



CHAPTER 2 **Alternatives**

I. INTRODUCTION

This chapter describes and compares the alternatives considered by the Forest Service for the *Moose Post-Fire Project*. It includes a discussion of how alternatives were developed, monitoring and other features common to all alternatives, a description and map of each alternative considered in detail, and a comparison of these alternatives focusing on the significant issues. Chapter 2 is intended to present the alternatives in comparative form, defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14).

Some of the information used to compare alternatives at the end of Chapter 2 is summarized from Chapter 3, "Affected Environment and Environmental Consequences." Chapter 3 contains the detailed scientific basis for establishing baselines and measuring the potential environmental consequences of each of the alternatives. For a full understanding of the effects of the alternatives, readers need to consult Chapter 3.

II. ALTERNATIVE DEVELOPMENT PROCESS

Public Involvement

The public involvement process started on January 6, 2002, with a legal notice in *The Daily Inter Lake* that provided information about the initial proposal and purpose of and need for the *Moose Post-Fire Project* (project record exhibit B-1). A Notice of Intent to Prepare an Environmental Impact Statement was published in the Federal Register on January 10, 2002 (project record A-2). *The Daily Inter Lake*, *Hungry Horse News*, and *Whitefish Pilot* also published numerous news articles about the proposal (project record B-1 through B-7). At this time, about 310 letters were mailed to the public, government agencies, and groups or individuals potentially interested in or affected by the project, asking them to review and comment on the proposed project (project record D-1). Letters and phone calls from about 20 more people were received requesting information on the project.

The public had 30 days to comment during this "scoping" process. As a result, we received nearly 160 letters, phone calls, and e-mails. After receiving these comments, we categorized them into six areas to help determine significant issues that might lead to alternative proposals or analysis of effects to certain resources. This process is explained in more detail in the issues section of this DEIS and in the project record.

Ongoing communication throughout the analysis process included discussions with the U.S. Fish and Wildlife Service, Montana Fish, Wildlife and Parks, the Environmental Protection Agency, and the Montana Department of Environmental Quality. This communication will continue through project implementation.

Summary of Comments Received during Public Scoping

Soil, water, fish: People expressed concerns that we maintain, protect, or enhance water quality and riparian values, particularly bull trout spawning grounds. Some believed that removing trees from riparian areas may cause further degradation to Big Creek; others said we should remove trees at risk from beetle populations or future fires, or trees that might create log jams detrimental to fish passage. Several comment letters referenced the Beschta report (1995), which presents general concerns related to post-fire management actions to soils and other resources. The Moose Interdisciplinary Team reviewed the Beschta report, and incorporated relevant information into alternative development and effects analysis. Appendix D of this DEIS contains specific information about the Beschta report and how it was considered.

Wildlife: Some said we should leave large live trees or large dead trees on site as habitat for birds, bears, ungulates, and other wildlife species. Some believed that we should provide more secure habitat for wildlife during hunting season because of the large amount of burned areas that have less hiding cover, making animals more vulnerable. Others believe habitat has been destroyed by the fire and there is no need for additional habitat security.

Salvage: Most responders said we should salvage dead and dying trees, although the comments often showed vastly different ideas about why, where, and how much we should salvage. Reasons varied from cutting trees to provide revenues and jobs for the local economy to reducing future fire hazards or threats from beetle epidemics to remaining trees. Others suggested we should cut trees only after consideration of the ecological roles of trees, both living and dead, beetle-infested or not, burned or not, and how this project will maintain or enhance those roles. Many wanted to know why we identified only 4,300 acres in which to salvage trees, when over 35,000 acres burned on national forest system lands. Some also suggested the use of pheromone traps without logging to address the beetle issues. Still others discussed various logging systems and their merits related to this project, such as using helicopters or forwarders.

Access/road closures: Road closures are proposed to meet Forest Plan requirements designed to provide secure habitat for grizzly bears. Amendment 19 to the Forest Plan directs us to restrict or in some cases to decommission roads to reach specific road density levels within areas called grizzly bear subunits by the end of a ten-year period. The ten-year mark is approaching and there are more miles of roads within the two subunits in our project area that need to be restricted or decommissioned to meet Forest Plan standards. Some respondents cited the need to close roads to meet Amendment 19 standards as the single most important aspect of our project. Others expressed equal concerns over a cumulative loss of motorized recreational opportunities and the increasing inability of people who cannot or do not want to hike, bike, or ride horseback to reach favorite recreation areas, such as huckleberry sites or camping spots. Watershed health related to road decommissioning was also of concern to some people. Finally, some expressed concerns about safety hazards and costs associated with decommissioning roads.

Wild and Scenic River: Some comments suggested we should exclude lands in the Wild and Scenic River corridor from salvage.

Economics: These comments focused on the economic effects of this project from two different viewpoints: 1) some suggested we should look at the benefits of cutting trees on the local economy, including jobs, school revenues, and providing lumber to local mills; 2) others suggested we should look at non-market benefits of not logging, such as scenic, aesthetic, ecologic, and recreational values.

Inventoried roadless: Some were concerned that removing trees in inventoried roadless areas would compromise the values of these areas, creating habitat fragmentation, impacts to recreational opportunities, and the loss of unique ecological values.

Fuels/fire: Concerns about future fire risk in the Big Creek drainage prompted some people to suggest we salvage trees to reduce the fuel loading. These individuals reason that when the dead trees fall to the forest floor and new trees re-establish, the resulting fuel conditions may increase the severity of the next fire. Others believed there is not enough scientific evidence to support removing trees as a method to prevent a high intensity fire. Also, some cited research that suggests thinning or burning in a 40-meter buffer around structures is adequate fire protection.

Miscellaneous: This includes some general comments in support of our proposal. Other comments suggested we seek an emergency exemption to our normal appeals process so that trees can be salvaged while still merchantable.

Issue Development Process

The ID team reviewed all comments received in response to scoping to identify significant issues, determine appropriate analysis procedures, and identify alternatives to the proposed action. Some comments were beyond the scope of this project; others were addressed by the Forest Plan or other regulatory framework, were beyond the

geographical influence of this project, or did not pertain to this specific proposal. Comments and concerns that fell into these categories were not considered relevant to this project-specific assessment, and therefore were not addressed.

The remaining comments and concerns were further examined to determine how they could best be addressed in the assessment and EIS. A few comments were best addressed by developing alternatives to the proposed action. These concerns became the significant issues that are described below. Others were best addressed by disclosing the effects of implementing the proposed action and its alternatives. Some comments were best addressed by developing design features common to all action alternatives. Project record exhibit D-2 contains further information regarding alternative development.

Issues Used for Alternative Development

The following are the significant issues that were used to develop alternatives to the proposed action. The issue statement is followed by “issues indicators,” which provide a means to measure the effects of each alternative.

1. Tree salvage in inventoried roadless areas does not allow natural processes to continue to occur within these areas and may therefore alter its roadless character.

Some respondents were concerned that removing trees in inventoried roadless areas would compromise the values of these areas, creating habitat fragmentation, impacts to recreational opportunities, and the loss of unique ecological values. One of these writers specifically stated, “I encourage the FS to not log in inventoried roadless lands. These lands should be our control group as we experiment with post-fire management. Let natural processes play out unhindered in roadless lands.”

This issue was addressed through development of Alternatives 3 and 4, which propose no timber salvage in inventoried roadless areas.

Issue Indicator: acres of salvage in inventoried roadless area, changes to natural integrity, apparent naturalness, remoteness, solitude, primitive recreation opportunities, manageability, and boundaries in inventoried roadless areas

2. Tree salvage in the Wild and Scenic River corridor may affect the character of the corridor.

In 1976, Congress designated the North Fork Flathead River as part of the National Wild and Scenic River System. Management direction for the river corridor is discussed in more detail in Chapter 3 of this EIS. The comments received on this issue provided no reasons why salvage harvest should not occur within the river corridor. However, we believe that some people have concerns that salvage logging in the river corridor may alter its character or integrity or may somehow harm the watershed. For example, several people stated “[t]he watersheds must be protected and an alternative developed in the EIS that would not allow logging in the most sensitive areas, riparian areas, and the Wild and Scenic River corridor.”

This issue is addressed through development of Alternative 4, which proposes no timber salvage within the North Fork Wild and Scenic River corridor.

Issue Indicator: acres of salvage and acres of fuels reduction within the Wild and Scenic River corridor

3. The use of temporary roads may cause increased sedimentation.

Some people believe building temporary roads, in conjunction with salvage activities, may increase sediment into the streams. In addition, some believe that road building, even temporary roads, causes long-term ecological damage.

This issue is addressed through development of Alternative 4, which would not construct any temporary roads.

Issue Indicator: miles of temporary roads; sediment yield from temporary roads

4. Snag and downed woody material retention should be increased over that in the proposed action to insure that these wildlife habitat and ecosystem components are provided over the landscape over time.

Because of the large number of trees burned on national forest system lands in the Moose Fire, some people had concerns for a lack of both large live and large dead trees critical to some wildlife species and for other ecosystem functions. Where large live trees--some retained as old growth--once occurred, there now are only dead standing or dead downed trees. Some people asked us to leave large dead trees on site as habitat for birds, bears, ungulates, and other wildlife species. One letter said, "Special consideration should be given to retaining burned old-growth and generous amounts of snags in areas that serve to connect existing areas of unburned old growth. We ask that snag retention guidelines be more generous than those provided in Amendment 21 in order to better provide for wildlife and to compensate for the effects of the Moose Fire."

This issue is addressed through development of Alternative 4, which proposes to retain greater levels of snags and downed woody material than other alternatives.

Issue Indicators: acres and percentage of high and moderate snag potential areas treated and acres and percentage of high and moderate down wood habitat potential areas treated

5. Riparian habitat conservation areas (RHCA) as described in the Native Inland Fisheries Strategy (INFISH) may not be large enough to compensate for the combined effects of the Moose Fire and proposed management activities.

Concerns for increased sediment to the streams from the Moose Fire, compounded by salvage and road management activities, might negatively affect streams critical to bull trout survival and recovery. By increasing the size of the RHCAs (or buffer areas surrounding streams), some people believe this may mitigate the negative effects from the fire in these important areas. One writer recommends following INFISH standards for RHCAs and increasing them in sensitive reaches where bull trout spawn and where soils are particularly unstable. This could include spawning reaches of Big Creek, Hallowat Creek, Nicola Creek, Coal Creek, South Fork of Coal Creek and Mathias Creek. Increasing buffers for post-fire salvage is a management technique used by other forests to reduce potential sediment impacts to bull trout habitat."

This issue is addressed through development of Alternative 4, which proposes 300 feet riparian habitat conservation areas on all streams. No salvage would be allowed within riparian habitat conservation areas.

Issue Indicators: RHCA widths; changes in sediment yield attributable to RHCA widths

6. The fire may have affected wildlife security particularly during hunting seasons.

Along with trees, the fire consumed many low-lying plants and shrubs. When alive, many plants served to hide wildlife. Some people have concerns that this loss of hiding cover will have negative effects on wildlife, especially during hunting season. Some people have asked us for seasonal closures on some roads during hunting season, at least until some hiding cover returns.

This issue is addressed through development of Alternatives 4 and 5. Alternative 4 proposes to implement seasonal restrictions to motorized use for more miles of roads than are needed to meet Forest Plan standards for open road density. Alternative 5 uses seasonal road restrictions to provide a higher level of wildlife security during hunting season, while meeting Forest Plan requirements for grizzly bear security.

Issue Indicators: a comparison of summer habitat effectiveness values within affected Habitat Analysis Units; and potential effects of salvage logging and road management on security and vulnerability during the hunting season

7. The proposed salvage treatments and road strategy may result in ineffective use of winter range areas by ungulate species.

Similar to other concerns for a loss of secure habitat for wildlife, this concern focuses on a reduction of hiding and thermal cover, effective habitat, and security during hunting season for big game in winter range areas.

This issue is addressed through development of Alternative 4, which proposes to implement seasonal restrictions to motorized use for more miles of roads than are needed to meet Forest Plan standards for open road density. Motorized access would be seasonally restricted with this alternative for the entire length of Big Creek Road #316, which goes through winter range. Alternative 4 also prohibits winter logging in all units.

Issue Indicators: qualitative assessment of potential effects of winter logging and removal of trees on elk and mule deer hiding and thermal cover.

8. More roads may need to be decommissioned and restricted than what the Forest Plan (Amendment 19) specifies due to accelerated runoff from burned lands and less cover and security for grizzly bears because of the fire.

To protect bull trout habitat, some people asked us to decommission more roads because accelerated runoff may threaten smaller culverts. If the culverts fail, runoff may add more sediment into Big Creek and Coal Creek. Also, Amendment 19, designed to provide secure habitat for grizzly bears, may no longer have adequate security because the fire consumed much of the vegetation that made up that secure habitat. A more open forest environment exists, increasing sight distances, which may affect security.

This issue is addressed through development of Alternative 4, which proposes to decommission more miles of road than needed to meet Forest Plan standards for grizzly bear habitat security.

Issue Indicators: miles of road proposed for decommissioning; miles of road closed to motorized access yearlong by subunit; miles of road closed to motorized access seasonally by subunit

9. Provide a higher level of public motorized access than Forest Plan standards allow.

When the *Big Creek Ecosystem Analysis at the Watershed Scale (EAWS)* was in progress (1999), a collaborative group helped formulate a road management plan for the Big Creek drainage. The group would like to see this plan carried forward and implemented through the Moose Post-Fire Project. One respondent said, "A lot of work was done with many diverse interests, including recreationists, to come up with that proposal. It does not totally meet A-19, because seasonal closures do not count toward A-19 closure requirements. Seasonal closures, however, could buy as much habitat security as full year closures in some areas, like around Moose Lake."

This issue is addressed through development of Alternative 3, which proposes a road management strategy that would allow more public motorized access than would occur to meet Forest Plan standards for grizzly bear security. This alternative would require a project-specific Forest Plan amendment to allow higher open and total road densities, and lower security core area than currently specified by Forest Plan grizzly bear standards.

Issue Indicators: miles of road open to conventional motorized use (wheeled vehicles) yearlong; miles of road open to conventional motorized use seasonally, miles of road decommissioned

10. Big Creek Road 316 should be re-opened because it provides good huckleberry picking and other recreation options.

Restrictions on the use of wheeled motorized vehicles were put into place on the upper portions of Big Creek Road 316 as a result of the Forest Supervisor's 1995 decision on the Expansion of the Big Mountain Ski and Summer Resort Project. Many people have asked us to reopen the road because it has offered families a good huckleberry picking area; it provided the only road access to the Smoky Range National Recreation Trail; and, along with the Werner Divide and Red Meadow roads, was only one of three roads where people could drive over the Whitefish Divide.

This issue is addressed through development of Alternatives 3 and 5. Alternative 3 proposes a road management strategy that would provide a higher level of motorized public access than Forest Plan standards allow. Road 316, currently closed to motorized use yearlong, would allow seasonal motorized use. This alternative would require a project-specific Forest Plan amendment to allow higher open and total road densities, and lower security core area than currently specified by Forest Plan grizzly bear standards. The road management strategy developed for Alternative 5 would meet Forest Plan standards for grizzly bear security while allowing seasonal motorized access on Road #316. To accomplish this, other roads would be restricted yearlong, including roads currently providing public access to the Moose Lake campground.

Issue Indicators: change in restrictions of conventional motorized vehicle use on Big Creek Road #316

11. Road decommissioning activities may not be compatible with snowmobiling on existing snowmobile routes.

Due to a lawsuit settlement agreement signed earlier this year, snowmobile use within the Glacier View Ranger District is restricted to certain play areas and existing road corridors. Proposed road decommissioning activities such as culvert removals, waterbars, barriers at the beginning of the road, etc. may leave some of these routes/roads in a condition that is neither safe nor desirable for snowmobile use.

This issue is addressed through the development of Alternative 3, which proposes to leave an estimated 10 to 15 stream crossing culverts in roads that would otherwise be decommissioned to meet grizzly bear standards for total road density and security core area. The Forest Plan currently required that roads have all stream crossing culverts removed before the road can be "counted" as decommissioned. Therefore, this alternative would require a project-specific Forest Plan amendment to allow culverts to remain in some roads that are "counted" as decommissioned.

Issue Indicators: miles of road proposed for decommissioning on existing snowmobile routes

12. There is concern that the project area needs to be rehabilitated and restored through such actions as road decommissioning and reducing sediment sources; which would include little to no salvage logging. Concern was also expressed that bark beetle control measures did not include enough non-salvage techniques.

Some people asked us to consider allowing the forest to heal itself. It might or might not include logging, but no logging would take place in inventoried roadless areas, riparian habitat, or "critical stretches of impaired watersheds." It would include road decommissioning and restoring areas affected by fire suppression that occurred during the Moose Fire and from past management activities. In addition, some people asked that we focus more effort on controlling possible beetle populations by using methods that would not require logging infested or susceptible trees.

Alternative 6 was developed specifically to respond to this issue. However, Alternative 6 was eliminated from detailed study. Further details are given on page 2-43.

13. There is concern that the proposed action does not salvage log enough of the project area to address beetle concerns, economic opportunities, and fuel hazards resulting in a reburn potential.

We received many comments from people asking why we identified only 4300 acres in which to salvage trees when over 35,000 acres burned on national forest system lands. Here is one example: “A maximum timber salvage alternative should include not only all economically viable timber on suitable lands, but valuable timber in non-timber management areas where wildlife, visual, or recreation goals can be improved by reduction of future timber deadfall and fire fuels.”

Alternative 7 was developed specifically to respond to this issue. However, Alternative 7 was eliminated from detailed study. Further details are given on page 2-44.

14. There is concern that deferring salvage in riparian areas results in a fuel hazard causing a reburn potential, debris jams causing channel instability, breeding habitat for bark beetles, and increases in nutrient loading.

Many trees in riparian areas, especially large spruce trees, died in the Moose Fire. Many of these trees have already fallen over, landing in streams and along stream banks and creating large jackstraws. Concerns from many people exist for the reasons stated in this issue. One writer wrote, “The fire was not selective by not burning riparian areas. In fact, riparian areas were burned very severely in some places. It is important to water quality, fisheries, and wildlife that these areas recover quickly. Salvaging must occur in the riparian areas. This work should be combined with placement of logs and root wads to replace windfalls that were burnt. Allowing massive wind throw with their large root systems to occur will only increase sedimentation, water velocity, and channel migration. How will you minimize the further destruction of the riparian areas?”

Alternative 8 was developed specifically to respond to this issue. However, Alternative 8 was eliminated from detailed study. Further details are given on page 2-45.

