

## CHAPTER 2. ALTERNATIVES

This chapter describes in detail the no action alternative (Alternative A) and two action alternatives (Alternatives E and G). It also describes the activities common to both action alternatives and the management practices, mitigation measures and monitoring that were developed during the analysis process.

### 2.1 Alternatives Description

The National Environmental Policy Act gives the interdisciplinary team the responsibility of providing the decision maker with a range of alternatives when unresolved conflict exists. The Act notes that all reasonable alternatives<sup>1</sup> should be considered. The action alternatives were developed to respond to the issues that came out of the many comments received from the public, other government agencies, and others. As noted in Chapter One, public comment generated two Key Issues involving unresolved conflicts: road management and clearcutting/large forest openings.

To provide a reasonable range of effects in the context of these two issues, the two action alternatives vary the acres of commercial harvest, the types of harvest (silvicultural prescriptions and logging systems), and the miles of new road construction, while still meeting the purpose and need for the project. As a result of public input, the original proposed action was dropped because it contained unacceptable amounts of new road construction and even-aged regeneration harvest.

Table 2-1 compares the management activities planned in each alternative, and Table 2-7 summarizes the effects of each alternative. Detailed information on each proposed treatment unit and road segment is given in Appendix B.

Maps of the action alternatives are at the end of this chapter. Because of the limitations of scale, identifying labels for the units and roads are not displayed on these maps. Larger scale maps are available electronically at <http://www.fs.fed.us/r6/colville/index.html>, along with this environmental assessment document. Printed copies of these larger scale maps are available upon request.

#### 2.1.1 Alternative A (No Action)

Alternative A is the No Action alternative, in which the proposed activities described in the action alternatives would not be initiated at this time. Under this alternative there would be no change in current management direction or in ongoing management actions within the project area. The No Action alternative is required by law and serves both as a viable alternative and as a baseline for comparison of the effects of the action alternatives.

While this alternative does not propose any new management activities, changes in vegetation would still result as trees grow, insects and disease cause damage, and fires occur. In this case, No Action would still result in visible and measurable changes caused by these events.

Work previously planned within the project area would still occur under this alternative. Effects of these activities are included in the cumulative effects discussions for this alternative in Chapter Four.

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<sup>1</sup> As established in case law interpreting the National Environmental Policy Act, the phrase "all reasonable alternatives" has not been interpreted to require that an infinite or unreasonable number of alternatives be analyzed, but does require a range of reasonable alternatives be analyzed whether or not they are within Forest Service jurisdiction to implement.

## **2.1.2 Alternative E**

Alternative E was developed to respond to issues raised during public scoping and meetings with the Northwest Forestry Coalition (which represents a range of public interests). It is designed to address issues of road density and visual impact of harvest treatments while still meeting the purpose and need. This alternative avoids building any new permanent roads and minimizes shelterwood and clearcut-with-reserve silvicultural prescriptions (Table 2.1), while still reducing hazardous fuels, improving forest health, and providing wood fiber to local mills. About 6.6 miles of road would be decommissioned, resulting in a net decrease of 6.6 miles of National Forest System roads. The actions proposed in this alternative are described in section 2.2 Activities Associated with Both Action Alternatives, displayed in maps at the end of this chapter, and listed in detail in Appendix B.

## **2.1.3 Alternative G**

Alternative G increases the number of acres commercially harvested over that proposed in Alternative E. This alternative emphasizes greater production of wood fiber while addressing road density and visual impact issues by limiting new road construction to about 4.9 miles. More acres of shelterwood and clearcut-with-reserve silvicultural prescriptions are proposed than in Alternative E (Table 2.1). About 6.6 miles of roads would be decommissioned, resulting in a net decrease of 1.7 miles of National Forest System roads. More acres treated would yield a greater reduction in hazardous fuels, greater improvement in forest health, and more wood fiber processed by local mills than in Alternative E. The actions proposed in this alternative are described in section 2.2 Activities Associated with Both Action Alternatives, displayed in maps at the end of this chapter, and listed in detail in Appendix B.

**Table 2-1. Key Features of the Alternatives**

Activity	Alternatives		
	A	E	G
<b>VEGETATION TREATMENTS</b>			
Commercial timber harvest (total, acres):	0	4,612	7,121
Harvest volume (total, MMBF)	0	29.822	47.100
<i>By silvicultural prescription (acres):</i>			
Commercial thinning (HTH)	0	1,489	2,047
Single-tree selection (HSL)	0	1,867	1,896
Shelterwood (HSH)	0	78	566
Irregular shelterwood (iHSH)	0	904	1,850
Clearcut-with-reserve-tree (HCR)	0	114	617
Overstory removal (HOR)	0	139	124
Sanitation harvest (HSA)	0	21	21
<i>By logging system (acres):</i>			
Tractor/ground-based system	0	3,259	5,220
Cable system	0	619	1,013
Helicopter system	0	734	888
Non-commercial Treatments (acres):			
Precommercial thinning	0	2137	2137
Post-and-pole removal	0	130	130
Fuels reduction (outside of commercial units)	0	687	611
Total treatment area within WUI (all units, acres)	0	1,462	1,890
<b>TRANSPORTATION SYSTEM</b>			
New specified road construction (miles)	0	0	4.9
Temporary road construction (miles)	0	2.5	3.6
Road rock pit development (# of pits)	0	2	2
Road reconstruction (miles):			
Light reconstruction	0	39.6	42.6
Medium reconstruction	0	34.2	34.9
Heavy reconstruction	0	0.5	1.0
Road decommissioning (miles)	0	6.6	6.6

## **2.2 Activities Associated with Both Action Alternatives**

The timber sale activities included with both action alternatives share the same objective. The Forest Service assigns purpose codes to track timber sales based on similar objectives. The "Forest Stewardship" purpose code is assigned to timber sales that are designed to improve forest and ecosystem health, wildlife habitat, fisheries habitat, and watershed function. Both action alternatives have the Forest Stewardship purpose code.

### **2.2.1 Commercial Timber Harvest**

#### **Silvicultural Prescriptions**

Silvicultural prescriptions (the practice of controlling where trees grow and at what rate) provide the most effective means with which to achieve vegetation management objectives, such as forest health, producing wood fiber, and reducing the risk of fire. A variety of factors influence which prescriptions are used, including the historic condition of the vegetation; the inherent disturbance regime; the present character of vegetation; project objectives and issues; the silvicultural prescriptions identified by the management area prescriptions (Chapter 4 of the Forest Plan); and feasibility of implementation. Prescriptions are also used to treat insect and disease conditions in the stands. Because forested stands are not homogenous, more than one silvicultural prescription is proposed for many units and, for various reasons (tree size, spacing, etc.), there are areas within units where no treatments would occur.

Both action alternatives propose silvicultural prescriptions. They differ by how many acres are affected; however, the silvicultural prescription definitions are consistent (Table 2-2). The prescriptions include objectives for: 1) age-class structure, 2) site occupancy and preferred species mixtures, 3) the spatial distribution of trees (e.g., "clumpy" or "uniform"), and 4) the maintenance or creation of desirable special structural attributes (e.g. wildlife trees).

Even-aged regeneration treatments (clearcut-with-reserves, shelterwood, and sanitation harvest) would create forested openings with grouped or dispersed reserve trees (4-30 trees per acre). Uneven-aged regeneration treatments (single tree selection, group selection, and irregular shelterwood) would result in an irregular mosaic of open forest interspersed with forested openings. In "retention" system harvest (which emphasizes the trees that are retained rather than the trees that are removed), a number of treatments would occur to create a mosaic of stand conditions. Cut areas would be irregularly shaped, and vary from areas resembling clearcut-with-reserves to areas similar to single tree selection. Based on the existing condition of the stands, cut areas would vary from 1/8 acre to 15 acres.

