CHAPTER 2

ALTERNATIVES

Changes between Draft EIS and Final EIS

Minor editorial changes to the text in all sections of the chapter. Clarification of Description Elements and Mitigation Measures and Design Criteria common to all action alternatives
Addition of Alternative E as an Action Alternative
Changes in timber volume and valuation of each alternative to reflect up to date market and field information

Introduction

Chapter 2 describes the proposed action and alternatives to the proposed action, including a no action alternative. The Interdisciplinary Team (ID Team) developed alternatives to the proposed action, which respond to the purpose and need and address key issues identified by the public. Each alternative is a mix of activities on specific parts of the landscape designed to accomplish a particular emphasis or theme. Five alternatives for managing land and resources in the Tripod Fire Salvage project area are described, analyzed, and compared. The alternatives are presented in comparison form, sharply defining the differences between each alternative for the public and providing a clear basis for choice among options to the Responsible Official. This chapter also describes the measures necessary to mitigate environmental effects, identifies management requirements, develops monitoring plans, and shows a summary comparison of the alternatives as they relate to the issues and the purpose and need for action.

The Tripod Fire Salvage Project EIS incorporates information and relies on direction provided in the Forest Plan (USDA Forest Service 1989a). All alternatives have been designed to adhere to all State and Federal laws and regulations.

This chapter is divided into five sections:

Alternative Development Process
Alternatives Considered in Detail
Design Criteria and Mitigation Measures Common to All Action Alternatives
Alternatives Considered but Eliminated from Detailed Study
Comparison of the Alternatives

Alternative Development Process

This chapter describes in detail five alternative ways to manage land and resources in the Tripod Fire Salvage project area. The Proposed Action was developed using the Line Officer's specific direction. Public participation to review and comment on the Proposed Action, develop issues and suggest alternatives for the Tripod Fire Salvage project area began in December 2006. Forest Service specialists were part of the Interdisciplinary Team that worked on development of action alternatives around the key issues. Based on the project purpose and need, comments received from the public and other agencies, direction given by Forest Leadership, and through incorporation of the Forest Plan as amended, and existing State and Federal laws, the range of alternatives was narrowed.

All the action alternatives were developed with some common themes. All action alternatives would to varying degrees:

- Cut and remove fire killed trees and fire-damaged trees that are expected to die within one year of project implementation. Removal of trees would occur through commercial sale of timber. Incidental live trees would only be removed to construct temporary roads and landings and to eliminate safety hazards to workers and the public
- Concentrate salvage activities on those areas of the fire and those specific trees within the fire area that have enough economic value to harvest
- Exclude salvage harvest from the following areas: areas with high soil damage, inventoried roadless areas, areas with undeveloped character, old-growth habitat as defined in the Forest Plan, recently regeneration-harvested areas, lynx habitat currently in suitable condition and PACFISH Riparian Habitat Conservation Areas (RHCA)
- Reforest the salvage harvested area where needed by hand planting trees
- Construct no new system roads
- Minimize the construction of temporary roads
- Decommission temporary roads after operational use
- Generally, keep roads open after operations that were open to public use before the fire. Similarly, keep roads closed after operations that were closed to public use before the fire
- Fall and remove roadside hazard trees along open roads and along any roads used for implementation of this project to provide safe and adequate road access.
- Apply design criteria and mitigation measures in the design and implementation of alternatives to protect water quality
- Leave any trees felled within Riparian Habitat Conservation Areas to provide coarse woody debris
- Provide some level of employment to local and regional economies

The comparison chart at the end of this chapter compares the environmental effects of each action alternative that was analyzed in detail. This comparison of effects along with projected environmental consequences detailed in Chapter 3 provides the Responsible Official with information needed to make an informed choice between alternatives.

The Responsible Official and ID Team determined that the alternatives to be analyzed in detail represented a range of reasonable alternatives (40 CFR 1502.14 (a)) that addresses the underlying needs of recovering the economic value of fire-killed and damaged trees that are

expected to die, improving safety within the fire area by reducing hazards associated with dead trees along roads, and re-establishing trees on sites that are proposed to be salvage harvested. The No Action Alternative is defined as no salvage harvest. Salvage Unit and Reforestation Map boundaries are approximate locations which will guide unit layout. Actual boundaries, when laid out on the ground, will vary to accommodate establishment of snag retention areas, to fit ground conditions and topographic features. Acres, miles, and volumes used in this analysis are approximations based on on-the-ground estimates and computer analysis. Actual figures may vary from these estimated numbers.

Alternatives Considered In Detail

As described in the Alternative Development section of this chapter, the No Action and four action alternatives were developed in detail and analyzed to predict their effect on the environment. This section describes these alternative ways to meet the project purpose and need. In addition to responding to the purpose and need, the range of alternatives addresses the key issues, which were brought forward in response to the Proposed Action. The action alternatives share many features in common, such as management requirements, design criteria, constraints and mitigation measures as described in the "Design Criteria and Mitigation Measures Common to All Action Alternatives" section of this chapter. The action alternatives differ mainly in where treatments would occur. The maps of each alternative (Appendix A) are important tools for understanding how the alternatives differ. The maps show harvest units and the logging systems that would be used, pre- and post-harvest roads status and which roads would be used for timber haul. At the end of this chapter, Figures 2.2 and 2.3 provide a tabular comparison of each alternative, by activity, purpose and need, and issue.

ALTERNATIVE A – NO ACTION

Purpose and Design

The purpose of Alternative A is to allow current processes to continue within the Tripod project area. Under Alternative A, the No Action Alternative, there would be no change in the level of on-going management activities. No salvage would take place. None of the action alternatives would be approved or occur within the project area at this time. This alternative responds to the requirement to consider a no action alternative and serves as a baseline for comparison of effects of all the alternatives.

Description

Previously approved or on-going activities such as fire protection, road maintenance, motorized access travel management, dispersed recreation, invasive species management and recommended Burned Area Emergency Response (BAER) projects would continue as authorized.

Salvage Harvest
No salvage harvest to recover the economic value of fire-killed and damaged trees would occur.

Reforestation
No trees would be planted in salvage harvest units. These areas would be left to regenerate naturally in this alternative.

Roadside Danger Tree Removal
Danger trees along roads currently open to the public would not be felled in this alternative. Danger trees along roads where Burned Area Emergency Response (BAER) activities are occurring would be felled to improve the safety of operational personnel.

Road Management
No temporary road construction, road reconstruction, road opening, road closures or decommissioning would occur. Previously approved BAER treatments on roads affected by the Tripod Fire would continue.

DESCRIPTION OF ELEMENTS COMMON TO ALL ACTION ALTERNATIVES (B, C, D, E)

Description

Maps showing the locations of actions included in Alternative B, C, D and E are located in Appendix A. A treatment table identifying specific treatments is located in Appendix B.

Salvage Harvest
The following areas would not be salvage harvested: areas with high soil damage, inventoried roadless areas, areas with undeveloped character, old-growth habitat as defined in the Forest Plan, Late and Old Structure (LOS) stands as defined in Okanogan National Forest Screen 2 Mapping Guidelines, recently regeneration-harvested areas, lynx habitat currently in suitable condition and PACFISH Riparian Habitat Conservation Areas (RHCA). In a few instances, skid trails could be located within RHCAs with concurrence of the fisheries biologist, hydrologist or soil scientist, and trees may be cut in these areas but would not be removed.

Salvage logging would focus on removing dead trees and fire-injured trees expected to die within one year of project implementation. The method for determining which trees are expected to die is described under “Design Features and Mitigation Measures”, Forest Vegetation section, in this chapter. Dead conifer trees and fire-injured trees expected to die within one year of project implementation that are from 10 inches diameter at breast height (DBH) up to and including 28 inches DBH would be commercially harvested (except Alternative E which would not salvage harvest any tree greater than or equal to 21” DBH). “Project implementation” is defined as when the salvage harvest unit is marked and cruised. Only dead conifer trees and fire-injured trees expected to die within one year of project implementation that are from 12 inches DBH up to and including 28 inches DBH would be commercially harvested within lynx habitat currently in unsuitable condition (as defined in the *Canada Lynx Conservation Assessment and Strategy* (Ruediger et al. 2000) (LCAS). Salvage harvest units (CE01, CE02, CE03, CE08, CE11, GA01, GA07) that were a part of the East Tripod Categorical Exclusion (USDA Forest Service 2007c) would harvest dead trees and fire-injured trees expected to die within one year of implementation, that are from 10 inches DBH up to and including 18 inches DBH. Approximately ten percent by area of dead trees and trees expected to die within these diameter classes would be retained. In some places, larger leave islands of burned forest would be left to avoid creating large areas without snags. Dead trees and trees expected to die below the lower diameter limits and greater than 28 inches DBH (greater than or equal to 21 inches DBH in Alternative E) would be retained throughout harvest units. Large live and dead retained trees would provide legacy structures.

Criteria Common to Salvage Harvest Areas:

Retain all snags less than 10 inches DBH in all harvest units

Retain all snags less than 12 inches DBH in harvest units located in lynx habitat currently in an unsuitable condition. Refer to Appendix 2 for a list of harvest units located in lynx habitat currently in an unsuitable condition

Retain all snags greater than 28 inches DBH in all harvest units (except greater than or equal to 21" DBH in Alternative E)

Retain all snags greater than 18 inches DBH in harvest units CE01, CE02, CE03, CE08, GA01, and GA07

Retain ten percent of the area within each harvest unit in an unharvested condition by identifying small retention islands surrounding favorable burned wildlife trees 10-28" DBH

Retain 40 acres of unharvested forest habitat (including standing and down trees) that is representative of post-fire conditions in all 100 acre neighborhoods within and adjacent to harvest units. Neighborhoods are a roving or moving area of 100 acres within which, the 40% retention criteria would be applied

Retain 6 acres of unharvested forest habitat (including standing and down trees) that is representative of post-fire conditions in all 20 acre neighborhoods within and adjacent to harvest units located in montane forest habitat. Refer to Appendix B for a list of harvest units located in montane forest habitat

Retain all fire injured trees that do not meet the description of a dead tree and have a moderate or high probability of surviving

Retain all down wood as of project implementation

Dead trees that existed before the Tripod Fire typically burned with higher intensity, sustained higher damage, and are not targeted for salvage harvest

Roadside Danger Tree Removal

Roadside danger trees would be felled along 47 miles of open (Maintenance Level 2 and above) roads within the project area to improve safety for road users (Danger Tree Falling Roads Map, Appendix A). Danger trees located within Riparian Habitat Conservation Areas (RHCA) would be cut and left in place to provide additional coarse woody debris. Danger trees would not be felled within IRAs or adjacent undeveloped areas, as these boundaries lie 200' from roads. On closed roads that are temporarily opened during project implementation, danger trees expected to become a hazard during project activities would be felled. A portion of the danger trees felled outside of RHCAs would be removed as firewood or other forest products. Specific danger tree felling guidelines are described in the "Design Features and Mitigation Measures" section of this Chapter.

Road Management

No new permanent system roads or access routes would be constructed. Although road densities would increase during implementation, there would be no long-term increase in open road density resulting from the salvage harvest.

Generally, roads that were open before the Tripod Fire would remain open and roads that were closed before the fire would be closed. Those open roads that have a publicly-involved decision to close them would be closed. Maintenance level decisions for each road generally have been made prior to the occurrence of the Tripod Fire, identifying the level of maintenance appropriate for each road within the project area. For unauthorized roads, a travel analysis was performed to determine 1) if they should become a transportation system road and 2)

what maintenance level should be assigned. Operational and objective maintenance levels and a description of road decommissioning are found in the Glossary.

Other actions
All of the action alternatives would be implemented through timber sale contracts and associated Sale Area Improvement, brush disposal and erosion control plans. The timber sale contract is a tool to accomplish economic recovery objectives. The contract provides very detailed specifications for road construction, maintenance and closures, timber harvest, and slash disposal. This contract is put out for public bid and the highest offer is generally accepted for sale of the designated timber. Post-timber sale work is often identified in and funded through a Sale Area Improvement (SAI) Plan. The SAI plan for this project would include reforestation and falling of roadside hazard trees. This work is most often accomplished by a contract for services. The Brush Disposal plan for this project would specify and fund slash disposal work such as landing slash. The timber sale purchaser most often accomplishes this work.

Depending on which alternative is chosen by the Responsible Official, activities included in the decision would occur in approximately the following timeline (Figure 2-1).

Figure 2-1: Activity Timeframe

Activity	2007	2008	2009	2010	2011	2012	2013	2014
Timber Salvage Harvest	X	X	X					
Activity Fuel Treatment	X	X	X	X				
Road Opening	X	X	X	X	X	X	X	X
Tree Planting	X	X	X	X	X	X	X	X
Road Closing	X	X	X	X	X	X	X	X
Monitoring	X	X	X	X	X	X	X	X

FOREST PLAN AMENDMENTS

Implementation of all action alternatives will require the following project-specific amendments of the Forest Plan. Non-significant amendments are defined in FSM 1926.51 as non-significant changes on standards and guidelines or actions that do not significantly alter the multiple use goals and objectives for long term land and resource management.

1) A project-specific, non-significant amendment will be needed to allow live trees greater than or equal to 21 inches diameter at breast height (DBH) to be salvage harvested (except for Alternative E) on the Tripod Fire Salvage Project. The diameter threshold is identified in Interim Wildlife Standard Scenario A #2a of the *Regional Forester's Eastside Forest Plan Amendment #2, "Revised Continuation Interim Management Direction for Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales, Appendix B"* (USDA Forest

Service 1995a), commonly referred to as the Eastside Screens. The intent of the Tripod Fire Salvage Project is to cut only dead and fire-injured trees expected to die within one year of project implementation. A dying tree is one in which any or all of the critical parts of the tree (crown, stem or roots) are irreversibly damaged and the tree cannot recover (Schmitt and Filip 2005). Determination of the probability that trees are dying will be made with a scientifically researched and validated approach commonly referred to as the Scott Guidelines (Scott et al. 2002, 2003, 2006). Using the Scott Guidelines, for this project, dying trees are described as those with a "low" probability of survival; only these and dead trees would be included in the salvage harvest. This Forest Plan Amendment would allow salvage harvest of those fire-injured trees greater than or equal to 21" DBH with a low probability of survival within one year of project implementation. It acknowledges that these trees are currently living and that a small percentage of these trees that are identified as having a low probability of survival might actually survive. This amendment would allow economic recovery of those fire-injured trees greater than or equal to 21 inches DBH with a low probability of survival. The Ninth Circuit Court recently confirmed that amendment of the 21 inch upper limit on live trees was appropriate:

> "The Forest Service is free, of course, to amend the Eastside Screens to allow logging of old-growth dying trees, either by adding a definition of the term "live trees" or by changing the requirement to maintain all live trees of a certain size."