15. There is concern that the salvage harvest should not create any openings greater than 40 acres.

One writer requested that an alternative be developed where proposed opening sizes would not be larger than 40 acres; however, no reasons were provided for their request. It is believed, though, that concerns for larger opening sizes relate to effects to cover and security for various wildlife species, effects to water quality and consequently effects to fish.

Alternative 9 was developed specifically to respond to this issue. However, Alternative 9 was eliminated from detailed study. Further details are given on page 2-45.

Analysis Issues

The following includes concerns that were expressed during the scoping period that are best addressed by disclosing, comparing, and contrasting the environmental and social effects of the proposed action and its alternatives. The results of the effects analysis on the following resources are described in detail in Chapter 3.

- Vegetation (includes spruce/Douglas-fir beetle risk, structure/composition)
- Threatened, Endangered, and Sensitive (TES) Plants
- Noxious weeds
- Fire and fuels
- Wildlife (including TES, ungulates, snags and downed woody material)
- Fish
- Hydrology
- Soils
- Recreation
- Heritage resources
- Visuals
- Inventoried roadless lands
- Wild and Scenic River
- Other unroaded lands
- Economics
- Air quality

III. DESIGN CRITERIA (FEATURES COMMON TO ALL ACTION ALTERNATIVES)

Many of the concerns that were expressed in the scoping period are best addressed through development of design features that are common to all action alternatives (Alternatives 2 through 5) that are developed specifically to avoid or reduce potential environmental impacts. These design features are an integral part of each of the action alternatives, and therefore are considered requirements should an action alternative be selected. They are listed here to avoid repeating them in each alternative description.

Appendix C includes a complete list of the project-specific Best Management Practices (BMP) and a table linking each measure to the applicable treatment units. BMPs are also features common to all action alternatives, although the location of specific practices varies by alternative.

Heritage Resources

If previously unknown heritage resources are encountered during implementation of the project, activities would be halted and the forest archaeologist would be notified immediately. Activities would not resume until adequate protective measures are developed and specified in the field.

A contractual provision would be included in any timber sale contract that requires identification and protection of known resources and allows modification or cancellation of the timber sale or other contracts if necessary to protect resources discovered while project implementation is in progress.

Wildlife/Fish

Prior to approval of a decision regarding this project, biological assessments would be completed, and concurrences obtained from the U.S. Fish and Wildlife Service, for any threatened or endangered species potentially inhabiting the project area.

The following contract provisions would be included in any timber sale contract:

- Use of Roads by Purchaser - Specifies conditions under which purchaser may use roads for hauling.
- Closure to Use by Others - Prohibits the hunting or transportation of big game animals by the purchaser within closed areas.
- Protection of Habitat of Endangered Species - For protecting any listed threatened, endangered, or sensitive species encountered during project implementation.
- Conduct of Logging - Sets forth methods of felling, skidding, and yarding required to implement silvicultural prescriptions and meet other land management objectives.

Surveys for wolf presence will be conducted each March, April, and May to determine whether wolves are using the project area. If wolves are detected and it is determined that denning is occurring, no logging activities would be allowed within a one-mile radius of the den and/or rendezvous sites during March 15 – July 1 (Forest Plan, p. II-44).

Any “moist sites” located during layout of salvage units would be protected and provided with an appropriate riparian buffer (Forest Plan, p. II-35).

Duration of Activities

Timber sale contracts would be awarded for a 3-year term, beginning in the fall of 2002 or spring of 2003 and continue for three years. Fuels reduction activities within salvage units, if needed, would be conducted within two years of completion of salvage operations. Tree planting would occur within 2 years of completion of salvage or fuels reduction activities, assuming adequate availability of trees. Road decommissioning work would be completed by late autumn of 2009. Road decommissioning above bull trout spawning areas would be carried out between May

15 and September 1. These dates are tentative, based upon anticipated budgets, work force, weather and other considerations. Actual dates for implementation and accomplishment could vary.

Threatened, Endangered and Sensitive Plants

If threatened, endangered, or sensitive plants are found during pre-salvage surveys, the proposed activities would be modified to avoid potential impacts. If unknown populations of such plants were found during project implementation, they would be evaluated and protected as necessary to retain population viability. A contract clause would incorporate this into any timber sale contract. This clause specifies that the contract will be modified to protect these plants if located.

Pheromones/Trap Trees

Methods of influencing beetle populations that do not involve extensive salvage of trees (such as using pheromone baited beetle traps, anti-attractant MCH pheromone, and trap tree methods) are common to all action alternatives. These features are described under the alternative descriptions in this chapter of the DEIS.

Air Quality

A burn plan would be prepared for each prescribed burn proposed with the action alternatives. Air quality sensitive areas, such as the Bob Marshall Wilderness Complex, Glacier National Park and the Flathead Valley would be identified in each specific burn plan. Prescribed burning resulting from this project would be scheduled when smoke would not accumulate in unacceptable concentrations. Burn timing would also be planned to minimize effects on these smoke sensitive areas. Extended meteorological and spot weather forecast on mixing height, atmospheric stability and wind speed would be required prior to burning to ensure that federal and state ambient air quality standards are met.

Prescribed burning would use effective firing techniques to minimize smoke output per unit area and appropriate fuel moisture conditions to remove only those fuels needed to meet the prescribed burn objectives. Pile and jackpot burning are the only prescribed burning actions proposed with this project.

The prescribed burn plan would contain the appropriate mop-up category to ensure actions taken reduce impacts of residual smoke on visibility and health.

The Flathead National Forest cooperates with the State Air Quality Bureau and is a member of the Montana/Idaho State Airshed Group. This coordination ensures that during project implementation, burning only occurs under conditions that will protect air quality and meet state and national standards.

Downed Wood and Snags

Dead, larger diameter trees, usually within leave groups and patches, would be left within all salvage units as per the site specific prescription (Appendix A) to provide primarily for forest structural diversity, wildlife habitat and long term soil productivity objectives. If these trees are tipped over or felled for safety reasons during the logging operation, they would not be removed but left for downed wood habitat.

In order to provide for long-term retention, recruitment and recycling of snag habitat, all live and dead western larch trees over 18" in diameter would be retained in all salvage units. While the intent is to retain all live and dead larch over 18" diameter, it must be noted that incidental trees meeting these criteria would likely be cut to accommodate landings, skid trails, skyline corridors, temporary road locations or for safety purposes.

In most units, all unmerchantable material (whole trees and tops/branches) would be left within the unit, standing where possible, but left where fallen if not. Treatment of logging slash (i.e. piling and burning, or jackpot burning) would be limited to only those units where fuel loadings pose other resource concerns (such as regeneration potential or fire risk). Trees felled during the logging operation but not removed from the site would be left as intact

as possible (no lopping), with only limbs of trees removed to get slash closer to the ground if necessary and hasten its decomposition.

Larger diameter high value snags within 200 feet of an open road or within riparian habitat conservation areas would be designated/signed to protect from firewood cutters.

Refer to the alternatives description in Chapter 2 and Appendix A for a more detailed discussion of downed wood and snag retention prescriptions for all units.

Retention of Live Trees

All salvage units require that trees of all species uninjured by the fire would be left within the units. Depending upon management objectives specific to individual units, additional trees with varying degrees of fire injuries would be left within all units as well. The Post-fire mortality guidelines (Appendix B) provides criteria for leave tree selection and would be followed in all salvage units except those within the Inventoried Roadless Areas, Wild and Scenic River corridor and in Management Area 13a (winter range unsuitable for timber management). In these latter areas, only trees infested with beetles would be salvaged; therefore, there would be many other trees of all species, sizes and degrees of fire injury remaining on the site after salvage is complete. It should be noted that some live trees would likely be cut for logging access or safety reasons.

Slash reduction

Slash reduction activities associated with salvage activities are expected to be minimal, with most of the unmerchantable trees, tops and limbs left scattered throughout the treatment areas for site and soil protection purposes. If post-harvest fuel loading in the salvage harvest units exceeds 30 tons per acre, prescribed fire may be used to reduce the fuels to the desired 10-15 tons per acre. Fuels in excess of 30 tons per acre would not automatically initiate fuels reduction treatments. If a unit has more than 30 tons per acre, consideration of factors such as unit location, soil sensitivity, surrounding fuel conditions, continuity and size of the slash would be used to determine whether fuel reduction would occur. Jackpot or prescribed burning would be the preferred method of fuels reduction. If mechanical fuel treatments were deemed necessary, they would be accomplished with excavators to reduce soil disturbance; use of dozers to pile slash would be prohibited.

Tree Planting

All salvage units would be reforested through either natural regeneration or tree planting of native conifer species (primarily larch, Douglas-fir, ponderosa pine or western white pine). This would restore the productive capacity of the land in a timely manner and ensure desired species diversity in the future forest. Refer to Appendix A and the alternatives descriptions within this chapter for projected planting acres.

Scenic/Visual Resources

In order to reduce the short-term visual impacts of slash residue in units in close proximity to “foreground viewing areas” or “middle-ground viewing areas,” the following actions would be taken:

- Dispose of burn piles along open roads within two years.
- Flush cut or angle cut stumps in the immediate foreground (100'), along the North Fork and Big Creek roads.
- Rehabilitate landing areas next to open roads. Dispose of slash and scarify as necessary to establish new vegetation.

Riparian

In order to reduce potential impacts on soils, water quality, wetland, and riparian areas, the following would occur:

- Requirements of the Montana Streamside Management Zone (SMZ) Law and the Inland Native Fish Strategy (INFISH) would be followed for all treatments within or adjacent to wetland or riparian areas.

Timber sale contracts contain standard clauses that provide protection for riparian areas, stream management zones and riparian habitat conservation areas.

Water

Dust abatement measures would be required in all timber sale contracts to minimize the airborne delivery of sediment to streams.

The timing of culvert removals and application of BMP measures can minimize the effects of road decommissioning activities. When possible, the staggering of culvert removals over more than one season in a single watershed would reduce the amount of sediment entering a stream at any given season. Following a culvert removal, the use of erosion control matting and shrub planting for streambank stabilization would reduce additional erosion and sedimentation.

Soils

Management practices to protect soil from erosion and maintain soil productivity include the following. These requirements would be incorporated in to any timber sale contract through the inclusion of the contract clauses noted:

- Minimize ground disturbance by using helicopters, skyline cable systems, and ground-based mechanized equipment that has proven capability to be “light on the land”.
- Use ground-based mechanized equipment (such as skidders and feller-bunchers) only on areas where terrain and soil conditions would cause minimal impact to soils (slopes generally less than 35%).
- Operate equipment only when soils are at an acceptable level of dryness, as determined by the timber sale administrator based on site-specific sampling.
- Designate main skid trails and temporary access roads and/or lay down treetops and limbs on these trails to protect the soil during skidding operations.
- Winter logging would be done when the ground has enough snow or is frozen enough to protect soils.
- Tops and branches would be left in the units to provide ground cover that reduces soil erosion rates and, if needles remain, provides nutrients. Whole tree yarding would not be allowed in most units.
- To minimize erosion and other detrimental impacts to the soil resource, all temporary road construction and timber harvest would be completed using BMPs or Soil and Water Conservation Practices (SWCPs). The practices are described in detail in the Forest Service Soil and Water Conservation Handbook (FSH 2509.22), the Soil Management Handbook (FSH 2509.18) and the Forest Plan (pages II: 40-46). Included are such practices as providing for sufficient road drainage, limiting tractor logging operations to periods when soils are dry or under winter snow and less subject to compaction, seeding of landings and cut and fill slopes of roads, and maintaining vegetative buffer strips between cutting units and streams for sediment filtration. Each harvest unit and all proposed road work would be reviewed and applicable SWCPs identified on a site-specific basis for protection of the soil and water resource. These practices would be listed and described in the Decision. Refer to Appendix C: BMPs.
- All skyline corridors would have waterbars installed and slash placed on bare soils. All skid trails would have waterbars installed and slash placed on the trails.
- If mechanical fuel treatments were deemed necessary, they would be accomplished with excavators to reduce soil disturbance (Land and Resource Management Plan Annual Monitoring Report, 1992 page 131-139).
- Required mitigation: All salvage units where levels of detrimental soil disturbance exceeds 15% post-harvest would require measures be implemented to reduce detrimental disturbance to 15% or below.

Additional design measures to minimize soil erosion and compaction based on burn severity ratings (the fire's effect on soil), and slope (which relates to erosion hazard) were developed. In addition, special management practices were developed for units where the fine branches and needles were completely burned. These practices are specific to individual salvage units, and are described in detail in Appendix C Best Management Practices.

Noxious Weeds

Features listed under the *Soils* section above would also serve to reduce risk of noxious weed establishment and spread. Specific actions related to noxious weed concerns include the following:

- Wash all off-road equipment before entering the area and upon moving between sites on the Flathead National Forest.
- Re-establish vegetation on bare ground created by road decommissioning or timber harvest activity. Use native material where appropriate and available.

Recreation

All trails would be protected during salvage harvesting. No skidding would occur down any trail. In addition, any crossing of a trail with heavy equipment would be minimized and trees would be felled away from the trail. Any damage that might occur during logging and associated site preparation activities would be repaired. Activities at developed recreation sites would be timed to accommodate public use to the extent practical.

Public Safety / Roads

Contractors would be required to post signs along Forest Service haul roads warning the public of truck traffic and activities. Warning signs and public announcements would be used to notify the public of logging/site preparation/road management activities in the area.

Road maintenance actions consisting of brushing and blading may be needed on the haul routes during project activities. Other minor drainage work such as the placement of drain dips would likely take place. Dust abatement and blading would occur as needed on the main haul routes. Dust abatement, using non-petroleum based products, would minimize delivery of airborne sediment to streams.

Warning signs and public announcements would be used to notify the public of logging/site preparation/road management activities in the area.

Roads may be restricted for a short period. Portions of the project area may be restricted to the public during helicopter operations.

On roads closed to motorized use that are needed to access salvage units, public access would remain restricted. Timber sale contracts would contain clauses to insure that roads remain closed to public motorized use.

Helicopter Landings

An estimated 10 to 15 areas covering approximately 10 acres would be used for helicopter landings. Landings would be located on flat areas away from streams. In some cases, roads may be used for helicopter landings.

IV. ALTERNATIVES CONSIDERED IN DETAIL

The proposed action (Alternative 2) and four alternatives are considered in detail. Alternative 1 is the *no action* alternative, under which the project area would have no salvage harvest or road management at this time and would remain subject to natural or ongoing changes only. The other action alternatives represent different ways to satisfy the purpose and need than that of the proposed action by responding with different emphases to the significant issues discussed earlier in this Chapter. Maps of all alternatives considered in detail are provided. The map for Alternative 1, the no-action alternative, represents the current condition of the project area. Larger-scale maps of the alternatives are contained in the project planning record.

Alternative 1 (No Action)

The emphasis of this alternative is to represent the existing condition against which the other alternatives are compared. Alternative 1 proposes no salvage, fuels reduction, pheromone beetle trap treatments or road management changes within the *Moose Post-Fire Project* area at this time. It does include those activities listed as foreseeable actions in Chapter 3. It does not preclude activities in other areas at this time, or preclude activities in the *Moose Post-Fire Project* area at some time in the future. CEQ regulations (40 CFR 1502.14d) require that a "no action" alternative be analyzed in every Environmental Assessment (EA) or Environmental Impact Statement (EIS).

Under this alternative, management activities would be limited to ongoing and foreseeable actions listed in Chapter 3 of this DEIS.

Map 2-1 displays the existing road management status in the project area.

MAP 2-1 Existing Road Management

See adjacent color insert.

Alternative 2 (Proposed Action)

The Proposed Action was developed specifically to respond to the Purpose and Need for Action. It focuses on reducing potential tree mortality from spruce and Douglas-fir bark beetles, recovering merchantable wood products on lands specified as suitable for timber production in the Forest Plan, and reducing future fire risk and hazard on specific sites adjacent to private property and administrative sites (see Purpose and Need for Action in Chapter 1). Alternative 2 would comply with all existing Forest Plan standards, and no Forest Plan amendments would be required.

The proposed action originally provided to the public for review in January 2002 was modified after scoping and in response to new information learned through field evaluations and public comment. Chapter 1, under *V. Purpose and Need and the Proposed Action* details these changes. Below is the modified proposed action carried forth in this analysis.

Salvage Harvest

Salvage harvest of trees affected by the fire would occur across approximately 3700 acres of the Moose Fire area (refer to Map 2-2). A range of fire severity occurred within proposed salvage units, leaving a mosaic of forest conditions and variable amounts of live, dead and dying trees across the landscape. Because of this, an estimated 3000 acres of the total 3700 acres would actually have trees removed in the logging operation, and live trees, as well as many dead standing trees, would remain within many harvested areas. An estimate of 27 million board feet (mmbf) would be generated with implementation of this alternative. Refer to Table 2-1 for acreages and descriptions of the treatments.

Treatment features common to all proposed salvage units under Alternative 2

In addition to the design criteria common to all alternatives listed in section III of this chapter, the following features are common to every salvage unit in Alternative 2:

No permanent roads would be constructed; however, less than 1 mile of temporary road would be constructed to facilitate logging systems in salvage units 3, 8, and 9. No temporary roads would be constructed in inventoried roadless areas. All new temporary roads would be water-barred, re-seeded with grass, have slash scattered over the surface, and be recontoured to their original slope. Where temporary roads reach within 150 feet of ephemeral stream channels, slash windrows or silt fence sediment traps would be used where appropriate to reduce potential sediment delivery.

Specific prescriptions for leave tree retention (snags and live trees) would be followed for each unit, taking into account fire severity and whether live trees remain or not; condition, size and species of trees; logging system and safety considerations. These ecosystem components are important for forest structural diversity (short and long term); habitat for numerous wildlife species; shade and protection on more exposed sites; long-term soil productivity and organic matter; soil erosion protection; and a host of other less understood ecological functions, such as providing a substrate for soil microorganisms and insect populations. Generally, snags and residual trees would be left in groups, with size ranging from several trees to several acres, depending upon terrain, logging system, unit sizes, numbers of live trees left, and other site specific factors. Leave groups would cover from 10-75% of a unit area, but most often in the 15-30% range.

All trees determined most likely to survive the direct or indirect affects of the fire, including bark beetle infestation and risk of infestation, would be left within the units (refer to "Post-fire Mortality Estimation Guidelines" in Appendix B). It should be understood that Douglas-fir beetle population buildup is of concern not only in the year immediately following the fire (2003), but in subsequent years as well, particularly in the next 2-4 years. Beetles will first attack and kill the trees most severely injured or killed by the fire itself, spreading to less damaged or undamaged trees in the same stand in subsequent years. Beetle activity can be very high for several years in fire-affected stands, and the majority of mortality in Douglas-fir frequently occurs not due to the fire directly, but to beetle attacks in the years immediately following the fire (Gibson 2001).