**Table 2-2. Silvicultural Prescriptions**

Activity	Description
Commercial Thinning Harvest (HTH)	The removal of trees in even-aged or uneven-aged stands to control tree spacing and favor desired trees, using a combination of thinning criteria. In the short term, this treatment maintains the current stand structural stage, increases the growing space of individual trees, and accelerates tree growth to move the stand towards late structure. The objectives are to: remove trees that exhibit poor form, vigor, or pose a significant risk of insect and disease mortality; reduce competition; and increase growing space for the development of large trees. A fully stocked stand with 60–110 residual trees per acre larger than 6” in diameter results from this treatment.
Uneven-aged Management (HSL)	The removal of selected trees from specified size and age classes over the entire stand, to meet a goal of size or age distribution and species composition in the remaining stand. This treatment retains a fully stocked stand with a variety of stocking densities, and may create small openings where a new crop of seedlings will become established. Growth of both the residual overstory trees and understory vegetation is accelerated. Cutting methods that develop and maintain uneven-aged stands are <i>Single Tree Selection</i> - the removal of individual trees, and <i>Group Selection</i> - the removal of small groups of trees. Up to 50 percent of the existing trees are harvested in each unit, with up to 25 percent in group openings.
Overstory Removal Harvest (HOR)	The removal of the overstory trees in a stand (with the exception of trees 21 inches in diameter and larger), usually accompanied by a light thinning of the understory trees. This is done only in situations where the older overstory trees in the stand are in extremely poor vigor and/or suffering from insect or disease. The determination is that the overstory trees are not a viable component for establishment of late structure, while the existing understory has a much more realistic chance for achieving that objective. Generally, this treatment will move a stand in middle structure back to early structure and release the understory trees.
Shelterwood Harvest with Reserve trees (HSH)	The central feature of shelterwoods is that some overstory trees are left on-site to protect the regenerating understory. When the understory no longer needs protection, the overstory “shelter” trees are removed in a later treatment. All trees are harvested except those needed for seed, wildlife, and shelter for the stand-to-be. About 10-25 trees per acre are retained. Generally, the largest trees on-site are retained as green-tree replacements for snags.
Irregular Shelterwood Harvest (iHSH)	A variant of shelterwood harvest, in which some or all of the shelter trees are retained, well beyond the normal period of retention, to attain goals other than regeneration of the stand. “Irregular” refers to the resulting variation in tree heights in the new stand. The resulting stand may be two-aged or trend towards uneven-aged, as a consequence of both seedling establishment and the retention of reserve trees that may represent one or more age classes. This treatment is used to promote structural diversity while maintaining the simplicity of even-aged management.
Clearcut with Reserve Tree Harvest (HCR)	A clearcutting method in which most of the trees (understory and overstory) are removed, with varying numbers of reserve trees retained to attain goals other than regeneration. Seedlings germinate in the resulting openings to establish a new stand. Residual snags and green-tree replacements are retained, and may be grouped to reduce the susceptibility to blowdown. This prescription is mostly used on dense, stagnant stands where the existing understory is not a viable component for establishing a late structure stand in the future.
Sanitation Harvest (HSA)	An intermediate harvest treatment emphasizing the removal of trees to improve stand health and to reduce actual or anticipated spread of insects and diseases. This treatment maintains the current structural stage of the stand.
Retention Silvicultural System	Retention differs from traditional silvicultural systems in that the focus is on what is retained rather than cut, and regeneration is not the primary objective. On the ground, it can resemble several other silvicultural systems. This treatment retains essential habitat structural elements within the cut block to meet management objectives. Retained elements may be single trees (dispersed) or clumps of trees (patches or aggregates), and can include live trees, dead snags, and woody debris.
Precommercial thinning (PCT)	This treatment removes some sapling-sized trees (those that are too small to make a merchantable product) to allow the remaining trees to grow faster from reduced competition for nutrients, water, and sunlight. Tree spacing varies from 12 feet in plantations to 20 feet in commercial harvest units (as a post harvest treatment). Generally, the healthiest conifer trees and all hardwood trees are retained.

## Log Yarding Activities

The mechanics of implementing silvicultural prescriptions involve felling and yarding. Both action alternatives propose the use of these activities (Table 2-3). Felling may be done manually with a chainsaw, or mechanically with a track or tire mounted vehicle with a cutting head. Yarding involves moving logs from their felling site to a landing, where they are loaded onto trucks. Section 2.4 of this chapter displays project-specific mitigation measures, and Best Management Practices are listed in Appendix C.

**Table 2-3. Log Yarding Activities**

Activity	Description
Tractor Yarding	A method of moving cut trees to a landing site for transportation to a mill, via ground-based (track-mounted or rubber-tire) vehicles. This is usually used on slopes less than 35 %, where the logs are dragged downhill to the landing site. On rare occasions the cut trees can be "adverse" yarded (uphill), up to 15 % slope. Yarding (skidding) distances are generally less than ¼ mile. Skid trails are usually 100-130 feet apart in the harvest unit. The cutting of the trees is performed manually (with chain saws) or by use of tree- shearing equipment.
Cable Yarding	A method of moving cut trees to a landing site for transportation to a mill, by use of a suspended cable that is attached to a mobile tower located on a road. This is generally used on slopes greater than 35 % slope, although the method has been used on less-steep slopes using intermediate supports. Yarding can be uphill or downhill. Yarding distances are generally 1200 feet or less. Cable corridors are usually 130 feet apart in the harvest unit. The cutting of the trees is performed manually (with chain saws).
Helicopter Yarding	A method of moving cut trees to a landing site for transportation to a mill, by use of a helicopter. Trees are hoisted by a group of cable-chokers attached to the helicopter and flown to a landing site, usually within ½ mile of the unit, but occasionally further away. The cutting of the trees is usually performed manually (with chain saws), but some sites are suitable for mechanized felling equipment.

## 2.2.2 Fuels Treatment

Wildland urban interface areas are defined as areas where humans and their developments meet or intermix with forested or rangeland areas that may be vulnerable to wildfires. In recent history the "wildland urban interface" has come into focus due to large wildfires moving out of wildland areas and into wildland urban interface areas causing damage and loss to human developments. These types of fires are becoming more common as humans move from urban and city settings to more rural settings, and as fuels buildup in the wildlands. Wildland fires do not have to be large fires to be of concern when they are in the wildland urban interface.

The following fuel reduction treatments in the South Deep project were specifically designed to meet National Fire Plan objectives:

Shaded fuelbreaks are constructed along the property boundary between private land and National Forest System lands. They are usually applied in between other treatment areas such as commercial harvest units to create a continuous fuelbreak along the private boundary. This constructs a defensible space to suppress a wildfire before it reaches private land. Shaded fuelbreaks are 200 to 300 feet wide. Within this strip, we remove or thin non-commercial trees less than seven inches in diameter, remove brush over five feet tall, and hand pile 75 to 80 percent of the material. Acres of shaded fuelbreaks proposed in each action alternative are displayed in Table 2-4.

Prescribed fire is used to reduce logging slash in harvested units and to prepare sites for reforestation. In this project, it would also be used to reduce fuels in areas not proposed for harvest. Prescribed fires reduce the surface fuels, which decrease the flame lengths and intensity of a subsequent wildfire in the stand. Jackpot burning is proposed in both action alternatives, both within fuels reduction areas and within commercial harvest units. This

treatment is described in Table 2-5. Acres of jackpot burning proposed in each action alternative are displayed in Table 2-4.

For each prescribed burn project, the Forest Service requires a written, site-specific prescribed fire plan approved by the District Ranger. The purpose of the plan is to ensure that resource management objectives are clearly defined and that the site and environment are not adversely impacted. Precise measurements of fuel moisture, predicted winds, and predicted humidity are factor into the burn prescription. This creates a small window of opportunity where prescribed fire can be done safely and will meet the objectives of the treatment. In some cases, fire-lines are constructed in order to ensure that the fire only burns where it is needed. A prescribed fire plan also includes considerations for smoke management and protection of improvements and fire-sensitive features.

There are also fuel reduction benefits from the other vegetative treatments proposed in this project:

**Commercial harvest:** Removal of trees with commercial value (6 inches and greater DBH for lodgepole pine, 7 inches and greater DBH for other species) reduces the crown bulk density and the risk of damaging crown fire. Commercial harvest is described in Section 2.2.1 in this chapter.

**Precommercial thinning:** Smaller diameter trees are thinned to an average spacing of 14 feet by 14 feet and the slash is disposed of by hand piling or mechanical grinding. This treatment is described in Section 2.2.3 in this chapter.

**Post harvest treatments** are used to reduce logging slash and debris on treatment units. These measures are described in Section 2.2.5 and Table 2-5. Acres of various post harvest treatments are listed in Table 2.4.

**Table 2-4. Fuels Reduction Treatments Proposed in Each Action Alternative**

	Alternative E	Alternative G
<b>Non-commercial Treatment Areas (acres):</b>		
Shaded fuelbreaks	140	87
Jackpot burning	547	523
<b>Treatments within Commercial Units (acres):</b>		
Grapple Piling (acres)	349	1,377
Hand piling (acres)	37	46
Whipfelling (acres)	1,431	2,962
Mastication (acres)	1,116	1,406
Jackpot Burning (acres)	1,133	1,631
<b>Treatments within WUI (total acres)<sup>1</sup></b>	<b>1,462</b>	<b>1,890</b>

<sup>1</sup>Includes commercial harvest, precommercial thinning, and fuels reduction areas; acres with multiple/overlapping treatments were only counted once.

## **2.2.3 Precommercial Thinning**

This activity applies to units that do not have enough commercial value to include in the timber sale, but would benefit from thinning small-diameter trees (6 inches and lower diameter at breast height, sometimes up to 7 inches). Trees are thinned to an average spacing of 14 feet by 14 feet and the slash is disposed of by hand piling or grinding. The residual trees grow faster from reduced competition and the overall stand vigor increases. Cut trees would be bucked, lopped, and scattered, or removed from the site.

Prescriptions for precommercial thinning units would retain a diversity of species as appropriate for the site, considering the management area designation, wildlife requirements, presence of insects and diseases, visual concerns, and other resource constraints.

Precommercial thinning is proposed within tree plantations in both action alternatives (Table 2-1). Additional areas within commercial harvest units are also proposed for this treatment.

## **2.2.4 Post and Pole Removal**

The thinning of sub-merchantable sized material (usually 2-3 inches in diameter material, but may include trees up to 6 inches in diameter) from dense lodgepole pine stands would be completed by members of the public interested in making posts or corral poles. Improved growth and vigor in the residual stand would result from the thinning. Residual spacing between leave trees would be 14 to 18 feet. This activity is proposed in selected sites in both action alternatives (Table 2-1).

