted the continued loss of motorized recreational opportunities as a primary concern. A recommendation was made to consider a Pro-Recreation Alternative that would address recreation opportunities and include the following characteristics (L26 c1, 2, 4):*

- Dispersed camping within 300 feet of all existing routes
- Use of seasonal closures, where required, to protect the environment and wildlife with the intention of keeping routes open for the summer recreation season
- All of the existing routes are needed as OHV routes due to the cumulative effects of all other closures
- Additional OHV routes are needed to address the growing popularity of OHV recreation and the greater needs of the public for access and motorized recreation

Effects to recreation resources would be addressed in analysis and project design features would be included to minimize potential impacts to recreation opportunities within the project area.

Travel management is being evaluated in the current Blackfoot Travel Plan (Non-Winter) and the appropriate project design and mitigation of the relevant best management practices would be applied to any developed action alternative. Developing a Pro-recreation alternative with additional OHV routes was considered, but this would not address the purpose and need identified for this project for fuels reduction in the WUI or restoration across the landscape. Therefore, this alternative was eliminated from detailed analysis.

*Consider a watershed or ecosystem restoration alternative or incorporate restoration elements in the alternatives considered. (L53 c6, 10, 11)*

The Stone Dry Watershed Assessment (2009) was considered when developing the proposed action. The purpose and need includes a restoration element. The proposed action was designed to incorporate treatments that move the project area towards a more resilient forest to address restoration of vegetative composition and structural diversity elements. Effects to vegetation and watershed resources would be discussed in Chapter 3 of the EIS.

Watershed restoration and reducing sedimentation is often focused on changes to roads, and includes fixing drainage structures, road design or decommissioning roads. Changes to existing road alignments and decommissioning existing roads are being evaluated in the current analysis for the Blackfoot Travel Management Plan (Non-Winter) and therefore not being considered in this proposal. Roads built for the Stonewall Vegetation Project would be obliterated immediately after timber removal.

Since many of the watershed elements of concern are being evaluated in the current Blackfoot Travel Plan (Non-Winter), and the appropriate project design and mitigation of relevant best management practices would be applied to any developed action alternative, a true or purer watershed restoration type alternative is not necessary; therefore, this type of alternative was not considered in detail.

# Comparison of Alternative Effects

This section provides a summary of the effects of implementing each alternative. The following section displays a summary of effects to biophysical settings, species habitats and analysis issues in the Stonewall Vegetation Project area by 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 comparison 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 comparison 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 comparison 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 comparison 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 will 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 would 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 three to five 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 eight 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 successionally 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 2012). 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 2012). 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 (LAU's 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 and Federal Candidate 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. |
| 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. |

| Species | Indicator |
|---|---|
| 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

The following table displays effects determinations for wildlife by alternative

| 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, result in short and long-term reductions in cover and increase the risk of bear/human interaction. However, based on the above analysis and the following rationale, implementation of alternative 2 **may affect, but not likely to adversely affect** grizzly bear. | Improve landscape level foraging habitat, maintain whitebark pine, result in short and long-term reductions in cover and increase the risk of bear/human interaction. However, based on the above analysis and the following rationale, implementation of alternative 3 **may affect, but not likely to adversely affect** grizzly bear. |
| Canada Lynx | **No effect.**<br>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 a WUI, meet exceptions for VEG 05 and VEG 06, and comply with VEG 10. Treatments comply with VEG 01 and VEG 02, 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 Rocky Mountain 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, but is not likely to adversely affect** Canada lynx. | All treatments fall within a WUI, meet exceptions for VEG 05 and VEG 06, and comply with VEG 10. Treatments comply with VEG 01 and VEG 02, 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 Rocky Mountain 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, but is not 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).<br>**May affect, not 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).<br>**May affect, not likely to adversely affect Critical Habitat** |
| 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 **not jeopardize** the 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 Vegetation Management Project would **not jeopardize** the 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 Vegetation Management Project would **not jeopardize** the wolverine. |
| **Sensitive and Federal Candidate 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.<br>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 impact individuals, but are not likely** | 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.<br>Alternative 3 has the potential for short-term impacts to foraging or dispersing wolves. However, based on the analysis and the above rationale, implementation of alternative 3 **may impact individuals,** |

| SPECIES | ALTERNATIVE 1 | ALTERNATIVE 2 | ALTERNATIVE 3 |
|---|---|---|---|
| | | **to cause a trend toward federal listing** for the gray wolf. | **but are not lik**ely to cause a trend toward federal listing for the gray wolf. |
| Fisher | Suitable habitat would be largely maintained. Risk of stand replacing wildfire is greatest under this alternative.<br>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. | 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.<br>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, but are not likely to cause a trend toward federal listing** for fisher. | 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.<br>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, but are not likely to cause a trend toward federal listing** for fisher. |
| Townsend's Big-eared Bat | **No impact.**<br>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. | 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, but are not likely to result in a trend towards federal listing** for the Townsend's big-eared bat.<br>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 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 | 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, but are not likely to result in a trend towards federal listing** for the Townsend's big-eared bat.<br>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 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. |

