

ENVIRONMENTAL ASSESSMENT
for the
BEAR PEN ANALYSIS AREA
EA NUMBER OR-118-02-003
July 2002

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
GLENDALE RESOURCE AREA

Public notice of the availability of this environmental assessment is being provided through the BLM Medford District's web site at www.or.blm.gov/Medford/planning and advertisement in the Grants Pass Courier and Umpqua Free Press.

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A preliminary environmental assessment (EA) for the Bear Pen Analysis Area was prepared by a private contractor and made available for public review in August 1999. The preferred alternative was identified as a combination of commercial harvest units in alternative 2, the road treatments in alternative 3 and the high priority non-commercial restoration thin treatments in alternative 5. This preferred alternative included 823 commercial harvest acres within 58 timber sale units. No decision was made in the selection of the an alternative to implement.

Since that time the Bear Pen Analysis Area has undergone further analysis and a preferred alternative has not been identified. The decision maker will select an alternative after the environmental assessment has gone out for public review. The Glendale Resource Area interdisciplinary team further developed alternative 4, which emphasizes fish, wildlife and other resource management objectives. The other three action alternatives contain minor modifications. All alternatives will comply with the Medford Resource Management Plan and amendments, including the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other mitigation Measures Standards and Guidelines.

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Figure 1. Location of Bear Pen Analysis Area

Figure 1. Location of Bear Pen Project Area.

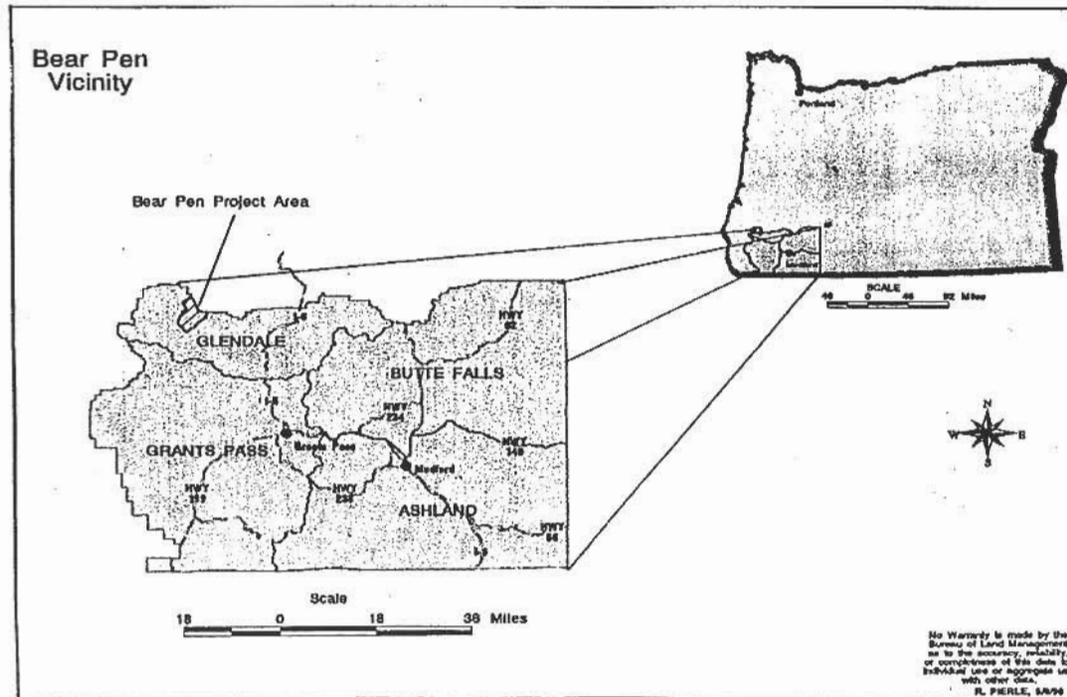
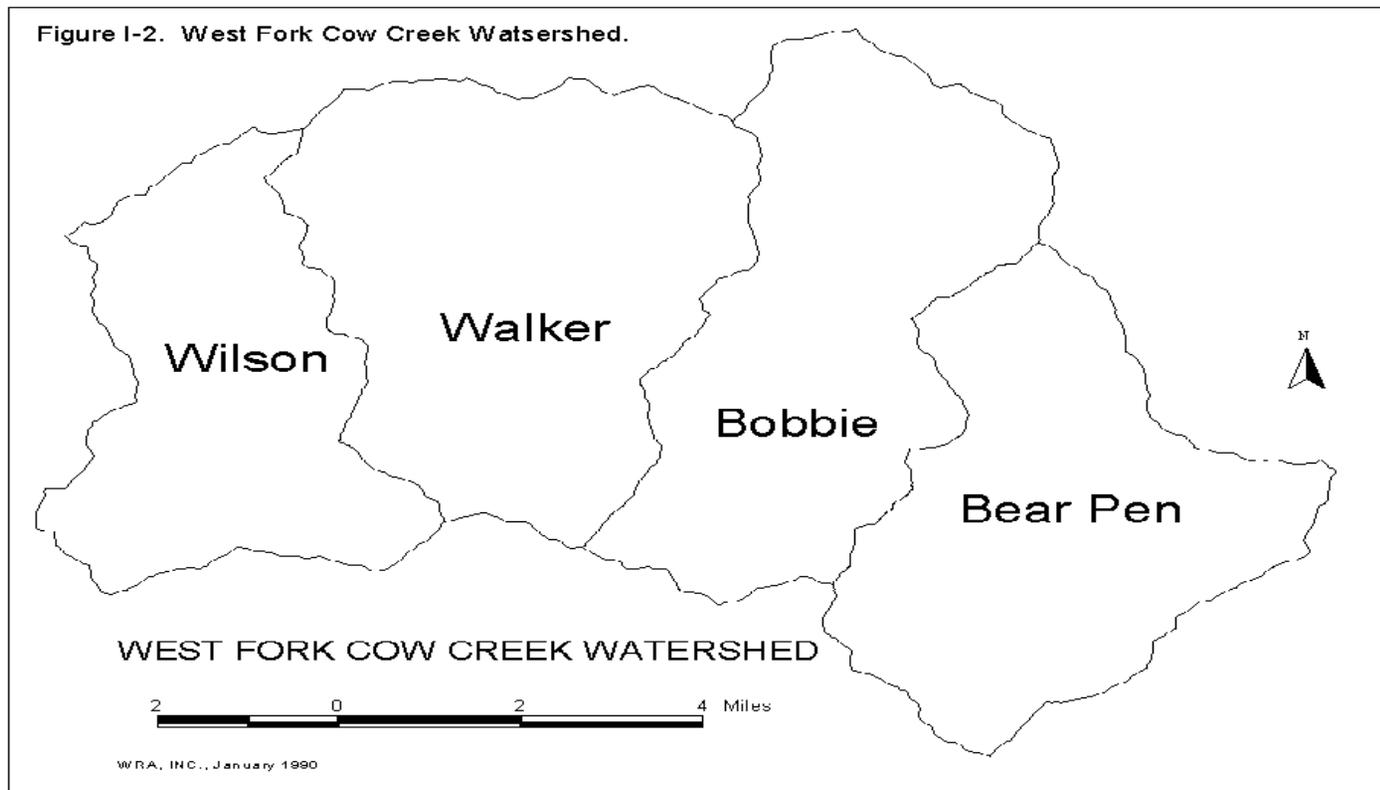


