

# Galesville Valley Project

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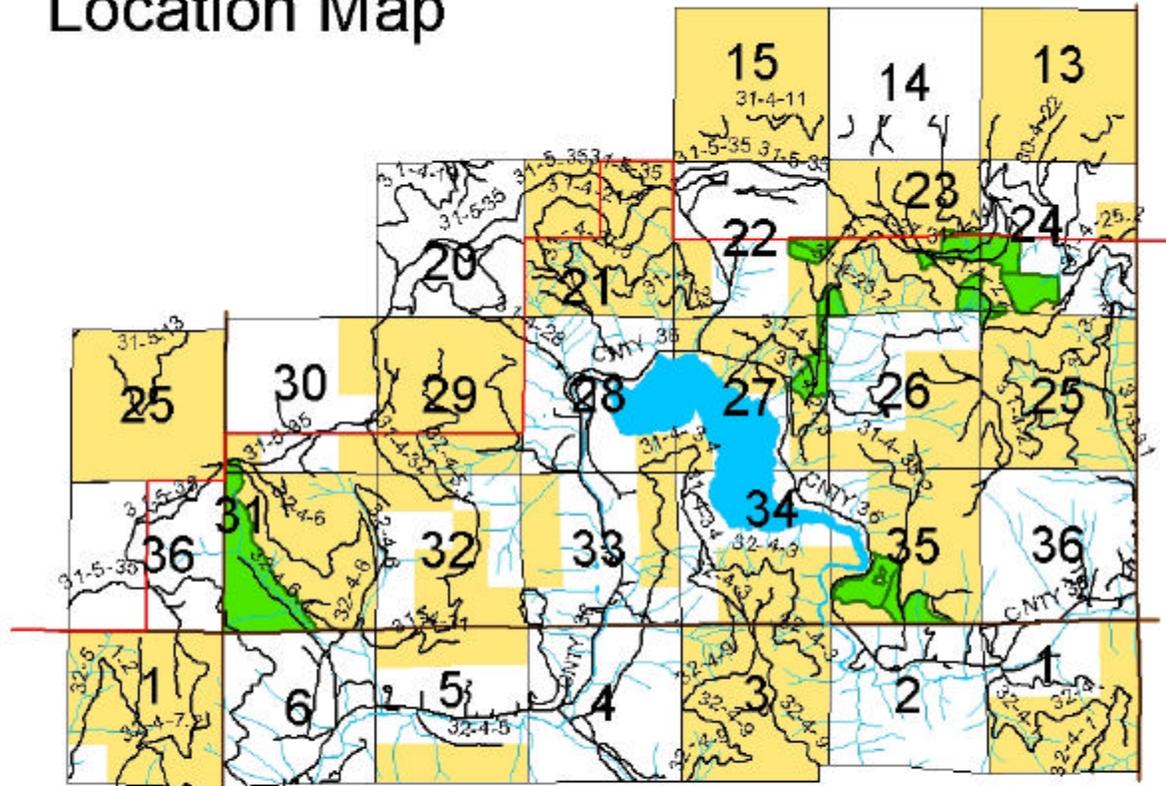
Proposed agency actions: Enhance wildlife habitat through thinning and removal of small diameter trees

Type of statement: Environmental Assessment

Lead agency: U.S. Department of Interior  
Bureau of Land Management  
Medford District, Glendale Resource Area

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BLM District Office

# Galesville Valley LSR Thin T.31 S R. 04 W Location Map



## Legend

- |   |                                 |   |                |
|---|---------------------------------|---|----------------|
|  | Glendale Resource Area boundary |  | Streams        |
|  | Lakes                           |  | Proposed units |
|  | Section lines                   |  | BLM land       |
|  | Township lines                  |  | Private land   |
|  | Roads                           |   |                |

1 0.5 0 1 Miles



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## **Chapter 1 – Purpose and Need for Action**

### **1.0 Introduction**

The Glendale Resource Area proposes to enhance wildlife habitat through thinning of small diameter trees less than 7” diameter breast height (dbh) in the South Umpqua River/Galesville Late-Successional Reserve (LSR #RO223). This would occur on approximately 400 acres of BLM managed land in southern Douglas County.

Resource management in Late-Successional Reserves (LSR) is focused on maintaining and promoting a functional and interacting late-successional and old-growth forest ecosystem. LSRs were designed to provide a distribution, quantity, and quality of old-growth forest habitat sufficient to avoid eliminating future management options; to provide habitat for populations of species that are associated with late-successional forest; to help ensure that late-successional species diversity would be conserved; and to provide a component of the Aquatic Conservation Strategy offering core areas of high quality stream habitat ( South Umpqua River/Galesville Late-Successional Reserve Assessment (LSR #RO223) pg S-1 ).

### **1.1 Purpose and Need for the Proposal**

Analysis of the project area shows that trees are too numerous, resulting in too much competition for space, light and nutrients. As a result, the kinds of plant and animal species seen in late successional stands are not abundant here.

The risk of disastrous wildfire to large tracts of land is often present in young stands due to continuous, dense and flashy fuels. Recognizing this, treatment of surplus dead woody material would be needed after cutting to lessen wildfire risk.

Primarily, this project would be designed to accelerate the development of young, dense stands into stands of larger trees with late-successional forest attributes. It would be done by reducing conifer and hardwood densities within overstocked stands. This would encourage height and diameter growth for all tree species and accelerate development of quality habitat in a shorter time frame than might otherwise occur.

Large snags and down woody material are a desirable characteristic for late successional stands (see LSR #R0233 pg 42). This project area has very small amounts of such resources. Artificially creating a few snags and trees likely to be recruited for snags in the near future (within a few decades) would improve the quality of habitat for late successional species and remedy this situation in a portion of the

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project.

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## **1.2 Project Selection Criteria**

The project area is approximately 500 acres in 19 units. The units proposed are less than 80 years of age. While the stands are not similar in all respects for this project, they were selected because of several characteristics they all have in common:

- Stands are in an early seral stage of development.
- Stands are generally even aged and single canopied.
- Stands have high stocking.
- Stands have high canopy closure.
- Crown ratios of trees are currently dwindling as a result of high stocking.
- Very little large down woody material is present.
- Stands exhibit little diversity in plant species or spacing.
- Competition among tree species for light, water, and nutrients is acute.

These characteristics indicate that these stands may take many decades to acquire desirable Late Successional characteristics as described below in Desired Future Conditions (Table 1).

## **1.3 Project Objectives**

- (a) Accelerate the development of high quality late successional forest in a portion of this LSR.
- (b) Reduce stand densities.
- (c) Replicate large down woody type structures seen in late-successional stands.
- (d) Create new snags using man-made techniques (blasting, girdling).
- (e) Retain the naturally occurring plant species composition of the stands, with conifer trees dominant in most stands.
- (f) Minimize the risk of habitat loss from fire through fuel reduction and careful burning.
- (g) Utilize materials resulting from activities that support objectives (a) and (b).

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**Table 1- 1. Summary of Specific Short Term Objectives leading to Long Term Desired Future Conditions As indicated in the table, these are minimum conditions.**

	Short Term Objectives	Long Term Desired Future Conditions
<b>Live trees</b>	<ul style="list-style-type: none"> <li>Approximately 170 trees per acre (with some areas within treatment units containing higher numbers of trees due to the 7" dbh upper diameter cut limit).</li> <li>Areas of unthinned trees and stream buffers would be left.</li> <li>Contain a variety of conifer and hardwood species appropriate to the site.</li> <li>Variable spacing of residual trees.</li> </ul>	<ul style="list-style-type: none"> <li>at least 10 conifers &gt; 35" dbh or 200 years old per acre</li> <li>A mixture of tree species with hardwoods comprising one quarter to one third of the basal area of the stand.</li> <li>at least 12 shade tolerant trees &gt; 16" per acre</li> <li>25% canopy cover for hardwoods &lt; 26' tall;</li> <li>2% canopy cover for conifers &lt; 26' tall</li> <li>Occasional large limby "wolf-trees"</li> </ul>
<b>Snags</b>	<ul style="list-style-type: none"> <li>Snags (natural and created) would remain within treatment units</li> </ul>	<ul style="list-style-type: none"> <li>4 per acre &gt; 20" dbh and 15' tall</li> <li>Trees in various stages of decay</li> </ul>
<b>Down logs</b>	<ul style="list-style-type: none"> <li>Some LWD, coarse woody debris , (natural and cut material) remaining within treatment units.</li> </ul>	<ul style="list-style-type: none"> <li>8% of ground covered by down logs including logs in various stages of decay.</li> <li>Approximately ten tons per acre of coarse woody debris. This would be made up of 10 pieces that are &gt;17 " in diameter and ≥ 13 ' long, of which two pieces per acre would be &gt; 50 ' long.</li> </ul>
<b>Activity Fuels</b>	<ul style="list-style-type: none"> <li>2" – 7" diameter: -construction of 2 to 3 artificial down woody logs/ acre -piled and burned</li> <li>OR</li> <li>4" - 7" diameter: -Removed to roads if considered merchantable</li> </ul>	<ul style="list-style-type: none"> <li>No more than 20% dead branches on live trees would be within 8' of ground</li> <li>80% of fine dead fuel would lie within 1' of ground</li> </ul>
<b>Openings</b>	<ul style="list-style-type: none"> <li>small openings surrounding leave trees would be created</li> </ul>	<ul style="list-style-type: none"> <li>10% of the area of stands would be open without tree cover</li> </ul>
<b>Structures</b>	<ul style="list-style-type: none"> <li>2-3 New LWD/ acre made</li> </ul>	<ul style="list-style-type: none"> <li>Adequate natural LWD occurring</li> </ul>