This is a non-significant amendment to the Forest Plan for the following reasons, based on direction found in the Forest Service Manual 1926.51:

The Interim wildlife standard 6. 4)a)(1) from the Regional Forester's Amendment #2 would not be permanently changed. The duration of this amendment would be short term, from one to three years, during which falling of trees is expected to occur on the Tripod Fire Salvage project. This amendment is specific to the Tripod Fire Salvage Project; it does not apply to any other project or area within the Okanogan and Wenatchee National Forests. In addition, the Forest Plan will likely be revised before any future projects can be implemented.

This amendment applies to this site-specific project area of which 3,404 acres or less would be treated. This amendment does not change management direction for the rest of the 4.0 million acre Okanogan and Wenatchee National Forests.

The objective of the Eastside Screens was to maintain green trees greater than or equal to 21" DBH for wildlife habitat values. The intent of the Tripod Fire Salvage Project is to cut only dead and fire-injured trees expected to die within one year of project implementation. A dying tree is one in which any or all of the critical parts of the tree (crown, stem or roots) are irreversibly damaged and the tree cannot recover (Schmitt and Filip 2005). Determination of the probability that trees are dying will be made with a scientifically researched and validated approach commonly referred to as the Scott Guidelines (Scott et al. 2002, 2003, 2006). Any green tree greater than or equal to 21" DBH with a moderate or high likelihood of survival will be retained, so no change in multiple use goals is expected. Only dead or trees expected to die within one year from project implementation would be salvage harvested, so these trees have a high probability of being snags within one year. The project proposal to harvest these trees would meet the most current Okanogan and Wenatchee National Forests snag management direction (Appendix D) based on the best available science.

This amendment temporarily modifies the Eastside Screens for the proposed Tripod Fire Salvage project harvest units

Therefore, this amendment is not significant because it is a minor change in standards and guidelines and does not significantly alter the multiple use goals and objectives for long-term land and resource management.

2) A project-specific, non-significant amendment will be needed to allow snowplowing and motorized use of designated groomed snowmobile routes to facilitate winter salvage harvest activities. Forest Plan Forestwide Standard and Guideline 17-6 identifies roads that shall not be snowplowed and shall be closed to motorized wheeled traffic from December 1 to April 1. The following roads would need to be snowplowed and opened for project motorized activities during that time interval in order for operations to occur in the winter:

Road 37 from the junction with Road 5010 to the junction with Road 39
Road 42 from the sno-park in section 23, T35N, R24E, to the junction with Road 4235.

This is a non-significant amendment to the Forest Plan for the following reasons, based on direction found in the Forest Service Manual 1926.51:

The Forest Plan Forestwide Standard and Guideline 17-6 would not be permanently changed. The duration of this amendment will be short term, from one to three years, during which falling and hauling of trees is expected to occur on the Tripod Fire Salvage project. This amendment is specific to the Tripod Fire Salvage Project; it does not apply to any other project or area within the Okanogan and Wenatchee National Forests. In addition, the Forest Plan will likely be revised before any future projects can be implemented.

This amendment applies to this site-specific project area of which about 3,404 acres or less would be treated. This does not change management direction for the rest of the 4.0 million acre Okanogan and Wenatchee National Forests. The Tripod Fire Salvage Project would allow snowplowing on 32 miles of road but would not change direction for the other 2724 miles of road on the Okanogan and Wenatchee National Forests.

The objective of standard and guideline 17-6 is to provide a groomed snowmobile trail system. In order to expediently salvage fire-damaged timber, harvest in the winter season may be necessary. Approximately 32 miles of snowmobile routes have potential to be restricted of a total of 95 miles subject to the standard and guideline 17-6. These closures may not occur at all, depending if associated units are harvested during the winter season.

This amendment temporarily modifies standard and guideline 17-6 only on roads No. 37 and 42 in the Tripod Fire Salvage project area by allowing snowplowing and motorized use from December 1 to April 1

Therefore, this amendment is not significant because it is a minor change in standards and guidelines and does not significantly alter the multiple use goals and objectives for long-term land and resource management.

3) A project-specific, non-significant amendment will be needed to Standard and Guideline MA26-20J in Management Area 26 to allow timber sale operations to take place in deer winter range from December through March. If salvage harvest operations occur during winter, the amendment would allow salvage harvest operations (but not access by the general public) in the following areas: Within Management Area MA 26-04, Units BL02, RA2, RA4, RA5, and RA6; within MA 26-02; Unit BO03. Most of the deer winter range involved is currently not effective habitat as it was burned by the Tripod Fire.

This is a non-significant amendment to the Forest Plan for the following reasons, based on direction found in the Forest Service Manual 1926.51:

The Forest Plan Standard and Guideline MA 26-20J in Management Area 26 would not be permanently changed. The duration of this amendment will be short term, from one to three years, during which salvage harvest is expected to occur on the Tripod Fire Salvage project. This amendment is specific to the Tripod Fire Salvage Project; it does not apply to any other project or area within the Okanogan and Wenatchee National Forests. In addition, the Forest Plan will likely be revised before any future projects can be implemented.

This amendment applies to this site-specific project area of which about 404 acres would be salvage harvested in deer winter range. This does not change management direction for the rest of the 4.0 million acre Okanogan and Wenatchee National Forests. There are a total of 87,900 MA 26 acres on the Okanogan National Forest (Okanogan National Forest, Land and Resource Management Plan FEIS, page 11-102), of which 404 acres would be subject to this amendment.

The objective of standard and guideline MA 26-20J is to protect deer during winter. In order to expediently salvage fire-damaged timber, harvest in the winter season may be necessary. Approximately 404 acres of deer habitat might have activity in them during the winter season. However, most of the deer winter range involved is currently not effective habitat as it was burned by the Tripod Fire.

This amendment temporarily modifies the management prescription for discrete MA 26-04 and 26-02 only, by allowing harvest operations, however other activities would still be restricted.

Therefore, this amendment is not significant because it is a minor change in standards and guidelines and does not significantly alter the multiple use goals and objectives for long-term land and resource management.

4) A site-specific, non-significant amendment will be needed to Standard and Guideline MA12-17D to allow motorized vehicle use in this discrete MA 12-01 from December through March. MA 12 has a management emphasis of providing habitat to support a stable lynx population while accessing the area for growing and producing merchantable wood fiber. If salvage harvest operations occur during winter, this amendment would allow salvage harvest of timber within MA 12-01 (but would not allow winter access to the general public). Most of the habitat affected is currently in an unsuitable condition for lynx due to the Tripod Fire.

This is a non-significant amendment to the Forest Plan for the following reasons, based on direction found in the Forest Service Manual 1926.51:

The Forest Plan standard and guideline MA 12-17D in Management Area 12 would not be permanently changed and the amendment would apply only to discrete MA12-01 areas and not other discrete MA 12 areas. The duration of this amendment will be short term, from one to three years, during which salvage harvest is expected to occur on the Tripod Fire Salvage project. This amendment is specific to the Tripod Fire Salvage Project; it does not apply to any other project or area within the Okanogan and Wenatchee National Forests. In addition, the Okanogan Forest Plan will likely be revised before any future projects can be implemented.

This amendment applies to this site-specific project area of which about 533 acres or less would be salvage harvested in MA 12. This does not change management direction for the rest of the 4.0 million acre Okanogan and Wenatchee National Forests. There are a total of 79,400 MA 12 acres on the Okanogan National Forest ((Okanogan National Forest, Land and Resource Management Plan FEIS, page 11-102), of which 533 acres would be subject to this amendment.

The objective of standard and guideline MA 12-17D is to prevent disturbance to lynx and their prey during winter. In order to expediently salvage fire-damaged timber, harvest in the winter season may be necessary. Approximately 533 acres or less of habitat to support lynx in discrete MA 12-01 might have salvage operations in them during the winter season. However, most of the habitat affected is currently in an unsuitable condition for lynx, due to the Tripod Fire.

This amendment modifies the management prescription for MA 12, by allowing harvest operations, however other activities would still be restricted.

Therefore, this amendment is not significant because it is a minor change in standards and guidelines and does not significantly alter the multiple use goals and objectives for long-term land and resource management.

ALTERNATIVE B – PROPOSED ACTION

Purpose and Design

Alternative B is the alternative that the Forest Service proposed at the beginning of the NEPA process to respond to the agency's purpose of and need for action. It was designed to maximize recovery of dead and fire injured trees expected to die within one year of project implementation that have positive net value. The volume recovered is part of the sustainable supply of sawtimber to local and regional economies. It provides for regeneration of harvest units. Public safety is improved by removal of danger trees along open road corridors. Forest Plan amendments would be implemented as described in the "Actions Common to All Action Alternatives" section of this chapter. The Proposed Action should not be confused with the Preferred Alternative, which is determined after the analysis is complete.

Description

Salvage Harvest

An estimated 2,748 acres would be commercially salvage harvested, with an estimated recovery of 17.9 million board feet (MMBF) of wood fiber. Only dead trees and fire-injured trees expected to die within one year of project implementation would be considered for harvest. Incidental live trees would be felled and removed only under the following conditions: if they jeopardized the safety of harvest operations, during construction of landings or temporary roads and to accommodate skid trails, skyline corridors and guyline anchors.

Ground-based harvesting would occur on approximately 2,156 acres with current road access and a sustained slope of 35% or less. Timber would be felled by mechanized equipment (feller bunchers or cut-to-length harvesters) or by hand (chainsaws) in ground based logging units. Logs would be yarded with crawler tractors, skidders, or forwarders to landings located adjacent to roads. The most likely logging system used for harvesting would be a combination of feller-bunchers and skidders, which bring whole trees into the landings to be processed as sawlogs for haul to the mill. Impacts to the soils would be minimized by avoiding areas of high soil damage or by the use of other practices, such as winter logging, or skidding on slash mat materials (concentrations of fine woody debris).

Skyline logging would occur on approximately 591 acres in areas with road access and a sustained slope greater than 35 percent and in areas with slopes of 35 percent or less where terrain and road location require the use of cable logging systems. Timber would be hand-felled and logs yarded uphill by a system of cables to landings located adjacent to roads. Logs would be partially suspended off the ground during yarding to reduce soil disturbance.

Helicopter logging would not occur in this alternative because it is expected that logging costs would exceed the value of the wood fiber.

Reforestation

Native tree seedlings would be planted on approximately 1,659 acres within salvage harvest units that have insufficient residual seed source to ensure adequate and timely regeneration of conifer species. Ponderosa pine, Douglas-fir, Engelmann spruce, western larch, and

lodgepole pine seedlings would be hand planted to ensure that salvage units would meet minimum tree stocking guides within five years of completion of harvest. Stocking standards and mitigation measures are described in the "Mitigation Measures and Design Criteria" section of this Chapter.

Approximately 1,089 acres within salvage units are expected to regenerate naturally. Natural regeneration would re-establish forest stands in areas where there is a residual seed source that is sufficient to ensure adequate regeneration of conifer species within five years of salvage harvest. Specific criteria for natural regeneration are described in "Mitigation Measures and Design Criteria" section of this Chapter.

Activity Fuels Treatment
In the approximately 2,156 acres harvested with ground-based methods, fuels would remain on-site if trees were felled by hand, or would be removed to landings if a feller-buncher was used. Fuels brought to landings would be concentrated into piles for later burning. In the approximately 591 acres of skyline logging harvest, fuels would remain on-site.

Road Management
Approximately 155 miles of open forest transportation system roads would be used for access to salvage units and for timber haul. Approximately 23 miles of closed system road would be opened for use and closed following harvest operations. There are about 7 miles of currently open road that would be used and closed, implementing a past decision from the South Twentymile EA. All other system roads would remain open.

There are approximately 3 miles of previously decommissioned or unauthorized roads that would be used as access spurs to salvage units. These roads would be decommissioned following harvest operations. An additional 3 miles of unauthorized roads were identified as having utility for management in the future. These roads would be re-opened, classified as a system road and closed following harvest operations.

Temporary roads would be constructed to access landing sites and allow landings to be less visible from roadways. Most individual temporary road segments would not exceed 500 feet in length. Total new temporary road length would be less than 3 miles. Temporary roads constructed during the project would be decommissioned and returned to productive ground following salvage harvest operations.

ALTERNATIVE C

Purpose and Design

This alternative responds to the key issue of reducing disturbances to lynx habitat. No salvage harvest would occur within lynx habitat, including habitat currently in unsuitable condition, as defined in the LCAS. Salvage harvest units are included that fall into Forest Plan Management Area 12, which has a goal of providing habitat to support a stable lynx population over the long term, while producing merchantable wood fiber. However, these units would only be in stands that are not capable lynx habitat. Alternative C also meets the primary purpose and need of economic recovery and design described in Alternative B above.

Description

Salvage Harvest

An estimated 2,247 acres would be commercially salvage harvested, with an estimated recovery of 14.0 million board feet (MMBF) of wood fiber. Only dead trees and fire-injured trees expected to die within one year of project implementation would be considered for harvest. Incidental live trees would be felled and removed only under the following conditions: if they jeopardized the safety of harvest operations, during construction of landings or temporary roads and to accommodate skid trails, skyline corridors and guyline anchors, and trees that are expected to die within one year of project implementation.

Ground-based harvesting would occur on approximately 1,896 acres with current road access and a sustained slope of 35% or less. Timber would be felled by mechanized equipment (feller bunchers or cut-to-length harvesters) or by hand (chainsaws) in ground based logging units. Logs would be yarded with crawler tractors, skidders, or forwarders to landings located adjacent to roads. The most likely logging system used for harvesting would be a combination of feller-bunchers and skidders, which bring whole trees into the landings to be processed as sawlogs for haul to the mill. Impacts to the soils would be minimized by avoiding areas of high soil damage or by the use of other practices, such as winter logging, or skidding on slash mat materials (concentrations of fine woody debris).

Skyline logging systems would occur on approximately 351 acres in areas where road systems are in place and a sustained slope greater than 35 percent and in areas with slopes of 35 percent or less where terrain and road location require the use of cable logging systems. Timber would be hand-felled and logs yarded uphill by a system of cables to landings located adjacent to roads. Logs would be partially suspended off the ground during yarding to reduce soil disturbance.

Helicopter logging would not occur in this alternative because it is expected that logging costs would exceed the value of the wood fiber.

Reforestation

Native tree seedlings would be planted on approximately 1,533 acres within salvage harvest units that sustained high levels of tree mortality (generally 70 percent or greater of the overstory trees) and have insufficient residual seed source to ensure adequate and timely regeneration of conifer species. Ponderosa pine, Douglas-fir, Engelmann spruce, western larch, and lodgepole pine seedlings would be hand planted to ensure that salvage units would meet minimum tree stocking guides within five years of completion of harvest. Stocking

standards and mitigation measures are described in the “Mitigation Measures and Design Criteria” section of this Chapter.