Table 2-1 below provides a summary of the treatments proposed within the salvage units. Refer to Appendix A for the detailed discussion of condition within units, the specific treatments, and forest structure/snag/woody debris prescriptions applicable to each proposed salvage unit or unit group. Also refer to treatment features specific to each Forest Plan management area, which follows this table.

Table 2-1: Summary of general treatment prescriptions for proposed salvage units in Alternatives 2 and 5

Units	Fire Severity	Logging system	Acres	Treatment prescription
36 units: Acres=1952 Units 3-13; 17-19; 21, 26, 28, 29; 31-35; 43, 44, 48, 49, 53, 54, 61, 62, 64, 65, 72, 73, 78	High (80+% tree mortality, usually nearly 100%)	Skyline or skidder	916 (836 acs treated)	<ul style="list-style-type: none"> Units range from 5 to 250 acres, though most (over 2/3) are < 50 acres. Salvage harvest would remove dead and dying trees across the units, either trees killed and damaged directly by the fire, infested with or susceptible to Douglas-fir or spruce bark beetles. Trees that meet the criteria outlined in the mortality guidelines (Appendix B) would be left on site. Treatment features specific to the management area would be applied, as described in the paragraphs following this table. In all units, trees (live and dead) would be left on the site for forest structure/snag/coarse woody debris objectives. These trees would be left as scattered individuals (primarily in the skidder units), but mostly as small groups of trees or larger intact patches of 2 to 10 or more acres in size (primarily in the larger >50 ac units and helicopter units), interspersed with the salvaged patches. Patches would cover from 10-40% of the unit area, varying by unit depending upon site-specific conditions, unit sizes and management objectives. Because of fire severity, groups and patches of leave trees would be dominated by dead trees. Groups and patches would be dispersed across the unit area, centering on live trees or larger highly desirable snags if available; favor draw bottoms, streams or wet spots of any nature; be interconnected and irregularly shaped where possible; and follow a guideline of a maximum 600 foot distance between any two patches or to the unharvested forest edge. Conifer seedlings would be planted across an estimated 1390 acres after salvage, including western larch, Douglas-fir, ponderosa pine and western white pine.
		Helicopter	1036 (795 acs treated)	
33 units: Acres=1576 Units 1, 2; 14-16; 20, 22-24; 27, 30, 37; 40-42; 45-47; 52; 55-59; 63; 66-70; 75-77	Low to Moderate (40-70% tree mortality)	Skyline or skidder	581 (507 acs treated)	<ul style="list-style-type: none"> Units range from 2 to 174 acres, though most (over 2/3) are < 50 acres. These units were burned at moderate or low severity and contain variable amounts of live trees, though most of these trees have been affected to some degree by the fire. These trees occur both as scattered individuals and in groups and patches throughout the unit area (estimated to cover from 15-75% of the area). These patches and trees would be left intact within the unit to the greatest degree possible, leaving an irregular pattern across the landscape of salvaged and unsalvaged patches or groups of trees, with size and proportions dependent upon individual unit conditions. For greatest benefit and to protect the integrity of leave tree patches, specifically in the larger units, patches would be a minimum of 2 acres in size where possible. Where choices exist, leave patches should also be centered around areas of high numbers of live trees or desirable large snags, streams, wet spots, and follow a guideline of maximum 600 foot distance between patches or to the unharvested forest edge. Salvage harvest is focused on removing trees directly killed by the fire, infested by susceptible to bark beetles. The criteria outlined in the mortality guidelines (Appendix B) would be followed, as would the specific treatment features by management area, described in the narrative following this table. Conifer seedlings would be planted across an estimated 281 acres after salvage, including western larch, Douglas-fir, ponderosa pine and western white pine.
		Helicopter	995 (693 acs treated)	

Units	Fire Severity	Logging system	Acres	Treatment prescription
Units 25, 38, 50, 60	Moderate (around 50% tree mortality)	Skyline	193	<ul style="list-style-type: none"> • These are past shelterwood harvests, with a pre-fire estimate of 15-30+ trees per acre overstory larch and Douglas-fir and an understory of seedling and sapling trees. Nearly all the understory was killed by the fire, along with variable amounts of the overstory trees. • Treatment would leave all trees over 18" diameter, as well as all larch, live or dead, of all sizes. Harvest would remove fire-killed/damaged merchantable Douglas-fir trees 14-18" diameter, susceptible to bark beetle infestation. • Conifer seedlings would be planted across an estimated 59 acres after salvage, including western larch, Douglas-fir, and ponderosa pine.
TOTAL 73 Units			3721 (3024 acs treated)	

Salvage Treatment Features specific to areas with different land management objectives

The proposed salvage units occur within various management areas (MA) according to the Flathead Forest Plan, each with different management goals, resource potential, direction and limitations (refer to Chapter 1). In accordance with this MA direction, there are some differences in treatments within salvage units, and these are described below.

MA 9, 13, and 15 (not including units within inventoried roadless area)
(Total of 59 Units, approximately 2956 acres -- Units 1 through 13 and Units 18 through 66)

These lands are classified as suitable for timber management, with timber production a primary goal in MA 15, and allowed in MA 9 and 13 if compatible with whitetail deer (MA 9) and elk/mule deer (MA 13) winter range management goals (Forest Plan, pages III-34 – III-38; III-60 – III-65; and III-69 – II-74). The proposed salvage within these management areas address two of the purposes of the project: (1) to recover merchantable wood fiber affected by the Moose Fire and (2) to reduce the expected threat of bark beetles in fire affected trees to other remaining live trees within and outside the Moose Fire area (refer to the purpose and need section in Chapter 1). To decrease potential beetle-caused mortality to live Douglas-fir and spruce trees within and outside the fire areas, salvage harvest would remove bark beetle infested and beetle-susceptible larger diameter Englemann spruce and Douglas-fir trees (greater than 14" dbh – diameter at breast height) that provide brood habitat for the spruce beetle and Douglas-fir beetle (refer to Appendix A for more detailed information). Removal of these trees would also contribute towards the recovery of merchantable wood products affected by the fire. Within these same treatment areas, salvage harvest of smaller diameter dead and dying trees of all species that are still merchantable for wood products would also occur.

MA 13A (winter range)
(Four Units, approximately 266 acres -- Units 14, 15, 16, and 17)

These lands are classified as unsuitable for timber management, with elk and mule deer winter range values of primary importance (Forest Plan, pages III-60 – III-65). Timber harvest is allowed to maintain or improve these values. Proposed salvage treatments within these units are designed for the sole purpose of addressing the concern of potential Douglas-fir bark beetle population buildup within the Moose Fire area and its spread to surrounding lands.

In these units, only Douglas-fir or spruce trees that are infested with bark beetles would be removed. All species other than Douglas-fir and spruce would be left standing (live or dead) or, if unsound and must be felled for safety reasons, would be left as downed wood on the site. Tree salvage would occur irregularly across the unit, with an estimated 15-50% of the area remaining in leave patches once salvage is completed. Douglas-fir trap trees may be utilized within these units to attract emerging beetles and allow salvage efforts to be more focused and effective in reducing beetle populations (refer to discussion under *Beetle Funnel Traps/Use of Pheromones/Trap Trees* below).

MA18 (Wild and Scenic River Corridor)

(Three Units, approximately 16 acres -- Units 67, 68, 69)

These lands are classified as unsuitable for timber management, with Wild and Scenic River values of primary importance (Forest Plan, pages III-87 – III-93). Timber harvest is allowed to meet specific objectives. Proposed salvage treatments within these units are designed for the sole purpose of addressing the concern of potential Douglas-fir bark beetle population buildup within the Moose Fire area and its spread to surrounding lands. Salvage would remove only Douglas-fir trees already infested with beetles; all other species would be left standing on site. These units are quite small, less than 7 acres each, and immediately adjacent to the North Fork road, on the bench several hundred feet above the river. MCH (anti-attractant) pheromone is currently being used in parts of the Wild and Scenic River Corridor to prevent beetle infestation in some of the fire-injured Douglas-fir (refer to discussion under *Beetle Funnel Traps/Use of Pheromones/Trap Trees* below).

Inventoried Roadless Areas

(Seven Units, approximately 483 acres -- Units 70, 72, 73, 75, 76, 77, 78)

Units 70 and 72 are allocated to MA 13A, while the remaining units are allocated to MA 15. The only purpose for proposed salvage in these units is to reduce bark beetle infestation risk. In all units, only Douglas-fir or spruce trees that are infested with bark beetles would be removed; all other trees would be left, unless they must be felled for safety reasons. If so, they would be left as downed wood on the site. Tree salvage would occur irregularly across the landscape, with an estimate of from 10-60% remaining as leave patches after salvage is complete. Douglas-fir trap trees may be utilized within these units to attract emerging beetles and allow salvage efforts to be more focused and effective in reducing beetle populations (refer to discussion under *Beetle Funnel Traps/Use of Pheromones/Trap Trees* below).

Beetle Funnel Traps/Use of Pheromones/Trap Trees***Spruce beetle:***

Pheromone-baited beetle funnel traps would be applied across an estimated 150-330 acres of spruce stands. These traps contain an attractant pheromone, mimicking that emitted by the female beetle after she finds a desirable tree in which to breed. The pheromone attracts both male and female beetles, which leads to a mass attack of the tree, aiding the beetle by overwhelming the trees natural defenses. The intent of the beetle traps are to draw in, capture and kill as many of the emerging beetles as possible before they have a chance to spread and attack live spruce trees outside the fire area.

Nearly 1000 acres of fire-affected spruce stands within the Moose Fire area are at risk to spruce beetle infestation. However, only about 382 acres of these are considered high risk and most likely to be infested in 2002, producing large numbers of beetles that could spread to live spruce stands. Of these high-risk stands, about 225 acres are located within riparian areas, or within 300 feet of a perennial stream. An additional 388 acres of spruce at medium risk to beetle are also located in riparian areas.

Nearly all acres proposed for the pheromone trap treatment are in these areas, concentrated in the riparian area of Big Creek and the lower portions of its tributaries, with one area located at the fire's edge in Deadhorse Creek, a tributary to Coal Creek. Field monitoring of all acres will begin in the summer of 2002 to monitor beetle populations. If there were evidence of an imminent spruce beetle epidemic developing, the beetle funnel trap control measures would be implemented to reduce this threat. Funnel traps would be placed in all or nearly all of these riparian areas where beetles have been located, which at this point is assumed to be a minimum of about 150 acres (all the highest risk stands) up to about 330 acres (includes some of the medium risk stands).

Douglas-fir beetle:

An anti-attractant pheromone, referred to as MCH, has recently become available for use with Douglas-fir beetle. This pheromone sends the chemical message of "no vacancy" to the flying bark beetles, indicating the tree is at maximum capacity and the beetle should look elsewhere for breeding sites. MCH has proven very effective in protecting trees from infestation, but its use is feasible only on a limited geographic basis. MCH would be used to protect the few remaining live Douglas-fir trees in the area immediately around the buildings of the Big Creek

Administrative Site (Glacier Institute), and in a small area within the Wild and Scenic River Corridor. Application of the “bubble capsules” (stapled to the trees) has occurred to protect the trees during the 2002 beetle flight. Under Alternative 2, MCH will continue to be applied for as long as beetle populations remain high (a minimum of 2-3 years). Keeping these large trees alive is considered important for their visual and aesthetic values, as well as a potential seed source and for wildlife habitat.

Trap trees may be used to more effectively control the potential spread of Douglas-fir bark beetles in portions of the project area, specifically those areas where the fire burned at low or moderate severity and numerous live but beetle-susceptible Douglas-fir trees remain. This method would be used in areas where salvage of the trees infested by beetles in 2002 is delayed beyond the spring of 2003, thus allowing the beetles within the fire-affected trees to emerge and attack surrounding live trees. The method involves felling about 2-4 green trees per acre, and/or baiting them with pheromone tree baits, which makes them extremely attractive to beetles searching for feeding and breeding sites. These trap trees are capable of drawing in large numbers of the available beetle population emerging that year – you might see up to 11 times the attack rate in these trees than in a “normal” stand of susceptible trees (Gibson 2002c). These trees would then be removed in the eventual salvage operation. Use of trap trees provides a means to protect larger numbers of remaining standing, live Douglas-fir trees within the Moose Fire area, by focusing salvage on fewer numbers but more beetle-attractive trees, and in more concentrated, predictable areas. It is important to be committed to removing these trap trees in a timely manner. Leaving them on site may only exacerbate an already undesirable situation. It is not known at this time the specific sites that may benefit from use of trap trees. Ongoing monitoring of the beetle populations and brood survival, beginning in the summer of 2002, will provide further information on the applicability of this method, and where it might be employed most effectively.

Fuels Reduction

Three areas would be treated specifically to reduce current fuel loads and lower future fire risk and hazard adjacent to private property along the northern boundary of the fire area, and in the Big Creek Campground and Glacier Institute area. Treatment would occur across approximately 235 acres (refer to Table 2-2).

Table 2-2: Fuel reduction treatment areas in Alternatives 2, 3, and 5

Treatment area	Fire Severity	Logging system	Acres	Treatment prescription
Coal Creek	High (95+% tree mortality)	Ground (skidder)	67	<ul style="list-style-type: none"> Treatment area is characterized by sapling and pole sized fire-killed lodgepole pine. A “thinning” type of prescription would be applied, with trees slashed, piled and burned, or utilized for a commercial product if possible, across the unit area. “Thinning” would be heaviest in the area closest to the private land boundary, leaving 20 or fewer trees per acre standing. More trees would be left as you move away from the private boundary, up to about 40 –80 tpa, creating a “feathering” effect of dead standing trees blending into the uncut forest. Very few trees survived the fire; live trees would be left (other than incidental trees cur for logging access or safety). No treatment would occur in stream management zones or within 300’ of Coal Creek. Max 15 tons/acre dead and down would be left on average over the unit.. Planting of larch and Douglas-fir seedlings would occur across all acres following treatment.
Big Creek Admin. Site (Glacier Institute)	Low to High patch mosaic (40-70% tree mortality)	Ground (skidder)	129	<ul style="list-style-type: none"> Fuel reduction areas are mostly small diameter lodgepole, with Douglas-fir and larch in some areas. Larger diameter, >9” dbh trees occur on some lower slopes and in the areas adjacent to Big Creek and Glacier Institute. Mortality varies from near 100% fire killed trees, to some small unburned patches in areas near Glacier Institute buildings. A “thinning” prescription would be applied across most of the area, with removal of only dead trees, which would be slashed, piled and burned, or utilized for a commercial product if possible. Thinning would be at variable densities, from about 30 up to 70 trees per acre left, blending into the surrounding uncut forest. All live trees would be left, as well as any additional dead or dying trees that are necessary to meet desired tree densities. Trees may be left in groups, patches or individuals to create a diverse structure and appearance. Maximum 15 tons/acre dead and down would be left on average over the area. Planting of more fire resistant trees (ponderosa pine, larch and Douglas-fir) at wide spacing would occur across an estimated 100 acres. Anti-aggregate pheromone MCH would be applied in the unburned region near the Glacier Institute to protect remaining live Douglas-fir at high risk of Douglas-fir beetle infestation. These are valuable trees for aesthetic reasons, as well as being about the only live larger trees left surviving for some distance.
Big Creek Campground	Low to unburned	Ground (skidder)	39	<ul style="list-style-type: none"> Fuel reduction activities would thin from below through portions of the campground that were mostly unburned by the fire. Selected trees of all size classes (saplings and larger) would be removed to open up the forest canopy. The dense Douglas-fir forest around the campsites would be thinned to about 15-25 feet between the tree crowns. In localized spots, planting of ponderosa pine and larch would occur. Removal of dead trees would occur for safety considerations.

Other design features of Alternative 2

Road Management

In 1995, Amendment 19 to the Flathead Forest Plan established new forest-wide objectives and standards for grizzly bear security on the Flathead National Forest to meet long-term conservation needs of this threatened species. Amendment 19 established short-term (5 years) and long-term (10 years) standards for open motorized access density, total motorized access density and security core area, in areas known as “Bear Management Unit (BMU) Subunits.” These five and ten-year standards are also contained in the Terms and Conditions of the Biological Opinion on the Flathead Forest Plan provided by the U.S. Fish and Wildlife Service (project record exhibit C-13). The five-year period has passed, and the ten-year period will be approaching within a few years. During the Amendment 19 planning process, the portion of the Flathead National Forest that occurred within the grizzly bear recovery zone (includes all of the Glacier View Ranger District) was subdivided into BMU Subunits that approximate the size of the home range for an adult female grizzly bear. The Moose Fire affected two of these BMU Subunits: Werner Creek (located in the upper drainage of Big Creek) and Lower Big Creek. These two BMU Subunits do not currently comply with the five or ten-year access density standards from Amendment 19 (refer to Table 2-3).

However, Amendment 19's open motorized access density standards have been met temporarily within both subunits via an Emergency Special Closure Order, which was signed on April 1, 2002. This Special Order restricted approximately 21 miles of open road within the 2 subunits with temporary gates. This Special Order will be effective for one year. As a result, the five and ten-year open motorized access density standards specified from Amendment 19 is currently met within the two subunits. The roads that have been restricted by gates due to this Special Order are the same open roads that have been proposed for restriction in Alternative 2. Table 2-3 does not display the existing situation as if this Emergency Special Order road closure was in place; to display this information, existing situation open motorized access density would be shown as 19% for both Werner and Lower Big Creek grizzly bear subunits.

Alternative 2 would modify travel management within the Werner Creek and Lower Big Creek grizzly bear subunits to meet open motorized access density, total motorized access density, and security core specified in the ten-year standards from Amendment 19 (refer to Map 2-3). Management of approximately 190 miles of roads within these two subunits would then be consistent with the objectives and standards of Amendment 19.

Table 2-3: Comparison of Alternative 2 with Amendment 19 Standards

WERNER CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 2
Open Motorized Access Density	31%	19%
Total Motorized Access Density	41%	19%
Security Core	41%	70%
LOWER BIG CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 2
Open Motorized Access Density	25%	19%
Total Motorized Access Density	34%	19%
Security Core	50%	68%
AMENDMENT 19 STANDARDS		
	5 year	10 year
Open Motorized Access Density (<1 mi/mi ²)	≤ 19%	≤ 19%
Total Motorized Access Density (<2 mi/mi ²)	≤ 24%	≤ 19%
Security Core	≥ 64%	≥ 68%

Yearlong road restrictions using gates, berms, and road decommissioning would reduce road densities for increased grizzly bear habitat security. Road decommissioning would include actions that would minimize the potential for future sedimentation of streams or noxious weed development. These actions would include placement of numerous waterbars, culvert removals, grass seeding, slash or debris placement on roads, planting shrubs, physical alteration of the road template. Culvert removals and stream restoration would occur where roads to be decommissioned intersect streams. To reduce the amount of ground disturbed, cross drain culverts would typically not be removed but waterbars would be placed nearby. The amount of physical altering of the road template from culvert removal or waterbar creation would vary according to the sites involved.