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	Short Term Objectives	Long Term Desired Future Conditions
<b>Cultured Trees</b>	<ul style="list-style-type: none"> <li>• Tree culturing done on selected conifers and hardwoods</li> </ul>	<ul style="list-style-type: none"> <li>• Occasional large limby “wolf-trees”</li> </ul>

**1.4 Plan Conformance**

This project is in conformance with The Medford District Resource Management Plan (RMP), which specifies the following:

- Plan and implement non-silvicultural activities inside late-successional reserves that are neutral or beneficial to the creation and maintenance of late-successional habitat. pg 33
- Plan and implement silvicultural treatments inside late-successional reserves that are beneficial to the creation of late-successional habitat. pg 33
- If needed to create and maintain late-successional forest conditions, conduct thinning operations in forest stands less than 80 years of age. This would be accomplished by pre-commercial or commercial thinning of stands regardless of origin (e.g., planted after logging or naturally regenerated after fire or blowdown). pg 33
- LSR’s would be managed to reduce the risk of large scale disturbance such as from wildfire, and the subsequent loss of habitat for old-growth associated species. pg 33
- In addition to practices that placed or maintain stands on desired developmental pathways, practices designed to restore forest condition (forest health), and other practices designed to reduce the risks of stand loss would be done to maintain long-term habitat viability. Pg 195

**1.5 Relationship to other Planning documents**

This Environmental Assessment (EA) is tiered to and conforms with the *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (FSEIS, 1994 and ROD, 1994); the *Medford District Proposed Resource Management Plan/Environmental Impact Statement and the Medford District Record of Decision and Resource Management Plan* (EIS, 1994 and RMP, 1995); and the *Final Supplemental Environmental Impact Statement and Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (FSEIS, 2000 and S&M ROD, 2001). *The Middle Cow Creek Watershed Analysis, Upper Cow*

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*Creek Watershed Analysis*, and *The South Umpqua River/Galesville Late-Successional Reserve Assessment (LSR # RO223)* are incorporated by reference and are not NEPA or decision documents.

**1.6 Decisions to be made on this Analysis**

The analysis in this environmental assessment would provide information to the Glendale Resource Area Field Manager in making a decision on the following.

- 1) Decide whether the action is conformance with Medford District Resource Management Plan.
- 2) Decide whether significant impacts to the human environment would result from the action.
- 3) Decide which alternative action to implement.

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## **Chapter 2 - Alternatives**

### **2.0 Introduction**

This chapter describes the alternatives under consideration. Descriptions focus on potential actions, outputs, and any related mitigation.

### **2.1 Alternative 1: No Action**

The Glendale Resource Area proposes to continue current management of this area under the Medford District Resource Management Plan.

Several ongoing activities would continue:

- Fire suppression activities to prevent large disastrous wildfires.
- Clearing debris and wood in roadways to maintain access.
- Road and culvert maintenance.

Under this alternative, the management actions described under the Action Alternative would not take place at this time. Any future treatment would be described in a future analysis document.

### **2.2 Alternative 2: Action**

The project area would undergo density management treatments to thin the surplus, overtopped, dying, and suppressed smaller diameter trees, both conifer and hardwood. These treatments would include cutting surplus tree stems between 2 “and 7” in diameter to increase spacing between trees, to accelerate growth, reduce disease, and maintain species composition.

As a result of the thinning, much down woody material would occur. This cut material would be handled in one of three ways:

1. Pieces not removed to the road would be used to form 2 – 3 artificial LWD logs/ acre. (see below for sizes)
2. Some pieces to be cut that are between 4” and 7” in diameter would be removed to the road.
3. Any surplus material beyond #1 & #2 would be piled and burned.

The amount of woody material removed to the road would depend on the amount present that could be cut. First priority for utilizing material would be in construction of artificial LWD logs.

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### **2.2.1 Project Design Features – Action Alternative**

Project design features (PDFs) are specific measures included in the design of the proposed action to minimize negative impacts on the human environment. Project design features for projects in the Medford District are specified for in the Resource Management Plan and may not all be repeated here. These include Best Management Practices (BMP) as described in Appendix D of the RMP (pg 151).

If changes to the PDFs are needed during project implementation, they would be cleared through the ID team and the Field Manager, and such changes would be analyzed as appropriate under the National Environmental Policy Act (NEPA).

#### Wildlife

- Some (no more than 1 tree every 5 acres) of the larger (between 12 and 36 inches dbh) trees in and adjacent to units proposed for density management would be blasted, girdled or inoculated with a heart-rot fungus.
  - Blasting tops. Some large trees would have their tops blasted with explosives. In some cases, the objective would be to kill the tree and produce a snag immediately. To achieve this, the tree would be blasted at as high a point as possible, but below all the live branches. A professional climber would be hired to climb a candidate tree and place a blasting device. The top of the tree above the explosive would fall to the ground and be left as large woody debris if it posed no safety hazard.
  - In other cases, the blast would be placed above the first whorl of large, live branches. In most cases, this would not kill the tree, but would cause a deformity in the bole, and one of the lateral branches would turn upright and then hold the terminal, growing bud of the tree. In rare cases, the wound from the blast would allow the introduction of pathogens that then would cause the delayed death of the tree and the creation of a snag.
  - Girdling trees. Some of the larger trees would have their boles double girdled near ground level. This would slowly kill the tree (in perhaps up to 3 years), and allow the complex structure of the fine branching to remain for several years.
  - Inoculating trees. Some of the trees would be inoculated with a heart rot fungus as high up as practical, but at a diameter of at least 6 inches. If initially healthy, the tree might not die for many years.
- Snag associated wildlife and identified bat roosts would be protected by retaining the adjacent dominant trees and snags.
- Trees showing signs of woodpecker foraging, an obvious bird or mammal nest or other intensive use by wildlife (e.g., squirrel mid den [cone-feeding] site) would be retained.

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Required surveys for Survey and Manage species would be conducted according to established protocol standards.

Spotted Owls

- Spotted owl surveys have been conducted in the sale area. Additional surveys would be conducted prior to harvest to determine if owls have moved into the area, or known pairs have moved around within the area. It is likely that a new U.S. Fish and Wildlife Service (USFWS) Biological Opinion would be available by October 2003.
  - If an active spotted owl nest or activity center is located within or adjacent to a unit, operations would be delayed until October 1. This proximity is distinguished from the category of work “within 1/4 mile” described below, by being activity that could cause a spotted owl to flush (USDA Forest Service/USDI Bureau of Land Management and Fish and Wildlife Service 2001).
  - Falling, yarding, slashing, other power equipment use, and all other heavy equipment work or production of heavy smoke within 1/4 miles of any spotted owl nest location would be limited to after July 1, or until two weeks after the fledging period, to February 28 of the following year, unless the pair is shown to be non-nesting for that season. If an active pair is located within or immediately adjacent to a unit, this season would be October 1 to February 28. This date may be altered by the Authorized Officer if the Resource Area biologist ascertains to the Field Manager that young have sufficiently dispersed. This same restriction would apply to blasting within one mile of a nest and to aircraft flights, associated with logging, within 1/4 mile of the nest.

Large Down Wood

- No treatments for trees or logs > 7” diameter would occur.
- All non-hazardous snags would be retained in all thinning units. If it is necessary to fall snags for safety reasons, they would be left on the site to provide additional down wood.
- 2 to 3 Artificial large down logs would be constructed using small (2” – 7”) logs, 4” – 7” logs on potentially merchantable material, and tightly binding them to create large down woody cylinders 16 – 24” diameter and 20 – 40’ length.
- Hand piles would be stacked at least 10 feet from any large (>16 inch diameter) wood or snag, or smaller snag showing obvious use by wildlife.

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Plants

Management recommendations for the Survey and Manage species require the maintenance of late-successional forest structure, soil conditions, and microclimate around known sites, and, for some species, the prevention of snag and stump loss through prescribed fire (USDA-USDI 1996, Castellano and O'Dell 1997).

Populations of Special Status and/or Survey and Manage vascular plants, lichens, and bryophytes would be protected with a no-cut buffer of approximately 100 feet. Buffer width would be determined on a site by site basis in accordance with existing microsite conditions. For units with prescriptions calling for less than 40 percent canopy retention, buffers would be enlarged to up to 200 feet radius. In cases where an existing road bisects a buffer, the buffer would extend across the road to ensure adequate protection of the plant site. Timber harvest, thinning, yarding corridors or road construction would not occur within these buffers. The potential for prescribed fire activity would be analyzed on a site by site basis, and may be permissible with project design features which minimize the possibility of exposing the plant to unnatural levels of heat exposure.

For Bureau Special Status species, buffers would occur around Bureau Sensitive and Assessment species, but not Tracking Species. For Survey and Manage Species, management guidelines for high priority (when established) and known sites of Category A, B, C, D and E species would be followed.