Figure 2. West Fork Cow Creek Watershed



HOW TO READ THIS ENVIRONMENTAL ASSESSMENT

This environmental assessment is divided under the following sections:

Chapter 1.0 describes the purpose and need for action.

Chapter 2.0 addresses the issues identified through the scoping phase of the project.

Chapter 3.0 addresses action alternatives considered, but eliminated from further analysis.

Chapter 4.0 describes and compares five alternatives (including no action) developed by the interdisciplinary team from the response to project need and issues identified. Project Design Features (PDFs) and Monitoring are also discussed.

Chapter 5.0 describes the affected environment of the Bear Pen Analysis Area and discusses the existing conditions of specific resources.

Chapter 6.0 forms the scientific basis for the systematic comparison of alternatives and discloses the environmental consequences of carrying out the alternatives described in Chapter 4. Each alternative potentially affects the environmental factors described in the Affected Environment, Chapter 5.

Following Chapter 6.0, is a List Of Preparers and Agencies Consulted. A Reference section provides the source description for published material referenced in the text. A List of Acronyms used in the text is provided and the Glossary defines terms used in the text that may be unfamiliar or specialized, follows.

Details of the proposed harvest units in each alternative are shown in Appendix A.

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The Glendale Resource Area of the Medford Bureau of Land Management (BLM) proposes management activities within the Bear Pen Project Analysis Area. The 6th field Bear Watershed forms the boundaries of the Analysis Area and encloses an intermingled “checkerboard” pattern of public and private lands. The town of Glendale, Oregon is located approximately 15 miles northwest (Figure 1) of the Analysis Area. Proposed management activities include harvesting timber, non-commercial stand density treatments, fuels hazard reduction and road work.

1.2 PROJECT PURPOSE AND NEED

Forest management action in the Bear Pen Analysis Area is proposed to achieve goals, objectives, and desired future conditions as described in the Medford District Resource Management Plan (RMP) and amendments. The interdisciplinary team used an ecosystem approach that blends the needs of people and environmental values.

Timber productivity within the Bear Pen Analysis Area is less than optimal due to fire exclusion and past management practices. The proposed action responds to the following purpose and needs.

- Treat most of the overstory stands within the Analysis Area where silvicultural treatments are needed,
- Improve forest health and increase productivity by treating overstocked conditions through commercial harvest and thinning,
- Reduce excessive forest fuel levels through stand treatments and prescribed burning
- Return the forest stands to a condition which supports long-term sustainability of forest resources. Fire suppression, timber harvest and other management activities along with natural phenomena have affected vegetation patterns on the Bear Pen Analysis Area. Management is needed to bring the ecosystem back comparable with historic conditions (pre-European settlement or pre-1900's).
- The proposed action is designed to provide timber to the economy. Timber harvest on suitable lands within the Analysis Area would partially satisfy the commercial demand for wood products while meeting a portion of the harvest target for the Medford District. This action would continue to provide jobs and contribute to stability of the local economy.