There are approximately 9 miles of road proposed for decommissioning that are also displayed as snowmobile routes on the Glacier View Ranger District Snowmobile Access Information Map (prepared January 2002 as a result of the Flathead Winter Recreation Agreement). Decommissioning activities on roads that are shown as snowmobile routes would be designed to accommodate safe and reasonable snowmobile use. These actions would include flattening slopes into, out of culvert removal areas, and in some cases placing half round culverts or bridges over streams. Upon completion of work, the definition of road decommissioning in the Forest Plan would be met.

All road mileages displayed in the following table are estimated from computer analysis. Actual miles affected during implementation may be more or less than shown in the tables. However, road changes displayed on the maps in this EIS would be implemented. Approximately 14 miles and 7 miles of open yearlong/seasonally open road would be

restricted yearlong within the Werner Creek and Lower Big Creek grizzly bear subunits, respectively. Also, approximately 57 miles of road would be decommissioned in both grizzly bear subunits.

Table 2-4: Alternative 2 Travel Management Status

Werner Creek Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 2
Open Yearlong	28 miles	17 miles
Open Seasonally	3 miles	0 miles
Closed Yearlong/Gate	33 miles	9 miles
Closed Yearlong/Berm	12 miles	20 miles
Closed Yearlong/Natural Revegetation	2 miles	0 miles
Decommissioned Roads (since 1995)	5 miles	5 miles
Proposed to be Decommissioned	N/A	18 miles; (also 12 more miles to be decommissioned under other past decisions)
Lower Big Creek Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 2
Open Yearlong	21 miles	14 miles
Open Seasonally	4 miles	4 miles
Closed Yearlong/Gate	34 miles	6 miles
Closed Yearlong/Berm	24 miles	19 mile
Closed Yearlong/Natural Revegetation	4 miles	0 miles
Decommissioned Roads (since 1995)	11 miles	11 miles
County Road – North Fork Road	8 miles	8 miles
Small Private Roads	2 miles	2 miles
Proposed to be Decommissioned	N/A	38 miles; (also 7 more miles to be decommissioned under other past decisions)

Map 2-2: Alternatives 2 and 5 Salvage Map

See adjacent color insert.

Map 2-3: Alternative 2 Road Management Map

See adjacent color insert.

Alternative 3

Alternative 3 was developed to clearly address the following significant issues, while responding to the purpose and need for action:

- 1. Tree salvage in inventoried roadless areas;**
- 6. The fire may have affected wildlife security during hunting seasons;**
- 9. Provide a higher level of public motorized access than Forest Plan standards allow;**
- 10. Big Creek Road 316 should be re-opened;**
- 11. Decommissioning road activities may not be compatible with snowmobiling on existing snowmobile routes.**

Alternative 3 would include two project-specific Forest Plan amendments. The road strategy associated with this alternative would not meet Amendment 19's five-year or ten-year access density standards within the Werner Creek grizzly bear subunit. The standards for open road density and security core would be amended 29% and 63%, respectively within the Werner Creek grizzly bear subunit (compared to current standard of 18% and 68%). In addition, the definition of a decommissioned road in Forest Plan Appendix TT would be amended to allow specific stream-aligned culverts to be left in place as long as they meet INFISH standards. These amendments would remain in place pending completion of revision of the Flathead Forest Plan, currently in progress and expected to be completed by 2006.

Salvage Harvest

Salvage harvest of trees affected by the fire would occur across approximately 3200 acres of the Moose Fire area. A range of fire severity occurs within these proposed units, leaving a mosaic of forest conditions and variable amounts of live and dead trees across much of the landscape (refer to Map 2-4). Because of this, an estimated 2700 acres of the total 3200 acres would have trees removed in the logging operation, and live trees, as well as many dead standing trees, would still remain in harvested areas. Implementation of this alternative would produce an estimated 23.6 million board feet (mmbf). Refer to Table 2-5 for acreages and descriptions of the treatments.

Treatment features common to all proposed salvage units

These features would be identical to those described for Alternative 2, including use of low impact logging techniques; constructing no permanent roads; using < 1 mile of temporary road to access units 3, 8 and 9; minimal treatment of logging slash, and avoiding use of dozers to do so; applying specific forest structure, snag and coarse woody debris prescriptions for each unit, including leaving all larch >18' dbh in all units (live or dead). Appendix A contains tables that describe specific conditions and treatments by unit or unit groups. Appendix B contains the post-fire mortality guidelines that would be used for most units under all alternatives.

Treatments proposed under Alternative 3 are the same as those in Alternative 2, except that Alternative 3 eliminates seven units (about 483 acres) within inventoried roadless areas in response to public concerns regarding timber salvage in inventoried roadless areas. Refer to Table 2-1 under Alternative 2 for a description of treatments for all units in Alternative 3. Table 2-5 below provides unit and acreage summary information specific to Alternative 3.

Table 2-5: Summary of general treatment prescriptions for proposed salvage units in Alternative 3

Units	Fire Severity	Logging system	Acres	Treatment prescription
33 units: Acres=1802 Units 3-13; 17-19; 21, 26, 28, 29; 31-35; 43, 44, 48, 49, 53, 54, 61, 62, 64, 65	High (80+% tree mortality, usually nearly 100%)	Skyline or skidder	916 (836 acres treated)	Same as description in Table 2-1 under Alternative 2, except for the following difference: <ul style="list-style-type: none"> Conifer seedlings would be planted across an estimated 1295 acres after salvage, including western larch, Douglas-fir, ponderosa pine and western white pine.
		Helicopter	886 (675 acres treated)	
29 units: Acres=1243 Units 1, 2;14-16; 20, 22-24; 27, 30, 37; 40-42; 45-47; 52;55-59; 63; 66-69	Low to Moderate (40-70% tree mortality)	Skyline or skidder	581 (507 acres treated)	Same as description in Table 2-1 under Alternative 2, except for the following difference: <ul style="list-style-type: none"> Units range from 2 to 122 acres, though most (over 2/3) are < 50 acres.
		Helicopter	662 (493 acres treated)	
4 units: Units 25, 38, 50, 60	Moderate (around 50% tree mortality)	Skyline	193	These are past shelterwood harvests, same treatment description as in Table 2-1 under Alternative 2.
TOTAL 66 Units			3238 (2511 acres treated)	

Salvage Treatment Features specific to areas with different land management objectives

The units treated -- their location and size -- and the description of these treatment features would be the same as described under Alternative 2 for Management Areas 9, 13, 15, 13A and 18. There would be no treatment within inventoried roadless areas, so that description does not apply under Alternative 3.

Beetle Funnel Traps/Use of Pheromones/Trap trees

All methods of beetle control would be applied across the same areas and in the same manner as described under Alternative 2 (except for treatments within inventoried roadless areas, which would not occur under Alternative 3).

Fuels Reduction

The same three areas as described under Alternative 2 would be treated, specifically to reduce current fuel loads and lower future fire risk. Refer to Table 2-2 under Alternatives 2. Approximately 235 acres total would be treated.

Other design features of Alternative 3

Road Management

Refer to the same introduction as written for Alternative 2. However, the road strategy associated with Alternative 3 would not meet the five-year or ten-year access density standards stated in the Forest Plan, but would make improve the existing situation (refer to Map 2-5). Two site-specific amendments to the Flathead Forest Plan would be necessary to implement this road strategy as previously described.

The road strategy developed for Alternative 3 is similar to the road management proposal suggested by a public collaborative group several years ago during a planning process for the Big Creek Resource Management Project. The project area for this Big Creek project included the same two grizzly bear subunits we are addressing in the *Moose Post-Fire Project*. Based on an issue raised during scoping, a road strategy was designed that approximated the road strategy recommended by this collaborative group.

The Forest Plan open motorized access density standards have been met temporarily within both subunits via an Emergency Special Closure Order, which was signed on April 1, 2002. This Special Order restricted approximately 21 miles of open road within the two subunits by temporary gates. This Special Order is effective for one year. As a result, the Forest Plan five and ten-year open motorized access density standards are currently met within the 2 subunits. The roads that have been restricted by gates from this Special Order are some of the same open roads that have been proposed for restriction in Alternative 2. If Alternative 3 were selected, some of these gated roads closed for emergency reasons would be re-opened. Table 2-6 does not display the existing situation as if this Emergency Special Order road closure was in place; to display this information, existing situation open motorized access density would be shown as 19 percent for both Werner and Lower Big Creek grizzly bear subunits.

Alternative 3 would propose to modify travel management within the Werner Creek and Lower Big Creek grizzly bear subunits to help improve current open motorized access density, total motorized access density, and security core levels.

Table 2-6: Comparison of Alternative 3 with Amendment 19 Standards

WERNER CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 3
Open Motorized Access Density	31%	29%
Total Motorized Access Density	41%	19%
Security Core	41%	63%
LOWER BIG CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 3
Open Motorized Access Density	25%	19%
Total Motorized Access Density	34%	19%
Security Core	50%	68%
AMENDMENT 19 STANDARDS		
	5 year	10 year
Open Motorized Access Density (<1 mi/mi ²)	≤ 19%	≤ 19%
Total Motorized Access Density (<2 mi/mi ²)	≤ 24%	≤ 19%
Security Core	≥ 64%	≥ 68%

Yearlong road restrictions using gates, berms, and road decommissioning would reduce road densities for increased grizzly bear habitat security compared to pre-fire conditions. Road decommissioning would include actions that would minimize the potential for future sedimentation of streams or noxious weed development. These actions would include placement of numerous waterbars, culvert removals, grass seeding, slash or debris placement on roads, planting shrubs, and physical alteration of the road template. Culvert removals and stream restoration would occur where roads to be decommissioned intersect streams. To reduce the amount of ground disturbed, cross drain

culverts would typically not be removed but waterbars would be placed nearby. The amount of physical altering of the road template from culvert removal or waterbar creation would vary according to the sites involved.

There are approximately 9 miles of road proposed for decommissioning that are also displayed as snowmobile routes on the Glacier View Ranger District Snowmobile Access Information Map (prepared January 2002 as a result of the Flathead Winter Recreation Agreement). These are currently open to snowmobile use. Decommissioning activities on roads that are designated snowmobile routes according to the Flathead Winter Recreation Agreement would be designed to accommodate safe and reasonable snowmobile use. These 9 miles of road would be converted to system winter snowmobile trails. As a result, appropriately sized culverts would remain in place at some stream crossings (10 to 15 culverts) while other culverts would be removed. Where culverts would be removed, slopes would be flattened into and out of culvert removal areas. Half round culverts or bridges may also be placed over these culvert removal areas if access is not feasible by a snowmobile in the winter.

All road mileages displayed in the following table are estimated from computer analysis. Actual miles affected during implementation may be more or less than shown in the tables. However, road changes displayed on the maps in this EIS would be implemented. Approximately 4 miles and 7 miles of open yearlong/seasonally open road would be restricted yearlong within the Werner Creek and Lower Big Creek grizzly bear subunits, respectively. Also, approximately 56 miles of road would be decommissioned in both grizzly bear subunits.

The following table provides a narrative description of proposed changes to various road segments by Alternative 3.

Table 2-7: Alternative 3 Travel Management Status

Werner Creek Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 3
Open Yearlong	28 miles	12 miles
Open Seasonally	3 miles	15 miles
Closed Yearlong/Gate	33 miles	8 miles
Closed Yearlong/Berm	12 miles	11 miles
Closed Yearlong/Natural Revegetated	2 miles	0 miles
Decommissioned Roads (since 1995)	5 miles	5 miles
Proposed to be Decommissioned	N/A	18 miles; (also 12 more miles to be decommissioned under other past decisions)
Lower Big Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 3
Open Yearlong	21 miles	14 miles
Open Seasonally	4 miles	4 miles
Closed Yearlong/Gate	34 miles	6 miles
Closed Yearlong/Berm	24 miles	19 mile
Closed Yearlong/Natural Revegetated	4 miles	0 miles
Decommissioned Roads (since 1995)	11 miles	11 miles
County Road – North Fork Road	8 miles	8 miles
Small Private Roads	2 miles	2 miles
Proposed to be Decommissioned	N/A	38 miles; (also 7 more miles to be decommissioned under other past decisions)

Map 2- 4

Alternative 3 Vegetation Treatments Map

See adjacent color insert.

Map 2-5: Alternative 3 Road Management Map

See adjacent color insert.

Alternative 4

Alternative 4 was developed to clearly address the following Significant Issues, while responding to the purpose and need for action:

- 1. Tree salvage in inventoried roadless areas;**
- 2. Tree salvage in the wild and scenic river corridor**
- 3. The use of temporary roads may cause increased sedimentation**
- 4. Snag and downed woody material retention should be increased**
- 5. Riparian habitat conservation areas may not be large enough**
- 6. The fire may have affected wildlife security during hunting seasons**
- 7. Proposed salvage treatments and road strategy may result in ineffective use of winter range areas**
- 8. More roads may need to be decommissioned and restricted than what Amendment 19 specifies**

Alternative 4 would comply with all existing Forest Plan standards, and no Forest Plan amendments would be required.

Salvage Harvest

Salvage harvest of trees affected by the fire would occur across approximately 2500 acres of the Moose fire area (refer to Map 2-6). A range of fire severity occurs within these proposed units, leaving a mosaic of forest conditions and variable amounts of live, dead and dying trees across the landscape. Because of this, an estimated 2150 acres of the total 2500 acres would have trees removed in the logging operation, and live trees, as well as many dead standing trees, would still remain within harvested areas. An estimate of 13.5 million board feet (mmbf) would be generated with implementation of this alternative. Refer to Table 2-8 for acreages and descriptions of the treatments.

Treatment features common to all proposed salvage units

In addition to the design criteria common to all alternatives listed in section III of this chapter, the following features are common to every salvage unit in Alternative 4:

In response to concerns related to sediment from road construction, no temporary roads would be constructed.

In order to reduce potential disturbance to wintering animals, winter logging would be prohibited under this alternative. This feature was included in response to concerns that management actions may result in ineffective use of winter range.

In response to public concerns regarding the amount of snags and down woody material retained, increased retention of snags and downed wood would occur under this alternative, compared to the other action alternatives. These ecosystem components are important for forest structural diversity (short and long term); habitat for numerous wildlife species; shade and protection on more exposed sites; long-term soil productivity and organic matter; soil erosion protection; and a host of other less understood ecological functions, such as providing a substrate for soil microorganisms and insect populations. Prescriptions would be followed for each unit to provide for this objective, taking into account fire severity and whether live trees remain or not; condition, size and species of trees; logging system and safety considerations (refer to Appendix A). Generally, snags and residual trees would be left in groups, with size ranging from several trees to several acres, depending upon terrain, logging system, unit sizes, numbers of live trees left, and other site specific factors. Leave groups would cover from 10-40% of a unit area, but most often in the 15-30% range.

Common to all salvage units would be the retention of all larch trees, live or dead, of all sizes. Also all Douglas-fir >18" in diameter that has been fire-killed with total crown consumption, would be left on site. If either these larch or Douglas-fir are tipped over or felled for safety reasons during the logging operation, they would not be removed but left for downed wood habitat.

All trees determined most likely to survive the direct or indirect affects of the fire, including bark beetle infestation and risk of infestation, would be left within the units (refer to “Post-fire Mortality Estimation Guidelines” in Appendix B). It should be understood that Douglas-fir beetle population buildup is of concern not only in the year immediately following the fire (2003), but in subsequent years as well, particularly in the next 2-4 years. Beetles will first attack and kill the trees most severely injured or killed by the fire itself, spreading to less damaged or undamaged trees in the same stand in subsequent years. Beetle activity can be very high for several years in fire-affected stands, and the majority of mortality in Douglas-fir frequently occurs as a result not due to the fire directly, but to beetle attacks in the years immediately following the fire (Gibson 2001).

Table 2-8 below provides a summary of the treatments proposed within the salvage units. Refer to Appendix A for the detailed discussion of condition within units, the specific treatments, and forest structure/snag/woody debris prescriptions applicable to each proposed salvage unit or unit group. Also refer to treatment features specific to each Forest Plan management area, which follows this table.

Table 2-8: Summary of treatment prescriptions for proposed salvage units in Alternative 4

Units	Fire Severity	Logging system	Acres	Treatment prescription
40 units: Acres=1441 Units 3a-b, 4, 5a-b, 6a-c, 7a-b, 8a-b, 9a-b, 10, 11, 12, 13, 17, 18, 19, 21, 26, 28, 29; 31-35; 43, 44, 48a-c, 49, 53, 61, 62, 65	High (80+% tree mortality, usually nearly 100%)	Skyline or skidder	745 (637 acres treated)	<ul style="list-style-type: none"> • Treatment areas range from 5 to over 200 acres, considering adjacency of units. Most treatment areas are less than 50 acres. • Salvage harvest would remove dead and dying trees across the units, either trees killed and damaged directly by the fire, infested with or susceptible to Douglas-fir or spruce bark beetles. Trees that meet the criteria outlined in the mortality guidelines (Appendix B) would be left on site. Treatment features specific to the management area would be applied, as described in the paragraphs following this table. • In all units, trees (live and dead) would be left on the site for forest structure/snag/coarse woody debris objectives, as described in paragraphs above under treatment features common to all units and in Appendix A. These trees would be left as scattered individuals (primarily in the skidder units), but mostly as small groups or (in the larger helicopter units) as intact patches of 2 to 10 or more acres in size, interspersed with the salvaged patches. • Patches would cover from 10-40% of the unit area, varying by unit depending upon site-specific conditions, units sizes and management objectives. Due to fire effects, individual leave trees, groups and patches would be dominated by dead trees. Patches and group would be dispersed across the unit area, centering on live trees or larger highly desirable snags if available; favor draw bottoms, streams or wet spots of any nature; be interconnected and irregularly shaped where possible; and follow a guideline of a maximum 600 foot distance between any two patches or to the unharvested forest edge. • Conifer seedlings would be planted across approx. 1110 acres after salvage, including western larch, Douglas-fir, ponderosa pine and western white pine.
		Helicopter	696 (645 acres treated)	

Units	Fire Severity	Logging system	Acres	Treatment prescription
30 units: Acres=1052 Units 1, 2a-b; 14,15,16a-b; 20, 22-24; 27, 30, 37; 40a-b, 41a- b, 42a-b; 45-47; 52; 56-59; 63; 66	Low to Moderate (30-70% tree mortality)	Skyline or skidder	541 (427 acres treated)	<ul style="list-style-type: none"> Units range from 5 to a little over 100 acres, though over 2/3 are less than 40 acres. These units were burned at moderate or low severity and contain variable amounts of live trees, though most of these trees have been burned to some degree by the fire. These trees occur as scattered individuals and in small groups and patches throughout the unit area (estimated to cover up to 60% of the area in some units, though usually more around 15%). These trees would be left intact within the unit as much as possible, leaving an irregular pattern across the landscape of salvaged and unsalvaged trees or groups of trees, with size and proportions dependent upon individual unit conditions. Where choices exist, leave groups should also be centered around areas of high numbers of live trees or desirable large snags, streams, and wet spots. In the larger units, a maximum of 600 feet distance between patches or to the unharvested forest edge should be used as a guideline. Salvage harvest is focused on removing trees directly killed by the fire, infested by or susceptible to bark beetles. The criteria outlined in the mortality guidelines (Appendix B) would be followed, as would the specific treatment features by management area, described in the narrative following this table. Conifer seedlings would be planted across an estimated 256 acres after salvage, including western larch, Douglas-fir, ponderosa pine and western white pine.
		Helicopter	511 (438 acres treated)	
TOTAL 70 Units			2493 (2147 acres treated)	

Salvage Treatment Features specific to areas with different land management objectives

Treatment variations occur among units depending upon the management area (MA). For Alternative 4, the description of these treatment features would be the same as described under Alternative 2 for MAs 9, 13, 15, and 13A. However, the shape, size and acreage of the treatment units have changed in some cases because of the design of this alternative. In response to public concerns regarding salvage harvest in inventoried roadless areas and the Wild and Scenic River Corridor, there would be no treatment within these areas, so the description under Inventoried Roadless Areas does not apply to Alternative 4.