Approximately 714 acres within salvage units are expected to regenerate naturally. Natural regeneration would re-establish forest stands in areas where there is a residual seed source that is sufficient to ensure adequate regeneration of conifer species within five years of salvage harvest. Specific criteria for natural regeneration are described in “Mitigation Measures and Design Criteria” section of this Chapter.

Activity Fuels Treatment
In the approximately 1,896 acres harvested with ground-based methods, fuels would remain on-site if trees were felled by hand, or would be removed to landings if a feller-buncher was used. Fuels brought to landings would be piled for later burning. In the approximately 351 acres of skyline harvest, fuels would remain on-site.

Road Management
Approximately 123 miles of open system roads would be used for access to salvage units and for timber haul. Approximately 13 miles of closed system road would be opened for use and closed following harvest operations. There are about 5 miles of currently open road that would be used and closed, implementing a past decision from the South Twentymile EA. All other system roads would remain open.

There are approximately 3 miles of previously decommissioned or unauthorized roads that would be used as access spurs to salvage units. These roads would be decommissioned following harvest operations. An additional 3 miles of unauthorized roads were identified as having utility for management in the future. These roads would be re-opened, classified as a system road and closed following harvest operations.

Temporary roads would be constructed to access landing sites and allow landings to be less visible from roadways. Most individual temporary road segments would not exceed 500 feet in length. Total new temporary road length would be approximately two miles. Temporary roads constructed during the project would be decommissioned and returned to productive ground following salvage harvest operations.

ALTERNATIVE D

Purpose and Design

Alternative D addresses the key issue of economics by providing increased amount of salvage timber that would be available to local and regional economies. However this additional timber includes salvage units with a higher logging cost or lower sawtimber value with a negative net value.

Description

Salvage Harvest

An estimated 3,404 acres would be commercially salvage harvested, with an estimated recovery of 24.0 million board feet (MMBF) of wood fiber. Only dead and fire-injured trees expected to die within one year of implementation would be considered for harvest. Incidental live trees would be felled and removed only under the following conditions: if they jeopardized the safety of harvest operations, during construction of landings or temporary roads and to accommodate skid trails, skyline corridors and guyline anchors, and trees expected to die within one year of implementation.

Ground-based harvesting would occur on approximately 2,156 acres with current road access and a sustained slope of 35% or less. Timber would be felled by mechanized equipment (feller bunchers or cut-to-length harvesters) or by hand (chainsaws) in ground based logging units. Logs would be yarded with crawler tractors, skidders, or forwarders to landings located adjacent to roads. The most likely logging system used for harvesting will be a combination of feller-bunchers and skidders, which bring whole trees into the landings to be processed as sawlogs for haul to the mill. Impacts to the soils would be minimized by avoiding areas of high soil damage or by the use of other practices, such as winter logging, or skidding on slash mat materials (concentrations of fine woody debris).

Skyline logging systems would occur on approximately 716 acres in areas where road systems are generally in place and a sustained slope greater than 35 percent and in areas with slopes of 35 percent or less where terrain and road location require the use of cable logging systems. Timber would be hand-felled and logs yarded uphill by a system of cables to landings located adjacent to roads. Logs would be partially suspended off the ground during yarding to reduce soil disturbance.

Helicopter logging would occur on approximately 532 acres in areas where other logging systems are not feasible. Timber would be hand felled and logs would be flown from helicopter units to landings located adjacent to roads. Logs would be fully suspended off the ground during yarding and soil disturbance minimized.

Reforestation

Native tree seedlings would be planted on approximately 1,930 acres within salvage harvest units that have insufficient residual seed source to ensure adequate and timely regeneration of conifer species. Ponderosa pine, Douglas-fir, Engelmann spruce, western larch, and lodgepole pine seedlings would be hand planted to ensure that salvage units would meet minimum tree stocking guides within five years of completion of harvest. Stocking standards

and mitigation measures are described in the “Mitigation Measures and Design Criteria” section of this Chapter.

Approximately 1,474 acres within salvage units are expected to regenerate naturally. Natural regeneration would re-establish forest stands in areas where there is a residual seed source that is sufficient to ensure adequate regeneration of conifer species within five years of salvage harvest. Specific criteria for natural regeneration are described in “Mitigation Measures and Design Criteria” section of this Chapter.

Activity Fuels Treatment
In the approximately 2,156 acres harvested with ground-based methods, fuels would remain on-site if trees were felled by hand, or would be removed to landings if a feller-buncher was used. Fuels brought to landings would be piled for later burning. In the approximately 716 acres of skyline harvest, fuels would remain on-site. In the approximately 532 acres of helicopter harvest, fuels would remain on-site.

Road Management
Approximately 156 miles of open system roads would be used for access to salvage units and for timber haul. Approximately 24 miles of closed system road would be opened for use and closed following harvest operations. There are about 7 miles of currently open road that would be used and closed, implementing a past decision from the South Twentymile EA. All other system roads would remain open.

There are approximately 3 miles of previously decommissioned or unauthorized roads that would be used as access spurs to salvage units. These roads would be decommissioned following harvest operations. An additional 3 miles of unauthorized roads were identified as having utility for management in the future. These roads would be re-opened, classified as a system road and closed following harvest operations.

Temporary roads would be constructed to access landing sites and allow landings to be less visible from roadways. Most individual temporary road segments would not exceed 500 feet in length. Total new temporary road length would be less than 3 miles. Temporary roads constructed during the project would be decommissioned and returned to productive ground following salvage harvest operations.

ALTERNATIVE E

Purpose and Design

Alternative E responds to the key issue of salvage harvesting dead and fire injured trees expected to die within one year of project implementation greater than or equal to 21" DBH. It is similar in many respects to Alternative B in that it proposes to salvage harvest the same units, reforest the same units, treat activity fuels in a similar manner and utilize the same road systems. However, it would not salvage harvest any live trees, dead trees or fire injured trees expected to die within one year of project implementation that are greater than or equal to 21" DBH.

Description

Salvage Harvest

An estimated 2,748 acres would be commercially salvage harvested, with an estimated recovery of 14.4 million board feet (MMBF) of wood fiber. Only dead trees and fire-injured trees expected to die within one year of project implementation less than 21" DBH would be considered for harvest. Incidental live trees would be felled and removed only under the following conditions: if they jeopardized the safety of harvest operations, during construction of landings or temporary roads and to accommodate skid trails, skyline corridors and guyline anchors.

Ground-based harvesting would occur on approximately 2,156 acres with current road access and a sustained slope of 35% or less. Timber would be felled by mechanized equipment (feller bunchers or cut-to-length harvesters) or by hand (chainsaws) in ground based logging units. Logs would be yarded with crawler tractors, skidders, or forwarders to landings located adjacent to roads. The most likely logging system used for harvesting will be a combination of feller-bunchers and skidders, which bring whole trees into the landings to be processed as sawlogs for haul to the mill. Impacts to the soils would be minimized by avoiding areas of high soil damage or by the use of other practices, such as winter logging, or skidding on slash mat materials (concentrations of fine woody debris).

Skyline logging would occur on approximately 591 acres in areas with road access and a sustained slope greater than 35 percent and in areas with slopes of 35 percent or less where terrain and road location require the use of cable logging systems. Timber would be hand-felled and logs yarded uphill by a system of cables to landings located adjacent to roads. Logs would be partially suspended off the ground during yarding to reduce soil disturbance.

Helicopter logging would not occur in this alternative because logging costs would exceed the value of the wood fiber.

Reforestation

Native tree seedlings would be planted on approximately 1,659 acres within salvage harvest units that have insufficient residual seed source to ensure adequate and timely regeneration of conifer species. Ponderosa pine, Douglas-fir, Engelmann spruce, western larch, and lodgepole pine seedlings would be hand planted to ensure that salvage units would meet minimum tree stocking guides within five years of completion of harvest. Stocking standards

and mitigation measures are described in the “Mitigation Measures and Design Criteria” section of this Chapter.

Approximately 1,089 acres within salvage units are expected to regenerate naturally. Natural regeneration would re-establish forest stands in areas where there is a residual seed source that is sufficient to ensure adequate regeneration of conifer species within five years of salvage harvest. Specific criteria for natural regeneration are described in “Mitigation Measures and Design Criteria” section of this Chapter.

Activity Fuels Treatment
In the approximately 2,156 acres harvested with ground-based methods, fuels would remain on-site if trees were felled by hand, or would be removed to landings if a feller-buncher was used. Fuels brought to landings would be concentrated into piles for later burning. In the approximately 591 acres of skyline logging harvest, fuels would remain on-site.

Road Management
Approximately 155 miles of open system roads would be used for access to salvage units and for timber haul. Approximately 23 miles of closed system road would be opened for use and closed following harvest operations. There are about 7 miles of currently open road that would be used and closed, implementing a past decision from the South Twentymile EA. All other system roads would remain open.

There are approximately 3 miles of previously decommissioned or unauthorized roads that would be used as access spurs to salvage units. These roads would be decommissioned following harvest operations. An additional 3 miles of unauthorized roads were identified as having utility for management in the future. These roads would be re-opened, classified as a system road and closed following harvest operations.

Temporary roads would be constructed to access landing sites and allow landings to be less visible from roadways. Most individual temporary road segments would not exceed 500 feet in length. Total new temporary road length would be less than 3 miles. Temporary roads constructed during the project would be decommissioned and returned to productive ground following salvage harvest operations.

Mitigation Measures and Design Criteria Common to All Action Alternatives

The ID Team developed the following design criteria and mitigation measures to be used as a part of the action alternatives. In addition, all applicable Timber Sale Contract provisions as they concern the management of soils, roads, water quality, and vegetation management would be applied. These design features listed below, serve to prevent or minimize the effects of management activities. Effectiveness of implementing these measures is considered to be high for this project because they have been used successfully for projects on the Okanogan and Wenatchee National Forests. Effectiveness of these measures is also discussed in Chapter 3 under each resource section. Items listed below apply to Alternatives B, C, D and E unless otherwise described. Measures and design criteria are an integral part of the action alternatives and the effects analysis in Chapter 3 is based on these measures being implemented.

WILDLIFE

Lynx Habitat Conservation

1. Where harvest is proposed within 'capable' lynx habitat (Alternatives B, D, and E):
   a. Field verify treatment units to ensure that harvest is only occurring outside suitable habitat
   b. Decommission temporary roads and waterbar skid trails and skyline corridors to prevent unwanted use. Specifications are described in Measures #24, 32, and 38
   c. To provide abundant structure for hare population recovery, retain 30% of the representative burned forest within a 20 acre area within and surrounding harvest units. RHCAs, inoperable terrain, edges of units, and small leave 'islands' all count toward this 30% retention level. In some cases larger leave 'islands' within harvest units will be needed to meet this goal
   d. Harvest no trees smaller than 12" DBH and no trees greater than 28" DBH (≥ 21" DBH for Alternative E)
   e. Allow natural regeneration to restock sites where lodgepole pine was present prior to the fire. Where natural regeneration is found to be unsuccessful, plant early and mid-seral species that occurred there historically, favoring lodgepole pine and Engelmann spruce. Reforestation objectives are to attain 15% or less variation in tree stocking levels and tree sizes between harvested and un-harvested areas within 10 years following harvest
   f. Ensure soil compaction and soil disturbance does not impede abundant regeneration of conifers in harvested lynx habitat
   g. Grass seeding will be employed in lynx habitat only where needed to limit soil erosion and noxious weed invasion
   h. An existing area closure within the Okanogan National Forest Travel Plan restricts snowmobiles to designated routes within lynx habitat. Area closures for all motorized vehicles (including snowmobiles) identified in the Okanogan National Forest Travel Plan will remain in effect during and after project operations

Education

2. Information about the protected status of grizzly bears, wolves, lynx, wolverines, fisher, bald eagles, great gray owls, peregrine falcons, gray flycatcher, Townsend's big-eared bat, fringed myotis and gray squirrels and the penalties for shooting and harassing would be provided to all private and Forest Service personnel working in the Tripod project area.

3. Information will be provided about storage of bear attractants and camping in bear country would be provided to all private and Forest Service personnel working in the Tripod project area.

Burned Forest Habitat

4. Designate 45 1,000-acre black-backed woodpecker reserves with at least 500 acres of highly suitable habitat as determined in habitat modeling by Dudley and Russell. Some of these would include harvest units, but all would retain at least 500 acres of highly suitable habitat after project completion. This is intended to provide habitat availability for at least 45 pairs of black-backed woodpeckers in all alternatives.

5. Retain down wood amounts, sizes and distribution consistent with standards in the Eastside Screens and best available science (Brown et al, 2003, as modified by Harrod 2007).

Raptor Territories

6. Protect known raptor territories and conduct surveys before and during project implementation in likely habitats to locate new territories of owls, hawks, falcons, and eagles (especially great gray owls and goshawks). Where active territories are located, no harvest will occur around the nest and seasonal restrictions will be applied within ¼ mile from March 15 to August 15 to limit disturbance. Contract language will be included to provide for raptor territory protection if active territories are found subsequent to contract award.

7. No helicopter activity will occur within ¼ mile or less than 1,000 feet overhead of raptor nest sites discovered during project implementation

Den Sites

8. If an active lynx den, grizzly bear den, or wolf den or wolf rendezvous site is discovered at any phase of the project, construction activities and project-associated disturbance will be prohibited within ½ mile (800 meters) of the site during the denning or rendezvous period. For lynx this period is May 1 to July 31; for bears October 1 to April 30, and for wolves April 1 to August 31. Consultation with USFWS would be re-initiated.

Riparian Habitat Conservation Areas (RHCA)

9. Delineate RHCAs as described in the Hydrology and Aquatic Resources Measures 11-21 below. These areas are important for a variety of wildlife and buffers allow compliance

with Management Indicator requirements for ruffed grouse. The snags left in these corridors will count toward retention levels needed for burned forest dependent species.

Invasive Species

10. Limit the spread of noxious weeds to avoid impacts to wildlife habitat, as described in the Invasive Plants measures.

HYDROLOGY AND FISHERIES

Riparian Habitat Conservation Areas (RHCA)

11. Provide stream and riparian protection based upon the Forest Plan as amended by PACFISH. Identify and map RHCAs during unit layout following snow melt and include potential landslide areas. PACFISH descriptions, standards and Riparian Management Objectives are described in Chapter 3.3. A fisheries biologist or hydrologist will monitor RHCA delineation to ensure Riparian Management Objectives are met.

12. No salvage harvest will occur within RHCA boundaries.

13. Leave danger trees felled in RCHAs in response to safety concerns in place. Fell hazard trees towards stream channels if it is safe to do so.

14. No temporary road or new landing construction will occur in RHCAs.

15. Actively restore existing landings within RHCAs following completion of salvage operations as detailed in Measure #46.