1.3 DESIRED FUTURE CONDITIONS

Federal lands within the Analysis Area are allocated among riparian reserves, late-successional reserves and matrix (General Forest Management Areas). The management objectives of these allocations are the following.

Riparian Reserves:

- Meet the objectives of the Northwest Forest Plan's Aquatic Conservation Strategy.
- Provide habitat for terrestrial species associated with late-successional forest habitat
- Provide dispersal habitat for northern spotted owls.

Late-Successional Reserves (74 acres):

- Protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth forest related species including the northern spotted owl and marbled murrelet.
- Maintain a functional, interacting, late-successional and old-growth forest ecosystem.

Matrix (General Forest Management Area, 5,199 acres, and Connectivity/Diversity Blocks, 2,380 acres):

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
- Provide connectivity (along with other allocations such as riparian reserves) between late-successional reserves)between late-successional reserves.
- Provide habitat for a variety of organisms associated with both late-successional and younger forests.
- Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags and large trees.

1.4 SCOPE OF THE PROPOSED ACTION

The scope of this environmental assessment (EA) was determined through scoping in accordance with requirements of 40 Code of Federal Regulations (CFR) §1508.25. The scope of the proposed action is limited to the site-specific timber harvest operations, post-harvest stand treatments including prescribed burning of natural fuels, road work, and watershed and wildlife improvement projects.

While the time period usually considered for planning is ten years, reasonable foreseeable future actions would vary by resource in the effects analysis. There are no additional harvest activities and road construction planned in the Bear Pen Analysis Area during this time period. Any future action would require a separate analysis under the National Environmental Policy Act (NEPA).

Timber harvest proposed in this EA would be offered in Fiscal Year 2002. The maximum length of the timber harvest activities could be five years with approximately another two years of site preparation and reforestation activities. These activities could be conducted within the Bear Pen Analysis Area from 2002 until approximately 2008.

1.4.1 Related EISs and Documents

The Bear Pen EA conforms to the Medford Resource Management Plan (RMP 1995); Record of Decision and Final SEIS for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (Northwest Forest Plan, 1994); and the Record of Decision and Final SEIS for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M ROD, 2001). The West Fork Cow Creek Watershed Analysis is incorporated by reference.

1.5 DECISIONS TO BE MADE

Based on the analysis presented in this document the responsible official will:

- Choose the alternative to implement
- Determine whether the selected alternative would have significant effects or not, and whether or not to prepare an environmental impact statement. If the impacts are determined to be insignificant, then a Finding of No Significant Impact (FONSI) can be issued and a decision can be implemented.

2.0 RELEVANT ISSUES

Chapter II describes in detail the relevant issues and the indicators which will be used to assess the effects of the proposed action on the issues.

2.1 ISSUES AND MANAGEMENT OBJECTIVES

The issues to be addressed by this environmental assessment were developed through the scoping process. Issues key to the development of alternatives also served to aid in sharply defining the potential effects of the proposed actions. The proposed alternatives in Chapter II respond to these issues to the extent feasible within the physical, biological and legal limits of forest management. For the Bear Pen Analysis Area the issues generally relate to fish habitat and water quality (especially stream temperatures and sedimentation), hydrologic effects, meeting Aquatic Conservation Strategy Objectives, fragmentation and connectivity of late-successional forest habitat and reforestation/site productivity/sensitive soils.

Each of the issues are identified as they relate to 12 separate forest management components as shown in Table II-1. Resource condition indicators are also shown which will be used to indicate potential effects on resource values of the proposed action by alternative.

Additional issues to those identified in the scoping process are also considered in the effects analysis (Table II-1). These issues are generally protected by specific laws, Best Management Practices (BMPs) and Bureau of Land Management guidelines. The net effects of these issues are often limited and may be relatively the same for all alternatives. Project design features necessary to maintain the levels and standards identified in the District RMP for these resources are shown in Chapter IV.

Table II- 1. Issues Key to Alternative Development, Related Issue Indicators and Management Objectives by Resource Component.

RESOURCE	ISSUE	INDICATOR	MANAGEMENT OBJECTIVE
Air Quality	Protection of Air Quality.	Conforms to Oregon SIP. Conforms to OR. Smoke Mgmt. Plan. Changes in visibility/local air quality.	Maintain current air quality conditions and conforms with provisions of the Clear Air Act.
Fire	Risk of large wildfire.	Relative hazard rating Acres of prescribe fire/slash control	Reduce the hazard of catastrophic fires.
Heritage Resources	Cultural/heritage/historic/ Religious resources and use.	Ability to avoid and protect traditional cultural properties (TCP's) while respecting and honoring any American Indian heritage that may be associated with the watershed.	Protect Heritage Resources.
Minerals, Geology, Soils	Potential geologic hazards Surface erosion and slope stability. Protection of soil productivity.	Geologic hazards present. Acres of ground-based logging systems on sensitive soils. Percent increase in moderately and severely disturbed/compacted surface areas. Area of handpile burn fuels treatment.	Minimize soil compaction.
Noise	Change in the noise environment for humans and animals.	Changes in noise environment.	Protection of solitude
Recreation	Recreation opportunities.	Amount and type of use and values affected.	Maintain quality recreational experiences.
Safety	Road-side Protection.	Amount of unsafe tree removal.	Forest worker and visitor protection.
Scenery	Scenic quality.	Area meeting Visual Resource Management (VRM) objectives.	Protect visual resource.