Silviculture

General - all units: Basic treatment would be a density management treatment (thinning) from below to concentrate growth in the stems of desired trees. Rather than a treatment based on a predetermined spacing, the thinning of conifers would be based on crown diameters. There would be 3-6 feet between crowns of selected conifers. Trees with the larger live crown ratios (LCR) would have the greater (6 feet) distance between crowns. Trees with the smaller LCR would have narrow distances between crowns. Unless otherwise noted, there would be an upper diameter cutting limit of 7" dbh for conifers. Maximum distance between boles of trees 7" dbh and less would be 18 feet regardless of crown size. Minimum distance between boles of trees 7" dbh and less would be 6 feet. Where white fir and/or cedar are present in the understory, there would be 14' x 14' spacing. Where possible, approximately one 6-7" dbh conifer per acre would be girdled instead of falling it, for the creation of short-term snags. Tree form hardwoods would be retained as well as dogwoods, maples and elderberry. Activity fuels would either be removed from site or hand piled and burned. Some material would be left on the site to function as woody debris. Unlike prescriptions designed to increase or accelerate the growth of trees for harvest, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage would be retained in addition to trees that would be retained in a "traditional" thin. Unless otherwise specified, there would be a 25 foot no-treatment buffer on stream channels that show signs of annual scour.

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To increase within stand diversity, a minimum of ten percent of each stand would remain uncut and unthinned. Unthinned areas would generally consist of:

- Areas where trees present are greater than the 7" dbh upper diameter cut limit;
- No-treatment riparian areas;
- South facing talus slopes;
- Areas where the stand is currently a mix of well-spaced conifers and hardwoods; and
- Areas of limited access.

In some areas, there may be trees with desired older forest characteristics such as large limbs or limbs that extend to the ground, or there may be large remnant trees of species that are scarce in the stand such as ponderosa pine, sugar pine, or incense cedar. There may also be large hardwoods. These characteristics and/or trees would be retained within the stands. Small openings around these trees would be created so that these features would persist (see LSR assessment, tree culturing p.80). Openings around individual trees would be no larger than ten feet past the drip line. There may be some situations where retention of two or more of these trees that are in close proximity to each other would occur. Openings around groups of trees would allow old growth conditions in terms of large conifers per acre to be achieved. "Tree culturing" of up to one tree for every two acres would occur. Maximum size of any opening would be one fortieth of an acre.

Additional unit specific treatments

Units 22-1, 22-2: Many of the trees within this unit grouping have high height/diameter ratios and could possibly collapse if the stand were opened up too much during a thinning. While some broken top trees and blown over trees may be desirable from a wildlife standpoint, loss of a large part of the stand is not. To lessen the chance of stand loss happening, the unit would be divided into 4 strips of roughly equal widths. Strips would be perpendicular to the contour. Strips 2 and 4, as numbered south to north, would be crown spaced with a maximum 3 feet between crowns. Within strip 2, ten percent of the trees remaining after the spacing operation would be girdled. Girdling of additional trees would further release the residuals but would provide support for live trees within the strip. Within strip 4, twenty percent of the trees remaining after the spacing operation would be girdled. Spacing strips 1 and 3 as described in the General treatments section above would happen.

Unit 22-3, 23-1, 27-1: Two main stems of hardwoods would be retained. One hundred percent brushing would be done.

Unit 24-2 (possibly 24-3): This unit contains laminated root rot. One area of root rot has been identified. Additional areas or individual trees may exist. The objective of the treatment in this area would be to slow the spread of the disease. Retention of minor conifer species (those that are not Douglas-fir) would occur. Small openings (40' radius) around infected individual trees and small groups

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of trees would be created. Infected trees and adjacent uninfected trees would be removed by the treatment. Within infected areas that are larger than one-quarter acre, a heavy thinning would occur that would retain trees that show few if any signs of infection.

Unit 31-1, within the area east of road 32-4-6.1 to the creek and through the other side: Crown spacing of conifers seven inches and less in diameter as described above would be done. Conifers 7-10" dbh would be crown spaced so that there is 5-10 feet between crowns of selected trees. Girdling at a rate of two trees for every tree felled would be done for trees that are 7-10" dbh so as to provide both short-term snags and woody debris. These cut trees would remain on site. The maximum distance between boles of trees within this diameter range would be 25 feet regardless of crown widths. Where there are no trees with diameters 7-10" dbh, conifers seven inches and less in diameter would be spaced so that there would be 3-6 feet between crowns. Boles of cut conifers greater than 4" would be limbed. Brush would be slashed. There would be a no treatment area that extends from high water mark of the creek for twenty-five feet away from the creek. Cut conifers less than 4" in diameter, cut limbs and brush would be hand piled. Hand piles would later be burned.

Unit 35-3, 35-4: Two main stems of hardwoods would be retained. One hundred percent brushing would be done. The density management treatment would occur as described in the general treatment guidelines. There would be an upper diameter cut limit of 7" dbh.

Utilization of Woody Material:

Woody material would be utilized in two ways.

- Some merchantable wood (4" to 7" diameter) would be removed to roads.
- Some non-merchantable woody material (2" to 7" diameter) would be utilized as artificial LWD logs.

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Merchantable woody material may be removed to roads with the following methods:

- Traditional cable yarding with lateral yarding capabilities.
- Tractor winching with lateral hauling.
- Monocable. *This system relies on a slow moving continuous loop of cable. Logs are attached by hand to the cable and removed at the landing.*
- Log chutes. *This system is a series of interlocking half pipe pieces, placed at an angle to the slope. They lie on the ground and serve as a logging corridor. When connected, the pieces act as a 'chute'. Lateral yarding is done by hand placing the logs into the 'chute'. As a result of gravity and the weight of the logs, the logs slide down the 'chute' to the landing.*
- Any other method of removal by hand.

Methods of removal that would not be used:

- If it becomes apparent that one of the of the above methods would substantially damage leave trees, then those portions of the units affected would not have commodity removal.
- High lead yarding
- Tractor yarding from skid trails
- Helicopter Yarding
- Horse logging
- Pulling cable through blocks from existing roads with vehicles

PDF's for all Permitted methods of removal:

- Directional falling away from streams and wet areas would be required within one tree length of areas with traditional cable yarding
- All pieces to be removed would be 4' to 7" in diameter
- Logs for removal would be no longer than 16'
- Branches would be bucked prior to removal
- All machinery for removal would operate from existing roads only.
- All systems would provide for one end suspension of logs.
- All landings would be designated.
- Yarding across riparian areas would not be allowed.
- Landings would not occur within 100' from riparian vegetation.

PDF's specific for Traditional Cable Yarding:

- Cable yarding would not be allowed between March 1 and June 1 to prevent bark slippage on residual trees.
- The number of cable yarding corridors would be minimized to reduce soil compaction. Corridors would be located at least 50 feet apart at the tail end; lateral yarding would be required in all units.

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PDF's specific for Tractor Winching:

- Yarding tractors would be permitted on rocked roads only.
- Yarding tractors would not be allowed between March 1 and June 1 to prevent bark slippage on residual trees.

PDF's specific for Monocable Yarding and 'Chutes'

- Yarding would be allowed year round

See Table 2-1 below for summary of outputs.

Other Treatment of Surplus Activity Fuels

Any woody material not removed to roads or formed into LWD logs and still considered a hazard would be piled and burned. (See Table 2-1 for Summary of treatments.)

This slash material would be piled away from residual trees, covered in plastic sheeting and later burned to reduce fuel loading.

Pile burning would be designed to:

- Reduce fuel loading of light fuels
- Minimize conflicts with smoke management
- Minimize the risk of fire spreading beyond piles
- Avoid adverse impacts to nesting and hibernating wildlife species
- Minimize consumption of soil organic matter and surface duff
- Minimize the loss of large down wood

Slashed material not formed into piles would be scattered away from residual trees.

**Table 2- 1. Summary of Utilized Activity Fuels, by Alternative.**

Action Alternative					
UNIT T.31S., R.04W.	Acres	Surplus Fuels Treatments	Woody Material Outputs		
			Est.## Cords	Est. ## New LWD Logs	Est.## Live TPA Left
22-1	10	HP	3 / acre	2 / acre	170
22-2	11	HP	3 / acre	2 / acre	170
22-3	5	HP.	3 / acre	2 / acre	170
23-1	13	HP.	3 / acre	2 / acre	170
23-2	5	HP	3 / acre	2 / acre	170
23-3	2	HP	3 / acre	2 / acre	170
23-4	2	HP	3 / acre	2 / acre	170

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Action Alternative					
UNIT T.31S., R.04W.	Acres	Surplus Fuels Treatments	Woody Material Outputs		
			Est.## Cords	Est. ## New LWD Logs	Est.## Live TPA Left
23-5	28	HP	3 / acre	2 / acre	170
23-6	20	HP	3 / acre	2 / acre	170
24-1	7	HP	3 / acre	2 / acre	170
24-2	33	HP	3 / acre	2 / acre	170
24-3	44	HP	3 / acre	2 / acre	170
24-4	1	HP	3 / acre	2 / acre	170
25-1	5	HP	3 / acre	2 / acre	170
27-1	41	HP	3 / acre	2 / acre	170
30-1	5	HP	3 / acre	2 / acre	170
31-1	190	HP	3 / acre	2 / acre	170
35-1	45	HP	3 / acre	2 / acre	170
35-3	41	HP	3 / acre	2 / acre	170
<b>TOTALS</b>	<b>503</b>		<b>1500</b>	<b>1000</b>	

Legend for Table 2-1

Surplus Fuels:

HP – Hand Pile & Burn

Wood Outputs:

Cords - Firewood;

LWD – Artificial Large Woody Debris;

TPA – Trees per Acre

mbf – thousand board feet

Roads / Landings

- Landings would not be constructed in riparian reserves.
- If needed, landings would be re-contoured, mulched and seeded following use. Seed used would be that of native species and would be weed-free.
- Use of heavy equipment would not be allowed on the existing, overgrown road template of BLM Road 32-4-6.1. This road is on BLM administered lands, but may also apply to other re-vegetated roadways.
- All terrain vehicles and trailers may be used on Road 32-4-6.1. Approximately 300' of BLM Rd. 32-4-6.1 has ruts would have to be filled in order for all terrain vehicles and trailers with small logs to travel on it. Subsurface scarification of the road surface, seeding, and Hand water bars may be required upon completion of proposed activities. A log and dirt barricade would be installed at the entrance of BLM Rd. 32-4-6.1 to prevent any vehicle use after completion of proposed activities.