MA 9, 13, and 15

(Total of 65 Units, approximately 2254 acres -- Units 1 through 13 and Units 18 through 66)

These lands are classified as suitable for timber management, with timber production a primary goal in MA 15, and allowed in MA 9 and 13 if compatible with whitetail deer (MA 9) and elk/mule deer (MA 13) winter range management goals. The objectives for the proposed salvage that occur within these management areas address two of the purposes of the project: to recover merchantable wood fiber affected by the Moose Fire and to reduce the expected threat of bark beetles in fire affected trees to other remaining live trees within and outside the Moose Fire area (refer to the purpose and need section in Chapter 1). Treatments would be the same as described under Alternative 2, except for the retention of all dead Douglas-fir > 18" diameter with crown consumed by the fire and all larch, as described earlier.

MA 13A (winter range)

(Five Units, approximately 239 acres -- Units 14, 15, 16a-b, and 17)

These lands are classified as unsuitable for timber management, with elk and mule deer winter range values of primary importance. Timber harvest can be used to improve or maintain these values. Proposed salvage treatments within these units are designed for the sole purpose of addressing the concern of potential Douglas-fir bark beetle population buildup within the Moose Fire area and its spread to surrounding lands. Treatments would be the same as described under Alternative 2, removing only beetle infested trees, except Alternative 4 includes the retention of

all dead Douglas-fir > 18” diameter with crown consumed by the fire (even if it is beetle infested) and all larch, as described earlier.

Beetle Funnel Traps/Use of Pheromones/Trap trees

All these other methods of beetle control would be applied across the same areas and in the same manner as described under Alternative 2 (except for treatments within inventoried roadless areas and the wild and scenic river corridor, which would not occur under Alternative 4).

Fuels Reduction

Two areas would be treated specifically to reduce current fuel loads and lower future fire risk and hazard adjacent to private property along the northern boundary of the fire area, and in the Big Creek Administrative site (Glacier Institute area). Treatment would spread across approximately 196 acres (refer to Table 2-9).

Table 2-9: Fuel reduction treatment areas in Alternative 4

Treatment area	Fire Severity	Logging system	Acres	Treatment prescription
Coal Creek	High (95+% tree mortality)	Ground (skidder)	67	<ul style="list-style-type: none"> • Areas proposed for fuel reduction activities are characterized by sapling and pole sized fire-killed lodgepole pine. A “thinning” type of prescription would be applied, with trees slashed, piled and burned, or utilized for a commercial product if possible, across the unit area. “Thinning” would be heaviest in the area closest to the private land boundary, leaving 20 or fewer trees per acre standing. More trees would be left as you move away from the private boundary, up to about 40 –80 tpa, creating a “feathering” effect of dead standing trees blending into the uncut forest. Surviving trees would be left. No treatment would occur in stream management zones or within 300’ of Coal Creek. • Maximum 15 tons/acre dead and down would be left on average over the unit. • Planting of fire-resistant species larch and Douglas-fir seedlings would occur across all acres following treatment.
Big Creek Admin. Site (Glacier Institute)	Low to High patch Mosaic (40-70% tree mortality)	Ground (skidder)	129	<ul style="list-style-type: none"> • Areas proposed for fuel reduction activities are mainly small diameter lodgepole, with Douglas-fir and larch in some areas. Larger diameter, >9” dbh trees occur on some lower slopes and in the areas adjacent to Big Creek and to Glacier Institute. Mortality varies from near 100% fire killed trees to some small unburned patches in areas near Glacier Institute buildings. • A “thinning” prescription would be applied across most of the area, with removal only of dead trees. They would be slashed, piled and burned, or utilized for a commercial product if possible. Thinning would be at variable densities, from about 30 up to 70 trees per acre left, blending into the surrounding uncut forest. All live trees would be left, as well as any additional dead or dying trees necessary to meet desired tree density. Trees may be left in groups, patches or individuals to create a diverse structure and appearance. • Maximum 15 tons/acre dead and down would be left on average over the area. • Desired conditions of open forest with low fuel loadings would be maintained with thinning and/or prescribed fire into the future. Planting of more fire-resistant trees (ponderosa pine, larch and Douglas-fir) at wide spacing would occur across an estimated 100 acres. • Anti-aggregate pheromone MCH would be applied in the unburned region near the Glacier Institute to protect remaining live Douglas-fir that are at high risk of Douglas-fir beetle infestation. These are valuable trees for aesthetic reasons, as well as being about the only live larger trees left surviving for some distance.

Other design features of Alternative 4

Road Management

In 1995, Amendment 19 to the Flathead Forest Plan established new Forest-wide objectives and standards for grizzly bear security on the Flathead National Forest to meet long-term conservation needs of this threatened

species. Amendment 19 established short-term (five years) and long-term (ten years) standards for open motorized access density, total motorized access density and security core area, in areas known as “BMU Subunits.” The five-year period has been surpassed, and the ten-year period will be approaching within a few years. During the Amendment 19 planning process, the portion of the Flathead National Forest that occurred within the grizzly bear recovery zone (includes all of the Glacier View Ranger District) was subdivided into BMU Subunits that approximate the size of the home range for an adult female grizzly bear. The Moose Fire affected two of these BMU Subunits: Werner Creek (located in the upper drainage of Big Creek) and Lower Big Creek. These two BMU Subunits are not in compliance with the five or ten-year access density standards from Amendment 19 (refer to Table 2-10).

However, Amendment 19’s open motorized access density standards have been met temporarily within both subunits via an Emergency Special Closure Order signed on April 1, 2002. This Special Order restricted approximately 21 miles of open road within the two subunits by temporary gates. This Special Order will be effective for one year. As a result, the five and ten-year open motorized access density standards specified from Amendment 19 is currently met within the two subunits. The roads that have been restricted by gates from this Special Order are some of the same open roads that have been proposed for restriction in Alternative 4. Table 2-10 does not display the existing situation as if this Emergency Special Order road closure was in place; to display this information, existing situation open motorized access density would be shown as 19 percent for both Werner and Lower Big Creek grizzly bear subunits.

In response to public concerns regarding reductions of wildlife security (specifically grizzly bear) resulting from the fire, Alternative 4 proposes to restrict more open roads than are necessary to meet open motorized access standards from Amendment 19 because of the issue related to wildlife/grizzly bear security. In addition, this alternative also proposes a seasonal closure to motorized access on the entire length of Big Creek Canyon Creek Road 316 (on those portions currently open to motorized use) during the spring (April and May) until hiding cover has become established. Spring is the time that bears are the most likely to be impacted by roads. This alternative also proposes to decommission more roads than is necessary to meet total motorized access standards or security core because of the issue related to accelerated water runoff.

Alternative 4 would propose to modify travel management within the Werner Creek and Lower Big Creek grizzly bear subunits to meet open motorized access density, total motorized access density, and security core specified in the Forest Plan ten-year standards (refer to Map 2-7). Management of approximately 190 miles of roads within these two subunits would then be consistent with the objectives and standards of Amendment 19.

Table 2-10: Comparison of Alternative 4 with Amendment 19 Standards

WERNER CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 4
Open Motorized Access Density	31%	18%
Total Motorized Access Density	41%	12%
Security Core	41%	75%
LOWER BIG CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 4
Open Motorized Access Density	25%	16%
Total Motorized Access Density	34%	7%
Security Core	50%	77%
AMENDMENT 19 STANDARDS	5 year	10 year
Open Motorized Access Density (<1 mi/mi ²)	≤ 19%	≤ 19%
Total Motorized Access Density (<2 mi/mi ²)	≤ 24%	≤ 19%
Security Core	≥ 64%	≥ 68%

Yearlong road restrictions using gates, berms, and road decommissioning would reduce road densities for increased grizzly bear habitat security. Road decommissioning would include actions that would minimize the potential for

future sedimentation of streams or noxious weed development. These actions would include placement of numerous waterbars, culvert removals, grass seeding, slash or debris placement on roads, planting shrubs, and physical alteration of the road template. Culvert removals and stream restoration would occur where roads to be decommissioned intersect streams. To reduce the amount of ground disturbed, cross drain culverts would typically not be removed but waterbars would be placed nearby. The amount of physical altering of the road template from culvert removal or waterbar creation would vary according to the sites involved.

There are approximately 31 miles of road proposed for decommissioning that are also displayed as snowmobile routes on the Glacier View Ranger District Snowmobile Access Information Map. Decommissioning activities on roads that are designated snowmobile routes according to the Flathead Winter Recreation Agreement would be designed to accommodate safe and reasonable snowmobile use. These actions would include flattening slopes into and out of culvert removal areas and in some cases placing half round culverts or bridges over streams. Upon completion of work, the definition of road decommissioning in Forest Plan Appendix TT would be met.

A new trailhead would be constructed at the junction of Elelelum Road 5272 and Big Creek Canyon Creek Road 316 to replace the existing trailhead that would be lost due to road decommissioning efforts. In addition, Elelelum Road 5272 would be decommissioned and then converted to a low use trail allowing motorcycle use.

All road mileages displayed in the following table are estimated from computer analysis. Actual miles affected during implementation may be more or less than shown in the tables. However, road changes displayed on the maps in this EIS would be implemented. Approximately 14 miles and 11 miles of open yearlong/seasonally open road would be restricted yearlong within the Werner Creek and Lower Big Creek grizzly bear subunits, respectively. Also, approximately 87 miles of road would be decommissioned in both grizzly bear subunits.

Table 2-11: Alternative 4 Travel Management Status

Werner Creek Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 4
Open Yearlong	28 miles	0 miles
Open Seasonally	3 miles	17 miles
Closed Yearlong/Gate	33 miles	3 miles
Closed Yearlong/Berm	12 miles	15 miles
Closed Yearlong/Natural Revegetated	2 miles	0 miles
Decommissioned Roads (since 1995)	5 miles	5 miles
Proposed to be Decommissioned	N/A	29 miles; (also 12 more miles to be decommissioned under other past decisions)
Lower Big Creek Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 4
Open Yearlong	21 miles	8 miles
Open Seasonally	4 miles	6 miles
Closed Yearlong/Gate	34 miles	1 miles
Closed Yearlong/Berm	24 miles	8 mile
Closed Yearlong/Natural Revegetated	4 miles	0 miles
Decommissioned Roads (since 1995)	11 miles	11 miles
County Road – North Fork Road	8 miles	8 miles
Small Private Roads	2 miles	2 miles
Proposed to be Decommissioned	N/A	58 miles; (also 7 more miles to be decommissioned under other past decisions)

Riparian Habitat Conservation Area Widths

In response to concerns that Riparian Habitat Conservation Areas (RHCA) may not be large enough to compensate for increased sediment levels, RHCA widths would be 300’ on either side of all streams, including ephemeral as well as perennial streams with Alternative 4.

Map 2-6: Alternative 4 Vegetation Treatments Map

See adjacent color insert.

Map 2-7 Alternative 4 Road Management Map

See adjacent color insert.

Alternative 5

Alternative 5 was developed to clearly address the following Significant Issues, while responding to the purpose and need for action:

- 6. The fire may have affected wildlife security during hunting seasons**
- 10. Big Creek Road 316 should be re-opened**

Alternative 5 would comply with all existing Forest Plan standards, and no Forest Plan amendments would be required.

Salvage Harvest

All the salvage harvest units and treatment prescriptions are exactly the same as proposed under Alternative 2. Refer to Table 2-1 for acreages and descriptions of the treatments. Also, refer to Map 2-2 for a map of salvage treatment areas.

Treatment features common to all proposed salvage units

These features would be identical to those described for the Proposed Action Alternative 2.

Salvage Treatment Features specific to areas with different land management objectives

The units treated and the description of these treatment features would be the same as described under Alternative 2. Salvage is proposed within Management Areas 9, 13, 15, 13A and 18 with seven units proposed for salvage in inventoried roadless areas,

Beetle Funnel traps/Use of Pheromones/Trap trees

All these other methods of beetle control would be applied across the same areas and in the same manner as described under Alternative 2. Refer to Map 2-2 for a map of these treatment areas.

Fuels Reduction

The same three areas as described under Alternative 2 would be treated, specifically to reduce current fuel loads and lower future fire risk. Refer to Table 2-2 under Alternative 2. Approximately 235 acres total would be treated. Refer to Map 2-2 for a map of these treatment areas.

Other design features of Alternative 5

Road Management

In 1995, Amendment 19 to the Flathead Forest Plan established new Forest-wide objectives and standards for grizzly bear security on the Flathead National Forest to meet long-term conservation needs of this threatened species. Amendment 19 established short-term (five years) and long-term (ten years) standards for open motorized access density, total motorized access density and security core area, in areas known as “BMU Subunits.” The five-year period has been surpassed, and the ten-year period will be approaching within a few years. During the Amendment 19 planning process, the portion of the Flathead National Forest that occurred within the grizzly bear recovery zone (includes all of the Glacier View Ranger District) was subdivided into BMU Subunits that approximate the size of the home range for an adult female grizzly bear. The Moose Fire affected two of these BMU Subunits: Werner Creek (located in the upper drainage of Big Creek) and Lower Big Creek. These two BMU Subunits are not in compliance with the five or ten-year access density standards from Amendment 19 (refer to Table 2-12).

However, Amendment 19’s open motorized access density standards have been met temporarily within both subunits via an Emergency Special Closure Order signed on April 1, 2002. This Special Order restricted approximately 21 miles of open road within the 2 subunits by temporary gates. This Special Order will be effective for one year. As a result, the five and ten-year open motorized access density standard specified from Amendment 19 is currently met within the two subunits. The roads that have been restricted by gates from this Special Order are some of the same open roads that have been proposed for restriction in Alternative 5. Table 2-12 does not display the existing situation as if this Emergency Special Order road closure was in place; to display this information, existing situation open motorized access density would be shown as 19% for both Werner and Lower Big Creek grizzly bear subunits.

Alternative 5 would propose to modify travel management within the Werner Creek and Lower Big Creek grizzly bear subunits to meet open motorized access density, total motorized access density, and security core specified in the Forest Plan ten-year standards (refer to Map 2-8). Management of approximately 190 miles of roads within these two subunits would be consistent with the objectives and standards of Amendment 19.

Table 2-12: Comparison of Alternative 5 with Amendment 19 Standard

WERNER CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 5
Open Motorized Access Density	31%	18%
Total Motorized Access Density	41%	19%
Security Core	41%	68%
LOWER BIG CREEK GRIZZLY BEAR SUBUNIT	Existing Alt 1	Alternative 5
Open Motorized Access Density	25%	19%
Total Motorized Access Density	34%	19%
Security Core	50%	68%
AMENDMENT 19 STANDARD	5 year	10 year
Open Motorized Access Density (<1 mi/mi ²)	≤ 19%	≤ 19%
Total Motorized Access Density (<2 mi/mi ²)	≤ 24%	≤ 19%
Security Core	≥ 64%	≥ 68%

Yearlong road restrictions using gates, berms, and road decommissioning would reduce road densities for increased grizzly bear habitat security. Road decommissioning would include actions that would minimize the potential for future sedimentation of streams or noxious weed development. These actions would include placement of numerous waterbars, culvert removals, grass seeding, slash or debris placement on roads, planting shrubs, and physical alteration of the road template. Culvert removals and stream restoration would occur where roads to be decommissioned intersect streams. To reduce the amount of ground disturbed, cross-drain culverts would typically not be removed but waterbars would be placed nearby. The amount of physical altering of the road template from culvert removal or waterbar creation would vary according to the sites involved.

There are approximately 9 miles of road proposed for decommissioning that are also displayed as snowmobile routes on the Glacier View Ranger District Snowmobile Access Information Map. Decommissioning activities on roads that are designated snowmobile routes according to the Flathead Winter Recreation Agreement would be designed to accommodate safe and reasonable snowmobile use. These actions would include flattening slopes into and out of culvert removal areas and in some cases placing half round culverts or bridges over streams. Upon completion of work, the definition of road decommissioning in Forest Plan Appendix TT would be met.

All road mileages displayed in the following table are estimated from computer analysis. Actual miles affected during implementation may be more or less than shown in the tables. However, road changes displayed on the maps in this EIS would be implemented. Approximately 14 miles and 7 miles of open yearlong/seasonally open road would be

restricted yearlong within the Werner Creek and Lower Big Creek grizzly bear subunits, respectively. Also, approximately 56 miles of road would be decommissioned in both grizzly bear subunits.