RESOURCE	ISSUE	INDICATOR	MANAGEMENT OBJECTIVE
Transportation	Road construction and reconstruction. High road density.	Miles of new permanent road constructed. Miles of new temporary road constructed. Miles of road renovated. Miles of road closed by gating. Miles of road closed by decommissionion. .	Assure any new roads are in stable locations and meet future management considerations. Maintain and stabilize roads. Reduce road density. Provide security habitat for big-game and other wildlife. No net increase in roads. Meet ACS objectives.
Vegetation	methods. Forest health and vigor. Potential Timber harvest levels. Harvest timber productivity. Understocked stands. Unique and special habitat. Unwanted competing vegetation potential. Effects on Special Status plant species.	Acres treated and volume harvested. Number of harvest units, range in size, average size and method of harvest. Potential area for harvest of special forest products. Species composition and distribution in the future. Volume growth. Acres and location of unique and special habitat affected. Potential for unwanted/noxious plant invasion – acres of disturbed soil surface. Loss of Special Status plant species.	Harvest timber economically while protecting other resources. Promote growth and release of existing young conifer stands. Improve forest health through density management thinning in over-stocked stands and reducing brush and hardwood competition. Minimize adverse effects of timber harvest on fish, wildlife and other resources. Regenerated decadent stands and areas currently understocked with conifers.

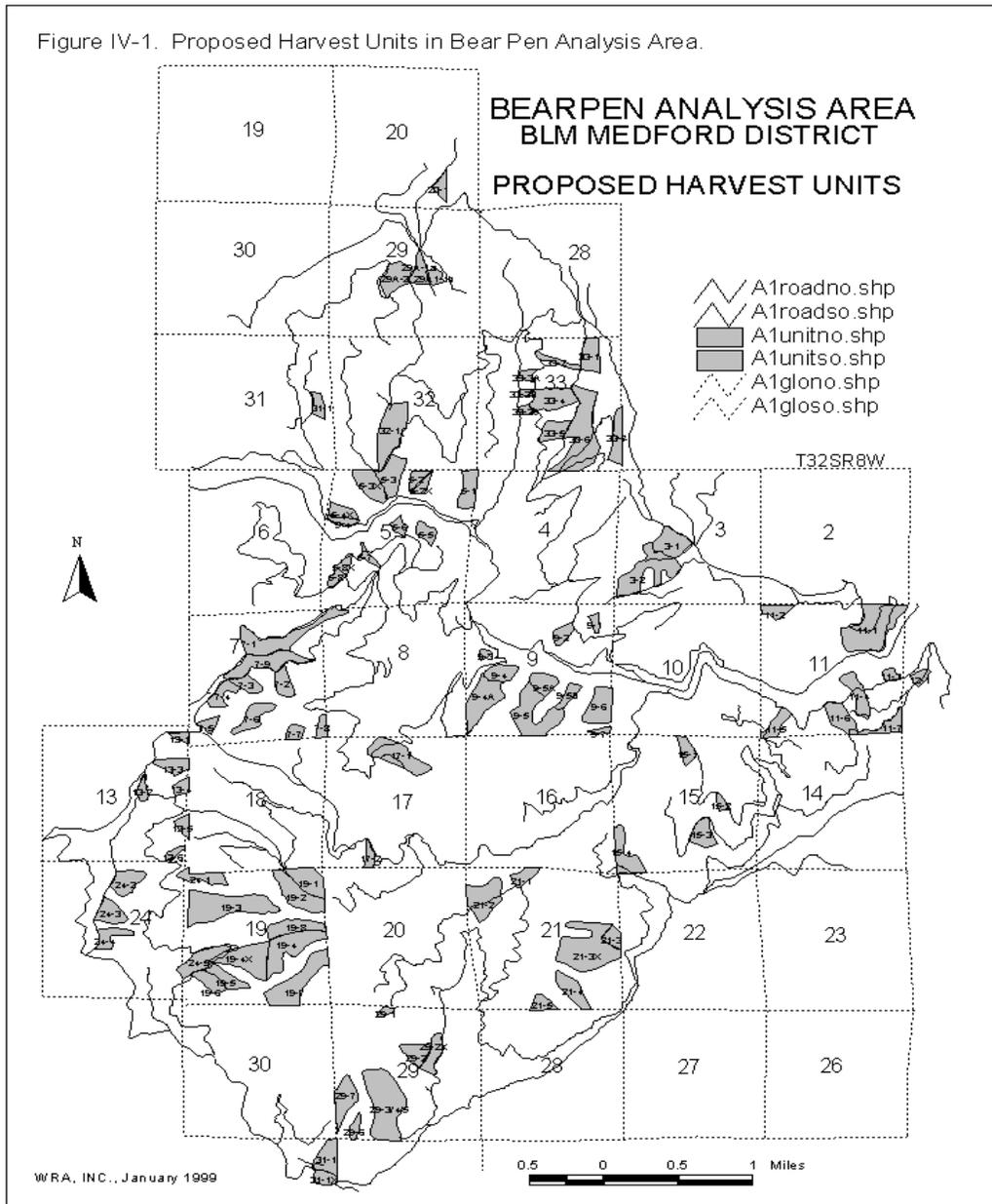
RESOURCE	ISSUE	INDICATOR	MANAGEMENT OBJECTIVE
Wildlife	<p>Effects on populations and habitat of Special Status, S&M and other wildlife species.</p> <p>Coarse woody debris levels.</p> <p>Protection of critical habitat.</p> <p>Protection of big-game habitat.</p> <p>Protection of late-successional habitat and suitable habitat components.</p> <p>Protection of habitat diversity.</p> <p>Protection of corridors and non-fragmented late successional reserves.</p>	<p>Presence of additional human disturbance.</p> <p>Presence of coarse woody debris</p> <p>Presence of and changes to critical habitat.</p> <p>Changes in big-game thermal cover.</p> <p>Changes in big-game hiding/security cover.</p> <p>Changes in big-game forage habitat.</p> <p>Acres of late-successional forest and suitable habitat components.</p> <p>Impacts to habitat diversity.</p> <p>Changes in corridors and late successional fragmentation.</p>	<p>Minimize adverse impacts on species associated with late-successional habitat.</p> <p>Promote pine communities on sites suited for pine.</p>