Cultural Resources

- Known archaeological sites would be flagged with a protection buffer area.

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- No landing would be constructed where known archaeological sites exist.
- Fuels treatment areas would receive protection measures that consist of a flagged buffer area where all hand piles would not be permitted inside the buffered area.
- All hand piles would be pulled back to an area 10-25 ft outside of the flagged buffer area.
- Protection of all archaeological sites would occur if they are discovered during project implementation as needed to avoid disturbance.
- Buffer areas would be made to accommodate known or newly found archaeological sites as needed to avoid disturbance to the site.

Riparian

- The Riparian Zone of West Fork of Russell Creek in unit 31-1 would receive a 25 foot no treatment buffer.
- Riparian Zones in units 23-1, 27-1, 23-5, 23-6, 24-1, 25-1, 24-2, 24-3, and 35-4 would receive a 25 foot no treatment buffer. This 25-foot buffer would be the distance from the stream bank.
- Material cut within 1 tree length of streams would be piled and burned except for some of the largest boles severed, (10 to 20 boles per 100 feet of stream length) to provide for down woody material in the short term.
- Existing road access to unit 35-1 would be barricaded after treatment.

Air Resources

- Prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. Prescribed burning would occur within the limits of a burn plan which would describe prescription parameters.
- Hand pile burning would also be planned during the winter and spring months to reduce damage to the site from high intensity burning and to facilitate control of the units being burned.
- Hand pile burning would be designed to produce little enough smoke so as not to cause intrusions into any smoke sensitive area.

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## **Chapter 3 - Affected Environment**

### **3.0 Introduction**

The South Umpqua/Galesville Late Successional Reserve (LSR), LSR # RO 223, has 103,327 acres in all ownerships within its boundaries.

It crosses three federal land management jurisdictions.

Glendale Resource Area, Medford District, BLM	32,454 acres
South River Resource Area, Roseburg District, BLM	21,369 acres
Tiller Ranger District, Umpqua National Forest, US Forest Service	12,270 acres
Non Federal lands	37,234 acres

### **3.1 Location**

The location of the Proposed Action is:

Analytical Watershed (fifth field):	Cow Creek
Project Area (sixth field watersheds):	Upper Cow Creek & Middle Cow Creek
County:	Douglas
Project Area:	T31S, R4W, Sections: 22, 23, 24, 25, 26, 35 (Upper Cow) 30, 31 (Middle Cow)

### **3.2 Late Successional Habitat**

The project area was chosen in Late Successional Reserve timber stands where habitat improvement was needed. The Assessment documented existing conditions within the LSR, analyzed important ecological functions, relationships, inventory and monitoring needs, as of 1999. Potential management actions were identified to meet the objective of maintaining and promoting a functional and interacting late-successional and old-growth forest ecosystem.

Many stands proposed for treatment are not developed or old enough to be considered late successional habitat. The area has been extensively altered by timber harvest, including clear cuts and partial cuts. Timber, on the majority of private lands in the watershed, has been harvested. Recent logging on private lands has created new clear cuts near the project area. Fragmentation across this landscape is high. Proposed treatment areas have high stocking with tree species. Proposed treatment

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areas are primarily composed of two stand types younger than 80 years: Western Hemlock Cool DF/Hemlock; DF/Chinkapin Tanoak.

The natural range of Port-Orford-cedar does not extend into the proposed treatment area.

### **3.3 Proposed Treatment Area Vegetation History and Description**

Stands proposed for treatment are similar in their features. They have been grouped by location.

McGinnis Creek (unit's # 22-1, 22-2, and 23-3): These units are young stands that developed after timber harvests in 1960, 1973, and 1978 and follow-up planting. Pre-commercial thinning to an approximate 12 ft x 12 ft spacing occurred in 1981, 1986, and 1996. These units are predominantly single-storied, small pole size Douglas-fir dominated stands. Stem diameters generally range from 6-12" dbh. Hardwoods are limited. The principal hardwood species, madrone and chinquapin, are declining as the canopy closes and they are shaded out. Overall canopy closure is in the seventy to ninety percent range. There is little differentiation within the stand. Understories are generally open with salal being the primary species. Live crown ratios (LCR) are 15-40%. Many of the trees have LCR in the 15-35% range. Recent coarse woody debris (CWD) is of smaller diameters. Larger pieces of CWD are present but exist in limited amounts and are generally in decay classes 3, 4, and 5.

McGinnis Creek (unit's # 22-3, 23-1, and 27-1): These units developed after timber harvest in 1964 and follow-up planting. Pre-commercial thinning (12 ft x 12 ft spacing) occurred in 1977 followed by aerial fertilization 1978. This is a mixed grouping. Below the road is a predominantly single-storied stand of Douglas-fir. Stem diameters are generally 6-12" dbh. The understory is relatively open with areas of rhododendron and salal. Limited amounts of madrone, chinquapin, and evergreen huckleberry are present. The hardwoods are declining. Above the road stem diameters are smaller, ponderosa pine is present, and there is more brush. Some manzanita exists within the stand.

McGinnis Creek (unit's # 23-6, 24-1, and 25-1): These units developed after timber harvest in 1966 and follow-up planting. Other follow-up treatments have not been done. The stand is a mix of pine and Douglas-fir poles 4-8" dbh and brush. The pine is being out-competed by the Douglas-fir and is falling out of the stand. Some differentiation is occurring. Madrone and bigleaf maple are present.

Shively Creek (unit's # 23-2, 23-4, 23-5, 24-2, and 24-3): This grouping of units is older and more variable than the previous McGinnis Creek unit groupings. There is not a great degree of differentiation within these stands. Unit 23-2 is the oldest of these units. It has an estimated birth date of 1950. It is a single-storied stand of Douglas-fir. Diameters generally range from 6-20" dbh. LCR are low. They generally range from 10-30% with a few of the dominant trees being 40% or more.

Unit 23-4 consists of the right-of-way that was cut when road 31-4-14 was built. Douglas-fir is the

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primary species here.

Units 23-5, 24-2, and 24-3 developed after timber harvests in 1961 and 1962 and follow-up plantings. Unit 24-3 was pre-commercially in 1981. Units 23-5 and 24-2 were pre-commercially thinned in 1984. All three units were aerial fertilized. These units are for the most part single-storied Douglas-fir poles. Diameters generally range from 6-14" dbh. Although these units were thinned to an approximate 12 ft x 12 ft spacing, there is considerable variability in tree size within this grouping. Live crown ratios are variable as well dependent upon spacing and tree size. There is a small area of laminated root rot along the eastern edge of 24-2. Understory vegetation consists primarily of salal and rhododendron.

Russell Creek (unit's # 30-1, 31-1): Unit 30-1 is a stand that developed after timber harvest in 1959 followed by natural seeding. The stand is mixed. There are areas of widely spaced, pole-size Douglas-fir mixed with limited manzanita brush and grass. There are also areas of more closely spaced Douglas-fir with little understory.

Unit 31-1 is a stand that developed timber harvest in 1957 and follow-up planting within portions of the unit. The stand is a mixed stand. It contains scattered large, remnant older Douglas-fir as well as groups of large, remnant conifers. There are areas of thick post and pole-size conifers primarily Douglas-fir. Areas of closely-spaced, small diameter (1-3" dbh) Douglas-fir are present. White fir and incense cedar are also present. Madrone, chinquapin, and canyon live oak are present within the stand.

Sugar Creek (unit's # 35-1, 35-3, and 35-4): Unit 35-1 is a stand that developed after timber harvest in 1960 and follow-up planting. It is a stand of small diameter Douglas-fir generally 4-8" dbh mixed with hardwoods and brush.

Unit 35-3 and 35-4 are units that are old partial cut units. The current stand is mixed. The overstory consists of mature and older Douglas-fir with a limited amount of ponderosa pine. Diameters range from 20-44" dbh. Some of this overstory is declining. There are thin crowns as well as spike top trees. There is a limited amount of unentered pole and post size Douglas-fir. The understory consists of areas of ocean spray brush mixed with Douglas-fir regeneration 1-3" dbh. There are areas of advanced Douglas-fir that are 1-8" dbh. Incense cedar as well as chinquapin and canyon live oak is present. Rhododendron is present below the road.

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### **3.4 Proposed Treatment Area Quality**

Stands proposed for treatment can be grouped into two types. Units #22-1, 22-2, 23-3; 22-3, 23-1, and 27-1; 23-2, 23-4, 23-5, 24-2, 24-3; and to a lesser extent 23-6, 24-1, 25-1, and 35-1 are predominantly single-storied. With limited areas of exceptions, stand structure is not complex. There is not a diversity of habitats. While the stands do provide some habitat for wildlife (including some species associated with late-successional conditions), habitat quality for late successional (LS) species is less than desired. Stands are young (less than eighty years) and because the sites are relatively productive there is the potential with active management to develop LS habitat in a shorter time period than would occur naturally. From a growth standpoint, stands are overstocked. Growth is slowing. Some self-thinning is occurring to a limited degree throughout the stands. However, there is not a great degree of stem differentiation in most of the units. Gap formation and the creation of multiple canopy layers are not occurring. Hardwoods are also being suppressed and if they haven't died out of the stands would soon do so. Height-Diameter ratios are high. Trees within the stands are becoming unstable and more prone to blowdown.