16. Deploy erosion control measures, such as silt fence, straw bales, or slash (organic debris) along margins of landings, along temporary roads, and within RHCAs to protect wetland and riparian habitat.

17. Leave existing large woody debris within RHCAs in place.

18. In portions of salvage units adjacent to RHCAs, directionally fell trees to be harvested away from the RCHA or inner gorges of all stream courses.

19. Protect the current temperature regimes in all perennial streams by maintaining shade and riparian vegetation adjacent to all stream channels.

20. Minimize sediment input to streams by directionally yarding away from RHCAs. If yarding logs across perennial fish-bearing or non fish-bearing RHCAs, use full suspension logging systems. Avoid yarding across intermittent streams; however if yarding across them is unavoidable, yarding will be limited to generally perpendicular crossings.

21. Ensure that hazardous material spill containment procedures are in place for all operations within RHCAs. No fueling will be done in RHCAs.

22. In areas grazed by livestock, minimize disruption of natural barriers that protect riparian wetlands and important streams .

Road Erosion Control

23. Evaluate existing roads used for log haul for erosion and sediment delivery potential. Employ, where applicable, appropriate erosion control measures such as: seasonal closures, culvert replacement or addition, gravelling, maintenance, ditching, water routing structures, sediment traps, waterbars, and drivable dips to minimize erosion. For these measures to be effective, water will be routed off road prisms, road fills, and dispersed across the slope.

24. Decommission temporary roads and return them to similar land contours, soil condition, and coarse wood cover as the natural surrounding area so that the road prism will be hydrologically stable and restrict motorized use.

25. Construct cross drains on roads with exposed mineral soil, as needed, to control runoff and minimize the potential for erosion. Complete work as soon as possible after operations.

26. Close Maintenance Level 1 roads (that have been opened for salvage harvest) at the end of hauling or prior to seasonal shutdown. These roads will not be left open, waiting for post-salvage activities (such as reforestation) to occur. Shape the disturbed roadbed to provide functional drainage and ensure that drainage structures are in place.

27. Where snowplowing is needed for winter access, construct water drainage outlets in the snow berm, along the fill-slope edge of the road to rapidly remove water from the road prism. No road material will be side-cast during snowplowing operations.

28. Meet Washington Department of Fish and Wildlife fish screening criteria during water drafting. Screen all pumps and water intakes to meet screening criteria unless ground water wells are used as a water source.

29. Use only existing and currently accessible water drafting sites where listed fish are not present. Water used for salvage operations, such as to reduce dust on roads for haul is a reservation purpose. Local Watermasters will be notified.

30. Do not draft water from the Chewuch River, lower Twentymile Creek off Road 5010, Blue Buck Creek, mainstem Beaver Creek and the South Fork of Beaver Creek downstream of the Middle Fork confluence except during emergency situations.

SOILS

Project design requirements to minimize soil disturbance and to aid recovery of sites disturbed during harvest operations are listed below. Erosion control measures are intended to reduce the risk of concentrated runoff, surface erosion, trap eroded material, or stabilize eroded material close to the source. Active soil restoration measures will help to reduce the level of detrimental soil disturbance and help restore compacted and displaced soils toward more desirable conditions.

31. Seed areas of heavily disturbed soils including landings, main skid trails, decommissioned temporary roads, landings, and constructed road cut and fill slopes. The Invasive Plant Specialist and Botany Specialist will determine the appropriate seed mix, application rates, locations and time of seeding to meet erosion control and invasive plant competition objectives.

32. Install waterbars on skid trails with bare soil or very thin vegetative cover at the end of harvest operations or prior to entering into season shutdowns or a period of extended inactivity. Timely completion of waterbars is important to divert runoff from seasonal rain or snow fall. Water bar spacing and design requirements follow (Packer 1967).

Percent grade	Average Spacing (feet)
2-10	150
11-20	120
21-34	90
35 or greater	80

    a. Construct to a minimum of 1.5 to 2 feet in height (2 feet high on the steeper skid trails). Some variation in waterbar size may occur but they must be large enough to function properly.
    b. Install at a 45 degree angle to either the left or right of the trail so as to disperse water on the down slope or lower side of the trail. A herringbone pattern of alternating water bars may be necessary on steeper slopes.
    c. Construct into mineral soil at a minimal depth of 18 inches, do not simply push up soils.
    d. Avoid driving on or damaging waterbars with heavy equipment, which would leave them prone to failure. If damage does occur, water bars will be repaired to bring them back up to the minimum design height.

33. Utilize existing road systems and skidder/forwarder trails from prior harvest activities as much as possible to reduce the need for additional skidding/forwarder trails.

34. Place organic debris along margins of landings as needed to prevent erosion.

35. Winter harvesting operations are recommended as an effective means of limiting detrimental soil compaction and displacement and to provide an alternative to the limitations and additional requirements of summer operations. To best ensure the snow pack is stable enough to support winter logging operations, the following conditions and methods of operation are advised:
    a. Require 8 inches compact snow or a combination of compacted snow and hard frozen ground equaling 8 inches. Prior to approval of winter logging operations, an assessment of suitable snow and soil conditions will be conducted by a Soil Scientist. Periodic assessments would be conducted during the winter operating period, especially during warming trends.
    b. Overnight temperatures should drop to 25 degrees F. or lower and afternoon temperatures should stay below 35 degrees F. to maintain frozen conditions. Afternoon temperatures can exceed 35 degrees F. for short periods if previous night time temperatures are below 20 degrees F.

c. Construct designated snow trails prior to operations. This promotes freezing of the ground beneath main skid trails to ensure stable operating conditions. If skid trails begin thawing and show signs of rutting and water runoff, relocate main skid trails to suitable snow and frozen soil conditions.
d. Single and multiple-pass logging equipment trails will be located a minimum of 40 feet apart except where they converge such as landings. Trail locations must be designated and approved prior to operating.

36. Summer harvesting operations will be conducted during periods of sufficient (but not excessive) soil moisture to provide adequate soil stability. The following requirements apply to summer logging operations and are intended to reduce the level of expected or additional detrimental soil disturbance in harvest units to 15 percent or less:
    a. Single-pass felling equipment trails must be located a minimum of 40 feet apart. Soil Group 2 soils will be actively restored if extended lengths or rutting or compaction occur. These soils have ash caps and are prone to compaction.
    b. Multiple-pass skidding equipment trails must be located a minimum of 100 feet apart except where they converge at landings.
    c. All multiple-pass trail locations must be designated and approved prior to operating.

37. Skyline corridors will be approved by the Sale Administration Representatives prior to any tree falling associated with each corridor. All operations will require a minimum of one end suspension of logs.

38. Skyline corridors will be water barred or have slash placed within the corridor, where necessary to limit erosion and sediment delivery. Factors which would indicate need for the above include but are not limited to continuous grades, water concentrating topography, proximity to wet or riparian areas, and ground disturbance that bares soil.

39. Avoid ground based equipment operation in Unit B008 and parts of Units GA03, GA07, GA08, MK04, MK05, Soil Group 1 (see Soil Group Maps for each alternative in Appendix A) when soils are saturated or standing water is present. This would avoid soil compaction.

40. Avoid areas of active soil movement to minimize the potential for increased soil erosion and sediment delivery to streams. Areas in Land Type Associations Area (LTA) Ja8 and Jb2 are most at risk. See LTA Maps for each alternative in Appendix A. Signs of soil movement could include pistol butted trees, up rooted trees, churned soil.

41. Retain sufficient trees in LTA Ja8 and Jb2 that grow directly in v-shaped confined incised down cut channels to maintain soil stability. Shrubs will also provide soil stability. See LTA Maps for each alternative in Appendix A. Avoid operation of ground based equipment within the channels. These channels are prevalent on steeper slopes and may have evidence of scouring and soil movement. Logging slash needs to remain to disrupt channeled water flow during high intensity rain or runoff events.

42. Avoid operating equipment on rock outcrops prevalent in Soil Group 5 and minor components in Soil Group 3, see Soil Group Maps for each alternative in Appendix A. Intermittent rock outcrops are present with adjacent shallow soils. This will avoid increased erosion and displacement.

43. Avoid operating equipment on short steep pitches over 35% slopes that are have bare mineral soil exposed. Units most at risk are BL02, B006, B008, B010, BR02, BR04, BR10, BR12, BR22, BR26, BR31, CA03, CE01, CE02, CE03, CE08, CE11, Ga01, HA01, HA02, HA03, HA05, HA08, JU08, LI39, LI54, MK07, MK08, PE01, PE02, PE04, RA02, RA06, RA07, RA09, RA11, RA13, RA14, RA15. These units have portions of high burn severity areas (Analysis File - Soil Burn Severity Maps).

44. Go back trails (trails used by the skidder to return to the woods for another turn) must be approved by the Sale Administrator and require the same restoration as multiple-pass skid trails. These trails will be allowed to access short steep slopes up to 150 feet and accommodate line-pulling.

45. Confine tractor skid/forwarder operations will be confined to slopes that are 35% or less except for pitches of 150 feet or less of steeper ground. No side hill travel of skidding/forwarder equipment will take place on these steeper pitches to avoid excess soil damage. Machinery will be excluded from any areas with extended pitches greater than 150 feet that exceed 35 percent. Operation on short steep pitches will only occur if adequate ground vegetation is present and bare mineral soil is not present.

Mitigation Measures for detrimentally compacted or displaced soil:

46. Actively restore detrimentally compacted soils in units where greater than 15% of the area has been affected such as landings, especially portions of multiple-pass skid trails that converge into landings and other segments that incur heavy compaction. Subsoil decompaction may be done with a self-drafting winged subsoiler or an excavator to restore sites with compaction levels in excess of 15 percent of portions in Units B008, B009, BR19, BR31, CA01, CA03,CE01, CE03, CE08, CE11, GA01, GA02, GA03, GA04, GA06, GA07, GA08, HA03, HA04, HA05, JU04, JU18, LI50, MK01, MK02, MK07, MK08, PE01, PE02, PE03, PE04, RA06, RA07, RA09, RA11 in Soil Group 2 on *Myerscreek-Manley* representative soils, see Soil Group Maps for each alternative in Map Appendix A. Soil restoration using a subsoiler will be limited to slopes under 25% and is not recommended for soils with bedrock less than 20 inches below the surface. Subsoiling will not be done in wet soils. Operations will be conducted when adequate equipment operating space is available to avoid damaging residual tree boles and roots. Subsoiling underneath the canopy drip line on more than one side of residual live trees will be avoided.

47. Active soil restoration using an excavator will require fracturing and loosening compacted layers to a depth of at least 12 to 15 inches, roughening the soil surface and placing vegetation plugs and other organic material along detrimentally disturbed skid trails and landings would help establish and promote vegetation growth. Adequate soil moisture, as assessed by the Soil Scientist, needs to be present to ensure vegetation establishment success. This measure will be an acceptable

substitute for subsoiling. Similar criteria would be applied as subsoiling but slopes over 25% would be considered for decompaction.

48. Keep coarse woody debris to levels consistent with soil properties and site conditions consistent with Regional Forester Amendment #2, PACFISH. This measure would help reduce the risk of dramatic reductions in nutrient capitol (reserves) and accelerated surface erosion associated with high intensity fires*,* See Figure 3.4-4, Relative Soil Interpretations.

49. Soil displacement occurring up to 6 inches or more of rutting if present will be pulled in to fill ruts, or if slash is available, it may be placed in the rutted area. Decompaction under displacement also needs to be reviewed by a Soil Scientist. This commonly occurs on slopes less than 35% slope in Soil Group 2 soils. Soils need to be decompacted to avoid puddling. Displacement occurring on slopes over 35% will only need to be slashed, due to equipment operability limitations. This measure will help avoid soil puddling on low relief slopes and help prevent water

FOREST VEGETATION

Salvage Harvest

50. Evaluate fire-injured trees to determine the probability of survival using the protocol described in the report entitled "Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains" (Scott et al. 2002). This report and two associated amendments (Scott et al. 2003, 2006) are referred to as the "Scott Guidelines". Public concern has been expressed about this methodology, however its use has been monitored on recent fire salvage projects and the guidelines have been recently revised to incorporate monitoring information (Appendix K). The guidelines currently represent the best available science for determining probability of survival. Specific measurement criteria for this project, to identify dead trees and implement the protocol for this project were reviewed and approved by Don Scott, the primary author of the Scott Guidelines (Scott et al. 2002, 2003, 2006), and Craig Schmitt, co-author of two papers that define mortality in western conifers and coauthor of the Scott Guidelines. The protocol and criteria to be used in the Tripod Fire Salvage Project are compatible with Pacific Northwest Region direction regarding conifer mortality determination (Goodman 2005, Schmitt and Filip 2005, Filip et al. 2007).

51. Identify dead trees and fire-injured trees expected to die within one year of project implementation that would be salvage harvested, as follows (Appendix F - Implementation/Marking Guides)

52. Dead Trees

1) Trees with crowns completely consumed by fire and other fire damaged trees with no live needles or live buds

2) Trees with evidence of successful bark beetle attack around the complete circumference of the bole. Evidence can include beetle boring frass, woodpecker feeding activity, pouch fungus (*Cryptoporus volvatus*) conks, or loose or sloughing bark exposing insect galleries

3) Trees other than mature or over mature ponderosa pines (usually older than 180 years) girdled by fire with dead or discolored cambium on three or more quadrants (bole faces) around the base of the tree at the root collar or on the top surfaces of lateral roots near the root collar (Schmitt and Filip 2005, Filip et al. 2007)

4) Mature and over mature ponderosa pines (usually older than 180 years) that have roots severely damaged by basal scorch will be considered dead when dead cambium is found in all 4 quadrants out of 4 samples taken from "recesses" around the circumference of the root collar (Scott et al. 2006, Filip et al. 2007)

b. Fire-injured Trees Expected to Die within 1 year of Project Implementation

1) Trees of any size or species rated by the Scott Guidelines with a "Low" probability to survive Decision Class. The probabilities of survival are composite ratings based on ten factors including; crown volume scorch, tree bole char, root char, total scorch height, and duff consumption. Site factors are also considered such as arrangement/distribution of down woody material, pre-fire tree vigor and season of fire. A rating of low approximates a 25 percent or lower probability of survival (Appendix F)

Harvest Methods

53. Use ground based logging systems to harvest trees on areas accessed by roads with a sustained slope of 35 percent or less. Timber will be felled by mechanized equipment (feller bunchers or cut-to-length harvesters) or by hand (chainsaws) in ground based logging units. Logs will be yarded to landings located adjacent to roads with crawler tractors, skidders, or forwarders.

54. Use skyline logging systems to harvest trees on areas accessed by roads with a sustained slope greater than 35 percent and areas with slopes of 35 percent or less where terrain and road location require the use of skyline logging systems. Timber will be hand felled and logs yarded uphill by a system of cables to landings located adjacent to roads. Logs will be partially suspended off the ground during yarding to reduce soil disturbance.