3.0 ALTERNATIVES CONSIDERED BUT ELIMINATED

In developing the proposed action, the interdisciplinary team considered all the General Forest Management Area lands and Connectivity/Diversity Blocks in the Bear Pen Analysis Area that supported trees outside of reserve areas. In the initial analysis, 87 potential harvest units were identified (See Table IV-1). Further analysis identified three additional units that met the unit selection criteria (Units 7-7, 7-8 and 7-9). Three other units were deleted as they were created as “slivers” in the GIS unit selection process. The location of the final units proposed for analysis are shown in Figure III-1.

Inspection and analysis of the proposed units resulted in ten units (20-1, 13-6, 24-3, 5-7, 7-5, 9-7, 11-2, 11-3, 11-4, 17-2) being dropped for consideration for harvest because all or a significant portion of the units were in riparian zones. In addition, 17 units were deferred from harvest at this time as they did not meet RMP requirements, most often because they contained too few overstory trees. Some of these units, however, have been considered for rehabilitation treatments in the selection of proposed alternatives (See Tables A-3, A-4).

Figure III-1. Proposed Units



4.0 ALTERNATIVES PROPOSED

4.1 ALTERNATIVE DEVELOPMENT

As a result of the scoping process and BLM project direction, five alternatives were identified. The alternative's descriptive titles, objectives and harvest unit selection criteria are as follows:

4.1.2 Alternative 1 – No Action

Alternative 1 is identified as the No Action Alternative.

4.1.3 Alternative 2 – Maximum timber harvest

Alternative Objectives:

- Maximize timber harvest while protecting other resources.
- Minimize sedimentation and reduce sedimentation sources where desirable.
- Ensure new roads are in stable locations
- Ensure no net increase in permanent roads as a result of federal management actions.
- Minimize soil compaction
- Optimize conifer growth in stands less than 100 years old.
- Provide for special forest product harvest.
- Provide for release of existing young conifers or provide for successful regeneration of conifers in harvest area.
- Minimize hazardous fuels resulting from logging activities.

Unit Selection Criteria:

- Select stands over rotation age with understocked overstory and slow growth. (Rotation age – 100 years for GFMA and 150 years for Connectivity/Diversity blocks)
- Treat manageable understory (Overstory Removal, Comm. Thin, etc.)
- Regeneration Harvest of isolated units
- No harvest with two site potential tree heights (about 360 feet) of fish bearing streams and one site potential tree heights of all other stream channels.
- Leave a minimum of 6-8 trees per acre 20+ inch dbh on all GFMA harvest units
- Leave a minimum 12-15 trees per acre 20+ inch dbh on all connectivity/diversity blocks harvest units.

4.1.4 Alternative 3 – Maximum timber harvest with no permanent roads

Alternative Objectives:

- Maximize timber harvest while protecting other resources.
- Minimize sedimentation and reduce sedimentation sources where desirable.
- Minimize soil compaction
- Optimize conifer growth in stands less than 100 years old.
- Provide for release of existing young conifers or provide for successful regeneration of conifers in harvest area.
- Minimize hazardous fuels resulting from logging activities.
- Avoid new permanent road construction.

Unit Selection Criteria:

- Same criteria as Alternative 2.
- No additional roads would be constructed over Alternative 2.