Units #30-1, 31-1, 35-3, and 35-4 are much less uniform. There exists some variability within them. They contain older remnant trees as well as a greater amount of structural diversity. There are areas of dense conifers that would respond to release. Treatments would accelerate the development of late-successional conditions. Hardwoods and conifer treatments would also allow lower limbs to develop and/or to be retained longer.

### **3.5 Special Status Species and Survey and Manage Species**

Animal:

Except for red tree voles there is no habitat for Survey and Manage animal species within the area affected by the project:

The Oregon shoulderband snail (*Helminthoglypta hertlieni*) occurs in rocky areas, including talus deposits and outcrops. The Oregon Megomphix (*Megomphix hemphilli*) occurs in mature or late-seral forests. Neither of these habitat types is found in or is affected by this project's units.

The red tree vole does occur in the project area. However, surveying and protecting them in such stands in the central portion of their range (in which Douglas County is included) is not considered necessary for the persistence of the species ("Survey and Manage Species Summary of Recommendations Regarding Category Placement and Range Changes from the FY01 Annual Species Review.")

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There are no known locations of aquatic Survey and Manage mollusks in the Middle Cow Creek fifth-field watershed.

**Plants:**

Vascular plant surveys have been completed. Nonvascular surveys would be completed in fall of 2003. All plant surveys would be completed before a Decision Record is signed.

The planning area is outside the range and habitat of *Fritillaria gentneri*, *Limnanthes floccosa* var. *grandiflora*, and *Lomatium cookii*, the three Threatened and Endangered Species (T&E) which occur on the Medford District.

### **3.6 Soils**

Two soil complexes were identified in the proposed project areas from the Douglas County Soil survey:

- Kanid/Atring (near ridge tops with soil depths of up to 20 inches) and
- Acker/Norling (generally on slopes less than 60% and on the lower 2/3 of slope, depths up to 60 inches).

Both complexes are derived from colluvium and residuum of metamorphic rocks. The soils are relatively productive and not considered a problem for revegetation. The water availability of the soils is adequate for forest production with the area receiving 40 to 60 inches of annual precipitation. Soils and productivity were confirmed by on-the-ground inspection by interdisciplinary teams during selection of the units.

### **3.7 Riparian Zones**

Riparian zones within units are currently stable and well shaded with regeneration of both hardwoods and conifer.

### **3.8 Fisheries**

West Fork of Russell Creek begins in Unit 31-1. McGinnis Creek begins adjacent to units in Sections 23, 24 and 27 and passes within 100 feet of Unit 27-1. These creeks are known to contain fish (cutthroat) ( see LSR #RO223). The streams are currently well shaded and stable. Red Alder and some Big Leaf Maple as well as conifer species currently provide shade for these streams.

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### **3.9 Air Quality**

Air quality and visibility monitoring sites do not exist in the immediate vicinity where treatments would occur, air quality information is available. Generally speaking, air quality is good since there are no stationary sources of particulate matter production and the planning area is remotely located.

There are no designated air quality areas (defined by the Oregon Department of Environmental Quality) that would be affected by management activities within the planning area. There are no smoke sensitive receptors adjacent to the planning area. Times of high public use adjacent to the planning area occur primarily in late spring through early fall. Smoke intrusions may occur (but not likely) as far north as the Umpqua River drainage. In this case, the towns of Canyonville and Riddle may have the potential of being impacted. The prevailing winds between late spring and fall are up canyon and uphill (west to southwest).

### **3.10 Cultural Resources**

In 1966 Newman and Scheans, under contract with the National Park Service, conducted research in the Galesville Area near Cow Creek. One prehistoric archaeological site was identified along with a potential burial and historic barn. These sites are located on private property. In 1976 Hopkins surveyed the area and discovered one highly disturbed site and a historic cabin (also located on private property). In addition, archaeological surveys were conducted in 1983 by CH2M Hill Company as a result of proposed dam construction, reservoir impoundment, road improvements and development of recreation areas. A portion of the archaeological record in the Galesville area was derived during this time primarily using survey, site testing, and oral interview. These investigations were conducted in the areas of three proposed dam sites on Cow Creek. These areas include, the Galesville Area, Gold Mountain and the Honeysuckle area.

The BLM conducted limited survey work in the vicinity of Gold Mountain and Honeysuckle project areas. Several historic and prehistoric sites have been recorded in the region but are located in adjacent areas from the site of this particular project. These sites include small lithic scatters and one homestead cabin site.

The range of cultural resource site types that could occur in the project area include, seasonal prehistoric camp sites, task specific camps or prehistoric isolates. These site types could attest to the occupation of Native peoples in this area. Likewise, the range of historic site types that could occur in this area include, homestead areas, structures or cabins relating to early occupation by Euro-Americans.

In prehistoric times several Native American groups inhabited the upper portion of the Cow Creek area. The lowland Takelma inhabited the upper portion of Cow Creek, which is a tributary of the South

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Umpqua River. The Cow Creek Band of the Umpqua occupied the project area during the settlement period. The pre-European lifeway of the Takelma as well as the Cow Creek Band of the Umpqua was dramatically disrupted in the early 1850's. The discovery of gold and the presence of good agricultural land and timberland brought an influx of Euro-Americans into the Watershed around 1870. Euro-American settlement in the upper Cow Creek region began in the 1870's with land transfer from the federal government to private investors.

History of the project area is limited. The history of settlement and resource exploitation in this area is the history of daily life. In the Galesville project area, settlement was tied to agricultural pursuits beginning in the late 1800's. Mining and timber extraction dominate the early history in this area.

In modern times descendants with ties to the area include, the Confederated Tribes of Siletz , Confederated Tribes of Grand Ronde and the Cow Creek Band of the Umpqua.

Current uses of this land area include timber harvest, agricultural and recreation. A mixed ownership pattern exists in this area. This includes private timber companies, the federal government and private landowners.

### **3.11 Invasive Species**

Invasive Species known to be in the area include bull thistle (*Cersium vulgare*), scotch broom (*Cytisus scoparius*) and meadow knapweed (*Centaurea pratensis*). They occur in very small amounts at this time along Cow Creek County Road and along the edges of BLM roads in the project area.

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## Chapter 4 – Environmental Consequences

### 4.0 Introduction

This chapter forms the scientific and analytic basis for comparison of alternatives. Discussions include environmental impacts anticipated from implementation of the alternatives, both positive and negative. It also identifies and analyzes mitigation measures, if any, which may be taken, to avoid or reduce projected impacts.

**Table 4- 1. Critical Elements by Alternative** The following elements of the human environment are subject to requirements specified in statute, regulation, or executive order and must be considered in all EA's.

Critical Element	Alternatives Affected (Y or N)*		Critical Element	Alternatives Affected (Y or N)*	
	No Action	Action		No Action	Action
Air Quality	N	Y	Invasive Species	N	Y
ACEC	N	N	Threatened & Endangered Species	N	Y
Cultural	Y	Y	Native American Concerns	N	N
Environmental Justice	N	N	Water Quality	N	Y
Energy	N	N	Wetlands, Riparian Zones	N	Y
Farmlands, Prime/Unique	N	N	Wild & Scenic Rivers	N	N
Floodplains	N	N	Wilderness	N	N
Hazardous Wastes	N	N	Survey and Manage**	Y	Y
LSR Quality**	Y	Y			

\* Y=yes; N=no    \*\* non-critical element

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#### **4.1 Air Quality**

##### **Alternative 1 (No Action Alternative):**

No impacts would be anticipated.

##### **Alternative 2 (Action Alternative):**

The planning area is approximately 30 miles from the Grants Pass non-attainment area and over 40 miles from the Medford/Ashland non-attainment area. Due to the distance involved, it is expected that prescribed fire operations would have little to no effect on these non-attainment areas.

Pile burning would occur in the winter and would not produce enough smoke to cause intrusions into any smoke sensitive area.

Pile burning emissions would not adversely effect annual PM10 attainment within the Grants Pass and Medford/Ashland non-attainment areas. Any smoke intrusions into these areas from prescribed burning would be light and of short duration.

#### **4.2 Cultural Resources**

##### **Alternative 1 (No Action Alternative):**

No impacts would be anticipated.

##### **Alternative 2 (Action Alternative):**

The portion of this project that involves the removal of small diameter timber is exempted from survey by the, "Protocol for Managing Cultural Resources on Lands Administered by the BLM of Oregon."

The portion of this project that involves fuel reduction in the form of burning slash piles has the potential to affect archaeological sites through direct impact by soil disturbance. This can happen with controlled (prescribed) fire or with wildland fire. In both cases there is a potential for increased ground visibility which can lead to a direct increase in unauthorized artifact collection. Both types of fire have the ability to destroy sites when wooden structures are involved. However, such impacts may be mitigated in case of prescribed fire, by designing projects to avoid archaeological sites. Furthermore, both types of fires have the ability to destroy archaeological sites by fire hand line construction involved with suppression efforts.

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**Alternative 1 (No Action Alternative):**

The current level of cultural resource protection would be maintained.