55. Use helicopter logging where other logging systems are not feasible. Timber will be hand felled and logs will be flown from helicopter units to landings located adjacent to roads. Logs will be fully suspended off the ground during yarding and soil disturbance minimized.

Reforestation

Tree Planting

56. Plant harvest units in areas where there is an insufficient residual seed source to ensure adequate and timely regeneration of conifer species. Ponderosa pine, Douglas-fir, Engelmann spruce, western larch, and lodgepole pine seedlings will be hand planted to ensure that salvage units will meet minimum tree stocking guides of 50 to 200 trees per acre within five years of completion of harvest. Western larch will be planted only within the geographic range where it naturally occurred prior to the fire, including the Volstead, Lightning, Beaver, Cabin, Cedar, Granite, McKay, and

Pelican Creek drainages. Conifer seedlings will not be planted in live aspen clones one-tenth acre and larger in size that are located in harvest units.

57. Implement tree planting to meet the minimum tree stocking guides developed for this project and species recommendations (Appendix F). The tree planting recommendations factor in expected seedling mortality in order to meet the minimum tree stocking standards. A description of the forest types and plant association groups used in the figures is provided in Chapter 3.6. Species composition of planted seedlings will be adjusted based on availability of collected seed and where site conditions necessitate so that minimum stocking levels will be attained.

Natural regeneration

58. Use natural regeneration as a method to re-establish forest stands in areas where there is a sufficient residual seed source to ensure adequate regeneration of conifer species within five years of salvage harvest. Employ natural regeneration in units where vigorous and desirable seed trees survived the fire and will be present at a minimum rate of five to ten trees per acre following harvest. Desirable seed trees include disease-free ponderosa pine, Douglas-fir, Engelmann spruce, and western larch approximately 12 inches DBH and larger with a minimum live crown ratio of 30 percent. Conifer seedlings will become established primarily from seed dispersed by seed trees that will be present in or adjacent to these units following harvest. Areas with inadequate second year stocking or fourth year stocking levels will be assessed and planted as needed to ensure that minimum acceptable stocking levels are attained.

59. Employ natural regeneration in units where tree overstory mortality exceeds the moderate level (generally 70 percent or greater of the overstory trees are dead) and mature lodgepole pines six inches DBH and larger were present at a minimum rate of approximately 30 well-distributed trees per acre prior to the fire. Natural regeneration is expected to become adequately established in these units because lodgepole pine in the fire area is adapted to stand replacement burning and has the ability to regenerate from seed stored in serotinous cones on fire-killed trees (Lotan and Perry 1983; Lotan et al. 1985). The majority of units where lodgepole pine natural regeneration is likely to occur are located in the montane forest type where high levels of lodgepole pine regeneration are desired.

60. Assess all proposed planting units in capable lynx habitat for lodgepole pine natural regeneration potential prior to planting. Proposed planting units with sufficient amounts of live or dead lodgepole pines with serotinous cones to ensure adequate natural regeneration will not be planted.

Seedling Protection

61. Discourage or avoid repeated livestock grazing in tree planting units for three years following planting to reduce livestock damage to tree seedlings. Avoid treatments that increase vegetation competition for moisture on dry sites that are planted. These measures will provide protection for planted seedlings to become established and increase the likelihood that minimum stocking levels will be attained. Some examples of grazing and range management activities recommended during this time include:

a. Avoid salting in or adjacent to plantations.
b. Avoid seeding palatable grass species at levels that will increase livestock use in or adjacent to plantations.
c. Avoid seeding grass species at levels that greatly increase competition for moisture with planted seedlings on hot-dry, warm-dry, cool-dry, or cold-dry sites.

Plant Communities

62. Facilitate native plant community recovery by minimizing soil disturbance within the rooting zone of re-sprouting shrubs and deep rooted perennial grasses and forbs. Retain decaying logs, coarse woody debris, and snags as provided under Soils measure #48 to provide protective micro-site habitat to facilitate native plant community recovery.

Invasive Plants

Objective: Reduce the potential for introduction, spread and establishment of invasive plants on newly disturbed ground.

63. All known sites would be inventoried and prioritized in the project area and along access roads for treatment. New infestations, particularly new invaders, should be the first priority for eradication.

64. Clean all ground disturbing equipment prior to entering the project site.

65. Minimize soil disturbance to no more than needed to meet project objectives. Logging practices to reduce soil disturbance include: winter logging or restrict equipment to designated trails to reduce total soil disturbance within project units.

66. Disturbed soil would be re-vegetated with certified seed to reduce the potential of additional soil erosion caused by invasive plant establishment. Native seed should be the first choice in re-vegetation. Non-native seed may be used in situations where locally collected native seed is not available and where the competitive quality of a nonnative is needed to prevent the establishment of invasive plants (USDA Forest Service 2005a).

67. Provide appropriate weed identification materials and infestation maps to people potentially involved in the Tripod Salvage project to help reduce spread of known sites and detection of unknown sites in the area.

68. District and Forest Weed Coordinators would inspect active gravel, fill, sand stockpiles, quarries, and borrow material for invasive plants before use and transport. Weed infested sources would be treated before using materials. Use only gravel, fill, sand, and rock judged to be weed free by District or Forest Weed Coordinators.

69. Road blading and pulling ditches along roads infested with invasive plants would be scheduled in coordination with the District Weed Specialists in accordance with the PNW FEIS for the Invasive Plant Program Record of Decision.

70. Straw bales used for erosion control would be noxious weed-free.

71. New landings would be constructed away from areas that are infested with new Invaders.

72. New weed infestations on ground disturbed by salvage operations would be treated through hand pulling.

73. Landings infested with established invaders would be hand pulled and seeded post-project; especially where slash has been stock piled and burned.

RECREATION

74. Maintenance level 1 roads and temporary roads use for salvage harvest will have public use restricted during operations. Commercial timber haul routes will be posted with warning signs on roads in the project area that will remain open to public use. When climate and road conditions warrant, dust abatement will be required for timber haul. Dispersed campsites within or immediately adjacent to timber harvest units will be closed during timber harvest activities to mitigate danger to campers. For public safety purposes, Forest Roads 4235 and 4235-100 that provide access to skyline harvest units LI08, LI09, LI25, LI32, LI34, LI35, and LI36 will be posted closed to public entry during harvest activity.

75. To mitigate the effects to recreation traffic, commercial timber haul will not be allowed on project area roads on weekends and holidays from Memorial Day through Labor Day. Exceptions may be granted with written permission from the District Ranger. In consideration of hunters, timber haul will not occur on weekends within the modern rifle deer season. Prescribed burning of localized piles of timber slash and debris will be coordinated to avoid specific hunter camps when occupied. Non-motorized hunting areas will be impacted by timber harvest units BO19, RA01, RA02, RA04, RA05, RA06, RA07, RA09, RA10, RA11, RA13, RA14, RA15, RA16, and RA17 if harvest activity occurs from October 1 through March 31. Timber harvest and haul activity will be allowed, however existing gates will be kept closed to the public. Personnel associated with timber harvest activity will not be allowed to hunt within the roadless hunting area.

76. Roads 37 and 42 are groomed snowmobile routes. In the interest of public safety during salvage operations utilizing these routes, they will be closed to public travel. If the purchaser operates in winter, this will include prohibiting snowmobiles, and will require the Forest Plan amendment described earlier in this chapter. Enforcement will occur through Title 36 CFR 261.50(b).

77. Snowmobile use of Road 38 will be allowed, as agreed under the Mutton T.S. Decision Notice. Units PE01, PE02, PE03, PE04 and PE05 will not be accessible for project operations from December 1 to April 1.

78. Permanent road closures will be done in the following manner to ensure an effective and safe closure after use by this project:

a. Preferred method is a gate without berms, logs and rocks.
b. If berms, rocks, logs and debris are used, the following guidelines apply:
    1) Berms shall be placed a minimum of 15 feet apart to prevent vehicles from getting hung up between berms.
    2) Logs in roadbed shall lay flat; placement of logs between berms is not recommended.
    3) Rocks in roadbed shall allow a 60 inch clearance between barriers for passage and should be staggered/offset rather than placed side-by-side (except in area closures for lynx habitat). Placement of rocks between berms is not recommended.
c. If culverts are removed, safe crossing of drainages shall be provided.
d. If any method or material used to block a road creates a hazard, appropriate signing on either side of the hazard shall be installed to provide warning.

AIR QUALITY

79. Follow the current Washington State Smoke Implementation Plan regulations to protect air quality and avoid smoke intrusions into sensitive areas.

80. Use guidelines in the Methow Valley and Tonasket Ranger Districts' Prescribed Fire Public Information Action Plans to notify public of prescribed burning activities as needed.

TRANSPORTATION

Road Management

81. Manage and maintain roads to minimize the risk of damage to roadways and the environment and to provide safe traffic conditions.

82. This space intentionally left blank..

Roadside Danger Tree Removal

83. Roadside danger trees will be felled along Forest roads open for public use (Objective Maintenance Level 2 and higher). On closed roads that are temporarily opened during implementation of project (salvage harvest and post-harvest) activities, danger trees expected to become a hazard would be felled. Danger trees located within riparian habitat conservation areas (RHCAs) would be cut and left to provide additional coarse woody debris. Danger trees felled outside of RHCAs would be available for removal as firewood or other forest products where economically feasible. Tracked or wheeled equipment used to remove danger trees located outside of ground based logging salvage harvest units would not be permitted to operate off of roads.

84. Danger trees along roads would be evaluated in accordance with the *Field Guide for Danger Tree Identification and Response* (USDA and USDI 2005a). Qualified persons as defined in the aforementioned field guide will identify and evaluate danger

trees. A danger tree is defined as any standing tree that presents a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction or lean of the tree (FSM 7733). The Field Guide classified danger trees into three categories; low, likely or imminent potential to fail.

85. Only danger trees with an imminent potential to fail and a potential failure zone that includes roads open for public use or closed roads temporarily opened for project activities will be felled. Trees with an imminent potential to fail are so defective or rotten that little effort is required to make them fail. The potential failure zone usually includes the area within one and one-half tree lengths from the base of the tree, and this can vary depending on slope, tree height, lean, individual tree characteristics, and other factors.

RANGE

86. Minimize disruption of natural (vegetative or downed wood) livestock drift barriers in areas with cattle use along riparian areas, wetlands and important stream courses. Minimize disruption of natural wood created drift barriers on allotment boundaries. Drift barriers are typically at the end of drift fences or in saddles of ridgelines between pastures/allotments.

87. When re-vegetating disturbed soil, use seed mixes suited to proper livestock management. A seed mix with a species composition capable of attracting cattle will be used in areas best suited to help draw cattle away from riparian areas. A seed mix with a species composition least attractive to cattle will be used in areas adjacent to riparian areas. Both seed mixes, including application rate, locations and time of seeding will be determined by the Invasive Plant/Range Specialist and the Botany Specialist. Seed mix will meet the standard erosion control and invasive plants competition objectives. In capable lynx habitat, seed only on landings and skid trails that have erosion potential.

88. Limit the accumulation of logging slash on stock driveways, stock trails, and areas of traditional cattle movement that are critical to the proper management of the allotment. Fence right-of-ways will be cleared of slash produced by logging or post sale activities. Maps of livestock routes will be available and critical areas flagged on the ground.

89. All existing structural range improvements (fences, gates, cattle guards) will be contractually protected. Fences which are cut in order to facilitate logging operations must be repaired to Forest Service standards by the purchaser. All fence line support trees will be designated as leave trees. No high stumping of trees within the fence line will be permitted. All gates will remain closed during work and non-work hours if cattle grazing is scheduled in the project area.

90. Coordination of management actions between the Range specialist, Sale administrator, and grazing permittees will occur to help prevent any conflicts.

91. Range management specialist will insure grazing permittees follow best management practices, including proper intensity and duration of use, proper salting and maintenance of water developments to meet riparian goals, and to obtain uniform distribution of use on the grazing allotment.

92. Delay livestock grazing where needed until standards are met that indicate sufficient recovery has occurred to allow return of livestock grazing (Appendix H).

SENSITIVE PLANTS

93. Action alternatives have been designed to avoid entering any habitat of sensitive species. Therefore, no surveys for sensitive plant species are foreseen. The analysis in Chapter 3 assumes that any sensitive species habitat is occupied. In the event sensitive plant populations are discovered during sale layout, the micro-site characteristics of the habitat will be protected. The site will be protected from any disturbance that alters the hydrology, solar radiation, soil properties or associated species in a given population. Buffer size will be determined by species needs, site conditions, habitat requirements, and will as a minimum be at least equal to the height of two site-potential trees. The Botanist and Silviculturist will design a buffer to ensure the sensitive species habitat requirements are met.

94. Roadside danger tree removal will be coordinated with the District Botanist along Road 3900, bordering the Roger Lake Research Natural Area (RNA) to protect the ecological integrity of the RNA and Sensitive plant habitat. The Botanist will be at the site on the day felling occurs. Trees felled within the Roger Lake RNA will not be removed.

95. Before activities begin near Unit JU20 and along Road 5010-540 in the Junior Creek drainage, coordination with the District Botanist will occur to avoid damaging the site of a State Threatened species.

96. Provide protection buffers for perennial springs and seeps from the edge of the wet ground to a distance equal to ½ a site potential tree or 50' slope distance, whichever is greater. Protect other riparian areas according to direction for RHCAs in PACFISH.

97. Exclude aspen groves ½ acre or larger in size from ground-disturbing activities and allow dead conifer trees to fall naturally within the groves. Leaving fallen snags helps protect re-establishing aspen from browsing ungulates and prevents potential soil compaction that could reduce the full recovery of the aspen grove. This will also protect the site from disturbance in the event there were unknown populations of Sensitive plants present prior to the fire. The following units are known to support inclusions of aspen: BL02, BO05, BO06, BO09, BO10, BO11, BR14, CA03, CE02, CE03, CE04, CE11, GA01, GA02, GA05, HA03, HA04, HA05, MK01, MK02, MK03, MK04, MK06, MK07, RA04, RA05, and RA06.

98. For any aspen stand that is 1/10th acre in size or larger, do not plant conifers within 50' of the aspen clone edge.

SCENIC RESOURCES

99. The following design features are developed to meet the intent of Moderate to High Scenic Integrity levels for Retention and Partial Retention foreground and middle-ground areas as allocated for the Chewuch Viewshed Road 51 and partial retention in the Middle Salmon-Boulder Viewshed Road 37. Other key areas of scenic concern are the middle-ground view from the communities of the Methow and Conconully Valleys.

100. Landscape Architect and Recreation Technician/Planner will review marking of units prior to logging in areas of high scenic concern, including Units JU18, BO08, HA03 and HA05. Additional units that have the potential to be seen from the designated travel routes will also be reviewed in the field.