Table 2-13: Alternative 5 Travel Management Status

Werner Creek Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 5
Open Yearlong	28 miles	8 miles
Open Seasonally	3 miles	9 miles
Closed Yearlong/Gate	33 miles	14 miles
Closed Yearlong/Berm	12 miles	15 miles
Closed Yearlong/Natural Revegetated	2 miles	0 miles
Decommissioned Roads (since 1995)	5 miles	5 miles
Proposed to be Decommissioned	N/A	18 miles; (also 12 more miles to be decommissioned under other past decisions)
Lower Big Creek Grizzly Bear Subunit	Exist Estimated Miles (without current temporary special order in place)	Total estimated miles after implementation of Alt 5
Open Yearlong	21 miles	14 miles
Open Seasonally	4 miles	4 miles
Closed Yearlong/Gate	34 miles	6 miles
Closed Yearlong/Berm	24 miles	19 mile
Closed Yearlong/Natural Revegetated	4 miles	0 miles
Decommissioned Roads (since 1995)	11 miles	11 miles
County Road – North Fork Road	8 miles	8 miles
Small Private Roads	2 miles	2 miles
Proposed to be Decommissioned	N/A	38 miles; (also 7 more miles to be decommissioned under other past decisions)

The road strategy proposed in Alternative 5 is similar to Alternative 2 in that both alternatives meet the ten-year access density standards from Amendment 19. The main difference is that Alternative 5 would restrict motorized access yearlong via gates and berms on the Hallowat Road 315 and the Moose Lake Road 5207, which would allow Big Creek Canyon Creek Road 316 to be open for part of the year. This is in response to public comments regarding the restriction of motorized use on Road #316. Conventional vehicle use (i.e. not snowmobiles) are restricted yearlong on the Big Creek Canyon Creek Road 316 by a decision on the Big Mountain Ski Area Expansion Project several years ago. In Alternative 5, this road would be restricted seasonally by a gate at the junction with Nicola Creek Werner Creek Road 1692; motorized access would be available from July 1 thru October 14 to a point approximately one mile west of the junction with Road 1696 where it would be restricted with a yearlong gate. Snowmobile access on this part of the Big Creek Canyon Creek Road 316 would be available from December 1 thru April 14. In response to public comments about reduced habitat security during hunting season, the seasonal closure period would prohibit motorized use during hunting season and winter months, thereby providing a greater level of habitat security during this time.

A new trailhead would be constructed at the junction with the Hallowat Road 315 and Big Creek Canyon Creek Road 316 to replace the existing trailhead that is located at Moose Lake. In addition, the campground at Moose Lake would be removed and rehabilitated.

The other change from Alternative 2 is that Werner Divide Road 1658 would be restricted seasonally by a gate at the divide and by the Road 316 gate at the junction with Nicola Creek Werner Creek Road 1692. Motorized access would be available July 1 thru October 14. Snowmobile access would be available from December 1 thru April 15.

Map 2-8 Alternative 5 Road Management Map

See adjacent color insert.

V. ALTERNATIVES CONSIDERED BUT NOT GIVEN DETAILED STUDY

During the review of internal and public issues and development of alternatives, The Interdisciplinary Team considered four additional alternatives, which were subsequently eliminated from detailed study. These alternatives are briefly presented here, along with the rationale for eliminating them from detailed study.

Alternative 6

Concerns were expressed that the project area needs to be rehabilitated and restored through such actions as road decommissioning and reducing sediment sources; this would include no salvage logging.

In response to these concerns, an alternative was considered that would involve only restoration and rehabilitation activities and no salvage harvest. Road management restoration actions are included as a feature in all of the alternatives. In addition, other rehabilitation actions are ongoing or planned to occur within the fire area (refer to past, ongoing, and foreseeable actions in Chapter 3). A “no salvage logging” alternative was not included for detailed study because it would not meet the purpose of and need for action. One of the purposes of the project is to recover merchantable wood fiber and contribute to the long-term yield of forest products, which is a Forest Plan goal. This would not be achieved if salvaging of merchantable wood did not take place. Another purpose of the project is to reduce future fire risk and hazard by reducing future fuel accumulations caused by the Moose Fire adjacent to private property or administrative sites. Thinning trees and removing them by burning or via commercial means is the only option to reduce future fuel hazards.

The final purpose of the project is to decrease potential mortality caused by bark beetles to remaining live Douglas-fir and spruce trees within and outside the Moose Fire area. In developing the proposed action, all available bark beetle management methods were considered and evaluated in light of the situation unique to the Moose Fire area. To even approach meeting this purpose for the project and effectively address potentially high beetle population levels, an integrated approach to beetle control is necessary. This would potentially include use of MCH in localized areas, trap tree felling where it is effective and feasible, pheromone baited beetle traps in limited areas to reduce spruce beetle, and salvage removal of a substantial proportion of the beetle susceptible and beetle infested trees across the fire area. Refer to description of treatments under the proposed action and its alternatives in other sections of this chapter for the types and locations of methods proposed for beetle treatments.

The proposed action that was sent to the public in December of 2001 has been modified somewhat based on new information on stand conditions and applicability of different beetle control methods (refer to discussion in Chapter 1). A major change of the current proposal as compared to the original proposal is the elimination of proposed salvage activities in the Big Creek riparian area, and replacing this with pheromone-baited beetle traps to reduce potential spruce beetle populations. This method lends itself well to the spruce beetle risk situation unique to the Moose Fire, where susceptible stands are relatively small in total acreage, easily accessible, and vulnerable trees are concentrated in relatively small patches. It is expected to be highly effective in reducing beetle populations across the acres treated (refer to Chapter 3 discussion).

Under all action alternatives, use of the anti-attractant pheromone ‘MCH’ would be used to protect live Douglas-fir susceptible to bark beetle in two sites within the fire area: the Big Creek Administrative Site (Glacier Institute) and portions of the Wild and Scenic River corridor. This is a very effective tool for use on small, more localized sites. These two sites are readily accessible, and are considered to have unique values to the public. This treatment would be applied for as long as the threat of beetle attack remains (perhaps 2-4 years). There is no such anti-attractant pheromone available for use with spruce beetle. Refer to the description of these MCH treatments under other sections of this chapter.

For Douglas-fir beetle, widespread use of pheromones alone (either the attractant beetle traps or the anti-attractant MCH) to address the concern of bark beetle outbreak would not be cost efficient and would not effectively limit beetle population buildup or spread. Where spruce beetle susceptible stands are small, succinct, and concentrated patches, Douglas-fir beetle susceptible stands and trees are scattered across many thousands of acres – many poorly accessible, on steep slopes, and at some distance from roads. Over 700 acres of Douglas-fir stands are at high risk and over 2400 acres at moderate risk. The likelihood for Douglas-fir beetle infestation is higher than that of

spruce beetle, with high beetle populations existing in the surrounding regions. Refer to the vegetation section of Chapter 3 for a full beetle analysis.

Trap trees may be used on a limited basis to aid in the control of Douglas-fir bark beetles (refer to description under the proposed action in this chapter). Use of trap trees will probably not be necessary for spruce beetle control as long as full implementation of the pheromone-baited beetle traps is completed. The spruce affected by the fire, particularly if they have fallen over, are already functioning very effectively as “trap trees.” They are highly attractive to spruce beetles and quite capable of attracting high numbers of beetles in 2002. The issue at this point in time is how we are going to address the already very high number of “trap trees” naturally created by the fire, and this issue guided the development of the current proposed action.

Other non-salvage methods of beetle control, such as burning, debarking, or application of pesticide to beetle infested trees, are not very applicable, feasible or useful tools in this Moose Fire situation. Debarking or burning trees or applying pesticide are all very labor-intensive activities, and thus less economically feasible on a large scale. Upwards of \$500 per acre would be required to effectively treat areas by these methods. In addition, application of pesticides, particularly within riparian areas, is not recommended, does not comply with Forest Plan management area direction and could cause unacceptable resource effects to other vegetation or to fish habitat. Project record section J provides more detail on the use and costs of these other beetle control measures.

Alternative 7

Some people stated that the proposed action does not salvage enough trees in the fire-affected area to address beetle concerns, economic opportunities, and reburn potential due to heavy fuels.

In response to these concerns, all national forest system lands within the Moose Fire perimeter were fully evaluated for possible resource concerns or needs, and possible actions to address these concerns. This included biological and social concerns. Some of this evaluation occurred during the Burn Area Emergency Rehabilitation (BAER) process, which began even while the fire was still active. Some of this evaluation occurred during the post-fire assessment stage, completed in the fall of 2001. Also, some of this occurred last fall by this interdisciplinary team in the preparation and development of the site-specific actions as proposed in this EIS. Two primary purposes for the proposed action revolve around our concern for greatly increased beetle populations in the project area and for recovery of merchantable wood fiber. We feel the proposal as developed addresses these concerns very well, considering the condition of the burned area and the many other resource values to evaluate and protect.

An alternative was considered that would involve more salvage logging in the burned area. Apart from the proposed treatment areas, there are few other areas within the fire that either contain burned forest at high risk of beetle infestation, or burned forest that contains trees of merchantable value that could be harvested for wood fiber in an economically viable manner. Further details on the condition of lands not proposed for salvage is provided in the project record, section O. A brief summary is provided below. All acres are approximate.

Under the proposed action, about 3700 acres out of a total 35,350 acres (national forest system lands only) within the Moose Fire are proposed for salvage. Of the remaining 31,650 acres:

- 4350 acres are unburned;
- 680 acres are within a small watershed near Skookoleel Creek that burned at very high intensity, and soil concerns led us to avoid disturbance of any kind in this drainage;
- 3280 acres are past regeneration harvests, previously dominated pre-fire by seedling and sapling-sized trees;
- 9450 acres are on lands described as unsuitable for timber management under the Forest Plan. These include higher elevation forest, riparian areas, rocky marginal sites, etc.;
- 11,570 acres are dominated by stands with <9” dbh average diameter of trees. These areas were burned in stand replacement fires in 1910, 1926 and 1919. A few spots are on gentler ground where ground-based (skidder/tractor) logging systems might be used. However, the vast majority is on steep ground where cable (with road access) or helicopter logging is necessary. Because of the small diameter of the wood and the logging system access problems, it would not be economically feasible to

log. This is accentuated by the fact that most of these trees will deteriorate rapidly and are likely to be of little economic value by the time the required decision-making process is completed and logging can begin. The *Moose Post-Fire Project* does not preclude the potential future removal of smaller diameter trees for post and pole material in areas that may be better accessible such as adjacent to the North Fork Road if it was so desired. However, nothing has been proposed that would make this action foreseeable.

This leaves about 2650 acres of forest potentially available for salvage but not proposed in any of the alternatives. Most of these areas have environmental concerns associated with potential salvage that influenced the decision not to treat. A few hundred of the acres are outside the Big Creek watershed (mainly in Coal Creek) and were eliminated from consideration for salvage. This was because ground-disturbing activities in additional watersheds other than Big Creek would greatly increase the size and complexity (and thus time) it would have taken to complete the environmental analysis process. Nearly a quarter (600 acres) of the 2650 acres are within Inventoried Roadless Areas. Because of public and agency concerns about salvage harvest within inventoried roadless areas, proposed salvage in inventoried roadless areas is limited to only those areas at relatively high risk of beetles infestation. Other acres were left to provide larger diameter snag habitat in regions of extensive past timber harvest. The remaining 2050 acres are a mix of marginal sites, with poor soils and productivity, or uneconomic for logging.

Alternative 8

Concerns were expressed that not salvaging trees in riparian areas may result in increased reburn potential from heavy fuels; channel instability from debris jams; breeding habitat for bark beetles; and increased nutrient loading in Big Creek.

In response, an alternative was considered that salvaged trees in riparian areas. The proposed action originally provided to the public for review in January 2002 included close to a thousand acres of harvest within riparian areas to address the spruce beetle concern. However, we decided to not consider this alternative further because intensive field reconnaissance of the riparian areas in Big Creek in the time period since the proposed action was sent to the public has allowed accurate identification and mapping of the conditions of the fire-damaged spruce stands. This review has revealed fewer acres of spruce at high-risk to bark beetle than were originally estimated. In addition, the high cost and complexities of logging on these sensitive sites and often-isolated patches was confirmed. Also considered was the high level of concern from oversight government agencies, as well as many members of the public, for potential effects of logging on riparian habitat values and on the threatened bull trout. Instead, to address the concern for spruce beetle outbreak, pheromone-baited beetle funnel traps were proposed in riparian sites if found to be infested with beetles.

Alternative 9

A concern was voiced that the salvage harvest should not create any openings greater than 40 acres.

In response, an alternative was considered that would not create openings greater than 40 acres. This alternative was not considered for detailed study because of the nature of the proposed actions and the conditions of stands proposed for treatment. The U.S. Forest Service Manual 2470, prepared in accordance with provisions of the National Forest Management Act, provides broad management direction to Forests regarding opening size limitations. It states "size of tree openings created by even-aged silviculture will normally be 40 acres or less. Creation of larger openings will require 60-day public review and Regional Forester approval, with the following exceptions." One of the exceptions is the following: "Where natural catastrophic events, such as fire, windstorms, or insect and disease attacks have occurred, 40 acres may be exceeded without the 60-day review and Regional Forester approval, provided that the public is notified in advance and the environmental analysis supports the decision." The Moose Fire created large areas of fire-killed forest that will provide openings on the landscape for some time. The *Moose Post-Fire Project* proposes salvage harvest in units of greater than 40 acres. Support and analysis of these units is provided in the vegetation section of Chapter 3. Many standing live and dead trees will remain within units after salvage (particularly units logged with ground based logging systems) – unmerchantable trees, individual trees retained for snag requirements, groups and patches of trees live and dead left to meet other

resource objectives, such as snag/downed wood and winter range habitat conditions (refer to Appendix A). Proposed tree planting within these units would advance the reforestation process, accelerating their return to a “non-open” condition.

VI. MONITORING

Monitoring activities can be divided into Forest Plan monitoring and project-specific monitoring. NFMA requires that national forests monitor and evaluate their forest plans (36 CFR 219.11). Chapter 4 of the Forest Plan includes monitoring and evaluation activities to be conducted as part of Forest Plan implementation. There are three categories of Forest Plan monitoring:

Implementation monitoring. Used to determine if the goals, objectives, standards, guidelines, and practices are implemented in accordance with the Forest Plan.

Effectiveness monitoring. Used to determine if the Forest Plan standards, guidelines, and practices, as designed and implemented, are effective in accomplishing the desired result.

Validation monitoring. Used to determine whether the data, assumptions, and estimated effects used in developing the Forest Plan are correct.

Effectiveness and validation monitoring are not typically done as part of project implementation. However, implementation monitoring, and any additional project-specific monitoring are important aspects of the project.

Implementation Monitoring

Routine implementation monitoring is part of the administration of all project contracts. They monitor performance relative to contract requirements. Input by resource staff specialists (such as fisheries biologists, soil scientists, hydrologists, and engineers), is regularly requested during this implementation monitoring process. These specialists provide technical advice when questions arise during project implementation.

Fisheries/Soils/Water

The monitoring plan for fisheries, soils, and water is found in Appendix E.

Best Management Practices

Flathead National Forest personnel conduct an annual review of BMP implementation and effectiveness. The results of this and other monitoring are summarized in a *Forest Plan Annual Monitoring and Evaluation Report*. This report provides information about how well management direction for the Forest is being carried out, and measures the accomplishment of anticipated outputs, activities, and effects.

Sensitive Plants

Sensitive plant field surveys will be conducted in the summer of 2002 in proposed treatment areas. The findings and determination calls for the effects on all species listed as sensitive for the Flathead National Forest will be documented in the Final EIS for this project. If a sensitive plant is found, appropriate mitigation measures would be incorporated into the final design for the project.

Noxious Weeds

Extensive monitoring of the Moose Fire area for the presence of noxious and invasive weed species will begin in the summer of 2002. Some of this monitoring was identified and was approved for funding under the Burn Area Emergency Rehabilitation Plan (BAER). Survey information will be used to determine needs for weed control before any activity.

Surveys will be conducted following vegetation and road treatments to identify any spread of weeds caused by the fire or this action. Weed treatments will be prioritized and scheduled where appropriate. Goals are to prevent any new infestations and to control any existing infestations to the pre-fire level. Weed treatments fall under the authority and guidance of the Flathead National Forest Noxious and Invasive Weed Control EA (March 2001).

Bark Beetle Activity

Surveys would be conducted across all areas at risk to bark beetles within the fire perimeter to monitor beetle populations and spread, beginning in the summer of 2002. Monitoring would continue in succeeding years until the point that beetle populations have diminished to levels that pose little concern. This information would help determine the effectiveness of control activities and to design any continuing or future beetle control actions.

Road decommissioning activities

Surveys of roads to be decommissioned would be conducted to determine the status of noxious weed infestation and assess appropriate treatments. Any treatments conducted for noxious weeds would be monitored and evaluated for success.

Fire

District fire personnel would monitor moisture conditions to insure that post harvest slash burning is done when soil and duff moisture content would promote fires that maintain organic matter and nutrients on the burned areas.

Wildlife

Snag and downed log quantities would be monitored to determine if timber sale activities maintained expected and prescribed levels of these components. This would be done after the first several units are harvested.

The timing and effectiveness of road closures would be monitored and closure structures maintained.

Monitoring of big game use would focus on understanding ungulate use of post-fire habitat, including locating heavy use areas, forage use, and animal counts. Monitoring would occur during January, February, and March and for at least three winters.

Effectiveness Monitoring

Vegetation treatment areas

Surveys would be conducted on all treatment areas after salvage activity is completed to determine whether treatment objectives were effective and met the desired vegetation conditions (including retention of snags and other trees, downed wood amounts). Using this information, sites will be evaluated for fuel reduction and reforestation needs, or other post harvest actions. In those areas where planting or natural regeneration is prescribed, surveys would be conducted during the five years following completion of regeneration efforts to monitor survival and growth of the seedlings.