**Alternative 2 (Action Alternative):**

A slight risk to archaeological/historical sites exist due to ground displacement that would occur as a result of hand pile/burn activities proposed under this alternative, but would be mitigated through the use of project design features.

**4.3 Late-Successional Reserve Quality**

**Alternative 1 (No Action Alternative):**

**Short Term**

- Stands' species diversity likely would decrease as conifers grew and shaded out hardwood and low brushy species.
- Components of late successional habitat such as multiple canopy layers, large limbs and relatively great species diversity (both of flora and fauna) may not develop. The current lack of complexity would continue.
- There would continue to be a high risk of wildfire in highly stocked stands.

**Long Term**

- High stocking levels would likely be reduced only through natural mortality over a period of many decades.
- Occurrence of natural openings up to ½ acre, while rare at present, would likely increase at a natural, slow pace.
- Despite mortality, very little new large down woody material be created.
- Crown ratios of trees, currently dwindling, would lessen further.
- Complex components of late successional habitat such as multiple canopy layers, large limbs and relatively great species diversity (both of flora and fauna) may not develop.
- A more simplified and less than optimal late successional stand with even-aged, large diameter trees with relatively little branching in lower levels may develop.
- Attainment of the larger diameters would be delayed.
- Creation of snags and down wood would be much delayed and not nearly as abundant as with the action alternative.
- Greater amounts of small woody debris (less than 8" diameter woody material) would develop within a few decades.

**Alternative 2 (Action Alternative):**

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**Short Term:**

- Temporary artificial structures for LWD would improve wildlife habitat quality.
- Stands would exhibit more openings and have improved potential for increased diversity of plants which would attract a wider variety of prey for late seral dependent predators.
- With removal of activity fuels, a reduction of fire hazard and risk of disastrous wildfire would occur.

**Long Term:**

- Improved LSR quality would be promoted through well spaced residual trees.
- Large tree development would be enhanced leading to increased amounts of future large down woody material.
- Crown ratios of many trees would increase with some development of large “wolf trees” (large and wide spreading over-mature trees with low live branches).

#### **4.4 Invasive Species**

**Alternative 1 (No Action Alternative):**

No impacts would be anticipated.

**Alternative 2 (Action Alternative):**

Ground disturbance and pile burning, associated with the cutting and removal of small logs and the creation of openings, may allow noxious and invasive species to spread and to become established in the Project Area under the Action Alternatives. The amount of disturbance would be small and have little or no effects towards LSR quality.

#### **4.5 Wildlife Species including Threatened & Endangered and Survey & Manage Species**

**Alternative 1 (No Action Alternative):**

Under the no action alternative the high stocking of tree species would remain. These areas would still remain dense, unless a wildfire came through this area and burned the existing vegetation. The ecological processes would continue the current trend and ultimately could be expected to lead to late successional vegetation. There would be no acceleration of seral stage development.

**Alternative 2 (Action Alternative):**

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- Blasting actively growing tops of trees may create favorable conditions for lichens which are more abundant on trees with deformed branches and crowns. Blasted tops are much more like lightning or wind-damaged trees. The blasted area of the tree would become more accessible to fungi that produce beneficial tree rot. The decaying tree would then provide habitat for cavity nesters and animals that roost or hibernate in hollow trees. Lichens, the branch deformities themselves and dead or heart-rot afflicted trees often serve as habitat for a large assemblage of insects, which benefits special status bats (e.g., silver-haired bats), most woodpecker species (e.g., pileated), other insectivorous birds (e.g., Western bluebird, Western slope flycatcher), and many other insectivorous vertebrates (e.g., Pacific tree frog and dusky shrew).
- Making bundles of smaller logs would provide for some period of time, some of the features of large down wood, a very important structural component of Late Successional forests. Large wood is used by many species of vertebrates and invertebrates for protection from the heat and desiccation of summer (e.g. long-toed salamander), the cold and wet conditions of winter (e.g. rubber boa), for physical protection from predators (e.g. deer mouse), for runways across difficult and energy-demanding terrain (e.g. Douglas squirrel), for nest sites (e.g. winter wren), feeding sites (e.g. ruby-crowned kinglet), as food for wood-eating invertebrates (termites and ants that make up a large percent of some woodpecker diets) and for visual cover from both humans and predators. Large down wood benefits many more species than are given in the examples above, and which are far too numerous to list.
- Girdling trees and inoculating them with a fungus would create snags, which benefit hibernating mammals, animals that depend on open, hollow snags (e.g., swifts) and would also, of course, indirectly benefit the insectivorous birds (e.g., brown creeper). Creating snags and trees with heart rot would serve a great number of species that depend on cavities for nesting and roosting. Insectivorous birds and mammals also use these structures as feeding sites, both for the insects that live in the dead wood, between the wood and the bark and on the surface and crevices of sloughing bark. During extremely cold or stormy weather the numbers of species of animals that use such shelters increases.
- Snags with fine branching preserved, such as those which had been girdled or inoculated with fungi, serve as perches for birds that forage on the wing (e.g., olive-sided flycatcher), forage on invertebrates that live on small branches (e.g., black-capped chickadee) and on invertebrates that live in the lichen on such structures (e.g., ruby-crowned kinglet).

#### **4.6 Riparian Zones**

##### **Alternative 1 (No Action):**

No impacts would be anticipated.

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**Alternative 2 (Action Alternative):**

Some riparian areas are so densely vegetated that a release via thinning would help to accelerate the growth of trees left. Release of tight, very dense vegetation to within 25 feet from stream bank of riparian zones would result in increased growth of tree species and accelerate maturation of vegetation within the ACS riparian management zone. This would help provide for large wood components along the streams in a shorter period of time than if left unmanaged. No effects to water quality, quantity, or existing shade are anticipated as a result of the vegetation release. Very little ground disturbance is expected during yarding of small diameter boles. Compaction of the soils is anticipated to be slight due to the small size of the material. No loss in productivity is foreseen.

**4.7 Quality of Vegetative Resources including Survey and Manage Species**

Microclimate measurements show that interior conditions may not be found until 100 to over 790 feet from clearcuts or agricultural fields, depending on site conditions and weather, and the variable measured (Chen 1991, Rodrigues 1998). Some of the smaller microclimate differences appear to be irrelevant to biological systems, as edge effects on biological variables, such as plant regeneration and species composition, generally average around 200 to 250 feet, with a range of 50 to 450 feet, adjacent to cleared areas (Chen 1991, Rodrigues 1998, Jules 1997).

Although burning may extirpate individual plants, burning can occur within certain populations of plants such as *Camassia howellii* and *Silene hookeri* var. *bolanderi*, which are typically associated with open areas. Underburning should preferably take place in the fall, and no later than March 1 in early spring.

*Survey and Manage Species*

Buffers would provide protection to plant populations which could be impacted by timber harvest, pile burning and ground disturbance, and would protect interior forest microclimate. No effects are anticipated to those Special Status, or Survey and Manage plants that require protection. Some populations of species that do not require

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protection (Tracking species, S&M Category F species) may be extirpated, although others would not, as they fall within areas protected for other resources.

**Alternative 1 (No Action Alternative):**

- Stands would progress toward Late Successional conditions, assuming a catastrophic fire does not enter the area.
- Snags and down wood production would be delayed and not as abundant.
- Populations of guilds may be less robust and widespread through the project area.
- Greater amounts of small woody debris (less than 8" DBH) would be produced in a few decades (benefits primarily limited to invertebrates).

Under the No Action Alternative, no effects would occur to Special Status, Threatened or Endangered, or Survey and Manage vascular plants, lichens, or bryophytes.

However, a potential exists for long-term negative effects resulting from catastrophic fire if ground and ladder fuels in these areas are not lessened.

**Alternative 2 (Action Alternative):**

Buffers would be placed around Survey and Manage Category A, B, C, D, and E species, Threatened and Endangered, and Bureau Special status species (with the exception of Bureau Tracking species). Some Survey and Manage fungi could be extirpated, as surveys are no longer required. Buffers, however, would provide protection to known plant populations.

Underburning of species such as *Camassia howellii* and *Silene hookeri* var. *bolanderi* are permitted within the timeframes identified in chapter 2. These sites should be monitored after treatment has occurred. To protect young subterranean shoots, burning should not occur later than March 1. Conversely, fall burning should be done as late as possible, after the duff layers receive moisture from fall precipitation. This practice avoids killing the underground bulbs and caudices from which the new plants re-sprout. Although there might be a short term negative effect, circumstantial evidence suggests these species respond well to fire activity. Burning would also reduce brush and small tree cover, thereby reducing shading and competition. By combining these two factors, the long term effect is expected to be positive.

BLM Manual 6840 requires that actions on BLM lands do not contribute to the need to list Special

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Status species under the Endangered Species Act. Some sites of the newly listed Special Status species might be affected from the action Alternatives, but any possible losses should be minimal and would not contribute to listing under the ESA. For the Special Status species that are Bureau Tracking, surveys and mitigation measures are discretionary (BLM Manual 6840).