| SPECIES | ALTERNATIVE 1 | ALTERNATIVE 2 | ALTERNATIVE 3 |
|---|---|---|---|
| | | is lowest under this alternative. | |
| Bald Eagle | **No impact.**<br>No anticipated impacts to the existing eagle nest, although the risk of wildfire is highest under this alternative. | Existing habitat in the project area habitat would be largely unaffected. As a result alternative 2 **may impact individuals, but are not likely to result in a trend toward federal listing** for the bald eagle.<br>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. | Existing habitat in the project area habitat would be largely unaffected. As a result alternative 3 **may impact individuals, but are not likely to result in a trend toward federal listing** for the bald eagle.<br>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. |
| Black-backed Woodpecker | **No impact.**<br>Suitable BBW habitat would continue to be widely available across the Forest. | **May impact individuals or habitat, but would not likely contribute towards a trend in federal listing**.<br>Suitable BBW habitat would continue to be widely available across the Forest. | **May impact individuals or habitat, but would not likely contribute towards a trend in federal listing**.<br>Suitable BBW habitat would continue to be widely available across the Forest. |
| Flammulated Owl | **May impact individuals, but would not likely contribute towards a trend in federal listing or cause a loss of viability.**<br>Suitable flammulated owl habitat would continue to decline under this alternative. While large diameter nest 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. | **May impact individuals or habitat, but would not likely contribute towards a trend in federal listing for the flammulated owl.**<br>Owl habitat would be restored or created on almost 4,200 acres or 31 percent of the dry forest community. Treatments would promote ponderosa pine and potential nest trees across the landscape and the likelihood of stand replacing wildfire is lowest under this alternative. | **May impact individuals or habitat, but would not likely contribute towards a trend in federal listing for the flammulated owl.**<br>Owl habitat would be restored or created on almost 2,800 acres or 21 percent of the dry forest community. Treatments 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 | **No impact.**<br>Western boreal toads and their habitat would not be affected. The risk of stand | **May impact individuals or habitat, but would not likely contribute towards a trend in federal listing.** | **May impact individuals or habitat, but would not likely contribute towards a trend in federal listing.** |

| SPECIES | ALTERNATIVE 1 | ALTERNATIVE 2 | ALTERNATIVE 3 |
|---|---|---|---|
| | replacing wildfire and a long-term reduction in breeding and upland habitat is highest under this alternative. | 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. | 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. |
| **Management Indicator Species** | | | |
| Northern Goshawk | **Not likely to cause a local or regional change in habitat quality or population status**.<br>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. | **Not likely to cause a local or regional change in habitat quality or population status.**<br>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. | **Not likely to cause a local or regional change in habitat quality or population status.**<br>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. |
| Pileated Woodpecker and Hairy Woodpecker | **Not likely to cause a local or regional change in habitat quality or population status** for the pileated or hairy woodpeckers.<br>Suitable snags and nesting and foraging habitat would be maintained and continue to be widely available. | **Not likely to cause a local or regional change in habitat quality or population status** for the pileated or hairy woodpeckers.<br>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 replacing wildfire Is lowest under this alternative. | **Not likely to cause a local or regional change in habitat quality or population status** for the pileated or hairy woodpeckers.<br>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 under this alternative. |
| American Marten | **Not likely to cause a local or regional change in habitat quality or population status.**<br>Existing habitat would be maintained. The risk of stand replacing wildfire is | **Not likely to cause a local or regional change in habitat quality or population status.**<br>Treatments would improve species and landscape diversity, and maintain 93 | **Not likely to cause a local or regional change in habitat quality or population status**.<br>Treatments would improve species and landscape diversity, and maintain 96 |

| SPECIES | ALTERNATIVE 1 | ALTERNATIVE 2 | ALTERNATIVE 3 |
|---|---|---|---|
| | highest under this alternative. | percent of the suitable habitat over the long-term. Also the risk of stand replacing wildfire is lowest under this alternative. | percent of the suitable habitat over the long term. The risk of stand replacing wildfire is reduced under this alternative. |
| **Commonly Hunted Species** | | | |
| Elk | 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.<br><br>Herd numbers would be largely unchanged. Effects of predation would be largely unchanged. The risk of a long-term reduction in cover from wildfire is highest under this alternative. | 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 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.**<br>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.<br><br>· 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.<br>· There would be no increase in public access or changes to elk security habitat.<br>· Within the combined herd units approximately 89 percent of the existing hiding cover and 86 | 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 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 e**<br>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.<br>· 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.<br>· There would be no increase in public access or changes to elk security habitat.<br>· Within the combined herd units, 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 |

| SPECIES | ALTERNATIVE 1 | ALTERNATIVE 2 | ALTERNATIVE 3 |
|---|---|---|---|
| | | 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.<br>· 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.<br><br>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. | and adjacent to treatment units and across the landscape.<br>· 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.<br><br>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. |
| Mule Deer | 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 available to support existing populations | 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 over the short and long term. Hunting | 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 and long term. Hunting opportunities |

| SPECIES | ALTERNATIVE 1 | ALTERNATIVE 2 | ALTERNATIVE 3 |
|---|---|---|---|
| | and maintain hunting opportunities. | opportunities would be maintained. | 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; 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 is 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 would 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 actions 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 exclosure, 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 proposes prescribed fire 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. Alternative 3 proposed on 3,565 acres (about 0.4 percent) within the Bear Marshall Scapegoat Swan IRA. The Lincoln Gulch Inventoried Roadless Area would not be treated.

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 sale and required design criteria is positive $68 thousand for the timber harvest 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. The 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 total jobs and labor income of $5.2 million 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.