## **2.2.5 Post Harvest Activities**

Post harvest activities are designed to reduce logging slash that could function as fuel for a wildfire and to prepare the site for natural regeneration and planting of tree seedlings (Table 2-4). Logging slash is generally considered to be a hazard when the combined amount of previously existing ground fuels and newly created slash exceeds 25 tons per acre. The threshold of concern may be lower than 25 tons per acre where there is a high percentage of a small diameter fuel on the ground, because a wildfire could ignite more easily in these finer fuels. Fuel reduction actions remove logging slash and debris through mechanical piling and/or burning.

Under the National Forest Management Act, areas receiving regeneration harvest need to be regenerated within five years after harvest. Site-preparation treatments and planting of seedlings are proposed in both action alternatives. The site-preparation treatments are aimed at removing excess understory trees, logging slash, or brush, so that seedlings can be planted and have a reasonable chance of becoming established. These treatments are commensurate with the Eastside Screens in that they are necessary to establish stands that are capable of reaching late structural status. The existing stands where these treatments are proposed are not capable of reaching late structure without treatments of this nature.

Reforestation of harvest units would use both planting and natural methods. Areas with disease incidence (such as white pine blister rust or *Armillaria* root rot) would be regenerated to resistant or tolerant species.

**Table 2-5. Post Harvest Activities**

Activity	Description
Yarding Tops Attached	A frequently used method for removal of logging slash is to conduct “whole tree” logging where all the branches and the tops are dragged out of the woods to the landing site. Slash can be concentrated at the landing and burned without risk of any scorch damage to the residual stand. This treatment is not economically feasible in helicopter yarding, but is used with tractor and cable yarding systems. Jackpot burning may also be applied in these units.
Whipfelling	<u>Whipfelling</u> is the cutting of noncommercial, small diameter trees (6 inches and lower diameter at breast height) where dense thickets and poor quality preclude their future management. It is commonly done after commercial harvest. When regeneration treatments are proposed (shelterwood and clearcut with reserves), excess small diameter stems must be removed so there is enough open ground to successfully plant seral species seedlings. Often, because the stands are so dense, fire cannot be used to prepare the site for planting because it would do unacceptable damage to the leave trees in the stands. In these cases, the stems would be cut, lopped to lie close to the ground, and left on site. Followup treatments of jackpot burning, or grapple piling and burning of the piles, would also be needed to reduce the resulting slash to a manageable level. These treatments would create adequate space for planting (300+ per acre) and for access to nutrients and sunlight for seedlings to become successfully established. This treatment also reduces ladder fuels and reduces the risk of a surface fire becoming a crown fire.
Mechanical Timber Stand Improvement (mastication)	This equipment treats the ladder fuels in the unit while they are still standing. The rotating head grinds the trees and brush and distributes the chipped material throughout the unit. In this project, this treatment would occur in stands where the tree species are not fire-resistant, and these units would not be jackpot burned.
Lop and Scatter	Tops from commercial harvest, and debris from precommercial thinning and whipfelling, are cut into 4 to 6 foot lengths and scattered throughout the unit with a fuelbed depth of less than 24 inches. This makes the fuelbed non-continuous and causes it to decompose faster.
Grapple Piling	After harvest treatments are completed, a separate contract may be let to place slash into piles using machinery equipped with a grapppler. Normally, the burning of piles takes place in the early winter, after the first snow or early winter rains have fallen. In this manner, the material can be burned safely with minimal damage to residual standing trees. The site is then ready for tree planting.
Hand piling	Fuels are hand piled in areas of heavy slash concentrations and then burned in the fall. Hand piling is used in areas where prescribed fire is not feasible because of fire intolerant species and grapple piling is not possible because of access or slope limitations of the equipment. Typically, hand piling is done in portions of units, such as in helicopter units along the private land boundary to reduce post-harvest slash. It would also be used in shaded fuelbreaks and precommercial thinning units within the WUI boundary, within 250 feet of the private land boundary.
Pile burning	All hand piles, landing piles, and grapple piles are burned in the late fall.
Jackpot burning	In some cases, prescribed fire can be applied directly to slash left on the ground after logging. A site suitable for jackpot burning typically has concentrations of slash throughout the unit with a non-continuous fuel bed. This treatment can also be used after whipfelling when the terrain is too steep to use grapple piling equipment. The burn consumes the concentrations of slash (or “jackpots”) to reduce the risk and intensity of wildfire in the stand. Jackpot burning is usually done in the spring or fall. Firelines may need to be constructed as a precautionary measure.
No Treatment	No fuels treatment may be prescribed if post-harvest fuel loadings are light (less than 15 to 20 tons per acre). This may also occur where tree species are not fire-resistant, or in inaccessible helicopter units where equipment limitations preclude mechanical treatments.
Seedling Planting	Many of the stands in the project area lack desirable seed sources, such as large, mature seed-bearing trees of Douglas-fir, western larch, western white pine, or ponderosa pine. If lodgepole pine is a stagnant component of the existing stand, it is likely that a large number of lodgepole pine seedlings will become established. The most desirable scenario for future management comes from planting seral species such as western larch or ponderosa pine after openings are created by harvest treatments. These tree species are resistant to many of the common pathogens in the forest, such as western spruce budworm, Douglas-fir beetle, and <i>armillaria</i> . These trees also have the capability of growing to large diameters, thus potentially fulfilling the need in the future for late structural stands. In WUI areas, fire-resistant tree species would be planted. Seedlings are generally planted at 250-350 trees per acre, but must have adequate space so that they are not outcompeted for sunlight, water, and nutrients.

## **2.2.6 Transportation System Activities<sup>2</sup>**

New specified road construction, reconstruction of existing roadbeds, and temporary road construction are proposed in the South Deep Management project (Table 2-6). The quantity and type of road construction proposed in each action alternative is the minimum necessary to support the proposed harvest activities. With implementation of the proposed road decommissioning (6.6 miles), there would be a net reduction of roads in the National Forest transportation system in both alternatives.

### **New Specified Road Construction**

Construction of new system (*specified*) roads is only proposed in Alternative G. Each proposed new road segment is listed in Appendix B, Table B-1, with the total miles and cost of new construction also listed. These roads would be designed to accommodate a logging truck and/or a yarder, depending on the logging system to be used in the harvest units. The minimum travel way would be 12 feet wide, with a minimum clearing width of 26 feet. Road design and construction standards would emphasize minimizing erosion and sedimentation, and the Best Management Practices developed for this project (Appendix C) would be followed.

If a road is needed for future use or could be extended in future entries, then it is normally constructed as a National Forest System road. It is retained on the Forest Road Atlas, usually in closed status (Maintenance Level 1) until it is needed again.

All of the newly constructed roads in Alternative G would be placed in closed status (Maintenance Level 1) and retained on the Forest Road Atlas. The exposed soil would be grass seeded, water bars installed where necessary, and the entrance would be reshaped to fit the natural ground, at a minimum. Some culverts may be removed. Closure locations, methods and devices would vary, depending on what is most effective for the site. Money is collected from the timber sale purchaser for roadwork relevant to the road closure such as pulling culverts, revegetation and constructing closure devices.

### **Temporary Road Construction**

Temporary roads are constructed for the sole purpose of aiding in the harvest of a specific unit. Some of the temporary road locations in this project have been identified. The main temporary roads proposed for each action alternative are displayed in Appendix B, Table B-2. Temporary road locations can also be determined at the time of harvest unit layout and are agreed upon between the Forest Service and the Purchaser immediately prior to unit harvest.

When the harvest activity is completed, temporary roads are permanently closed. The road beds are obliterated or, at a minimum, properly drained, scarified and revegetated, and the entrances are blocked and camouflaged. If there is logging slash available, it may be placed on the old roadbed. Slopes may be pulled back to the natural ground in some locations.

### **Road Reconstruction**

The majority of the transportation system used in the South Deep Management project would be existing National Forest System roads. Because many of these roads were built in the 1970s for previous timber sales, some reconstruction is needed to bring them up to current standards for drainage and preventive maintenance. All road segments proposed for reconstruction are listed in Appendix B, Tables B-3 to B-5. Levels of reconstruction are defined as light, medium, and heavy and are defined in Table 2-5. Currently open roads that are reconstructed for the timber

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<sup>2</sup> Source: Transportation Report

sale would remain open after completion of the timber sale. Currently closed roads that are opened and reconstructed for the timber sale would be closed after the sale, using the same methods as the current closure or similar to newly constructed specified roads. Reconstruction of key road segments are discussed below.

**Pend Oreille County Road 4699 (Rocky Creek Road):** about 3 miles is proposed for reconstruction in both action alternatives. This section has not received much maintenance in recent years and has become unsafe for log haul, as well as contributing sediment into Rocky Creek. It is severely outsloped and narrow in places and there are deep erosion rills on the steeper grades. The road would be widened to a minimum of a 14-foot travelway, the road template would be shaped for safer travel, and drainage control structures such as drain dips and ditch relief culverts would be constructed. An existing 36-inch culvert pipe located just west of the junction with Forest System road 7018100 is severely damaged and would be replaced with a larger culvert to accommodate 100-year flows. An agreement with Pend Oreille County would be needed to work on this segment of county road.