**Table 4- 2. Vegetation Effects for woody species – Short-term**

Proposed Treatment Areas	No Action Alternative		Alternative One	
	Units: 22-1, 22-2, 23-3, 22-3, 23-1, 27-1, 23-6, 24-1, 25-1, 23-2, 23-4, 23-5, 24-2, 24-3, 35-1	Units: 30-1, 31-1, 35-3, 35-4	Units: 22-1, 22-2, 23-3, 22-3, 23-1, 27-1, 23-6, 24-1, 25-1, 23-2, 23-4, 23-5, 24-2, 24-3, 35-1	Units: 30-1, 31-1, 35-3, 35-4
<b>Tree Characteristics (of dominants and codominants)</b>				
Vigor	Continued decrease	No change to slight decrease	Increase	Increase
Growth Rate	Continued decrease	No change to slight decrease	Increase	Increase
Live Crown Ratio	Continued decrease	No change to slight decrease	No change	No change
Branching	Continued loss of lower limbs	Continued loss of lower limbs	Retention of lower limbs on retained trees	Retention of lower limbs on retained trees
Ability to Respond to Release Treatments	Continued decrease	No change to slight decrease	Increase, however due to low Live Crown Ratios (LCR), some retained trees probably won't respond much in the short-term, if they do	No change
<b>Stand Characteristics</b>				
Stability	Continued gradual decrease	No change	Potential rapid decrease in parts of these units where height /diameter ratios are currently high; probable loss of some retained trees or groups of trees	No change
Coarse woody debris	Increase –small pieces	Increase –small pieces	Increase-small pieces	Increase – small snags

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	No Action Alternative		Alternative One	
Snags	Increase – small snags	Increase-small snags	Increase –small snags	Increase- small snags
<b>Stand Characteristics</b>				
Plant Species Diversity				
Conifers	No change to slight decrease	No change	No change	No change
Hardwoods	Continued decrease	No change to slight decrease	No change	No change
Shrubs/Brush/forbs	Continued decrease	No change to slight decrease	No change	No change
Development of late successional stand characteristics	Continued decrease	No change	None to slight increase	None to slight increase
Canopy Gaps	No change	No change	Slight increase. Potentially large increase if parts of stand collapse	Slight increase
Multiple Canopy Layers	Continued decrease	No change to slight decrease	Slight increase. Potentially large increase if parts of stand collapse	No change. Retention of existing layers.
Differentiation	Little to no additional	Little to no additional	Little to no additional	No change

**Table 4- 3. Vegetation Effects for woody species – Long-term**

	No Action Alternative		Alternative One*	
	Units: 22-1, 22-2, 23-3, 22-3, 23-1, 27-1, 23-6, 24-1, 25-1, 23-2, 23-4, 23-5, 24-2, 24-3, 35-1	Units: 30-1, 31-1, 35-3, 35-4	Units: 22-1, 22-2, 23-3, 22-3, 23-1, 27-1, 23-6, 24-1, 25-1, 23- 2, 23-4, 23-5, 24-2, 24-3, 35-1	Units: 30-1, 31-1, 35-3, 35-4
<b>Tree Characteristics (of dominants and codominants)</b>				
Vigor	Continued decrease. Some individual trees would increase as mortality around them occurs	No change to slight decrease. Some individual trees would increase as mortality around them occurs	Increase	Increase

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	No Action Alternative		Alternative One*	
Growth Rate	Decrease. Some individual trees would increase as mortality around them occurs	Decrease. Some individual trees would increase as mortality around them occurs	Increase	Increase
Live Crown Ratio	Continued decrease	None to slight decrease	Increase	Increase
Branching	Continued loss of lower limbs	Continued loss of lower limbs	Retention of lower limbs	Retention of lower limbs
Ability to Respond to Release Treatments	Potentially lost for the majority of the trees	Decrease	Increase	Increase
<b>Stand Characteristics</b>				
Stability	Continued decrease, possible stand collapse (or parts) in future	No change	Increase	Increase
Coarse woody debris	Increase – smaller pieces	Increase - smaller	Increase – larger pieces	Increase – larger pieces
Snags	Increase – smaller snags	Increase – smaller snags	Increase – larger snags	Increase – larger snags
<b>Species Diversity</b>				
Conifers	Principal species remains Douglas-fir. Minor species shift from pine to white fir and incense cedar. Larger amounts of hemlock on north aspects	Principal species remains Douglas-fir. Increase of white fir and incense cedar as it seeds in.	Principal species remains Douglas-fir. Increase of white fir, incense cedar, and hemlock (northern aspects) as it seeds in.	Principal species remains Douglas-fir. Increase of white fir and incense cedar as it seeds in.
Hardwoods	Decrease	Decrease	Retention	Retention
Shrubs/Brush/forbs	Decrease	Decrease	Slight decrease	Slight decrease
Development of late successional stand characteristics	Possibly never	Gradual	Increase overall. Parts of these stands may never develop certain characteristics such as large branches	Increase
Canopy Gaps	Gradual	Gradual	Increase	No change to slight decrease as existing layers age and grow

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	No Action Alternative		Alternative One*	
Multiple Canopy Layers	Decrease	Decrease	Slight increase	No change to slight decrease as existing layers age and grow
Differentiation	Gradual	No change	Increase	No change to slight decrease as existing layers age and grow

- Due to existing stand conditions (high height/diameter ratios in parts of the these units and the potential for tree/stand loss following a treatment that opens up the stand), alternative one does not propose to leave the resultant stand in a condition where additional treatments would not be needed to achieve late successional stand conditions in the future. Alternative one proposes to retain higher levels of canopy cover (greater numbers of residual trees) so that should parts of the stand collapse, a level of overstory sufficient enough to develop into late successional habitat would remain. It is anticipated that additional thinning/release treatments would be needed in the future to achieve/maintain late successional characteristics. Disturbance, either natural or artificial, may be needed to maintain features such as canopy gaps and multiple canopy layers.

#### 4.8 Cumulative Effects Summary

A number of past federal actions throughout the Middle Cow Creek and Upper Cow Creek fifth field watershed were identified:

**Table 4-4. Proposed and Past Timber Sales**

Timber Sale	Year	LSR	Watershed
Slim Jim *	-----	✓	Middle Cow and Upper Cow Creek
Cottonsnake *	2003		Middle Cow Creek
Papa Cow	2002		
Soukow	2001		
Bonnie & Slyde	On hold		
Wildcat Thin	On hold	✓	Middle Cow and Upper Cow Creek
McLawson	1996		Middle Cow Creek
High Five	1995		
Power Hungry	1990	✓	

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Reuben Overlook	1990		Upper Cow Creek
Fir Point	1988		
Fizzleout	1988	✓	
Langdon	1988		
Lost Fortune Branch	1988		
Quines Creek	1988	✓	
Snow Creek	~ 1988	✓	

\* Proposed project. The Cottonsnake Timber Sale is concurrently being analyzed in the Middle Cow Creek watershed on General Forest Management Area lands.

**No Action Alternative**

Untreated areas would continue current conditions and trend. The dense vegetation would not be treated and fuel loading would increase over time. The potential for a stand replacement fire within the watershed would continue to be high. The opportunity to reduce fire hazard would not occur under the No Action alternative. Enhancement of late seral stage development would also not occur. However, through natural ecological processes, some areas are expected to develop into late successional forest. The No Action alternative would not significantly impact the current seral stage development trend or the fire risk to the area.

**Proposed Action**

The proposal to reduce vegetation density would have a generally positive effect on the continuing trend towards late successional development. The resources that would be affected by the proposed action would be air-quality, cultural resources, late successional reserve quality, invasive species, threatened and endangered species, riparian zones, and survey and manage species.

The impacts to air-quality would result from burning piles during the winter. The effects would be transient and would have generally no effect on non attainment status of the area. The past activities of the area would not add to the transient smoke impacts and no cumulative effects would be expected. The future activities related to the Cottonsnake Timber Sale, Slim Jim (planned) and Wildcat (pending) would be similar to those described for this proposed action, and would not be expected to significantly effect the environment.

The effects to cultural resources are limited to a slight risk to sites due to ground displacement resulting from hand pile and burn activities. The slight risk would be mitigated through the use of the project design features and would not add incrementally to the risk to cultural resources in the region.

The threat of invasive species to the project area through the proposed action would be small.

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Compared to a regional trend of invasive species being able to take hold along roadsides, there would be a slight cumulative increase in this general trend.

Effects to wildlife species are focused primarily on habitat quality. Many of the past harvest areas are in early seral conditions at this time. The effects of timber harvest in this watershed are reflected in the seral stage distribution as identified in the Middle Cow Creek Watershed Analysis (USDI 1998, p.34) and the seral stages identified in late successional reserve through the South Umpqua River/Galesville LSR Assessment (USDI and USFS 1999, p.20). Speeding up late seral forest development through the thinning process expands the areas of use for late successional affiliated species. This improvement would be accomplished by releasing trees to enable faster growth of residual trees while maintaining diversity of the stands. The quality of habitat would also be improved through the addition of large woody debris and snags. The Late Successional Reserve would be moving towards the goal of promoting large blocks of late successional habitat (USDI and USFS 1999 pg 53). Competition for water, sunlight and space would be reduced in Riparian Management Zones through the removal of dense vegetation. Increase in the growth of tree species and accelerated maturation of vegetation would be promoted. The risk of fire would be reduced through the elimination of the dense fuels. As the trees mature, they would become more fire resistant with thicker bark. As trees expand in size, and the features of late successional forest become more apparent, the quality of habitat for late successional affiliated species would be enhanced. The benefits are positive to late successional affiliated species.

Overall, the effects from the proposed action would be those anticipated in the Medford Proposed Resource Management Plan Environmental Impact Statement (RMP EIS pgs 4-2 to 4-25) to which this environmental assessment is tiered. None of the impacts would be expected to be significant either singly or cumulatively.