4.1.5 Alternative 4 – Emphasize other resource objectives.

Alternative Objectives:

- Harvest timber while protecting other resources.
- Minimize sedimentation and reduce sedimentation sources where desirable.
- Ensure new roads are in stable locations
- Ensure no net increase in permanent roads as a result of federal management actions.
- Minimize soil compaction
- Optimize conifer growth in stands less than 100 years old.
- Provide for release of existing young conifers or provide for successful regeneration of conifers in harvest area.
- Minimize hazardous fuels resulting from logging activities.
- Minimize existing hazardous fuels outside of harvest units.
- Minimize adverse impacts to species associated with late-successional species, while harvesting.
- Maintain at least 30% of the landscape (6th-field watershed) in late-successional habitat.
- Avoid timber harvest within 0.25-mile of active owl sites.
- Do not exceed hydrologic parameters (compaction, transient snow zone openings and % early seral vegetation) above relative indicator values.
- Provide additional watershed protection by surfacing (rock) select natural surface roads in the Analysis Area.
- Minimize fragmentation of northern spotted owl connectivity corridors.

Unit Selection Criteria:

- Same selection criteria as Alternative 3.
- Action to be deferred on units in Alternative 3 that would:
- Reduce impacts on sensitive soils.
- Give additional riparian protection.
- Provide additional protection of key wildlife habitat.
- Prevent further reduction of connectivity corridors.

4.1.6 Alternative 5 – Emphasize harvest for stand vigor and growth.

Alternative Objectives:

- Harvest timber while protecting other resources.
- Minimize sedimentation and reduce sedimentation sources where desirable.
- Ensure new roads are in stable locations
- Ensure no net increase in permanent roads as a result of federal management actions.
- Minimize soil compaction
- Optimize conifer growth in stands less than 100 years old.
- Provide for release of existing young conifers or provide for successful regeneration of conifers in harvest area.
- Minimize hazardous fuels resulting from logging activities.
- Improve growth of residual stands
- Maintain at least 40% canopy closure.

Unit Selection Criteria:

- Same selection criteria as Alternative 2 except units planned for regeneration harvest or overstory removal, where the understory is below the sapling size, will not be included. The selection priority was:

Priority 1 – Restoration thinning in or adjacent to treated units.

Priority 2 – Restoration thinning to release conifers in other units.

Priority 3 – Restoration to complete treatments in proposed units.

Priority 4 – Restoration to establish new stand – Douglas-fir/Tanoak/Madrone sites.

Priority 5 – Restoration to establish new stand – Douglas-fir/Tanoak/Live Oak sites.

Table IV - 1. Bear Pen Potential Harvest Unit Status and Alternative Qualification.

ID#	BLM UNIT	STATUS	REMARK	QUALIFIES			
				Alt. 2	Alt. 3	Alt. 4	Alt. 5
1	20-1	Drop	Riparian	No	No	No	No
2	29A-1		Split Stand, Treat East portion in Alt 5; Needs road renovation	1a - Yes 1b - Yes	No	Yes	1a - No 1b - Yes
3	29A-2	Mod-sub	Ridgeline, Delete South Ridge, Provide connectivity in Alt. 4	Yes	Yes	No	No
4	31-1	Defer	TFO, Needs rehab treatment- Alt. 5	No	No	No	Yes
5	32-1	Mod-add	Rip. Adj., Gate Access; E ½ needs PCT in Alt. 5.	Yes	Yes	Yes	Yes
6	33-1		Scattered OS over pockets of Douglas-fir regeneration and hardwoods.	Yes	Yes	No	Yes
7	33-2	Defer	TFO, Needs rehab in Alt. 4,5.	No	No	Yes	Yes
8	33-3A		Scattered decadent OS, DF understory within hardwoods. Drop in Alt. 4 because of location with respect to Slotted Pen Cr.	Yes	Yes	No	Yes
9	33-3B		Similar to 33-3A with a few more OS trees. Again drop in Alt. 4.	Yes	Yes	No	Yes
10	33-3C		Similar to 33-3A. Drop in Alt. 4	Yes	Yes	No	Yes
11	33-4			Yes	Yes	Yes	No
12	33-5			Yes	Yes	Yes	No
13	33-6		Treat and repair old skid trails in Alt. 5; Abandon cross road 32-8-4.1.	Yes	No	Yes	Yes

ID#	BLM UNIT	STATUS	REMARK	QUALIFIES			
				Alt. 2	Alt. 3	Alt. 4	Alt. 5
14	33-7		Treat and repair old skid trails in Alt. 5.	Yes	No	Yes	Yes
15	13-1	Mod-add	Extend to riparian zone on westside. Young stand needs thinning.	Yes	Yes	Yes	Yes
16	13-2			Yes	Yes	Yes	Yes
17	13-3		Two-storied, needs thinning.	Yes	Yes	Yes	Yes
18	13-4		Two-storied	Yes	Yes	No	Yes
19	13-5	Defer	Two-storied; Commercial thin in Alt. 5.	No	No	No	Yes
20	13-6	Drop	Riparian	No	No	No	No
21	24-1	Defer	TFO, west ½ could be rehab in Alt. 5.	No	No	No	Yes
22	24-2			Yes	Yes	Yes	Yes
23	24-3	Drop	Riparian	No	No	No	Yes
24	24-4	Defer	TFO, Possible rehab in Alt. 5.	No	No	No	Yes
25	24-5	Mod-sub	TFO east ½,	Yes	No	Yes	Yes
26	3-1	Defer	Previously thinned, thrifty and still growing.	No	No	No	No
27	3-2	Mod-sub	East ½ previously thinned, thrifty and still growing. Possible deferment in Alt. 4 to provide connectivity to LSR. No regeneration harvest in Alt. 5.	Yes	Yes	Yes	No
28	5-1	Defer	TFO; Road closure by gating 32-8-32.	No	No	No	Yes
29	5-2	Mod-sub	Remove SE ½, uneconomical to log. Rehab in Alt. 5.	Yes	Yes	Yes	Yes
30	5-3	Mod-sub	TFO, Defer west ½; Rehab in Alt. 4,5. Needs road renovation.	Yes	No	Yes	Yes
31							
32	5-4	Mod-sub	Remove north 2/3, TFO, Decadent. Subunit 5-4x needs rehab.	Yes	Yes	Yes	Yes
33	5-5			Yes	Yes	Yes	Yes