**Forest System road 7018000** has been overtopped by Rocky Creek at the stream crossing about 3 times in the past 15 years. The culvert at this crossing would be replaced with a bridge, the road realigned to meet the bridge, the road grade raised, and stream channel damage repaired. The culvert is proposed for replacement to accommodate high flows and to meet Washington State fish passage requirements. During bridge construction the water would be diverted around the construction site, the stream bed excavated to install supports. Stream diversion could be up to 60 days. Instream work would occur at low flow, between July 1 and August 31, meeting the MOU between Washington State Fish and Wildlife and the US Forest Service, Pacific NW Region. This project would not be funded as part of a timber sale; the 7018000 is currently safe for log haul. Other funding sources, such as Regional Capital Improvement Project program, are currently being pursued by the forest. Additional details about this project are in section 4.1.2 Hydrology of this EA and in the Transportation report in the South Deep analysis file.

## Aggregate Rock Sources

### *Existing Rock Sources (outside of the South Deep watershed)*

Rock material from these pits would be used for new road construction and road reconstruction for the South Deep project.

**Thomas Mountain Quarry** (T36N, R41E, SE ¼ Section 2) has a stockpile of high quality crushed aggregate.

**Jump Off Joe Pit** (T36N, R40E, Sec 5, NWSE) has a stockpile of well-graded pit run aggregate. The site has not been used for about 10 years, and small trees growing on the stockpiles would need to be removed.

**Irish Mountain Pit** (T36N, R40E, Sec 10, NWNW) is used periodically for road maintenance and road reconstruction and is ready for use. The site would continue to be used for ongoing road work.

### *New Rock Sources*

In addition to existing rock pits, new sources would be developed. Development would involve clearing, excavating, rock crushing (which would generate large quantities of dust), piling, loading and hauling of rock material. Drilling and blasting may also occur.

**Byers Pit** (T37N, R41E, NE ¼ Section 2) is the only existing rock pit within the South Deep project area. There is minimal material ready for use at this site. The Regional Engineering Geologist visited the site in Fall 2002 and recommended further exploration, testing and development. Material from this site would continue to be used for ongoing road maintenance as well as the South Deep project.

**T37N, R41E, Section 2 NENE** This new, undeveloped site is on the north side of Forest System road 1700265. About five acres would be directly impacted from clearing and excavation activities. Some of the crushed material may be stockpiled for future road maintenance use.

**T37N, R41E, Section 34 NWNW** This new, undeveloped site is on Forest System road 7018122, an existing closed road. Less than one acre would be impacted. This site would not be used in the future beyond the South Deep project.

## Haul Route Safety

Stevens County Bridges: Three bridges on county road 4699 (Rocky Creek Road) were questioned regarding their adequacy for commercial haul. The county has plans to replace the third bridge (located at MP 0.93) in July and August 2006, but work on the other bridges is not indicated on the county's five year construction plan. If necessary to ensure safe haul, some bridge maintenance or temporary repairs may be included with the South Deep timber sale work, in coordination with Stevens County.

Danger Tree Management: On December 7, 2005, Region 6 of the Forest Service published FS Manual PNW Supplement No. 7730-2005-1 providing direction for danger tree management along roads in the National Forest. The direction recommends using the tools in Timber Sale and Stewardship contracts to remove danger trees where possible. In this project, danger trees along haul routes would be designated by a qualified person and the hazard removed (cut and either removed or left on the ground).

OHV Use: Off Highway Vehicles (OHV) are currently permitted on some of the Maintenance Level 2 roads within and adjacent to the South Deep project area. With the increased traffic of a timber sale or stewardship contract, the safety hazard is increased. To mitigate the hazard, OHV use would be restricted on these roads and all roads used for harvest activities throughout the life of the contract. The currently designated roads are listed below.

1700200	1700290	7000635	7005570
1700255	7000500	7000640	7018200
	7000620	7000655	7020100

## Road Decommissioning

The Road Analysis Process for the South Deep Management project reviewed the existing road system in the South Deep watershed. About 6.6 miles of National Forest System roads are proposed to be decommissioned/obliterated in Alternatives E and G. These closures are described in detail in Appendix B, Table B-6. These roads are not anticipated to be used in the future and would not be maintained on the Forest Road Atlas as existing roads.

## Cost Share Roads

Due to mixed patterns of ownership in some areas it is often advantageous and prudent to utilize existing cooperator roads to access isolated timber stands on National Forest System lands. There are six roads within the South Deep Project area that are identified as existing cost share roads. Three of these, FSR 7000500, 7000620 and 7000670 are cost shared with Forest Capital, formerly Boise Cascade Corp. These are no longer active cost share roads because the Forest Service has acquired those lands through conveyances. Three roads within the project area are currently cost shared with Washington Dept of Natural Resources: FS roads 1700200, 1700215, and 1700302. Portions of roads 1700200 and 1700302 are planned for reconstruction. At this time no new cost share agreements are being pursued within the project area.

**Table 2-6. Transportation System Activities**

Activity	Description
New Specified Road Construction	Construction of new roads is proposed in order to gain access to stands in need of silvicultural treatment. The term "specified road" refers to roads that merit contractual specification and acceptance by the Forest Service in their construction. This is due to a number of factors including the terrain over which the new road is constructed, presence of wet areas or streams, amount of rock that may need to be blasted, total length of the spur, or intended future use of the road.
Temporary Road Construction	The term "temporary" is a Forest Service Timber Sale Contract term used to define those roads to be constructed by the timber purchaser for the sole purpose of harvesting a specific unit. Temporary roads are, generally, short-term and single purpose (needed for one project and not to be used for future entries). The difficulty of construction is low with a minimum level of resource impact. The road has little or no rock blasting, is located on flatter side slopes, and has no need for tight control of construction or location. No special design standards are needed, such as special sediment reduction methods, low bed access, rock surfacing, or large culverts or bridges. Typically, temporary road segments are no longer than ½ mile in length.
Road Reconstruction	<p><u>Light</u>: consists of occasional drain dip construction with associated light blading and brushing which is beyond the scope of pre-haul maintenance requirements needed to facilitate commercial haul. Rocking of drain dips and RHCAs and their contributing areas, and rocking of the roadbed for sediment control and subgrade strength are also included. Light reconstruction typically occurs in "spots", and about 15% of the road length would actually have work done.</p> <p><u>Medium</u>: consists of light reconstruction plus occasional clearing of vegetation, including trees 6" and greater; excavation of the cut bank and roadbed for width, as well as placement of material; and culvert replacement and installation.</p> <p><u>Heavy</u>: consists of medium reconstruction plus road re-alignment, especially for correcting curves less than 50' radius, major excavation and clearing. This type of reconstruction would have initial disturbance similar to new construction but it is usually only planned in specific work locations.</p>
Danger Tree Removal	Removal of danger trees to ensure public safety is part of new road construction, road reconstruction, and ongoing road maintenance. Most of the National Forest System roads in the project area are low priority for danger tree removal, due to their low traffic volume. However, log haul routes are treated for danger trees as part of timber sale road maintenance.
Rock Pit Development	Rock and crushed stone products would be loosened by drilling and blasting, and then loaded by power shovel or front-end loader into large haul trucks that transport the material to the processing operations. Techniques used for extraction vary with the nature and location of the deposit. Processing operations may include crushing, screening, size classification, material handling, and storage operations.
Road Closure	All newly constructed specified roads and temporary roads would be closed after completion of the proposed activities. This may be up to one year after a sale unit is completed, to allow for removal of firewood by the public. Closures may consist of gates, guardrails, or earthen berms.
Road Decommissioning	About 6.6 miles of road decommissioning is proposed, in addition to closures of newly constructed roads. Decommissioning covers a broad range of closure methods, from simple barriers to full obliteration.

## **2.2.7 Wildlife Habitat Area Adjustments**

Included in both action alternatives are proposed changes to the boundaries of three pine marten/northern three-toed woodpecker management requirement (MR) areas and two pileated woodpecker MR areas within the South Deep watershed. These minor adjustments in boundaries are proposed where better habitat exists outside the current MR locations. The proposed adjustments would add the superior habitat, and exclude inferior habitat currently located within the areas. (“A” blocks of pine marten MRs are current habitat, and “B” and “C” blocks are identified as potential future habitat. Only changes to the “A” blocks are proposed at this time.)

The existing MR boundaries are displayed in section 3.2.5 Wildlife Management Indicator Species, Figure 3-12. The proposed MR boundaries are displayed in section 4.2.5 Wildlife Management Indicator Species, Figure 4-1. The following changes are proposed:

PW06: The proposed new delineation is bounded by the powerline right of way on the eastern side, increasing the MR to about 315 acres.

PM29: A portion of the “A” block of this MR was incorrectly located on private land. The new “A” block area would be located to the south and west of the current location, in T36N R41E Sections 29 and 36.

PM30: The new “A” block delineation is larger (by about 24 acres, increasing the area to 178 acres) and uses existing roads to better define boundaries. The primary reason for the new delineation is to make the area easier to identify on the ground.

PM38: More open stands in the southeastern part of the existing “A” block are not good marten habitat. More suitable habitat occurs in the adjoining “B” block on the west side and to the north. The more suitable habitat would be added and the less suitable habitat excluded.

## **2.3 Other Alternatives Considered and Eliminated from Detailed Study**

Federal agencies are required by the National Environmental Policy Act to rigorously explore and objectively evaluate a range of reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

The following alternatives were developed by the interdisciplinary team early in the planning process and were subsequently eliminated in response to public comments and concerns.