101. Maintain diversity and variety in sizes of leave snags in clumps and masses on a landscape scale. Provide leave islands and clumpy mosaic arrangements. Minimize mechanical damage to existing leave snags. Leave clumps of varying sizes of overstory and understory for snag retention.

102. Locate landings out of the immediate foreground (or seen area) in Management Area 5 Retention allocation areas, or screen as much as possible. If landings are placed on Forest Roads, keep disturbance contained within the existing road prism.

103. Locate skylines at angle to avoid linear effect as viewed from Chewuch Viewshed Forest Road 51 and the Middle Salmon-Boulder Viewshed Forest Road 37. Keep skylines as short as possible to blend into the landscape, avoid long distances and multiple skylines to landings. Keep corridors narrow.

104. Maintain visual characteristics of high, moderate, and low intensity burned landscapes for viewing. In the burned landscape, a combination of uniform and mosaic landscapes is desirable to create variety. The preferred landscape character is mosaic for long term diversity.

105. Maintain a landscape composed of a variety of textures and patterns. Maintain the highly textured sky line, ridgelines and dominating patterns of the swales.

106. Use clumping and feathering of unit edges to avoid introducing dominating lines. Visually link riparian and wildlife corridors, patches and edges by using irregular spaced clumping and feathering.

HERITAGE RESOURCES

107. If any National Register of Historic Place (NHRP) eligible or potentially eligible properties are discovered during project implementation and cannot be protected through project design or avoidance, appropriate mitigation measures will be developed in consultation with the State Historic Preservation Office (SHPO) and the National Advisory Council. All required mitigation work will be completed before project implementation.

108. Contract provisions for the protection of heritage properties considered eligible or potentially eligible for inclusion on the NHRP will be included as part of any timber sale contract. This will provide for the protection of areas where heritage resources have been identified and for those that may be discovered in the area during the contract period. The locations of listed, eligible, and potentially eligible heritage properties will be identified as Areas to Protect in any contracts. Flagging and other area protection marking used for heritage properties would be removed at the close of all project activities.

MONITORING

Erosion/Soils

The Forest Service Timber Sale Administrator/Harvest Inspector will perform implementation monitoring on the following items, on a routine basis during periods of operation. These items include tree falling, yarding (including skid trail spacing), loading, hauling, road closures and erosion control operations, such as constructional water drainage control features and seeding. For example, the Timber Sale Administrator/Harvest Inspector will monitor erosion control measures, ensuring work would be completed prior to periods of seasonal precipitation or run-off and roads to be closed have effective closures. Forest Service Timber Sale Administrators will ensure that equipment would not be operated when ground conditions are such that excessive damage would result. This monitoring will be in consultation with the Forest Service Hydrologist and Soils Specialist. The Forest Service Soils/Hydrology specialists will perform effectiveness monitoring after operations are complete.

Reforestation

The District Reforestation Forester will monitor seedling establishment in plantations, during the first and third growing seasons following tree planting. Seedling survival surveys would be also be conducted during the first and third growing seasons following tree planting. The District Reforestation Forester would conduct stocking surveys during the third growing season following planting to assess the condition and total number of planted seedlings, natural seedlings, and other vigorous live trees to certify that minimum acceptable stocking levels have been attained. Areas with inadequate first year planting stock survival or third year stocking levels will be assessed and replanted as needed to ensure that minimum acceptable stocking levels are attained.

Natural Regeneration

The District Reforestation Forester will monitor seedling establishment in natural regeneration units during the second and fourth growing seasons following the completion of harvest. Conduct stocking surveys to assess the condition and total number seedlings and other vigorous live trees present to certify that stocking levels listed for the minimum tree stocking standards have been attained. Areas with inadequate second year stocking or fourth year stocking levels will be assessed and planted as needed to ensure that minimum acceptable stocking levels are attained. Planting in unsuccessful natural regeneration units will be conducted according to the previously described tree planting procedures.

Wildlife Monitoring

Wildlife monitoring items include: Lynx habitat road use, raptor territories, road closure implementation and effectiveness, vegetation recovery for livestock compatibility, and weed introduction and spread.

Lynx habitat motorized vehicle use.
In winter, snowmobile use is prevalent in the Tripod Fire area. There are some places closed to use by the Forest travel plan. Monitoring of winter use in areas closed for resource needs is an important conservation measure for lynx. Documentation of use is needed to support law

enforcement requests. Multiple visits to assess snowmobile incursion into closed areas between November and April will be conducted by Methow Valley and Tonasket District wildllife biologists from 2007/08 to 2014/15.

Raptor nesting

Raptor territories are subject to disturbance during the nesting season. Okanogan National Forest standards and guidelines require protection of raptor nest sites. Detection of those sites is at times difficult and different techniques are employed for different species. Goshawk, great gray owl, and peregrine falcon surveys are planned for each spring March – June while harvest operation proceed (2007 to 2009), to allow protection measures described in Chapter 3 to be implemented where needed. Surveys will be conducted to standard protocols by Ranger District wildlife biologists and / or contractors.

Road closures

The implementation of road closures is part of the design for habitat protection in this project. Many roads are available for recreation use. Some are not needed to provide fully for recreation experiences. Insuring road closures are completed is an important task in wildlife habitat management. Following timber harvest (2007-2009), Ranger District wildlife biologists will monitor all roads scheduled to be closed and assess if the designed closure was put in place. Some opening of closed roads will be needed for post-harvest activities such as burning and planting. The roads re-opened will again be closed to specifications determined in the Transportation Appendix. These closures will also be monitored (2007-2014) by Ranger District wildlife biologists.

The effectiveness of road closures has a consequence for the habitat protection that they provide. Roads closed will be checked between 2009 and 2014 to determine if roads closed are being used in a way that is undesirable.

Invasive Plants

District Weed Specialists and weed crews will annually monitor weed establishment at landings and on skid trails after harvest operations are complete, for three to five years.

Fuels

After salvage operations are complete the District Fuels Specialist will monitor needs for fuel hazard reduction, fuel consumption, and site preparation for burning projects. Walk-through surveys and monitoring will be conducted by fuels management staff. Plot information and data may be collected on a sample basis. Some projects may be intensively monitored following the Methow Valley RD or Tonasket RD Prescribed Fire Program Monitoring Plans.

Air Quality

The Prescribed Fire Manager and burn boss will monitor smoke quantity, flow, and locations of potential impact during and after prescribed burning activities. .

Heritage Resources

Monitor treatment activities near documented heritage resource sites during salvage operations. Monitoring will be conducted by Cultural Resource Technicians or by a professional archaeologist.

Sensitive Plants

Monitor recovery of aspen stands greater than ½ acre in size within or adjacent to harvest units 1, 3, and 5 years following project activities. Monitoring will be conducted by the District Botanist.

Alternatives Analyzed But Eliminated From Detailed Study

Federal Agencies are required by the National Environmental Policy Act to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). All alternative courses of action that the ID Team developed were compared with the Purpose and Need statement and the key issues for this project, existing management direction, and evaluated for feasibility to determine if they warranted further study. The following alternatives were considered but eliminated from detailed analysis.

1. Maximize timber recovery
This alternative would maximize the amount of timber recovered from burned forest stands. This would include harvesting small trees (6-10" DBH) that do not have enough recoverable sawtimber to cover the costs of falling, yarding to the landing, and hauling to the mill. Each one of these logs would cost more to deliver to the mill than they are worth. Maximizing the amount of timber recovered would also include harvesting from areas only accessible with helicopters. The costs of helicopter logging are much greater than the value of the sawtimber that would be recovered. The purpose and need for economic recovery would not be met. This alternative will not be analyzed in further detail.

2. Blue Buck Creek
The ID Team considered an alternative that would have salvaged harvested trees in Blue Buck Creek. This drainage burned with moderate to high severity, damaging thousands of acres of timber stands. An alternative was developed that salvage harvested approximately 1,800 acres in Blue Buck Creek and its tributaries for a project area total of 5,152 acres, recovering 38.6 MMBF of dead and dying timber. However, there is a population of bull trout in Blue Buck Creek that is listed by the US Fish and Wildlife Service as a threatened species. It is unknown what effect the Tripod Fire had on this population, therefore it would be very difficult to assess the effects of additional disturbance on the bull trout population. In addition, the complexity of analyzing a proposal in Blue Buck Creek, which supports a threatened species, would have slowed down the analysis process and been more costly. Therefore, this alternative was dropped, and will not be analyzed further.

A variation of this alternative, which would have helicopter-yarded all the salvage harvest units in the Blue Buck Creek area was also considered, as this would have minimized effects of sedimentation in Blue Buck and Beaver Creek. However, this alternative was not economically feasible, as helicopter yarding costs more than the timber is worth. Therefore, this alternative was not analyzed further.

3. Reduce Fuels
An alternative was considered that would prioritize the reduction of fuels across the landscape within the Tripod Fire Salvage project area. On the dry and mixed conifer sites it would emphasize the removal of fire-killed and damaged trees, so that there would be less fuel on the landscape when the next wildfire occurs in this frequent fire ecosystem. This would increase future forest resiliency and forest health. It would look similar to the "Maximize timber

recovery" alternative discussed above, except utilization standards would likely be lowered, removing smaller trees. Therefore, it would be economically infeasible, having high economic risk to prospective timber sale purchasers. In addition, little scientific research exists, linking the removal of large fuels such as tree boles, with the reduction of future fire hazard. The Purpose and Need for the Tripod Fire Salvage EIS project is economic recovery of fire-killed and damaged trees from the Tripod Fire. Fuel load conditions, are an existing condition within the project area, but are not a driver for this analysis. The effects of different levels of timber recovery on fuel loading will be analyzed by alternative in this EIS, but an alternative will not be developed for the fuels issue.

4. Utilize prescribed fire to reduce fuels
This alternative would apply prescribed fire across the landscape in order to further reduce fuel loading. In many areas the Tripod Fire burned most of the available fine fuel in July to October 2006. It will take a number of years until enough fine fuel develops within the project area to effectively carry a prescribed fire in the spring or fall prescribed burning seasons. In addition, fuels reduction is not part of the Purpose and Need for this project. This alternative will not be analyzed further.

5. Harvest live (green) trees
While resources are mobilized to harvest the dead trees and trees expected to die within one year in the project area, this alternative would also consider cutting and removing live (green) trees to achieve a forest restoration objective on these dry sites. Most of the green trees cut would be part of commercial thinning prescriptions with the objective of removing enough fuel to prevent a future crown fire. Harvest of green trees would slow down both the analysis (planning) and operational (logging) processes, at a time when dead trees and trees expected to die need to be salvage harvested quickly before they lose their value. In addition, neither fuels reduction nor the harvest of green trees are part of this project's Purpose and Need and are beyond the scope of this analysis. This alternative will not be analyzed further.

6. Salvage Harvest Trees Greater than 28 inches DBH
There was a recommendation by the forest products industry to include salvage of trees larger than 28 inches DBH. This would enhance economic recovery as larger trees retain more value. The upper diameter limit for this project was set at 28 inches DBH after consultation with the regional timber industry, because trees larger than 28 inches DBH cannot generally be utilized by mills in this area. In addition, the 28 inch DBH upper diameter limit would help meet snag requirements for wildlife habitat and few trees this size remain on the landscape. Therefore, this alternative will not be further analyzed.

7. Salvage Harvest fire injured trees with moderate probability of survival
The action alternatives would only salvage harvest those fire-injured trees expected to die within one year that have a "low" probability of survival, using the Scott Guidelines (Scott et al. 2002, 2003, 2006). The Scott Guidelines is a reference that helps evaluate the probability that a fire-damaged tree will survive. It categorizes trees into three classes; having a low, medium, or high probability of survival. The ID Team considered an alternative that would also salvage harvest those trees that have a "low and moderate" probability of survival. This alternative would better meet the economic recovery purpose and need of the project, as more trees would be salvage harvested. However, in areas of the fire with moderate to high tree mortality, every tree that might survive is valuable as a seed source or as green habitat.

Therefore, only fire-injured trees with a low probability of survival would be salvage harvested. This alternative will not be analyzed further.

8. Collaborative Action Team Alternative

A Collaborative Action Team (CAT) composed of diverse interests came together with the goal of assisting the Forest Service in developing and conducting an expedient Tripod salvage project that would meet the needs of local community safety and economic and environmental viability. The CAT proposed an alternative to the Forest Service (though not all members of the CAT concurred) that the signatories felt was non-controversial and could contribute to meeting both fuels and economic recovery objectives. Portions of the proposal which have been incorporated into the Tripod Fire Salvage project Proposed Action are: 1) No salvage operations in: Inventoried Roadless Areas, undeveloped areas, Riparian Habitat Conservation Areas, currently suitable lynx habitat, or Blue Buck Creek, and 2) No helicopter yarding. The CAT proposal also called for heavy removal of trees up to 12 inches DBH, partial removal of trees 12-18 inches DBH and no removal of trees larger than 18 inches DBH. Relying on a higher proportion of smaller trees for salvage harvest is not economically feasible once the trees undergo the first year of deterioration after the fire. The trees in these smaller diameter ranges have higher rates of defect from checking and staining and are more expensive to harvest since more logs must be processed for the same amount of volume. An economically feasible sale offering must include sufficient volume in the medium (12 to 18 inches) and larger diameter classes in order to have marketable stumpage values.

Therefore, because the CAT proposal is not economically feasible it would not meet the purpose and need of economic recovery and will not be further analyzed.

9. Emphasize Green Sale Program

Salvage harvest of the timber killed or damaged by the Tripod Fire requires personnel and financial resources to complete the environmental analysis, layout and preparation of the sales of timber. These resources would normally have been involved with preparation of the green timber sales program, which currently emphasizes fuel reduction treatments in the Wildland-Urban interface. Therefore, completing the salvage harvest effort would delay the green program by at least one year. The alternative proposed was to not salvage harvest any of the Tripod timber, rather continue with the green program. This proposal is outside the scope of this project and will not be analyzed in this EIS.

10. Salvage in Inventoried Roadless Areas and adjacent areas with Undeveloped Characteristics

The Tripod Fire burned portions (73,342 acres) of three Inventoried Roadless Areas (IRA); Granite Mountain, Long Swamp, and Tiffany, which total 115,860 acres. Adjacent to these IRAs are undeveloped areas covering 27,701 acres which also burned (23,177 acres). In total, of the 163,669 acres that the Tripod Fire burned on the National Forest, 96,519 acres (59%) were in IRAs and undeveloped areas. The undeveloped areas are currently being considered in another process for their suitability as possible wilderness. Current Forest Service direction under the Roadless Area Conservation Rule prohibits road construction and cutting, sale and removal of timber in IRAs, with some exceptions that do not apply to this project. Much of the IRA and undeveloped land is at high elevations, above 6000 feet, and is often not commercial timber ground. The undeveloped areas below 6000 feet, while usually productive forest land, is not economically viable for salvage harvest due to the lack of road access and having to rely on expensive helicopter logging. In addition, the public controversy around salvage harvesting in IRAs and undeveloped areas would add to the complexity, cost

and time involved with completing this analysis. Therefore, salvage harvest proposals in IRAs and undeveloped areas will not be further analyzed.