ID#	BLM UNIT	STATUS	REMARK	QUALIFIES			
				Alt. 2	Alt. 3	Alt. 4	Alt. 5
34	5-6			Yes	Yes	Yes	No
35		Delete	Non-unit				
36	5-7	Drop	Riparian	No	No	No	No
37	5-8	Mod-sub	Split Unit- Defer east ½ ,TFO; Rehab in Alt. 5. Needs road renovation	Yes	No	Yes	Yes
38	7-1	Defer	Variable stand; Riparian – Unit on headlands above clearcut that needs protection.	No	No	No	No
39	7-2	Mod-sub	Portion above road moved to new unit 7-9	Yes	Yes	No	Yes
40	7-3	Mod-sub	Portion above road moved to new unit 7-9	Yes	Yes	No	Yes
41	7-4	Mod-add	Moved boundary up against 7-3. Part of unit dropped for riparian.	Yes	Yes	Yes	Yes
42	7-5	Drop	Riparian	No	No	No	No
43	7-6		Boundary modified to fit stand	Yes	Yes	Yes	Yes
44	7-7		Unsuitable cable landing, can only be helicopter logged.	Yes	Yes	Yes	No
	7-8		Unsuitable cable landing, can only be helicopter logged.	Yes	Yes	No	No
	7-9		New homogeneous unit	Yes	Yes	Yes	Yes
45	9-1	Mod-sub	Riparian, Consider CT through riparian in Alt. 5	Yes	Yes	Yes	Yes
46	9-2	Mod-add	Boundary modified to fit stand	Yes	Yes	Yes	Yes
47	9.3	Split Unit	Defer west 2/3 TFO; Rehab in Alt. 5	Yes	Yes	Yes	No
48	9-4			Yes	Yes	No	No
	9-4A	Mod-add to 9-	Boundary modified to southwest section	Yes	Yes	Yes	Yes

ID#	BLM UNIT	STATUS	REMARK	QUALIFIES			
				Alt. 2	Alt. 3	Alt. 4	Alt. 5
		4	line to fit stand and includes portion of 9-5.				

ID#	BLM UNIT	STATUS	REMARK	QUALIFIES			
				Alt. 2	Alt. 3	Alt. 4	Alt. 5
49	9-5	Mod-sub	TFO and Riparian, High variability. Consider holding as large undisturbed block in Alt. 4. Split in to smaller units to meet riparian zone and logging requirements. Rehab in Alt. 5.	No	No	No	Yes
	9-5A		Portion of 9-5.	Yes	Yes	No	No
	9-5B		Portion of 9-5	Yes	Yes	Yes	No
50	9-6	Mod-add	Move boundary to north and Section line to east to fit stand.	Yes	Yes	Yes	No
51	9-7	Drop	Riparian	No	No	No	No
52	11-1	Mod-add	Clumpy stand with pockets of large OS, group CT harvest. Pocket rehab in Alt. 5.	Yes	Yes	Yes	Yes
53	11-2	Drop	Riparian	No	No	No	No
54	11-3	Drop	TFO and riparian. Rehab in Alt. 5.	No	No	No	Yes
5-5	11-4		Riparian & TFO. Rehab in Alt. 5.	No	No	Yes	Yes
56	11-5	Mod-sub	Riparian.	Yes	Yes	Yes	No
57	11-6	Defer	TFO	No	No	Yes	Yes
58	11-7	Defer	TFO. Rehab. In Alt. 5.	No	No	No	Yes
59	12-1		Very steep; Slide below in Sec. 11.	Yes	Yes	Yes	No
60	15-1	Mod-sub	TFO on west Side. Would need road access for cable logging.	Yes	No	Yes	No
61	15-2	Defer	TFO for connectivity block.	No	No	Yes	Yes
62	15-3	Defer	TFO for connectivity block; Consider rehab in Alt. 4,5.	No	No	Yes	Yes
63	15-4	Mod-add	Moved boundary north and west to section line to fit stand.	Yes	Yes	Yes	No