- **Alternative B:** The original proposed action included treating about 6,000 acres of vegetation with stand-improvement thinning, stand regeneration treatments, salvage, and associated post-harvest site preparation and tree planting. Almost 15 miles of new roads would be constructed. Plans included reducing the amount of fuel in the project area through prescribed fire and non-commercial type thinning treatments. Research studies were planned in timber stands with small diameter trees in riparian buffers (measuring sedimentation), erosion, silviculture, and harvesting systems.
- **Alternative C:** A minimal road construction alternative was developed in response to scoping concerns about new road construction. In this alternative about 7,800 acres of timber would be commercially harvested, but only new roads needed to access research studies would be constructed (2.6 miles). Any other treatments would use the existing road system, and extensive helicopter yarding was used to meet this objective.

- **Alternative D:** This alternative was developed to meet the purpose and need of providing wood fiber for local mills and the American public, and also to enhance the ability of early and middle structural stands to attain late structure. This alternative took advantage of local mills being able to take smaller diameter logs, and applied management to stands that might otherwise not be economically viable. Under this alternative, more than 9,000 acres would have been commercially harvested, requiring construction of almost 20 miles of new roads.

In scoping comments, the public expressed concerns about creating larger forest openings that would have adverse effects on natural resources and the effects of road construction on wildlife, sensitive plants, visual quality, water quality, fish habitat, and recreational experiences. As a result of these comments, these three alternatives were eliminated from detailed study and Alternatives E and G were developed. Alternatives E and G greatly reduce the construction of new permanent roads, and commercial harvest using shelterwood and clearcut-with-reserve silvicultural prescriptions, to address these concerns.

Some comments recommended a “restoration-only alternative” that included fuels treatments and road closure and obliteration without any commercial harvest. This alternative was not consistent with the purpose and need for the project to provide wood fiber for local mills. Additionally, alternate sources of funding would be needed to accomplish the restoration treatments. Consequently, this alternative was eliminated from detailed study.

## 2.4 Management Practices and Mitigation Measures

These measures are used to reduce negative effects on area resources. All listed measures (some of which are standard management practices included in timber sale contracts and road construction contracts) are common to both action alternatives, unless otherwise noted. They would be required if either of the action alternatives is implemented. In general, both action alternatives incorporate the mitigation associated with Forest Plan standards and guidelines, as amended.

In addition to the measures listed below, **Best Management Practices** (BMPs) will be applied to this project. BMPs are the primary mechanism used to achieve soil and water quality standards and are identified by the interdisciplinary team. They are implemented primarily through project design and contract provisions in the timber sale contract, road construction contract, etc. The BMP measures that apply to this project are listed in Appendix C.

### 2.4.1 Soils<sup>3</sup>

- 1) Exclude areas of Kegel loam from harvest units, or operate late in the summer when the area is dry, or operate over snow. Kegel loam is found on relatively active floodplains and other areas that sometimes become flooded during spring melt. Applies to areas within the following units:
  - Unit DBD has a very small area of Kegel loam in the extreme southern part of the unit, along the edge of a meadow.
  - Unit DCH has a very small area of Kegel loam in the southeastern part of the unit, near the wetland that is just outside the unit boundary.

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<sup>3</sup> Source: Soils Report

- 2) On temporary roads and tractor harvest units that are adjacent to roads and trails open to OHV use or dispersed campsites, design and implement the ground-based yarding system so that it is unattractive to OHV users. Practices include building waterbars, ripping temporary roads and landings, blocking skid trails with unmerchantable material, and covering skid trails with slash. This work will be done through a combination of timber sale contract requirements and Knutsen-Vandenberg funds.
- 3) Develop burn plans so small unburned patches are retained, some of the forest floor litter and duff layer is retained over most of the burn area, and the mineral soil surface is not oxidized to a reddish color. Avoid burn prescriptions that result in duff removal of large areas (greater than 100 square feet). This measure will help to maintain soil cover on the site. Applies to all prescribed fires.
- 4) Leave slash on the ground for one winter prior to prescribed burning. Leaving tops and branches retains the majority of the nutrients on the site. Leaving slash over one winter (wet season) will allow much of the potassium in the slash to enter the soil. This measure applies to all treatment areas. Exception would be in areas of bark beetle epidemics, when slash would be burned immediately (see Mitigation #16, section 2.4.4 Forested Vegetation).
- 5) Retain organic debris for nutrient cycling and long-term productivity. Retain 10-20 tons/acre of larger woody debris (> 6 inches diameter). Leave as much fine organic debris (less than 2 inches in diameter) as possible, while still meeting fuels reduction objectives. Applies to all timber sale units.

## **2.4.2 Water Quality**<sup>4</sup>

- 6) Wetlands, springs, seeps, and streams not previously identified during the NEPA inventory and analysis will be excluded from treatment during unit layout using Inland Native Fish Strategy riparian guidelines.
- 7) All riparian roads and road segments with unstable slopes proposed for closure will be drained, ripped, and seeded if they are currently accessible with machinery. All culverts within these road sections will be removed and channels restored if accessible with machinery. Proper sediment catchment materials such as, but not limited to, straw bales and silt fence shall be constructed and maintained during the duration of the activity. The *Colville National Forest Guide to Seeding and Planting Vegetation* will be used for all site restoration activities on disturbed soils.
- 8) Precommercial thinning, fire/fuels, and post/pole treatments in riparian habitat conservation areas will retain vegetative cover and root masses in quantities sufficient to maintain streambank stability and water temperatures. Large woody material (less than 12 inches in diameter; more than 35 ft. long) will not be felled or removed from riparian habitat conservation areas. Ground-based machinery will not be allowed to operate in riparian habitat conservation areas.
- 9) Prescribed fire ignition will cease at least 150 feet outside perennial stream channels and 50 outside intermittent channels. Backing fires will be allowed to enter the riparian habitat conservation areas.
- 10) Avoiding side casting of soils or snow during plowing or reconstruction on road segments within or abutting riparian habitat conservation areas.

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<sup>4</sup> Sources: Hydrology and Aquatic Environment Reports

- 11) Timber harvest units DCI, ECJ, and DCH will open up timber stands around the wetlands below the dam at Big Meadow Lake and may increase cattle access into the wetlands. Slash dispersal in the harvest units may discourage additional cattle access. The wetlands will be monitored for compliance with forest plan standards and, if impacts are unacceptable, other options such as fencing will be implemented.

### **2.4.3 Air Quality**<sup>5</sup>

The following mitigation measures insure that impacts to air quality will remain within Washington State and Forest Service guidelines. They apply to all prescribed fire activities.

- 12) To reduce the rate of release of smoke emissions the times and places of ignition will be staggered. Burning will also be done when an unstable atmosphere is present to allow for mixing and dispersion of smoke emissions.
- 13) Jackpot burning activities consuming more than 100 tons of fuel within a 24-hour period, and pile burning which is anticipated to exceed 300 tons of smoke, require approval from the Washington State Department of Natural Resources prior to ignition. Locally, wind direction will be monitored and if it is anticipated that it will adversely affect a community the project plan will be modified or postponed.
- 14) Water sources will be provided for rock pit and log haul dust abatement, and for compacting material during road reconstruction. No water will be withdrawn from fish-bearing tributaries of Byers, Rocky, and Meadow Creeks. The mainstems of these creeks can be used as water sources. Intake hoses will be screened to prevent small fish from being impacted. Pumping equipment will be operated so that it does not block fish passage. See also Best Management Practice PR-17 (Appendix C).

### **2.4.4 Forested Vegetation**<sup>6</sup>

- 15) Appropriate resource specialists will assist the silviculturist in developing site specific prescriptions, marking guidelines, and monitoring for units located within designated wildlife habitat areas, developed recreational areas, and visual emphasis areas.
- 16) Slash piles containing high amounts of lodgepole pine, which are at risk to create or continue the spread of bark beetles will be burned as early as possible in fall. Delaying of slash pile burning to allow for firewood cutting may increase the potential for pine engraver and mountain pine beetle buildup. Firewood cutting from piles will be allowed as soon as possible after the unit is completed. This will reduce the slash available for the beetles to invade.
- 17) Douglas-fir beetle infested logs cut in one season will be removed from the sale area prior to April of the following spring, or at the earliest opportunity after the first of April if the area is inaccessible prior to April. This will be applied through timber sale contract provisions.
- 18) Prescribed burning will not occur in units that contain active Douglas-fir beetle populations until the Douglas-fir beetle populations have returned to endemic "pre-outbreak" levels. At endemic levels, the beetle infests scattered trees, including windfall trees and trees injured by fire scorch, defoliation, or root disease (Schmitz, Gibson, 1996). This mitigation applies outside of regeneration units.

<sup>5</sup> Sources: Fuels and Transportation Reports

<sup>6</sup> Source: Silvicultural Report

- 19) One stand of structural stage six (portions of commercial harvest unit NBE) is being treated to move it toward structural stage seven. Due to mapping errors, small inclusions of structural stage six are within commercial harvest units DBS, DCF, DCG, and ECC; these areas will be excluded from the harvest activity. If any stands are identified as old growth or structural stage six or seven during future reconnaissance or unit layout, they will be excluded from the harvest activity.
- 20) All “select trees” (designated for the collection of seed to develop genetically improved tree stock and for general reforestation needs) within the project area will be protected. This includes retaining shelter trees around the select tree to reduce the risk of blowdown, and not piling slash within 30 feet of the drip line of the tree. Remove or modify both the ground and ladder fuels adjacent to the select tree to increase the chance of survival in the event of a wildfire or during site preparation burn activities.

## **2.4.5 Fuels Reduction**<sup>7</sup>

The following practices apply to all prescribed burning.