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## **Chapter 5 - Persons and Agencies Consulted**

### **5.0 Persons and Agencies Consulted**

A legal notice would be placed in local newspapers to announce to the public that the Glendale Resource Area is requesting public comments on the proposed management action. In addition, notification of this proposal would be sent to the Oregon Department of Fish and Wildlife, the Oregon Dept. of Forestry, Douglas County Commissioners, several environmental groups, local timber companies, and landowners within a ¼ radius within the project area to request their comments. These announcements would be made following completion of this environmental assessment and before a decision is made. The Field Manager would consider all input before reaching a finding or making a decision concerning this proposal.

<u>List of Preparers</u>	<u>Title</u>	<u>Primary Responsibility</u>
David Eichamer	SFP Forester	Project Lead
Sherwood Tubman	Ecosystem Planner	NEPA
Mary Lou Schnoes	Wildlife Biologist	T&E and S&M species
Jim Brimble	Prescription Writer	Vegetation, Silvicultural Rx
Loren Wittenberg	Hydrologist	Water Quality, Riparian Zones/Soils
Brian Keating	Fuels Specialist	Fuels/ Prescribed Burning
Amy Sobiech	Archaeologist	Cultural Resources
Rachel Showalter	Botanist	T&E and S&M species
Sondra Nolan	Right-of-Way Specialist	Lands, Right-of-Ways

### **5.1 Mailing List of Adjacent Owners**

Seneca Jones Timber Company	Douglas County Management
Sharkey, David, Thomas & Michael	& Finance
Mendell, Tracy K & Teresal	Douglas County
Bull River Land Co	Head, Cecilia & Robert
Gage, Susan	Shepherd, Ernest Wouldiam
Quinn, Eric Robert & Laurie H	Brown, Debbie Kathleen
Sorenson, James L & Florence M	

The Proposed Action has been screened for compliance with the Endangered Species Act, The American Indian Religious Freedom Act, Historic Preservation Act, Bureau of Land Management policies related to the ecosystem objectives and concepts in the Medford District Resource Management Plan (RMP) and with the Aquatic Conservation Strategy of the Northwest Forest Plan.

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Furthermore, this action has been screened from a landscape perspective and there are no effects anticipated from this action that would foreclose future management options in relation to the watershed management objectives identified through the Ecosystem Analysis.

\_\_\_\_\_  
Ecosystem Planner  
Reviewed for format and consistency

Date

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**References**

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**Acronyms and Glossary**

Abbreviations:

ACS	Aquatic Conservation Strategy
BLM	Bureau of Land Management
BMP(s)	Best Management practices
CT	Commercial Thinning
DBH	Diameter at breast height
ESA	Endangered Species Act
LSR	Late Successional Reserve
MBF	Thousand Board Feet
NEPA	National Environmental Policy Act
PCT	Precommercial Thinning
Special Status	Endangered, Threatened and Sensitive
S&M	Survey and Manage

**Air Quality.** Refers to standards for various classes of land as designated by the Clean Air Act, P.L. 88-206, Jan. 1978.

**Best Management Practices (BMP).** Practices determined by the resource professional to be the most effective and practicable means of preventing or reducing the amount of water pollution generated by non-point sources; used to meet water quality goals (See Appendix D in RMP (USDI BLM 1995)).

**Diversity.** The relative distribution and abundance of different plant and animal communities and species within an area.

**Canopy.** The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand.

**Coarse Woody Debris.** Portion of trees that have fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.

**Commercial Thinning.** The removal of merchantable trees from most often an even-aged stand to encourage growth of the remaining trees.

**Compaction** (relative to this EIS). Refers to soil becoming consolidated by the effects of surface pressure often from heavy machinery or vehicle and pedestrian traffic.

**Cover.** Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.

**Cultural Resources.** The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs,

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etc.) having scientific, prehistoric or social values.

**Cumulative Effect.** The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can also result from individually minor, but collectively significant actions taking place over a period of time.

**Diameter at Breast Height (dbh).** The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

**Ecosystem.** The complete biological and abiotic system formed by the interaction of a group of organisms and their environment.

**Edge.** Where different plant communities meet, or where variations in successional stage or vegetation conditions within the plant community come together.

**Effects (or Impacts).** Environmental consequences as a result of a proposed action. Effects provide the scientific and analytical basis for comparison of alternatives. Effects might be either direct (caused by the action and occur at the same time and place) or indirect (occurring later in time or at a different location, but are reasonably foreseeable or cumulative results of the action).

Effects and impacts as used in this EA are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or healthy effects, whether direct, indirect, or cumulative. Effects might also include those resulting from actions that might have both beneficial and detrimental effects, even if on the balance it appears that the effects would be beneficial.

**Emissions.** Substances discharged into the air, such as from tractors and trucks..

**Endangered Species.** Any species defined through the Endangered Species Act of 1973 as amended, as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

**Environmental Assessment (EA).** A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of NEPA and is released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the project proposal.

**Erosion.** Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is more rapid than normal, natural, or geologic erosion, primarily resulting from the activities of people, animals, or natural catastrophes.

**Floodplain.** The lowland and relatively flat area adjoining inland and coastal waters, including, at a minimum, areas that are subject to a one percent or greater chance of flooding in any given year.

**Forage.** All browse and non-woody plants that are available to livestock or game animals and used for

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grazing or harvested for feeding.

**Forest Health.** The ability of forest ecosystems to remain productive, resilient, and stable over time and to withstand the effects of periodic natural or human caused stresses such as drought, insect attack, disease, climatic change, flood, resource management practices and resource demands.

**Forb.** Any herb other than grass.

**Fuels.** Combustible wildland vegetative materials present in the forest which potentially contribute to a significant fire hazard.

**Habitat Type.** (Vegetative). An aggregation of all land areas potentially capable of producing similar plant communities at climax.

**Hardwoods.** A conventional term for broadleaf trees and their wood products.

**Impacts.** A spatial or temporal change in the environment caused by human activity. See effects.

**Intermittent Stream.** Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

**Landscape.** A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout.

**Late Successional Forests.** Forest seral stages which include mature and old-growth age classes of trees.

**Long Term.** More than 100 years.

**Mitigation.** Mitigation includes (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (5) compensating for the impact by replacing or providing substitute resources or environments.

**Monitoring.** The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

**National Environmental Policy Act of 1969.** This law requires the preparation of environmental impact statements for every major Federal Action which causes a significant effect on the quality of the human environment.

**No-Action Alternative.** The No-Action alternative is required by regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1502.14). The No-Action alternative provides a baseline for estimating the effects of other alternatives. When a proposed activity is being evaluated, the No-Action alternative discusses conditions under which current management direction would continue unchanged.

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**Non-attainment.** Failure of a geographical area to attain or maintain compliance with ambient air quality standards.

**Old-growth.** A forest stand usually at least 180-220 years old with moderately high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground (coarse woody debris).

**Overstory.** That portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct layer (canopy).

**Perennial Streams.** Streams that flow continuously throughout the year.

**Pre-commercial Thinning.** The practice of removing some of the trees less than merchantable size from a stand so that remaining trees would grow faster.

**Prescribed Burning.** The intentional application of fire to wildland fuels in either their natural or altered state. Burning is conducted under such conditions as to allow the fire to be confined to a predetermined area and to produce an intensity of heat and rate of spread required to meet planned objectives (e.g., silvicultural, wildlife management, reduction of fuel hazard, etc.).

**Prescribed Fire.** A preplanned wildland fire burning under specified conditions to accomplish specific planned objectives. It could result from either a planned or unplanned ignition.

**Prescription.** Management practices selected and scheduled for application on a designated area to attain specific goals and objectives.

**Regeneration.** The renewal of a tree crop, whether by natural or artificial means. This term might also refer to the crop itself(seedlings, saplings).

**Resource Management Plan (RMP).** A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act. (See USDI, BLM 1995).

**Riparian Areas/Habitats.** Areas of land that are directly affected by water, usually having visible vegetation or physical characteristics reflecting the influence of water. Streambanks, lake edges, or marshes are typical riparian areas.

**Riparian Reserves.** Designated riparian areas found outside Late-Successional reserves.

**Riparian Zone/Habitat.** Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

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**Seral Stages.** The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. Generally there are five stages recognized: early-seral, mid-seral, late-seral, mature-seral, and old-growth.

**Short Term.** 10-20 years.

**Slash.** The residue on the ground following felling and other silvicultural operations and/or accumulating there as a result of a storm, fire girdling, or poisoning of trees.

**Snag.** A standing dead tree usually without merchantable value for timber products, but having characteristics of benefit to cavity nesting wildlife species.

**Soil Compaction.** An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

**Stand.** A community of trees or other vegetation uniform in composition, physiognomy, spatial arrangement, or condition to be distinguishable from adjacent communities.

**Structural Diversity.** Variety in a forest stand that results from layering or tiering of the canopy and the die-back, death and ultimate decay of trees. In aquatic habitats, the presence of a variety of structural features such as logs and boulders that create a variety of habitat.

**Successional Stage.** A stage or recognizable condition of a plant community which occurs during its development from bare ground to some climax plant community.

**Threatened Species.** Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and which has been designated in the Federal Register as such. In addition, some states have declared certain species in their jurisdiction as threatened or endangered.

**Understory.** Vegetation (trees or shrubs) growing under the canopy formed by taller trees.

**Water Quality.** The chemical, physical and biological characteristics of water.

**Watershed.** Entire area that contributes water to a drainage system or stream.

**Wildfire.** Any wildfire not designated and managed as a prescribed fire with an approved prescription.

**Yarding.** The act or process of moving logs to a landing.