VII. COMPARISON OF ALTERNATIVES

Comparison of Features in the Alternatives

The following table summarizes and compares each alternative's features:

Table 2-14: Comparison of Features of the Alternatives

Features of the Alternatives	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Salvage Acres	0	3721 acres (3024 treated acres) Helicopter – 2031 Skyline – 886 Skidder -804	3238 acres (2704 treated acres) Helicopter – 1548 Skyline – 886 Skidder - 804	2493 acres (2147 treated acres) Helicopter – 1266 Skyline – 594 Skidder - 613	3721 acres (3024 treated acres) Helicopter – 2031 Skyline – 886 Skidder -804
All salvage units would have many trees remaining after harvest to provide for desired forest structure, snag habitat for wildlife, shade on more exposed sites, soil erosion protections, and long-term soil productivity (see "Snags, Large Diameter Downed Wood" below).					
Snags, large diameter downed wood left on site after logging	N/A	All larch >18" diameter, live and dead, would be left.	All larch >18" diameter, live and dead, would be left.	- All larch (all sizes) live and dead, would be left. - All severely burned Douglas-fir > 18" diameter would be left (bole deeply blackened, small branches of tree crown burned up)	All larch >18" diameter, live and dead, would be left.
<i>Common to All Action Alternatives:</i>					
<ul style="list-style-type: none"> o Live and dead trees would be left in all units, in small groups or larger patches several acres in size. Leave groups would cover from 10-75% of the treatment area, but most commonly in the 15-30% range. o Live trees most likely to survive direct and indirect effects of fire would be left. o Trees small or large that do not make a merchantable product would be left on site; o High value snags within 200 feet of an open road would be signed to protect from firewood cutters 					
Conifer Planting		1897 acres	1802 acres	1533 acres	1897 acres
Timber Volume (mbf)	0	27062	23597	13531	27062
Salvage acres in inventoried roadless areas	0	483 total acres (320 treated acres: about 30% in leave patches)	0	0	483 total acres (320 treated acres: about 30% in leave patches)
Only Douglas-fir and spruce trees infested with bark beetles would be removed.					
Salvage acres in Wild and Scenic River corridor	0	16	16	0	16
Only Douglas-fir and spruce trees infested with bark beetles would be removed.					
May include some winter logging	N/A	Yes	Yes	No – winter logging not allowed to avoid wildlife disturbance	Yes
Temporary road miles (No permanent roads will be constructed)	0	0.9	0.9	0	0.9
Total acres of fuels reduction treatments	0	235 (all three sites)	235 (all three sites)	196 (eliminates the campground unit)	235 (all three sites)

Features of the Alternatives	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Non-salvage methods of beetle control, including funnel traps/ pheromones (natural chemicals produced by beetles) and Trap Tree use	0	<i>Common to all Action Alternatives:</i> <ul style="list-style-type: none"> ○ 150-330 acres where spruce beetle funnel traps would be used to attract and capture beetles emerging from the fire injured/killed trees before they have a chance to spread and attack live spruce trees outside the fire area. ○ Using a "repellent" pheromone MCH on live Douglas-fir trees in areas considered to have unique values (the Glacier Institute site and within the Wild & Scenic River corridor). This would protect them from beetle attack. ○ Using "trap trees" to more effectively control potential spread of Douglas-fir bark beetles in areas where salvage of beetle infested trees is delayed until 2003 or later. Trap trees are live trees that are cut and left on the site (only 2-4 trees per acre are needed), which are extremely attractive to beetles, and are designed to draw in as many beetles as possible as they emerging from nearby infested trees. 			
Miles of roads to be decommissioned in Big Creek watershed	0	57	56	87	56
Snowmobile consideration on decommissioned roads	N/A	Stream-aligned culverts would be removed on decommissioned roads; methods such as half culverts would be used to provide access over these areas	Some stream-aligned culverts may not be removed on decommissioned roads; some half culverts may be used; roads would be converted to winter system snowmobile trails	Stream-aligned culverts would be removed on decommissioned roads; methods such as half culverts would be used to provide access over these areas	Stream-aligned culverts would be removed on decommissioned roads; methods such as half culverts would be used to provide access over these areas
Project-specific amendment to Forest Plan	N/A	No	Yes to A-19 1) to allow some stream-aligned culverts to remain in place on decommissioned roads (see above). 2) to modify ORD and security core 10 yr standards in Werner Creek Subunit	No	No

Table 2-15: Comparison of Road Management (major road segments) by Alternative

Road Segment	Exist. Situation Prior to Temporary Special Order	Exist. Situation After Temporary Special Order signed 4/1/02	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Alternative 5
WERNER CREEK GRIZZLY BEAR SUBUNIT						
Werner Divide Road 1658	Restricted seasonally; conventional vehicle motorized access available from April 15 thru November 30 from the jct. with Big Creek Road 316 to the divide. Snowmobile access available December 1 thru April 15.	Restricted for one year by a gate at the divide and by the Road 316 gate at the jct. with Nicola Creek Road 1692. Snowmobile access available December 1 thru April 15.	Restricted all year by a gate at the divide and by the Road 316 gate at the jct. with Nicola Creek Road 1692. Snowmobile access available December 1 thru April 15.	Restricted seasonally; conventional vehicle motorized access available July 1 thru October 14 from the jct. with Big Creek Road 316 to the divide. Snowmobile access available December 1 thru April 15.	Restricted all year by a gate at the divide and by the Road 316 gate at the jct. with Nicola Creek Road 1692. Snowmobile access available December 1 thru April 15.	Restricted seasonally by a gate at the divide and by the Road 316 gate at the jct. with Nicola Creek Road 1692. Motorized access available July 1 thru October 14. Snowmobile access available December 1 thru April 15.
Hallowat Creek Road 315 (to jct with Road 5207)	Open all year	Open all year	Open all year	Restricted seasonally with a gate beyond mile 3.0, the jct. with Werner Creek Road 5261; motorized access available from July 1 thru March 31.	Restricted seasonally due to a gate on Big Creek Road 316 at the jct. with the McGinnis Creek Road 803; motorized access would be allowed from June 1 thru March 30.	Restricted all year by a gate at the jct. with Big Creek Road 316. Road 5207 to Moose Lake would also be affected by this restriction. Road 315 would be used as a trail to provide access to Moose Lake and two trails that take off from the lake. A new trailhead at the gate would replace trailhead at Moose Lake.
Kletomus Creek Road 5207 (to Moose Lake)	Open all year	Open all year	Open all year	Restricted seasonally by gate on Hallowat Creek Road 315; motorized access available from July 1 thru March 31.	Restricted seasonally due to a gate on Big Creek Road 316 at the jct. with the McGinnis Creek Road 803; motorized access would be allowed from June 1 thru March 30.	Restricted all year with a berm at the jct. with Forks Westside Road 5220. Kletomus Creek Road 5207 (to Moose Lake) would be used as a trail to provide access to Moose Lake and to the two trails that take off from the lake.
Werner Creek Road 5261, Nicola Creek Road 1692, and Upper	Open all year	Roads 5261, 1692, and 1655 are restricted by gates for one year.	Restricted all year; Werner Creek Road 5261 would be restricted with a gate from the jct. with Hallowat Creek Road 315 to the junction with Nicola Creek Road	Restricted all year; Werner Creek Road 5261 would be restricted for its entire length by a berm at the junction with Hallowat Creek Road 315. A berm on Nicola	Werner Creek "loop" Roads 5261, 1692, and 1655 would each be decommissioned for its entire length, from the jct. with Road 315 to the junction with Big Creek	Restricted all year; Werner Creek "loop" Roads 5261, 1692, and 1655 would each be restricted for its entire length by a berm at the jct. with Road 315 and

Road Segment	Exist. Situation Prior to Temporary Special Order	Exist. Situation After Temporary Special Order signed 4/1/02	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Alternative 5
Nicola Road 1655			with Nicola Creek Road 1692, and then restricted by a berm. Road 1692 would be restricted by berms at the jct. with Road 5261 and at the jct. with Big Creek Road 316. Road 1655 is controlled by berms on each end of Road 1692.	315. A berm on Nicola Creek Road 1692 at the jct. with Big Creek Road 316 controls Road 1692 as well as remaining access to Road 5261. Road 1655 is controlled by berms on Road 5261 and Road 1692.	junction with Big Creek Canyon Creek Road 316 near four corners.	jct. with Road 315 and a berm at the jct. with Big Creek Road 316 near four corners.
Lakalaho Road 1696 (warming hut)	Restricted all year by a gate	Restricted all year by a gate	Restricted all year by a berm for 3.3 miles and then decommissioned	Restricted all year by a gate for 3.3 miles and then decommissioned	Restricted all year by a berm for 3.3 miles and then decommissioned	Restricted all year by a gate for 3.3 miles and then decommissioned
Forks Westside Road 5220	Restricted all year by a gate	Restricted all year by a gate	Restricted all year by a gate	Restricted all year by a gate	Restricted all year by a berm	Restricted all year by a gate
Big Creek Road 316 (upper portions)	Restricted all year by a berm at the jct. with Werner Divide Road 1658 and by a gate at the jct. with Trumble Creek Road 9848.	Restricted all year by a gate at the jctn with Nicola Creek Road 1692 and by a gate at the jct. with Trumble Creek Road 9848.	Restricted all year by a gate at the junction with Nicola Creek Road 1692, and by a berm at the jct. with Werner Divide Road 1658, and by a berm at the jct. with Trumble Creek Road 9848.	Restricted seasonally by a gate at the jct. with Werner Divide Road 1658; conventional vehicle motorized access would be available from July 1 thru October 14 to the jct. with Lakalaho Road 1696. Road 316 beyond would be restricted with berms to the jct. with Road 9848. Snowmobile access on these parts of Road 316 would be available from December 1 thru April 14.	Restricted all year by a gate at the junction with Nicola Creek Road 1692, and by a berm at the jctn, with Werner Divide Road 1658, and by a berm at the jct. with Trumble Creek Road 9848.	Restricted seasonally by a gate at the jct. with Nicola Creek Road 1692, motorized access available from July 1 thru October 14 to a point approx. 1 mile west of the jct. with Road 1696 where it would be restricted with a gate all year. A new trailhead at this gate would replace the existing trailhead for the Smoky Range National Recreation Trail. Snowmobile access on this part of Road 316 from December 1 thru April 14.
LOWER BIG CREEK GRIZZLY BEAR SUBUNIT						
Big Creek Road 316 (lower portion)	Open all year	Open all year	Open all year	Open all year	Restricted seasonally by a gate at the jct. with the Lookout Creek McGinnis Cr. Road 803; motorized access would be available from June 1	Open all year

Road Segment	Exist. Situation Prior to Temporary Special Order	Exist. Situation After Temporary Special Order signed 4/1/02	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Alternative 5
					thru March 30. This restriction effectively shuts off access for the Big Creek drainage for two months.	
Elelehum Creek Road 5272 (to mile 3.6)	Restricted seasonally by a gate; motorized access available from July 1 thru August 31.	Restricted seasonally by a gate; motorized access available from July 1 thru August 31.	Restricted seasonally by a gate; motorized access available from July 1 thru August 31.	Restricted seasonally by a gate; motorized access available from July 1 thru August 31.	Decommissioned and converted to a low-use trail allowing motorcycles. A new trailhead at the jct. of Road 5272 and Big Creek Road 316 would replace the existing trailhead.	Restricted seasonally by a gate; motorized access available from July 1 thru August 31.
Langford Road 5222	Restricted all year by a berm	Restricted all year by a berm	Restricted all year by a berm	Restricted all year by a berm	<u>Decommissioned</u>	Restricted all year by a berm
McGinnis Creek Road 803 (includes the Lookout Creek drainage)	Open all year	Restricted by gates for one year from the jct. with Road 803L to the jct. with Road 5290 at the divide.	Open all year from Road 316 across Big Creek to the jct. with Road 803L, then restricted with an all year gate to the jct. with Road 1656, and then restricted with all year berms to the jct. with Road 5290 at the divide between Lookout Creek and McGinnis Creek.	Open all year from Road 316 across Big Creek to the junction with Road 803L, then restricted all year with a gate to the jct. with Road 1656, and then restricted with berms to the jct. with Road 5290 at the divide between Lookout Creek and McGinnis Creek..	Open all year from Road 316 across Big Creek to the jct. with Road 803L, then decommissioned to the jct. with Road 1656, and then restricted with a berm to the jct. with Road 5290 at the divide.	Open all year from Road 316 across Big Creek to the jct. with Road 803L, then restricted all year with a gate to the jct. with Road 1656, and then restricted with a berm to the jct. with Road 5290 at the divide.
Roads 1656 and 1664 in Lookout Cr.	Restricted all year by a berm	Restricted all year by a berm	Restricted all year by a berm	Restricted all year by a berm	<u>Decommissioned</u>	Restricted all year by a berm

Table 2-16: Comparison of alternatives by significant issues and issue indicators

Significant Issues	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p>1. Tree salvage in inventoried roadless areas does not allow natural processes to continue to occur within these areas and may therefore alter its roadless character.</p> <p>Indicators:</p> <p>(a) <i>acres of salvage in inventoried roadless area</i></p> <p>(b) <i>changes to natural integrity apparent naturalness, remoteness, solitude, primitive recreation opportunities, manageability, and boundaries in inventoried roadless areas</i></p>	0 acres	438 acres	0 acres	0 cares	438 acres
	No change from existing situation	Reduced on 1.8% of Deadhorse IRA, and 0.6% of Standard Peak IRA	No change from existing situation	No change from existing situation	Reduced on 1.8% of Deadhorse IRA, and 0.6% of Standard Peak IRA
<p>2. Tree salvage in the Wild and Scenic River corridor may affect the character of the corridor.</p> <p>Indicators:</p> <p>(a) <i>acres of salvage and acres of fuels reduction within the Wild and Scenic River corridor</i></p>	0 acres	16 acres	16 acres	0 acres	16 acres
<p>3. The use of temporary roads may cause increased sedimentation.</p> <p>Indicators:</p> <p>(a) <i>miles of temporary roads</i></p> <p>(b) <i>sediment yield from temporary roads</i></p>	0 miles	0.9 miles	0.9 miles	0 miles	0.9 miles
	None	0.5 tons	0.5 tons	None	0.5 tons
<p>4. Snag and downed woody material retention should be increased over that in the proposed action to insure that these wildlife habitat and ecosystem components are provided over the landscape over time.</p> <p>Indicators:</p> <p>(a) <i>acres and percentage of high and moderate snag potential areas treated</i></p> <p>(b) <i>acres and percentage of high and moderate down wood habitat potential areas treated</i></p>	0 acres 0%	3326 acres 42%	2866 acres 36%	2211 acres 28%	3326 acres 42%
	0 acres 0%	2797 acres 29%	2415 acres 25%	2295 acres 24%	2797 acres 29%

Significant Issues	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p>5. Riparian habitat conservation areas (RHCA) as described in the Native Inland Fisheries Strategy (INFISH) may not be large enough to compensate for the combined effects of the Moose Fire and proposed management activities.</p> <p>Indicators:</p> <p>(a) <i>RHCA widths</i></p> <p>(b) <i>changes in sediment yield attributable to RHCA widths</i></p>	<p>N/A</p> <p>N/A</p>	<p><u>Each side of stream:</u> - Min. 100' intermittent streams; - 150' perennial non fish bearing; - 300' fish- bearing</p> <p>Minimum INFISH RHCA widths – would provide adequate undisturbed area to reduce risk of sediment delivery</p>	<p><u>Each side of stream:</u> - Min. 100' intermittent streams; - 150' perennial non fish bearing; - 300' fish- bearing</p> <p>Minimum INFISH RHCA widths – would provide adequate undisturbed area to reduce risk of sediment delivery</p>	<p><u>Each side of stream:</u> 300' all streams</p> <p>RHCA widths increased to 300' on intermittent and non-fisheries streams – would provide additional protection against sediment delivery</p>	<p><u>Each side of stream:</u> - Min. 100' intermittent streams; - 150' perennial non fish bearing; - 300' fish- bearing</p> <p>Minimum INFISH RHCA widths – would provide adequate undisturbed area to reduce risk of sediment delivery</p>
<p>6. The fire may have affected wildlife security particularly during hunting seasons.</p> <p>Indicators:</p> <p>(a) <i>a comparison of summer habitat effectiveness values within affected Habitat Analysis Units</i></p> <p>(b) <i>potential effects of salvage logging and road management on security and vulnerability during the hunting season</i></p>	<p>Hallowat - 62% Kletomus -45% Lower Elelehum - 38% Langford - 36%</p> <p>No salvage logging would occur. Road restrictions would not occur. Security would be reduced and animals more vulnerable compared to pre-fire conditions.</p>	<p>Hallowat - 62% Kletomus -45% Lower Elelehum - 38% Langford - 36%</p> <p>Salvage would remove cover, reducing security. Road restrictions may reduce vulnerability somewhat, but critical lower Big Creek Road #316 would remain open.</p>	<p>Hallowat - 62% Kletomus -45% Lower Elelehum - 38% Langford - 36%</p> <p>Salvage would remove cover, reducing security. Road restrictions may reduce vulnerability somewhat, but critical lower Big Creek Road #316 would remain open.</p>	<p>Hallowat - 62% Kletomus -45% Lower Elelehum - 46% Langford - 36%</p> <p>Salvage would remove cover, reducing security. Road restrictions may reduce vulnerability somewhat, but critical lower Big Creek Road #316 would remain open.</p>	<p>Hallowat - 78% Kletomus -60% Lower Elelehum - 38% Langford - 36%</p> <p>Salvage would remove cover, reducing security. Road restrictions may reduce vulnerability somewhat, but critical lower Big Creek Road #316 would remain open.</p>

Significant Issues	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p>7. The proposed salvage treatments and road strategy may result in ineffective use of winter range areas by ungulate species.</p> <p>Indicators:</p> <p>(a) <i>qualitative assessment of potential effects of winter logging and removal of trees on elk and mule deer hiding and thermal cover</i></p>	No salvage would occur.	Winter logging could increase disturbance to wintering animals. Removal of trees would reduce hiding cover; thermal cover could be reduced in Units 15, 16 and 70.	Winter logging could increase disturbance to wintering animals. Removal of trees would reduce hiding cover; thermal cover could be reduced in Units 15 and 16.	Winter logging would be prohibited. Removal of trees would reduce hiding cover; thermal cover could be reduced in Units 15 and 16.	Winter logging could increase disturbance to wintering animals. Removal of trees would reduce hiding cover; thermal cover could be reduced in Units 15, 16 and 70.
<p>8. More roads may need to be decommissioned and restricted than what Amendment 19 specifies due to accelerated runoff from burned lands and less cover and security for grizzly bears as a result of the fire.</p> <p>Indicators:</p> <p>(a) <i>miles of road proposed for decommissioning</i></p> <p>(b) <i>miles of road closed to motorized access yearlong by subunit</i></p> <p>(c) <i>miles of road closed to motorized access seasonally by subunit</i></p>	0 miles	56 miles	55 miles	87 miles	56 miles
<p>9. Provide a higher level of public motorized access than Forest Plan standards allow.</p> <p>Indicators:</p> <p>(a) <i>miles of road open to conventional motorized use (wheeled vehicles) yearlong</i></p> <p>(b) <i>miles of road open to conventional motorized use seasonally</i></p> <p>(c) <i>miles of road decommissioned</i></p>	Werner – 53 mi L. Big Cr. – 73 mi	Werner – 34 mi L. Big Cr. – 36 mi	Werner – 24 mi L. Big Cr. – 36 mi	Werner – 23 mi L. Big Cr. – 20 mi	Werner – 34 mi L. Big Cr. – 36 mi
	Werner – 3 mi L. Big Cr. – 4 mi	Werner – 0 mi L. Big Cr. – 4 mi	Werner – 15 mi L. Big Cr. – 4 mi	Werner – 17 mi L. Big Cr. – 6 mi	Werner – 9 mi L. Big Cr. – 4 mi
<p>(a) <i>miles of road open to conventional motorized use (wheeled vehicles) yearlong</i></p> <p>(b) <i>miles of road open to conventional motorized use seasonally</i></p> <p>(c) <i>miles of road decommissioned</i></p>	49 miles	31 miles	26 miles	8 miles	22 miles
	7 miles	4 miles	19 miles	13 miles	13 miles
	0 miles	56 miles	55 miles	87 miles	13 miles
					56 miles
10. Big Creek Road 316 should be re-opened					