- 21) All jackpot burning will be ignited during the spring or fall depending on environmental conditions such as; temperature, relative humidity, wind, fuel moistures and soil moisture. Those projects that are associated with slash reduction for hazard or planting will be done early as possible in the spring prior to green up. Prescribed fire projects that are associated with natural fuels and wildlife could be ignited during spring or fall depending on environmental conditions. Sometimes natural fuels and wildlife objectives cannot be achieved during spring because of excessive moisture, green up, low temps, high relative humidity and heat sink. When this is the case projects are completed during the fall when environmental conditions are favorable. The same techniques for fuel moistures and soils are also used in the fall.
- 22) All brush disposal and jackpot burning projects will be done as early as possible in the spring prior to green up. This allows the large diameter fuels (greater than 3 inches) to have fuel moisture content greater than 20 percent. High fuel moisture content results in very low consumption of the 3 + inch fuels, which in turn means less fire intensity and shorter fire duration. During this time of year soil moistures will also be high and soil temperatures low, which will cause less erosion and loss of soil productivity.
- 23) Employ lighting patterns that will prevent rapid spread of fire to help mitigate overstory mortality from high fuel concentrations and topography changes. Fuel moistures are also intensely monitored before ignition of any prescribed fire.

The following practices apply to the disposal of landing piles, grapple piles, right-of-way piles and hand piles. All pile disposal projects will also have a prescribed fire plan completed prior to any ignition.

- 24) All piles will be burned after significant moisture in the fall, when risk of fire spread is insignificant.
- 25) Fuel reduction and consumption techniques: all landing and right-of-way piles that are accessible to the public will be left at least one season for firewood gathering. For better consumption, techniques will be used that minimize dirt in all piles.

<sup>7</sup> Source: Silvicultural Report

- 26) Piles will be disposed of during meteorological conditions when an unstable atmosphere is present, to allow for mixing and dispersion of smoke.
- 27) To help mitigate against the invasion of noxious weeds, firelines will be seeded and the removed material will be spread over the line to help initiate re-growth of native plant species. This, along with water bars, will also help reduce the chance of erosion occurring on steeper slopes during rain events.

## **2.4.6 Noxious Weeds and Competing Vegetation**<sup>8</sup>

- 28) All applicable measures in the *Colville National Forest Integrated Noxious Weed Management Program Environmental Assessment* (1992) are incorporated by reference.
- 29) All newly constructed roads and closed roads that have been re-opened shall be closed as soon as required project activity, wood gathering, and harvest activity are completed to minimize the probability of noxious weed establishment.
- 30) New road closures will not be implemented until weeds have been treated. Follow-up monitoring and re-treatment of areas behind road closures and/or obliterated roads must be conducted, at a minimum, once a year for the first two years after the treatment or until such time as it can be verified that the weed infestation has been effectively treated.
- 31) Haul routes, including existing landing areas, and helicopter service landings, will be treated for noxious weeds at least a season before hauling to decrease noxious weed spread. New roads will be seeded shortly after they are built to reduce noxious weed spread and concomitant habitat loss. Roads will be closed and re-vegetated, using the most effective barriers, as soon as practicable after being built.

## **2.4.7 Threatened, Endangered and Sensitive Species**

### **Sensitive Plants**<sup>9</sup>

- 32) A site-specific “no activity buffer” will be implemented around sensitive plant populations, based on topographic features and either Forest Botanist recommendations or the following guidelines. When any of the following guidelines cannot be implemented, the Forest Botanist will be consulted prior to any ground-disturbing activities.
  - Avoid commercial harvest activities within 250 feet of sensitive plant populations.
  - Avoid log landings and tree felling in meadows with sensitive plant populations.
  - Avoid pre-commercial thinning activities within 150 feet of sensitive plant populations.
  - Locate new roads at least 250 feet from sensitive plant populations.

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<sup>8</sup> Source: Noxious Weeds Report

<sup>9</sup> Source: Sensitive Plants Report

- Limit reconstruction of existing roads to the existing template in the vicinity of sensitive plant populations.
- 33) If any sensitive species population (not previously mapped) is found in the project area while project activities are occurring, a botanist will be consulted as to measures required to protect the species and its habitat.

## Wildlife Species<sup>10</sup>

### Bald Eagle, Great Gray Owl

- 34) Continue to monitor bald eagle activity; if eagles nest near Big Meadow Lake, implement timing restrictions to reduce or eliminate conflicts with bald eagles.
- 35) If a great gray owl nest is found within the project area, it will be protected with appropriate activity buffers and/or in accordance with existing Forest Service Timber Sale Contract provisions for the protection of Threatened, Endangered and Sensitive species.

### Canada Lynx

- 36) The district wildlife biologist will work with the district fuels specialist and silviculturist to ensure that concentrations of downed wood are retained in the portions of commercial harvest units that fall within lynx habitat in the Lynx Analysis Unit. Applies to units DBO, DBX, DBY, DCK, DCQ, DCZ, DDH, DDM, DDN, DFB, DFC, DFG, DFM, DFT, DGF, ECK, ECR, ECS, ECV, SDG, SDI, SDN, SDO, SDP, SDQ, SDS, SDT.

### Grizzly Bear, Gray Wolf, Wolverine

- 37) New roads N12 and W2 will be closed where they cross riparian areas by pulling slash and debris over them, to maintain the function of these areas as travel corridors.
- 38) To reduce loss of hiding cover from precommercial thinning units, retain a 50-foot no-thin strip along open roads.

### Townsend's Big-eared Bat

- 39) In the vicinity of abandoned mine shafts known to be occupied by bats, prescribed fire will be timed (November 1 and April 1) to avoid impacts to hibernating bats.

## 2.4.8 Wildlife Species<sup>11</sup>

### Management Indicator Species

#### Big Game

- 40) Within Forest Plan designated winter range areas (Management Areas 6 and 8), if units are to be harvested in winter, a gate or other entrance barrier will be installed on those roads to be used for project activities and kept closed to all but harvest-related traffic. The roads will be closed with a Code of Federal Regulations closure.
- 41) Marking and harvest of units WGH (Alternative G only), WGJ, WGD, and WGF will be designed to retain the existing snow intercept thermal cover qualities.

<sup>10</sup> Source: Biological Evaluation and Biological Assessment

<sup>11</sup> Source: Wildlife Report

- 42) Burn prescriptions for those areas of noncommercial unit ZZ that overlap with Vegis polygons 100397, 100398, and 1001009 will be designed to protect the existing snow intercept thermal qualities.

**Pine Marten / Pileated Woodpecker (MR), Barred Owl (MA-1)**

- 43) Commercial harvest unit NBA (Alternative G only) overlaps with a small portion of the Smackout MA-1 area. Should this unit be selected for harvest, the unit boundary will be laid out to exclude the MA-1 area. No harvest will occur in MA-1 areas, per Forest Plan direction (Forest Plan, p. 4-71).
- 44) Post-treatment firewood collection activities will be controlled in MA-1 and MR areas through road closures to help maintain snag and downed log densities, as required by the Forest Plan. Signing will be funded as a Knutsen-Vandenberg project. The following roads will be signed as closed to firewood cutting along the MA-1 and MR area boundaries:

Smackout	1728250 (closed), 1728255 (closed)
MA-1	
PM29	7018290 (open and closed sections)
PM30	C4699, 7020100 7002120 (closed)
PM31	7020500 (closed)
PM37	7000730
PM38	7018300
PM39	7018330, 7018350 (closed), 7018360 (closed)
PM40	7000775 (closed)
PM41	7005500
PM42	1728230, 1728265 (closed)
PW06	1700000, 1700100 (closed), 1700110 (closed), 1728050

**Blue Grouse**

- 45) Maintain at least eight winter roost trees per acre in roosting habitat. Applies to the following commercial harvest units:

Acres			Acres			Acres		
Unit	Alt. G	Alt. E	Unit	Alt. G	Alt. E	Unit	Alt. G	Alt. E
DBL	N/A	14	ECB	22	22	SDO	21	21
DBO	18	18	ECF	21	21	SDT	24	24
DBX	45	45	ECK	81	N/A	WFB	30	30
DCG	59	N/A	ECL	35	N/A	WFD	16	N/A
DCK	57	N/A	ECR	13	13	WFF	46	N/A
DCQ	N/A	46	ECV	7	7	WFG	89	N/A
DCZ	N/A	26	SDG	33	33	WFH	68	N/A
DDH	24	24	SDH	43	43	WFO	23	N/A
DGF	15	N/A	SDI	18	18	WFQ	46	N/A
			SDN	8	8	WFW	12	N/A

**Other Woodpeckers**

- 46) The District Wildlife Tree Marking Guideline Update (1995) will be applied in all harvest units. This update requires retaining a minimum of four large snags and eight replacement trees per acre, when available, to provide for 100% of the potential population of primary cavity nesters. It describes sizes and alternatives if these are not available. If the number of remaining snags does not meet the requirements in

this guideline, the loss, due to harvest, may be mitigated by creating snags during post harvest sale area betterment (Knutsen-Vandenberg funded) activities.

## Raptors

- 47) Buffer the two known Cooper's hawk nest areas and the known red-tailed hawk nest by 300 feet. Commercial units DBZ, WGP, WGL, ECB, and precommercial thinning unit TBM are the units closest to these known nests.
- 48) If other raptor nests are found, buffers around nests and post-fledging areas will be established according to current direction. If new nests are found within or adjacent to commercial harvest units prior to the time of timber sale contract award, all mitigations will be implemented. If a nest is found in such an area after the contract is awarded, the Forest Service will negotiate with the purchaser to provide as much protection as is feasible.