11. Soils Protection
Forest soils are more susceptible to erosion and compaction after a wildfire event because litter and duff layers are often removed, and roots which help hold soil in place have been eliminated. Ground based yarding activities can add to these conditions by further disturbing soils. Some soils within the Tripod Fire Salvage project area have been disturbed by past activities and are of particular concern. The ID Team considered analyzing an alternative that would provide an additional level of protection for the soil resource. The ID Team considered deleting units that overlaid soils with surface characteristics that indicated that Forest Plan standards for detrimental impacts might have been exceeded. However, it was felt salvage operations would be able to meet Forest Plan standards for detrimentally impacted soils with active restoration, which would also benefit areas with previous impacts. Soils in Blue Buck Creek have high ash cap levels which make the soils susceptible to compaction. This was one reason why salvage operations were not proposed in Blue Buck Creek, where there was also a large amount of high severity burned areas.

12. Exclusively helicopter or skyline yard
The ID Team considered an alternative that would not utilize ground based yarding systems, in order to better protect the soil resource. This alternative would yard all the salvage units with the helicopter or skyline yarding systems. Helicopter and skyline yarding do not disturb soils as much as ground based systems, but they are more expensive. Helicopter yarding is three times as expensive as ground based systems and skyline yarding is two times the cost of ground based yarding. The costs of utilizing these systems to yard logs in to a landing, in combination with all the other logging costs (falling, loading, haul) are more than the value of the logs that would be yarded. In other words, a sale of salvage timber that is exclusively harvested with helicopter and skyline systems is not economically feasible. The purpose and need for economic recovery would not be met. Therefore, this alternative will not be analyzed further. However, some amount of skyline or helicopter can be included in an offering, if it is subsidized by the value of timber that is ground-based logged. The yarding system selected for each alternative was based on the system that provided adequate resource protection while balancing its economic viability. For example, helicopter yarding was included in Alternative D to access more salvage units when there was no available or easily constructed road access or where resource protection warranted it.

13. Winter logging
This alternative would require winter logging with ground-based systems in specific units in order to protect soil resources and minimize invasive weed spread. The advantage of winter logging is that it occurs when there is a protective layer of snow that absorbs the impacts of log yarding. However, requiring winter logging for the Tripod Fire Salvage Project would assume that the winter season would have enough snow and/or cold temperatures to meet winter logging requirements. If these conditions would not exist in any given winter season, timber value would be lost by waiting until the next winter to harvest dead and dying trees. Winter logging will be allowed but if the trees can be salvage harvested earlier they will retain more value. The Purpose and Need for economic recovery would not be met by requiring purchasers to wait until a winter season that had the appropriate conditions for winter logging requirements. Soils design criteria for all action alternatives would effectively mitigate for soil impacts. This alternative will not be analyzed further.

14. Active Restoration of Riparian Areas/Wildlife Habitat
This alternative would actively restore riparian areas by planting brush species/aspen and actively falling snags to provide coarse woody debris. However, most riparian areas did not burn with a high enough intensity to kill brush and aspen roots and these species are expected to re-sprout naturally. Some trees killed by the Tripod Fire have already fallen and snags will continue to naturally fall into streams to provide coarse woody debris. Specifically, the Colville Confederated Tribes proposed a restoration area, to plant native trees, brush and forbs along a waterway. The Purpose and Need for this project is economic recovery, danger tree removal and reforestation. Restoration is outside the scope of the decision to be made. This alternative will not be analyzed further.

Likewise, there are opportunities for restoration of wildlife habitat through plantings or installation of structures. However, wildlife habitat restoration is not part of this project's purpose and need. Therefore, this alternative will not be analyzed further.

15. Salvage Harvest within Riparian Habitat Conservation Areas
This alternative would salvage fire-killed and damaged trees within the boundaries of the Riparian Habitat Conservation Areas (RHCA). RHCAs are intended to protect the health of the aquatic ecosystem. Snags provide coarse woody debris, an important part of these ecosystems, to project area streams. When riparian vegetation burns, the sediment filtering action of the RHCAs is reduced. Harvest within recently burned RHCAs could increase fine sediment delivery to stream channels. The remaining tree boles in RHCAs provide shade to streams and help keep water cooler than if the boles were removed. High water temperatures are a concern following fire in the downstream reaches where endangered and threatened fish reside. Large wood is essential to stream functions such as sediment storage, water storage, aquatic invertebrate production, fish cover, creation of deep pools, and shading over channels. Future wood recruitment has been reduced by the fire. Once the currently burned trees are recruited to streams and riparian areas there will not be an additional source of wood for 100 to 150 years when the new forest matures. Snags provide coarse woody debris, an important part of these ecosystems, to project area streams and for wildlife habitat. Much of the area is grazed by livestock and the down trees in RHCAs will help to provide a natural "fence" to protect streams from over grazing. Therefore, dead and dying trees would be retained within RHCAs. This alternative will not be analyzed further.

16. Build No New Roads
This alternative would build no new roads in the project area. Further road construction could degrade wildlife habitat, contribute to erosion, and provide further vectors for noxious weeds. Most of the project area is currently served by a transportation system. However, many forest stands in the project area have no road access. Though no new permanent system roads are proposed to be built in any alternative, temporary roads are proposed to access landing sites or other key locations. Most of these roads segments would be less than 500 feet long and they would be decommissioned and returned to productive ground following salvage operations. Stands that need temporary road access do not have enough commercial value to support helicopter yarding and the longer yarding distances that would occur if additional roads were not built. However, the amount of temporary roads proposed has been minimized and the locations that are proposed are located on relatively flat ground locations where there are no hydrologic concerns. They do not enter any large areas of undeveloped ground, and are considered spurs to reach landing locations in areas that are already roaded. If no

temporary roads were built the amount of ground which could be treated economically would decrease and would limit the ability to meet the Purpose and Need of economic recovery. The No Action Alternative will consider the effects of not building roads. This alternative will not be analyzed further.

17. Close Roads to Provide for Public Safety Rather than Falling Danger Trees
The ID Team considered an alternative that would close roads that had danger trees along them that were open to public use, to provide for public safety. The Proposed Action would fall danger trees along roads open to the public, in order to increase public safety. Closing roads to provide for public safety would restrict the public's access to developed and dispersed recreation opportunities on the National Forest. The risk of trees damaged by the fire falling into the road can be efficiently mitigated by falling them. This would allow roads historically open to the public to remain open. This alternative will not be further analyzed.

18. Avoid Activities in Areas with Noxious Weeds
This alternative would not perform salvage harvest activities in areas with current noxious weed infestations, in order to better prevent weed spread. However, weeds are present throughout the project area, especially along roads. This alternative would not result in enough salvage harvest to meaningfully meet the Purpose and Needs for this project. The Noxious Weed Prevention Plan that is a part of this project would help prevent weed populations from expanding. This alternative will not be analyzed in further detail.

19. Avoid Burning Slash from Harvest Operations
The ID Team considered alternatives other than burning, to deal with slash that accumulates on the landings. Burning under stagnant weather conditions could allow smoke to drift into adjacent communities. Most landings will be opened to firewood cutting, though utilization may be low, in those piles with a lot of black wood. Leaving the remaining slash piles is not an option, because of the fire risk they pose during hot, dry summers. Scattering the slash is often not an option, because landings are often located along open roads or because there is too much slash for the landing size. Chipping the slash on-site would also require hauling the chips away for disposal as spreading the chips inhibits vegetative recovery. Pile burning has potential for only short term smoke impacts because the compact arrangement of fuels allows for rapid, complete combustion with little smoldering past the day of ignition. This rapid consumption creates an efficient ventilation column that carries smoke well into the transport winds aloft, dispersing the smoke rapidly. Additionally, pile burning can be accomplished in a wide weather window, allowing for ignition during inclement weather that would increase smoke transport and dispersal. Because of the compact arrangement of fuels, distance to private lands and restrictions on when burning could occur, burning the landing piles for the Tripod Fire Salvage project is unlikely to affect people or communities. Therefore, other alternatives for slash treatment will not be further analyzed.

20. Maintain All Groomed Snowmobile Routes
An alternative was considered that would not allow salvage harvest operations along any roads that are used as groomed snowmobile routes in the winter. Forestwide Standard and Guideline 17-6 identifies roads that should not be snowplowed and shall be closed to motorized wheeled traffic from December 1 to April 1. This would not allow salvage harvest operations to occur in the drainages of Boulder Creek and its tributaries, Lightning Creek and the Middle Fork Beaver Creek between those dates. However, due to the rapid deterioration rates of burned timber and subsequent loss of value, it is important to be able to salvage

through the winter, if necessary. Plowing these roads would be a one winter occurrence and may not occur at all, as winter logging is not required, or conditions suitable for winter logging may not occur next winter. Road 38 will be maintained as a groomed snowmobile route, as described in the Mutton Timber Sale Decision Notice. Units in the Pelican Creek drainage will not be accessible from December 1 to April 1. This alternative will not be analyzed further.

An alternative was considered to accommodate both wheeled and snowmobile traffic on Road 37 from the Chewuch River Road 5010 up to the Bromas Creek Road. Half of the road prism would be plowed for wheeled traffic and the other half would be groomed for snowmobiles. However, the canyon is very narrow in this six mile portion and the road prism is not wide enough to safely accommodate both of these uses. This alternative will not be analyzed further.

21. East Tripod Categorical Exclusion

The Tonasket Ranger District completed an East Tripod Categorical Exclusion (USDA Forest Service 2007c) and signed a Decision Memo approving salvage harvest for a portion of the Tripod Fire. The project would remove the fire hazard represented by the merchantable sized dead and fire-injured trees expected to die within one year from seven units covering approximately 307 acres (Unit #'s CE01, CE02, CE03, CE08, GA01, GA07). Trees salvaged would range in size from 7 to 18 inches DBH and winter logging would be required by ground-based yarding systems. The intent was to offer a sale of timber during winter 2006-2007 that could remove some of the lower diameter trees while they retained sufficient value to comprise an economically feasible timber sale. An offering of timber under this decision did not sell. The decision was made to have the Tripod EIS analyze salvage of these seven units for ground-based summer yarding. The ID Team considered an alternative to increase the upper diameter limit to 28 inches DBH for these seven units. However, it was decided to continue the direction from the East Tripod decision which avoids having to re-mark the seven units. However, the lower diameter limit was increased to 10 inches DBH (designation by description) as it was felt that the 7 to 10 inch DBH material would not be merchantable by the time a Tripod Fire Salvage EIS decision was made.

22. Restrict Motorized Access in winter in Deer Winter Range (Management Area 26)

The ID Team considered an alternative that would maintain Forest Plan Standard and Guideline MA-26-20J, which prohibits access by motorized vehicles (except on designated haul routes) in deer winter range from December through March. The intent of this standard is to minimize disturbance to the wintering deer herd. However, this might cause salvage of damaged timber to be delayed up to six months because of additional down time from wet soil conditions and spring breakup, during which time substantial timber value would be lost. This portion of the winter range was burned in the Tripod Fire and currently has little winter range value. Therefore, this alternative will not be analyzed further. The action alternatives propose a Forest Plan Amendment to allow salvage harvest activities during the restricted time period.

23. Restrict Motorized Access in Lynx Habitat in the Winter

The ID Team considered an alternative that would maintain Forest Plan Standard and Guideline MA-12-17D, which prohibits access by motorized vehicles in suitable lynx habitat from December through March. The intent is to minimize disturbance to lynx. However, this might cause salvage of damaged timber to be delayed up to six months, during which time substantial timber value would be lost. This portion of lynx habitat was burned in the Tripod Fire and is currently not in suitable habitat condition. Therefore, this alternative will not be

analyzed further. The action alternatives propose a Forest Plan Amendment to allow salvage harvest activities during the restricted time period.

24. Treatment as recommended in the 1995 Beschta Report

The ID Team considered an alternative that would manage the burned forest similar to the management recommendations in Beschta et al. (2004). These recommendations for post-fire management are aimed at maintaining or restoring the integrity of forested landscapes and their dependent freshwater systems. There are two general themes of the paper: 1) native species are adapted to natural patterns and processes of disturbance that produce and maintain diverse ecosystems, and 2) reducing the negative effect of past management practices and avoiding additional impacts of future practices will promote regional recovery of biodiversity.

Recommendations of the Beschta paper *(italics*):

a. *Beneficial active restoration activities might include reducing sediment production from firelines and roads, replacing faulty drainage structures, and planting native species.* Firelines were rehabilitated by the Fire Suppression organization with construction of waterbars and pulling material back onto the firelines. Burned Area Emergency Response (BAER) work completed in the fire area concentrated on minimizing the potential for elevated or concentration of surface runoff, mass erosion and sediment delivery from roads. Culverts were replaced, drain dips were constructed and ditches and surfaces were maintained (see Appendix L). Planting native species (outside of trees within salvage units) is outside the economic recovery purpose and need for this project. However, native species would naturally recover under all alternatives.
b. *Post fire management should not compact soils, increase soil erosion or reduce soil productivity. Ground-base logging will cause additional site disturbance and soil compaction. Decreased infiltration, increased overland flow and accelerated sedimentation following ground based logging not only degrades forest soils but can also affect aquatic systems.* Different action alternatives utilize the entire range of logging systems available (see Alternative descriptions in Chapter 2). The No-Action alternative would not disturb any ground (see the effects of the No-Action alternative in Chapter 3.4 Soils.
c. *Salvage logging conducted in or near riparian zones or streams diminishes the source of large wood important for stream structure.* All action alternatives have adopted the design criteria to not salvage harvest within RHCA boundaries. Trees felled for safety reasons within RHCAs would be left in place.
d. *Salvage logging may be especially detrimental in those watersheds where only a few large trees or snags remain following fire.* Direction for providing habitat for primary cavity excavators is from Regional Forester Amendment #2 to the Okanogan Forest Plan interpreted by a Okanogan and Wenatchee National Forests letter of guidance (Appendix D) which documents the process to determine snag levels using the best available science, specifically addresses new science and the management of snag habitat in post-fire salvage logging and provides snag management direction. Key strategies include the retention of burned forest habitat and fostering the persistence of a variety of snag and downed log species, size and decay conditions across the landscape. Design measures are incorporated into the action alternatives to maintain adequate numbers of large trees or snags. (See Regulatory Framework, Background Information and Design Criteria sections under Burned Forest and Snag Habitat, in Chapter 3.2 Wildlife).