Significant Issues	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p>because it provides good huckleberry picking and other recreation options.</p> <p>Indicators: (a) <i>change in restrictions of conventional motorized vehicle use on Road #316</i></p>	<p>No change</p>	<p>No change. The portion of Road 316 located behind Big Mountain would remain restricted to wheeled motorized access yearlong</p>	<p>Road #316 would be open yearlong to wheeled motorized access to the jct. with the Werner Divide Road.</p>	<p>Road #316 would be open seasonally (6/1-3/30) from the McGinnis – Lookout Road to the jct. with the Upper Nicola Creek Connection Road. This would eliminate motorized access to most of the Big Creek drainage during the spring bear-hunting season, and reduce the season of use at the Moose Lake Campground and associated trailheads by approximately 2 weeks.</p>	<p>Road #316 would be open yearlong to the jct. with the Upper Nicola Creek Connection Road. The Whitefish Divide Road and Rd. 316 would be open seasonally (7/1-10/14). This would allow travel across the Whitefish Divide, and provide access to the upper portions of the Big Creek drainage.</p>
<p>11. Decommissioning road activities may not be compatible with snowmobiling on existing snowmobiling routes.</p> <p>Indicators: (a) <i>Miles of road proposed for decommissioning on existing snowmobile routes</i></p>	<p>0 miles</p>	<p>9 miles</p>	<p>9 miles</p>	<p>31 miles</p>	<p>9 miles</p>

Table 2-17: Comparison of alternatives by their response to effects indicators (described in more detail in Chapter 3)

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<u>Vegetation Indicators</u>					
• Acres of salvage harvest	0 acres	3721 acres	3238 acres	2493 acres	3721 acres
• Acres of reforestation	0 acres	1897 ac. planted 1824 ac. natural	1802 ac. planted 1436 ac. natural	1533 ac. planted 960 ac. natural	1897 ac. planted 1824 ac. natural
• Acres of natural successional development	25,984 acres	24,087 acres	24182 acres	24451 acres	24,087 acres
• Change in access for future timber management	No change	Road decommissioning would change access to 7000 acres	Road decommissioning would change access to 6400 acres	Road decommissioning would change access to 12,000 acres	Road decommissioning would change access to 6400 acres
• Salvage harvest by structural stage (acres)	No harvest	Stand initiation: 2267 acres Stem exclusion: 0 acres Understory reinitiation: 1414 acres Young forest multistory: 0 acres Late seral: 30 acres	Stand initiation: 2040 acres Stem exclusion: 0 acres Understory reinitiation: 1160 acres Young forest multistory: 0 acres Late seral: 30 acres	Stand initiation: 1565 acres Stem exclusion: 0 acres Understory reinitiation: 932 acres Young forest multistory: 0 acres Late seral: 30 acres	Stand initiation: 2040 acres Stem exclusion: 0 acres Understory reinitiation: 1160 acres Young forest multistory: 0 acres Late seral: 30 acres
• Legacy areas remaining (acres)	25,906 acres	22,185 acres	22,668 acres	23,413	22,185

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p><u>Spruce and Douglas-Fir Indicators</u></p> <ul style="list-style-type: none"> • Pheromone treatments in areas of high, med and low spruce beetle risk (acres) • Salvage treatments in areas of high, med and low spruce beetle risk (acres) • Salvage treatments in areas of high, med and low DF beetle risk (acres) 	<p>No treatment would occur.</p>	<p>High: 150-222 ac Med: 0-100 acres Low: 0 ac</p> <p>High: 127 acres Med: 85 acres Low : 31 acres</p> <p>Very high/high: 560 acres Mod. high: 122 acres Moderate: 1924 acres Low/moderate: 177 acres Low: 966 acres</p>	<p>High: 150-222 ac Med: 0-100 acres Low: 0 ac</p> <p>High: 99 acres Med: 47 acres Low: 31 acres</p> <p>Very high/high: 376 acres Mod. high: 0 acres Moderate: 1775 acres Low/moderate: 117 acres Low: 968 acres</p>	<p>High: 150-222 ac Med: 0-100 acres Low: 0 ac</p> <p>High: 59 acres Med: 37 acres Low: 31 acres</p> <p>Very high/high: 341 acres Mod. high: 0 acres Moderate: 1127 acres Low/moderate: 108 acres Low: 918 acres</p>	<p>High: 150-222 ac Med: 0-100 acres Low: 0 ac</p> <p>High: 127 acres Med: 85 acres Low : 31 acres</p> <p>Very high/high: 560 acres Mod. high: 122 acres Moderate: 1924 acres Low/moderate: 177 acres Low: 966 acres</p>
<p><u>Invasive Plant Indicators</u></p> <ul style="list-style-type: none"> • Relative rating of vulnerability to weed spread (1-highest, 5-lowest) by activity by alternative. • Acres at risk from infestation/invasion of selected weeds in the Moose project weed analysis area. • Percent of area at risk from infestation/invasion of selected weeds in the Moose project weed analysis area. 	<p>Lowest risk</p> <p>See Table 3-27 in the DEIS</p> <p>See Table 3-28 in the DEIS</p>	<p>Action alternatives have higher risk than no action; all action alternative are similar in risk</p> <p>See Table 3-27 in the DEIS</p> <p>See Table 3-28 in the DEIS</p>	<p>Same as Alt. 2</p> <p>See Table 3-27 in the DEIS</p> <p>See Table 3-28 in the DEIS</p>	<p>Same as Alt. 2</p> <p>See Table 3-27 in the DEIS</p> <p>See Table 3-28 in the DEIS</p>	<p>Same as Alt. 2</p> <p>See Table 3-27 in the DEIS</p> <p>See Table 3-28 in the DEIS</p>

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p><u>Grizzly Bear Indicators</u></p> <ul style="list-style-type: none"> • Whether Forest Plan standards related to grizzly bear would be met (18% open road density; 18% total road density, 68% core area) • The potential loss of habitat values associated with dead trees. 	No	Yes	Yes, with a project-specific Forest Plan amendment	Yes	Yes
	Fire reduced hiding cover values on 25, 984 acres of NFS lands	Hiding cover values would be further reduced within 3721 acres of salvage units	Hiding cover values would be further reduced within 3238 acres of salvage units	Hiding cover values would be further reduced within 2493 acres of salvage units	Hiding cover values would be further reduced within 3721 acres of salvage units
<p><u>Gray Wolf Indicators</u></p> <ul style="list-style-type: none"> • The effect on ungulate habitat. • The change in habitat security. 	No change. Post-fire carrying capacity is low.	Some reduction in hiding cover; increased disturbance, increased hunting season and winter vulnerability.	Some reduction in hiding cover; increased disturbance, increased hunting season and winter vulnerability.	Some reduction in hiding cover; increased disturbance, increased hunting season and winter vulnerability.	Some reduction in hiding cover; increased disturbance, increased hunting season and winter vulnerability.
	No change	Improvement from road management; winter logging could reduce temporarily.	Same as Alternative 2	Same as Alternative 2, but winter logging would be prohibited.	Same as Alternative 2
<p><u>Bald Eagle Indicators</u></p> <ul style="list-style-type: none"> • The amount of habitat alteration within the habitat zone adjacent to the North Fork Flathead River. • The probability that management activity would disturb nesting bald eagles and cause disruption of natural behavior. • Adherence to Montana Bald Eagle Management Plan nest territory guidelines. 	No changes to eagle habitat	Removal of potential perch or nest trees on 16 acres	Same as Alternative 2	No changes to eagle habitat	Same as Alternative 2
	None	Low. Activities > ½ mile from known nest sites	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
	Consistent with plan	Consistent with plan	Consistent with plan	Consistent with plan	Consistent with plan

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<u>Canada Lynx Indicators</u>					
<ul style="list-style-type: none"> Management actions shall not change more than 15 percent of lynx habitat within an LAU to an unsuitable condition within a 10 year period 	No management actions would occur.	Complies. Proposed salvage units are currently unsuitable from fire. Planting would speed recovery to suitable condition.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
<ul style="list-style-type: none"> Following a disturbance, such as windstorm, fire, or insects/pathogens mortality that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than five acres. 	No salvage is proposed	All proposed salvage areas are greater than 5 acres	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
<ul style="list-style-type: none"> Maintain denning habitat in patches generally larger than 5 acres comprising at least 10 percent of lynx habitat. 	All potential denning habitat would remain	Over 12,000 acres of burned but unsalvaged area would provide for denning habitat	Same as Alternative 2	Same as Alternative 2, but retains more acres	Same as Alternative 2
<u>Black-backed Woodpecker Indicators</u>					
<ul style="list-style-type: none"> Acres and percent of habitat lost 	0 acres; 0%	2489 acres; 44%	2236 acres; 40%	1717 acres; 31%	2489 acres; 44%
<ul style="list-style-type: none"> Number of large bocks unsalvaged 	N/A – all remain	4	5	7	4
<u>Boreal Toad Indicators</u>					
<ul style="list-style-type: none"> Extent of activities that could cause direct mortality of boreal toads in terrestrial habitats 	No activities would occur	Salvage units: 3721 acres Actual salvage: 3000 acres Temp road: 0.9 mi. Road decommissioning: 57 mi.	Salvage units: 3238 acres Actual salvage: 2700 acres Temp road: 0.9 mi. Road decommissioning: 56 mi.	Salvage units: 2493 acres Actual salvage: 2150 acres Temp road: 0 mi. Road decommissioning: 87 mi.	Salvage units: 3721 acres Actual salvage: 3000 acres Temp road: 0.9 mi. Road decommissioning: 56 mi.

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p><u>Wolverine Indicators</u></p> <ul style="list-style-type: none"> An assessment of effects on potential prey species of wolverine (big game) and on levels of potential disturbance (motorized access). 	No change to prey species. Continued disturbance from motorized access.	Slight increase in risk of mortality to prey species. Winter logging could cause disturbance to wolverine. Road closures would improve habitat suitability.	Slight increase in risk of mortality to prey species. Winter logging could cause disturbance to wolverine. Road closures would improve habitat suitability.	Prohibition on winter logging, higher levels of trees left (more cover) and road management strategy would reduce risks.	Similar to Alternatives 2 and 3, but road management strategy would reduce risks.
<p><u>Snag and Down Woody Habitat Indicators</u></p> <ul style="list-style-type: none"> Vulnerability to loss of snag habitat on national forest system lands due to firewood cutting (acres within 200' of open road) Acres of timber salvage relevant to snag habitat across the analysis area (total acres of high quality) Acres of Timber Salvage Relevant to Larger-diameter Downed Wood Habitat across the Analysis Area (total acres of high quality) 	2008 acres 0 acres 0 acres	2084 acres 1487 acres 1263 acres	2007 acres 1450 acres 1233 acres	1907 acres 1185 acres 930 acres	1939 acres 1487 acres 1263 acres
<p><u>Soils Indicators</u></p> <ul style="list-style-type: none"> Total acres and percent detrimental soil disturbance in the analysis area. 	2958 acres / 5.6%	2999 acres / 5.7%	3022 acres / 5.7%	2861 acres / 5.4%	2999 acres / 5.7%

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<u>Hydrology Indicators</u>					
<ul style="list-style-type: none"> • Potential Sediment from Proposed Salvage Above Spawning Area (tons) 	No salvage – 0 tons	102 tons	78 tons	62 tons	102 tons
<ul style="list-style-type: none"> • Potential Sediment from Proposed Salvage Below Spawning Area (tons) 	No salvage – 0 tons	407 tons	370 tons	329 tons	407 tons
<ul style="list-style-type: none"> • Total Potential Sediment from Proposed Salvage - Big Creek (tons) 	No salvage – 0 tons	505 tons	444 tons	391 tons	505 tons
<ul style="list-style-type: none"> • Qualitative Assessment of Nutrient Load Effects 	Increase post-fire	Slight increase above post-fire level – highest of alternatives	Slight increase above post-fire level – mid range of alternatives	Slight increase above post-fire level – lowest of alternatives	Slight increase above post-fire level – highest of alternatives
<ul style="list-style-type: none"> • Number of culverts removed and sediment produced 	No culverts removed – high risk of culvert failure	40 culverts removed 370.8 tons	40 culverts removed 370.8 tons	62 culverts removed 517.8 tons	40 culverts removed 370.8 tons
<ul style="list-style-type: none"> • Proposal Sediment Yield Increase Above Natural (tons) from Proposed Road Management and Decommissioning 	None	345 tons	345 tons	438 tons	395 tons
<ul style="list-style-type: none"> • Water Yield increase from proposed salvage 	0	0 acre-ft	0 acre-ft	0 acre-ft	0 acre-ft
<u>Fisheries Indicators</u>					
<ul style="list-style-type: none"> • RHCA Buffer Widths (Feet) 	N/A	Each side of stream: - 100' intermittent streams; - 150' perennial non fish bearing; - 300' fish- bearing	Each side of stream: - 100' intermittent streams; - 150' perennial non fish bearing; - 300' fish- bearing	Each side of stream: - 300" all streams	Each side of stream: - 100' intermittent streams; - 150' perennial non fish bearing; - 300' fish- bearing
<ul style="list-style-type: none"> • Predicted tons of sediment delivered to streams as a direct result of <u>timber harvest</u>; and tons predicted to be delivered upstream of some portion of the bull trout spawning reaches in Big Creek and Hallowat Creek 	See indicators for Hydrology above	See indicators for Hydrology above	See indicators for Hydrology above	See indicators for Hydrology above	See indicators for Hydrology above
<ul style="list-style-type: none"> • Predicted tons of sediment delivered to streams as a direct result of <u>road decommissioning</u>; and tons predicted to be delivered upstream of some portion of the bull trout spawning reaches in Big Creek and Hallowat Cr. 	See indicators for Hydrology above	See indicators for Hydrology above	See indicators for Hydrology above	See indicators for Hydrology above	See indicators for Hydrology above

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<p><u>Fisheries Indicators (cont.)</u></p> <ul style="list-style-type: none"> Qualitative assessment of changes in stream temperature 	Incremental increases may occur	No increase beyond No Action anticipated	No increase beyond No Action anticipated	No increase beyond No Action anticipated	No increase beyond No Action anticipated
<p><u>Air Quality Indicators</u></p> <ul style="list-style-type: none"> Particulate Matter (PM10) Generated by Alternative (tons) 	0 tons	66 tons	66 tons	55 tons	66 tons
<p><u>Scenic Indicators</u></p> <ul style="list-style-type: none"> a qualitative assessment of changes in scenic quality 	No change from post-fire conditions	Salvage harvest would create open areas in foreground as seen from North Fork Road, and foreground and mid-ground as seen from Big Creek Road. Salvage in Wild and Scenic River corridor may be slightly noticeable.	Salvage harvest would create open areas in foreground as seen from North Fork Road, and foreground and mid-ground as seen from Big Creek Road. Salvage in Wild and Scenic River corridor may be slightly noticeable.	Salvage harvest would create open areas in foreground as seen from North Fork Road, and foreground and mid-ground as seen from Big Creek Road. Salvage would not occur in Wild and Scenic River.	Salvage harvest would create open areas in foreground as seen from North Fork Road, and foreground and mid-ground as seen from Big Creek Road. Salvage in Wild and Scenic River corridor may be slightly noticeable.
<p><u>Recreation Indicators</u></p> <ul style="list-style-type: none"> Qualitative assessment of treatments in or near Glacier Institute and recreation sites. 	No treatments would occur. Visitor safety would not be improved. Fire danger would increase over time at Big Creek campground and Glacier Institute.	Visitor safety improved at some dispersed sites. Fire danger would be reduced at Big Creek campground and Glacier Institute.	Visitor safety improved at some dispersed sites. Fire danger would be reduced at Big Creek campground and Glacier Institute.	Visitor safety improved at some dispersed sites. Fire danger would be reduced at Glacier Institute, but not Big Creek campground.	Visitor safety improved at some dispersed sites. Fire danger would be reduced at Big Creek campground and Glacier Institute.
<p><u>Other Roadless Areas Indicators</u></p> <ul style="list-style-type: none"> Acres of salvage in other unroaded area Changes to natural integrity, apparent naturalness, remoteness, solitude, primitive recreation opportunities, manageability, and boundaries in other unroaded areas 	No salvage would occur No change	999 acres Natural integrity and apparent naturalness reduced on SW part of Demers Ridge. Solitude reduced during logging operations. Primitive recreation experiences would not change. Boundaries would be more difficult to manage after harvest.	999 acres Same as Alternative 2	728 acres Similar to Alternative 2, but to a lesser degree due to fewer acres affected	999 acres Same as Alternative 2

Effects Indicator	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<u>Economics Indicators</u>					
• Effects on Job Growth Rate	0 jobs/year	454 jobs/year	400 jobs/year	331 jobs/year	454 jobs/year
• Effects on Unemployment Rate	No change	Slight to no change	Slight to no change	Slight to no change	Slight to no change
• Effects on Personal Income and Wages	No change	Minimal increase	Minimal increase	Minimal increase	Minimal increase
• Effects on Cost of Living	No change	No change	No change	No change	No change
• Effects on Economic Dependency and Diversity	No change	Little to no change	Little to no change	Little to no change	Little to no change
• Effects on Economic Trends	No change	Very little effect	Very little effect	Very little effect	Very little effect
• Effects on Income (M\$)	No change	\$9787	\$8597	\$7111	\$9786
• Effects on Revenue Sharing	No change	No change	No change	No change	No change
• Effects on Local Economic Development Objectives	Would not contribute towards meeting	Consistent with objectives	Consistent with objectives	Consistent with objectives	Consistent with objectives
<u>Fire and Fuels Indicators</u>					
• Effective Fuels Reduction (Ac)	0 acres	3295 acres	2939 acres	2343 acres	3239 acres
• Effects on prescribed fire escape risk (pile burning and/or jackpot burning)	No risk	Very low risk	Very low risk	Very low risk	Very low risk