## Focal Species

### Migratory Land Birds

- 49) To minimize the unnatural effect of spring underburning and impacts on nesting birds, no more than 10% of any 6<sup>th</sup> field watershed will be burned in a single year.
- 50) Burning of noncommercial unit ZU has the potential to impact higher elevation sagebrush habitat. These areas are limited on the Forest and may provide specialized habitat for some bird species. Fire personnel will work closely with wildlife personnel on the prescription for burning unit ZU to minimize the mortality of sagebrush.

### Waterfowl

- 51) In commercial harvest units within ½ mile of Big Meadow Lake and adjacent wetlands (units DCI, DCH, DCJ, ECB, ECG, ECN) leave all trees greater than 12 inches in diameter that contain nest holes at least 3.5 inches in diameter.

## 2.4.9 Heritage<sup>12</sup>

- 52) Avoid heritage sites located within treatment units. These are sites 06211200002, 06211200003, 06211200005, 06211200012, 06210100107, 06210100108 (both alternatives); and 06211200004, 06211200006, 06210100216, 06210100225 (Alternative G only). The archeologist will be consulted and the appropriate avoidance distances identified site-specifically.
- 53) Adjust design of roads and/or design of yarding systems to avoid heritage sites. These are sites 06211200009, 06210100005, 06210100144, 06210100215, 06210100216 (both alternatives); and 06211200008 (Alternative G only). The archeologist will be consulted and the appropriate avoidance distance identified site-specifically.

<sup>12</sup> Source: Heritage Report

## **2.4.10 Scenery**<sup>13</sup>

- 54) Precommercial thinning units that have portions located in the near foreground of the Meadow Creek Road will have slash that is visible from the road removed or pulled back (50 ft.) into the unit. Units needing mitigation: TAZ, TBA, TBD, TBH, TBL, TBM, TBP, TBW.
- 55) Cable logging system: keep cabled corridors as narrow as possible to reduce contrasting line effects; orient away from Aladdin Highway where possible; and retain rub trees. Units needing mitigation: DBH, DBJ, DCA, DCG, DCO, ECC, ECH, ECL, NBI, NBN, NBO, SDH, SDI, WGL. and DBS (Unit DBS -- orient cable corridors away from Meadow Creek Road)
- 56) Created opening: use irregular shaped openings (no straight lines or corners) with grouped leave tree islands to reduce visual contrasts; and limit the size of created openings to no more than 10 acres (to reduce soil color contrast). Units needing mitigation: NBE, NBO, SDG, SDH, WFQ.
- 57) Canopy texture: retain 25-30 leave trees/acre, thus maintaining enough forest canopy to meet the Visual Quality Objective (leave trees may be grouped or clumped). Units needing mitigation: DCG, DCK, ECH, ECL, NBI, NBN, SDB, SDH, WFL, WFS, WFX, WGG, WGJ, WGL (30-35 leave tree density to screen upper portion of unit), WGP.
- 58) Boundary line: retain trees along the boundary between private and National Forest System lands in an irregular, feathered, undulating pattern to reduce the impacts of the straight line effect of the boundary. Units needing mitigation: DBS, DCA, DCO, ECB, ECC, ECE, ECH, NBT, WFL, WFS, WFV, WGL, WGN, WGO, WGQ.
- 59) Transmission line rehabilitation: remove trees along the transmission line clearing in an irregular, feathered, undulating pattern to soften and blend the negative line effect. Units needing mitigation: DGA, DGB, NBN, NBQ, NBV, NBW.
- 60) Foreground screening: mitigation would include retaining trees in an irregular, feathered pattern on the lower edge of the unit to screen views into the unit from the roadway, trail, or lake. Units needing mitigation: DBU, DCB, DCC, DCI, ECG, WFL, WFS, WGL, WGN, WGO, WGQ.
- 61) Road Construction / Heavy Reconstruction screening of road cuts and fills: retain vegetation below the road; adjust the road location to utilize unseen topographic benches; and avoid locations on more than 45 % slopes where visual exposure would occur for more than ¼ mile. The following are road segments where these mitigation measures will be needed due to existing conditions: 7000660, E4, E10, N12, W1.

## **2.4.11 Recreation**<sup>14</sup>

- 62) No new road construction or reconstruction will occur during winter months on roads used as a snowmobile route. Applies to: county road 4699, Forest Service roads 7018000, 7015125.
- 63) Numerous harvest units in the Blacktail Butte and Seldom Seen Mountain area are near a snowmobile route. Some of these units are recommended for winter logging because of existing levels of soil compaction. As needed, the snowmobile route will be closed prior to and during winter harvesting activities in this area. Users will be

<sup>13</sup> Source: Scenery Report and Addendum

<sup>14</sup> Source: Recreation Report

informed of closures through coordination with the Washington State Parks and Recreation Commission and media releases.

- 64) Sign dispersed recreation sites and Trail 142 to make recreationists aware of road reconstruction activities. During road reconstruction, prevent access to the area for user safety. After reconstruction has ceased, clean up dispersed recreation sites by removing material (root systems, dirt, rocks, etc.) generated by the reconstruction activities in and adjacent to the site. Eliminate as much remaining slash as possible to reduce risk of ignition by human cause. Applies to county road 4699 and FS roads 7000500, 7000620, 7000655, 7000680, 7005570, 7005576, 7015125.
- 65) Sign dispersed recreation sites before and while harvesting activities take place so users know that area will be impacted by harvesting activities. After harvesting activities have ceased, clean up dispersed recreation sites by removing material (root systems, dirt, rocks, etc.) generated by the harvest activities in and adjacent to the site. Eliminate as much remaining slash as possible to reduce risk of ignition by human cause. Applies to commercial harvest units DCD, DCH, DCI, DCP, DFT, ECB, ECG, WFB, WFD, WFG, WFQ, WFR, WFW, and precommercial thinning units TBD, TBU, TBW.
- 66) Commercial harvest units DCI and ECG are near the Big Meadow Lake Campground and associated trails. Sign the area prior to and for the duration of harvesting activities to make recreationists aware of harvesting activities.
- 67) The increased traffic of log haul for a timber sale or stewardship contract poses a safety hazard on designated OHV routes. To mitigate the hazard, haul routes will be signed, and OHV use will be restricted on roads used for harvest activities throughout the life of the contract.
- 68) Do not burn prescribed burning units during Memorial Day or Labor Day weekends since these are times of high recreation use of the project area.

## **2.4.12 Mineral Resources**<sup>15</sup>

- 69) Protect all existing or new claim corners or monuments, discovery monuments, or active workings during road construction/reconstruction, timber harvest, fuel treatments, site preparation, and prescribed fire.

## **2.5 Monitoring**

The Colville National Forest has developed plans for three types of monitoring: Forest Plan implementation, the effectiveness of management practices, and validation of the assumptions and models used in planning. The Forest prepares an annual Monitoring and Evaluation Report documenting the monitoring results. For activities related to this project, all alternatives would comply with specific monitoring requirements identified by the Forest Plan.

Forest Plan monitoring is not designed to validate the resource effects of project activities. It is used principally to monitor changes that affect outcomes and outputs. Predicting the effects from land management activities depends on research. A large number of research findings were used for this project and are discussed in the various resource specialist reports, available in the South Deep analysis file.

<sup>15</sup> Source: Mineral Report

Monitoring encompasses many activities and administrative processes. The monitoring identified in the monitoring and evaluation chapter of the Forest Plan does not include all of the monitoring done by the Forest Service. Monitoring to address other laws, policies, and site-specific decisions are part of forest-wide monitoring programs.

The following monitoring will be conducted if one of the action alternatives is implemented. This monitoring is designed to verify that the projects are implemented as designed and are effective and efficient in meeting project and Forest Plan objectives. The length of time that monitoring is needed is determined by the results and evaluation of what is being monitored. When it is certain that regulations and standards are being met, monitoring of a particular element will cease. If monitoring evaluations show that regulations or standards are not being achieved at the desired level, management intervention will occur.

## **2.5.1 Colville National Forest Monitoring Requirements**

The Forest Plan identified monitoring needs in Chapter 5, and the Colville National Forest Monitoring Guide describes this monitoring in more detail. This monitoring includes National Environmental Policy Act compliance, Best Management Practices, Water Quality, Heritage Resources, Threatened, Endangered and Sensitive Animals and Plants to name a few.

The following monitoring items are part of the monitoring needs identified in the Colville National Forest Monitoring Guide. These items are particularly pertinent to this project, and will be monitored.