e. *Beschta et al (1995) recommended that salvage logging should leave at least 50% of standing trees in each diameter class, emphasizing the importance of retaining the oldest and largest trees. Beschta also recommends no harvest of live trees within burn perimeters.* The Everett (1995) review of the Beschta recommendations found no scientific basis for numerical limits for snags on salvage logging, since historical and pre-fire tree densities varied greatly in stands across the landscape. The Okanogan Forest Plan as amended, and it's implementing direction for Regional Forester Amendment #2, interpreted by the July 3, 2007 Forest Letter of guidance will contribute to the viability of primary cavity excavators and cavity nesters. These recommendations have been updated based on the best available science and are incorporated into this EIS. No live trees that are expected to survive more than one year are proposed for salvage in this analysis.
f. *Postfire salvage logging has been justified on the assumption that >50% crown scorch results in tree mortality. However trees within low and mid-elevation forests of the western United States possess a suite of adaptations that facilitate fire survival.* The Scott Guidelines (Scott et al. 2002, Scott et al. 2003, 2006) is the methodology proposed to be used for this project to determine the probability of fire-damaged tree survival. It is tree species specific. The probabilities of survival are composite ratings based on ten factors including; crown volume scorch, tree bole char, total scorch height, duff consumption, arrangement and distribution of down woody material, pre-fire tree vigor and season of fire. Only those trees with a low rating for survival (25% probability of survival) are proposed for salvage by this project.
g. *Salvage logging should generally be prohibited on sensitive sites including riparian areas, moderately or severely burned areas, fragile soils, steep slopes, roadless areas, watersheds where sedimentation is already a problem, where impacts to early successional vegetation may occur, and sites where accelerated surface erosion or mass soil erosion may occur.* During the alternative development process, the following areas were excluded from harvest; areas with high soil damage, inventoried roadless areas, areas with undeveloped character, old-growth habitat as defined in the Forest Plan, Late and Old Structure (LOS) stands as defined in Okanogan National Forest Screen 2 Mapping Guidelines, recently regeneration harvested areas, lynx habitat currently in suitable condition and PACFISH RHCAs.
h. *Construction and reconstruction of roads and landings is not consistent with post fire ecosystem restoration.* No new permanent forest transportation system roads or access routes would be constructed under this proposal. Temporary roads are proposed to access landing sites or other key locations. Most of these road segments would be less than 500 feet long, locations proposed are located on relatively flat ground where there are no hydrologic concerns, do not enter large areas of undeveloped ground, If no temporary roads were built, the amount of ground that could be salvaged economically would decrease and limit the ability to meet the economic recovery purpose and need.

The No Action alternative responds to the basic conclusions of the 2004 Beschta paper to allow natural processes to restore fire burned areas, and the effects analysis of the No Action Alternative is detailed in Chapter 3. These recommendations would not harvest trees on steep ground, sensitive soils, or severely burned soils, would not harvest trees in riparian, roadless areas, would not build road to access harvest units, and would not harvest live trees. Many of the Beschta recommendations have been incorporated into the design of the action alternatives, including no harvest within RHCAs, roadless or unroaded areas, no permanent road construction, avoidance of highly-damaged soils, and no harvest of any trees that are not dead or expected to die within one year. The ID Team used a planning process that focused

current land management planning direction while consulting current scientific documentation of the site-specific natural systems that are present within the analysis area. Further analysis of the Beschta (2004) paper is included in Appendix K.

25. Utilize prescribed fire to treat small fuels

The ID Team considered an alternative that would apply prescribed fire as an underburn to treat the small fuels (0-3" diameter) created by salvage logging. No local studies have been performed to evaluate the levels of small fuels created by salvage logging. However, McIver and Ottmar (2007) found at salvage operations after the Summit Fire, the projected risk of greater mass of slash fuels in logged stands was likely no higher than for the unlogged stands for two reasons. First, because slash decays so quickly, the period of time during which unlogged and logged units have meaningfully different slash fuel masses is short, somewhat less than 20 years. A wildfire would have to re-occur at the same place during this relatively short period of time in order for the difference between logged and unlogged stands to be expressed in terms of tree mortality. Secondly, the developing stand that is at risk from fire in the short-term would initially be composed of very small trees, many of which would not survive even a relatively light-intensity fire, let alone a moderate wildfire.

For the Tripod Fire Salvage Project, small fuels were analyzed using the Forest Vegetation Simulator Growth and Yield Model with the Fire & Fuels Extension under the East Cascade Variant. FVS-FFE decay modeling shows rates of differences in slash accumulation and decay for the Tripod Fire Salvage Project area for non-salvage and salvage scenarios that are similar to those found in McIver and Ottmar's study. The results of this study relating to developing stands would also apply to the Tripod Fire Project area in both salvage and non-salvaged areas.

Therefore the ID Team felt that; 1) because the projected risk of greater mass of slash fuels in logged stands was likely no higher than for unlogged stands and 2) even if these fuels were reduced the young stands would still be susceptible to damage from low intensity fire, prescribed fire to treat small fuels in salvage units is not warranted. This alternative will not be analyzed further.

Comparison of Alternatives

This section provides a side-by-side description of each alternative (Figure 2-2) and a summary of how each alternative responds to the Purpose and Need and each Key Issue (Figure 2-3). See Chapter 1 for background on the issues and Chapter 3 for a complete description of the effects and for the scientific basis for results in the summary table.

Figure 2-2 Comparison of Alternative Activities

Activities	Unit of Measure	Alternatives				
		A (No Action)	**B**	**C**	**D**	**E**
Harvest						
Timber Salvage	Acres	0	2,748	2,247	3,404	2,748
Timber Salvage Volume	MMBF	0	17.9	14.0	24.0	14.4
Harvest Method						
Skyline	Acres	0	591	351	716	591
Helicopter	Acres	0	0	0	532	0
Ground Based	Acres	0	2,156	1,896	2,156	2,156
Roads						
Open system roads to be used	Miles	0	155.4	123.0	155.5	155.4
Temporary road construction	Miles	0	3.0	2.0	3.0	3.0
Closed system roads to re-open	Miles	0	22.7	13.4	23.7	22.7
Unauthorized roads to re-open	Miles	0	6.7	6.6	6.7	6.7
Open roads where danger trees would be felled and/or removed	Miles	0	47.0	47.0	47.0	47.0
Post Harvest Treatment						
Soil Active Restoration	Acres	0	129.5	116.5	129.5	129.5
Reforestation	Acres	0	1,659	1,533	1,930	1,659
Burn Landing Piles	Acres	0	122	135	143	122

Figure 2.3 Comparisons of Alternatives by Purpose and Need and by Issues

Purpose & Need and Issues	Unit of Measure	Alternatives				
		A	B	C	D	E
Purpose and Need						
Recover a portion of the dead trees and fire injured trees expected to die within one year while they have economic value	MMBF	0	17.9	14.0	24.0	14.4
	Total Value ($)	0	533,000	446,000	-310,000	346,000
Improve safety within the fire area by reducing hazards associated with dead trees along roads open to the public by cutting &/or removing these trees.	Miles of Road where Danger Trees would be Felled	0	47	47	47	47
Re-establish trees in salvage harvest units where there is insufficient residual tree source.	Acres of reforestation	0	1659	1,533	1,930	1,659
Key Issues						
Economic Recovery						
Resource Recovery	Timber Salvaged (MMBF)	0	17.9	14.0	24.0	14.4
	Acres Salvaged	0	2,748	2,247	3,404	2,748
Economic Value	Tractor Log (acres)	0	2,156	1,896	2,156	2,156
	Skyline Log (acres)	0	591	351	716	591
	Heli Log (acres)	0	0	0	532	0
	Total Value $	0	533,000	446,000	-310,000	346,000
Lynx						
Effect on Lynx Habitat	Capable Habitat Salvaged	0	413	0	929	413

Purpose & Need and Issues	Unit of Measure	Alternatives				
		A	B	C	D	E
	(acres)					
	Length of temporary road remaining open in lynx habitat	0	0	0	0	0
Salvage of Trees ≥ 21" DBH						
	Salvage units where all trees ≥ 21" DBH would be retained (acres)	NA	0	0	0	2,748
	Dead and high probability of dying trees ≥ 21" DBH per acre retained in salvage units	2.2	0.2	0.2	0.2	2.2
	Green and low to moderate probability of dying trees ≥ 21" DBH per acre	0.3-1.0	0.3-1.0	0.3-1.0	0.3-1.0	0.3-1.0

Purpose & Need and Issues	Unit of Measure	Alternatives				
		A	B	C	D	E
	retained in salvage units					
Other Issues						
Fisheries and Hydrology						
RHCAs	Protected (Yes/No)	Yes	Yes	Yes	Yes	Yes
Temperature	Qualitative	Natural increase from fires	No change from A	No change from A	No change from A	No change from A
Large Wood	Qualitative	Natural increase from fires	No change from A	No change from A	No change from A	No change from A
Water Yield	Qualitative	Natural increase from fires	Minor increase from A, not measurable with confidence	Minor increase from A, not measurable with confidence	Minor increase from A, not measurable with confidence	Minor increase from A, not measurable with confidence
Sediment	Tons above increase from fires (1st year)	Natural increase from fires – 346,848	4,250	3,610	4,248	4,250
Soils						
Net increase in detrimentally disturbed soils	Acres	0	93	60.5	125	93
Salvage Harvest in areas susceptible to soil movement (ground based and skyline yarding)	Acres	0	1,832	1,270	1,951	1,832
Wildlife/Burned Forest (BF) Habitat						
Within harvest units: BF retained	Minimum % area retained	100	10	30	10	10
Within 100-acre neighborhoods: BF retained	Minimum % stand replacing	100	75	68	66	75

Purpose & Need and Issues	Unit of Measure	Alternatives				
		A	B	C	D	E
	burn retained (Figures 3.2-28 to 30)					
Within three 5th order watersheds: BF Harvested	acres (%) harvested by habitat type (Figure 3.2-19)	0	Dry 578 (11) M.C.1352 (7) Mont. 807(1)	Dry 578 (11) M.C.1314 (7) Mont. 0 (0)	Dry 626 (11) M.C.1465 (8) Mont. 1301(2)	Dry 578 (11) MC 1352 (7) Mont 807 (1)
Forest Vegetation						
Vegetation type to be salvaged compared to total vegetation type in Fire Area	Dry forest (ac/%) Mix conifer (ac/%) Montane (ac/%)	0/0 0/0 0/0	580 / 14 1510 / 13 658 / 3	580 / 14 1,359 / 12 308 / 1	629 / 15 1,805 / 16 970 / 4	580/14 1510/13 658/3
Reforestation (planting)	Acres planted	0	1,659	1,533	1,930	1,659
	Acres natural regeneration	0	1,089	714	1,474	1,089
	% soil disturbance in natural regeneration units	0	12	12	11	12
Plant Communities						
Ground based (GB) and skyline logging in areas of high burn severity	GB Acres Skyline acres	0 0	151 207	19 53	151 193	151 207

Purpose & Need and Issues	Unit of Measure	Alternatives				
		A	B	C	D	E
Invasive Plants						
Closed system roads to be re-opened, then closed	Miles	0	22.7	13.4	23.7	22.7
Temporary road construction	Miles	0	3.0	2.0	3.0	3.0
Detrimental soil disturbance caused by logging system:						
Ground-based	Acres	0	323	284	323	323
Skyline	Acres	0	18	11	21	18
Helicopter	Acres	0	0	0	0	0
Current weed infestation in salvage units	Acres	0	112	108	119	112
High burn severity in salvage units by logging system:						
Ground-based	Acres	0	144	93	144	144
Skyline	Acres	0	178	53	181	178
Helicopter	Acres	0	0	0	139	0
Moderate burn severity in salvage units by logging system:						
Ground-based	Acres	0	813	697	813	813
Skyline	Acres	0	330	247	387	330
Helicopter	Acres	0	0	0	216	0
Recreation						
Potential public access restrictions	Acres	0	2,748	2,247	3,404	2,748
Log haul past rec. residences:						
Brevicomis tract	Truck trips	0	55	52	110	55
N. Salmon tract	Truck trips	0	45	0	54	45
Danger tree falling on open roads	Miles	0	47.2	47.2	47.2	47.2
Possible groomed snowmobile route restrictions	Miles	0	32.5	22.0	32.5	32.5
Inventoried Roadless Areas and Areas with Undeveloped Character						
Salvage Harvest Units	Acres	0	0	0	0	0

Purpose & Need and Issues	Unit of Measure	Alternatives				
		A	B	C	D	E
Fuels						
Coarse woody fuel loadings in 2037:						
Dry Forest	Tons/acre	6-26	6-11	6-11	6-11	8-20
Mixed Conifer	Tons/acre	9-31	6-11	6-11	6-11	6-20
Montane Forest	Tons/acre	12-38	7-17	7-17	7-17	7-26
Changes in resistance to control (RTC) compared to No Action, by year:						
2012 Low RTC	Percent	0	3	3	3	3
2012 High RTC	Percent	0	4	3	6	4
2022 Low RTC	Percent	0	3	3	3	3
2022 Mod. RTC	Percent	0	4	3	6	0
2022 High RTC	Percent	0	0	0	0	4
2037 Low RTC	Percent	0	7	6	9	3
2037 Mod. RTC	Percent	0	0	0	0	4
Air Quality						
Landing piles to be burned	No. Piles	0	122	135	143	122
Total particulate emissions:						
PM 10	Tons	0	61	68	72	59
PM 2.5	Tons	0	53	58	62	51
Transportation						
Roads to be used for salvage operations	Miles	0	187.8	145.0	188.9	187.8
Open road miles that would be closed post-project (previous NEPA decision)	Miles	0	7.0	4.9	7.0	7.0
Currently closed roads that would be open post-project	Miles	0	0	0	0	0

Purpose & Need and Issues	Unit of Measure	Alternatives				
		A	B	C	D	E
Sensitive Plants						
Sensitive plants within salvage harvest units	No. Plants	0	0	0	0	0
Range						
Salvage harvest units within pasture	Acres	0	2,707	2,206	3,263	2,707
Detrimental soil disturbance in grazing allotments	Acres	0	341	295	344	341
Capable/suitable rangeland within salvage harvest units	Acres	0	1,432	1,628	1,904	1,432
Natural livestock drift barriers modified by salvage operations	Miles	0	1.0	0.7	1.0	1.0
Salvage harvest units within ¼ mile of perennial RHCAs	Acres	0	860	735	918	918
Scenic Viewsheds & Landscape Character						
Skyline and ground-based salvage harvest units within the foreground visible from given viewsheds and viewpoints	Acres	0	223	130	223	223
Skyline and ground-based salvage harvest units within the middleground visible from given viewsheds and viewpoints	Acres	0	384	384	384	384
Heritage Resources						
Heritage sites located w/in units	Known sites	0	0	0	0	0

Preferred Alternative

The Preferred Alternative is Alternative B.