- Best Management Practices are the primary mechanism to achieve water quality standards. The forest hydrologist and district personnel ensure use during implementation by checking project design and proposed contracts. Best Management Practices to be applied to this project, with specific monitoring requirements, are listed in Appendix C.
- Field monitoring by a soil scientist will be performed to ensure a minimum of 80% of the activity area will be left in a non-detrimentally impacted state. The highest priority will be those areas that might exceed 20% soil disturbance because of new techniques, known or unknown equipment used. Lower priority will be given to other areas.
- Water quality will continue to be monitored on the Forest, in accordance with Washington state water sampling protocol, to ensure compliance with state water quality standards. (See Quality Assurance Project Plan, Colville National Forest—Water Quality Monitoring.) Changes in site conditions or extreme weather-related events (such as drought or flooding) should trigger the potential need for additional monitoring surveys.
- Riparian plants, stream channels, and soils will continue to be monitored in accordance with Forest Plan monitoring standards. The Proper Functioning Condition process will be used as a minimum standard for riparian assessment (Technical Report #1737-9, 1993; and national letter of direction for riparian assessments, 1996). Riparian monitoring will be completed by an interdisciplinary team of Forest Service resource specialists. Representative riparian areas in the South Deep project area will be re-surveyed in accordance with the Forest-wide monitoring schedule.
- Forest Pest Management conducts annual aerial surveys to identify locations and severity of insect and disease problems. These surveys are reviewed by district and forest personnel and sites are visited to ascertain the extent of activity or damage. From this information, appropriate action is taken with the goal to prevent catastrophic losses. The Forest also provides an annual narrative report of Insect and Disease conditions.

- The Forest Biologist recommends four to six snags per acre (depending on biophysical setting) be left to meet the Regional Forester's Amendment No. 2 wildlife standards. The minimum standard is an average of 4-6 snags per acre in the 15-inch size class (or next smaller size if 15+ inch snags do not exist) within a timber sale unit. Snag levels at different phases of the project, including harvest and closure, will be surveyed.
- Visual monitoring will be done along the Aladdin Highway and Meadow Creek Road, from dispersed campsites, and from all trails and trailheads to determine if Visual Quality Objectives were met.

## **2.5.2 Project Specific Monitoring**

The District Ranger will ensure that the mitigation measures and Best Management Practices listed in this EA are applied.

### **Water Quality**

- Timber harvest units DCI, ECJ, and DCH will open up timber stands around the wetlands below the dam at Big Meadow Lake and may increase cattle access. These areas will be monitored for compliance with Forest Plan standards and, if impacts are unacceptable, other options such as fencing may be needed.
- Decommissioned road segments within riparian areas will be monitored for 5 years following closure to assure the effectiveness of restoration efforts. Monitoring will focus on stream crossings, revegetated areas, and unstable slopes, and will be done by the district hydrologist or aquatic specialist.
- Project implementation will be monitored in accordance with Forest Plan monitoring standards to ensure that riparian resources and water quality protection measures (as listed in the Inland Native Fish Strategy and Forest Plan) are correctly applied.

### **Air Quality**

- Washington State Department of Ecology will monitor rock pits to ensure air quality standards are maintained. The designated engineering representative/contracting officer representative who is responsible for the crushing contract coordinates this monitoring for the Forest Service.

### **Vegetation**

- The district silviculturist will monitor project implementation to ensure that harvest prescriptions are implemented as planned, and survival of planted trees and stocking levels in any created openings, for compliance with the National Forest Management Act and the Forest Plan. Stocking surveys for reforestation are conducted in the first and third years after planting or in third and fifth years in naturally regenerated openings.
- A sample of harvest and burn units, 3 to 5 years post-sale, will be reviewed to determine if resource objectives were met and if the desired structural stages were achieved.
- Monitoring will occur on 10% of the harvested areas to ensure adequate logs were left as specified in Regional Forester's Amendment No. 2 wildlife standards.

### **Noxious Weeds**

- During and after project implementation, the project area will be monitored for the presence and/or spread of noxious weeds along newly reconstructed roads, sale units, obliterated roads, and other disturbed areas. Appropriate strategies will be followed if noxious weeds are detected.

**Wildlife**

- All currently closed roads within big game winter range, and all roads closed in conjunction with this project, will be periodically monitored for closure effectiveness. Road closure violations will be promptly reported and repaired.
- Mines used by Townsend's big-eared bats have been buffered from harvest units to minimize potential changes in microclimates caused by timber harvest. Monitors will be installed in these mine locations to detect any potential changes.

**Sensitive Plants**

- The Forest Botanist will monitor selected populations of sensitive plants in the analysis area to evaluate the effects of implementation of the project.

## 2.6 Comparison of Effects of the Alternatives

This section provides a summary of the effects of implementing the alternatives that are disclosed in Chapter 4 of this environmental assessment. The effects of Alternative A, the No Action Alternative, are compared with the existing condition. However, biological processes change over time, and therefore, taking no action would have effects on resources not identified in the table. The effects of Action Alternatives E and G are compared with Alternative A. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. Additional information is given in Chapter 4 and in the various specialist reports that are in the project analysis file.

**Table 2-7. Comparison of Effects of the Alternatives**

Comparison Element	Alternative A No Action	Alternative E	Alternative G
<b>Purpose and Need #1: Hazardous Fuels</b>			
Surface fuels reduction	0 tons	4,546 tons	12,902 tons
Treatments in Wildland Urban Interface areas	0 acres	1,462 acres	1,890 acres
<b>Purpose and Need #2: Forest Health</b>			
Treatment of High Priority Stands	0 acres	1,624 acres (50%)	2,813 acres (87%)
Treatment of Moderate Priority Stands	0 acres	2,338 acres (45%)	3,893 acres (75%)

Comparison Element	Alternative A No Action	Alternative E	Alternative G
Treatment of Low Priority Stands	0 acres	645 acres (76%)	410 acres (49%)
<b>Purpose and Need #3: Local Economy</b>			
Harvest Volume	0	29.822 MMBF	47.100 MMBF
Net Timber Product Value	\$ 0	\$1,936,384	\$3,625,481
Jobs Provided	0 jobs	356 jobs	567 jobs
<b>Key Issue #1: New Road Construction</b>			
New classified road construction (miles)	0 mi	0 mi	4.9 mi
New roads within MA-1, MA-6, MA-8, and MRs	0 mi	0 mi	0.9 mi
Culvert replacements New stream crossings	0 replaced 0 new	5 replaced 0 new	7 replaced 2 new
<b>Key Issue #2: Clearcutting and Large Forest Openings</b>			
Harvest units with clearcut-with-reserves and shelterwood prescriptions	0 acres	192 acres	1183 acres
<b>Soils</b>			
Negative Effects on Soil Productivity due to landings and road construction/reconstruction	0 acres	58.5 acres	109.5 acres
Negative Effects on Soil Productivity due to logging	0 acres	325 acres	521 acres
Negative Effects on Soil Productivity due to burning	0 acres	20 acres	26 acres

<b>Comparison Element</b>	<b>Alternative A No Action</b>	<b>Alternative E</b>	<b>Alternative G</b>
Estimate of detrimentally disturbed soil due to timber harvest	0 acres	9-10%	9-10%
<b>Water Quality and Fish Habitat</b>			
Estimated sediment increase	191 tons	679 tons	711 tons
Attaining Riparian Management Objectives	No Effect	Would not retard attainment	Would not retard attainment
<b>Noxious Weeds</b>			
Acres of bare soil created by project activities	0 acres	559 acres	755 acres
Total estimated increase in extent of weed infestations	0 acres	209 acres (28%)	260 acres (32%)
<b>Wildlife Species</b>			
Big Game	No Effect	Would move habitat closer to the desired forage/cover ratio than Alternative G	Would improve forage/cover ratio
Beaver	No Effect	No Effect	No Effect
Pine Marten Barred Owl Pileated Woodpecker Northern Three-toed Woodpecker	No Effect	No negative effects on designated management areas for these species	Same as Alternative E
Blue Grouse	No Effect	Moderate short-term habitat improvement	Improves the most habitat and causes the most short-term degradation due to new roads
Franklin's Grouse	No Effect	Would improve 322 acres of habitat	Would improve 960 acres of habitat
Other Woodpeckers	No Effect	Short-term negative effects, long term positive effects	Greater short-term negative effects, greater long term positive effects than Alternative E
Raptors and Great Blue Herons	No Effect	Improves habitat over the long term	Same as Alternative E

<b>Comparison Element</b>	<b>Alternative A No Action</b>	<b>Alternative E</b>	<b>Alternative G</b>
Migratory Land Birds	No Effect	Improves diversity of habitat in the long-term	Improves diversity of more acres of habitat in the long-term
Waterfowl	No Effect	Minimal adverse effects	Same as Alternative E
<b>Threatened, Endangered, and Sensitive Species</b>			
Bald Eagle Grizzly Bear Gray Wolf	No Effect	May affect but not likely to adversely affect	May affect but not likely to adversely affect
Great Gray Owl Fisher Wolverine Townsend's Big-eared Bat Westslope Cutthroat Trout	No Effect	May affect but would not lead in a trend toward federal listing or loss of viability	May affect but would not lead in a trend toward federal listing or loss of viability
Common Loon Peregrine Falcon Canada Lynx Woodland Caribou Bull Trout Interior Redband Trout Pygmy Whitefish	No Effect	No Effect	No Effect
Sensitive Plants	No Effect	May affect 16 populations; would not lead in a trend toward federal listing or loss of viability	May affect 25 populations; would not lead in a trend toward federal listing or loss of viability
<b>Recreation</b>			
Potential conflicts with snowmobile routes	No Effect	Winter logging and haul could result in temporary closure of the Blacktail Butte snowmobile route	Additional harvest units near snowmobile route than in Alternative E
<b>Range</b>			
Potential negative effects on wetlands	No Effect	Harvest of units near Big Meadow Lake could increase access of cattle to wetlands; monitor and restore barriers as needed.	Same as Alternative E