ID#	BLM UNIT	STATUS	REMARK	QUALIFIES			
				Alt. 2	Alt. 3	Alt. 4	Alt. 5
64	17-1		Large trees defective; SW corner could rehab in Alt. 4,5.	Yes	Yes	Yes	Yes
65	17-2	Drop	Riparian	No	No	No	No
66	19-1			Yes	Yes	No	No
67	19-2	Defer	TFO for connectivity block.	No	No	Yes	Yes
68	19-3	Defer	TFO for connectivity block; Consider rehab in Alt. 4,5	No	No	Yes	Yes
69	19-4	Mod-sub	Defer W ½ because TFO for connectivity block.	Yes	Yes	Yes	No
70	19-5	Defer	TFO for connectivity block. Rehab in Alt 4,5.	No	No	Yes	Yes
71	19-6			Yes	No	Yes	No
72	19-7		May want to defer in Alt. 4 to add connectivity to adjacent NSO reserve in SE corner.	Yes	Yes	No	No
73	19-8		Defer in Alt 4 for connectivity.	Yes	Yes	No	No
74	21-1		Rehab skid trails in Alt. 5.	Yes	No	Yes	Yes
75	21-2	Mod-add	Enlarge to fit stand boundary.	Yes	Yes	Yes	No
76		Delete	Non-Unit				
77	21-3	Defer	TFO; Consider for rehab in Alt. 5	Yes	Yes	No	No
78	21-4	Mod-add	Boundary modified to fit stand.	Yes	Yes	No	No
79	21-5		TFO	Yes	Yes	No	No
80	29-1			Yes	Yes	No	No
81	29-2	Split Unit	TFO in E ½ which could be rehab in Alt. 5	Yes	Yes	No	Yes
82	29-3		Combined in to larger unit.				
83	29-4	Defer	Combined into larger unit.				
84	29-5		Combined into larger unit.				

ID#	BLM UNIT	STATUS	REMARK	QUALIFIES			
				Alt. 2	Alt. 3	Alt. 4	Alt. 5
	29-3,4&5		Combined three units for treatment. Consider deferment for wildlife security habitat in Alt 4. Opportunities rehab Alt.5.	Yes	Yes	No	Yes
85	29-6	Defer	TFO and wildlife security habitat. Rehab in Alt. 5.	No	No	No	Yes
86	29-7		Defer for wildlife security habitat in Alt. 4.	Yes	Yes	No	No
87	31-1		Ridgetop rehab needed in Alt. 4,5. Would need road renovation.	Yes	No	Yes	Yes 10A add Rehab.
Definitions: TFO - Too few overstory trees to meet RMP requirements; OS - overstory trees; CT - commercial thin; PCT - precommercial thin; DF - Douglas-fir; NSO - northern spotted owl; LSR - late successional reserve.							

4.2 PROJECT DESIGN FEATURES COMMON TO ALL ALTERNATIVES

Project design features (PDFs) are specific measures included in the design of the proposed alternatives to minimize or avoid adverse impacts to the human environment. Many PDFs are included in the Medford District RMP, as described in Best Management Practices (BMPs), Appendix D.

4.2.1 Helicopter Yarding

The purchaser would be required to use helicopter landings as approved by the Authorizing Official. Other sites may be used after being approved by the Field Manager.

Helicopter refueling sites, including those located in riparian reserves (minimum of one tree length), would be operated to comply with all applicable regulations.

Helicopter landings would be constructed, used and ripped in the same season. These landings would only be rocked if it is necessary to prevent erosion and stream sedimentation. The road ditch line at the helicopter landings would be bladed, seeded with certified seed, and straw mulched before October 1 to allow proper drainage and to prevent movement of sediment offsite.

Helicopter operation within 0.25 mile of northern spotted owl core areas would not be permitted between March 1 and June 30.

4.2.2 Timber Resources (includes tractor and cable yarding)

Tractor yarding would occur between June 1 and October 15 (soil moisture permitting) of the same year to minimize the amount of soil disturbance and compaction unless approved by the Authorized Officer. Water bar spacing on tractor skid trails would be based on existing guidelines considering slope and soil series.

Yarding tractors would not exceed eight feet in width and would be equipped with an integral arch to raise the front end of the logs in order to minimize soils disturbance and compaction.

Tractor operations would be restricted to designated skid trails and to slopes less than 35 percent, except where permitted by the Authorized Officer. Partial suspension would be required on all cable yarding units where possible to minimize ground disturbance and soil compaction. Designated skid trails in overstory removal units would be located to minimize damage to existing regeneration. Existing skid trails would be used where regeneration in skid trails is sparse or in poor condition. New trails would be no closer than 150 feet.

Tractor yarded units and overstory removal units would have skid trails water barred and discontinuously ripped using winged rippers (to reduce soil compaction) and then planted with conifers. Ripped skid roads would be mulched with weed-free straw where necessary and planted with conifers. This will occur during the dry season (before October 15th). Skid trails in commercial thin units would

not be planted to trees. Water bar spacing on tractor skid trails would be based on existing guidelines considering slope and soil series.

In cable yarded units the number of yarding corridors would be minimized to reduce soil compaction and erosion. Corridors would be located at least 150 feet apart at the tail end and lateral yarding would be required.

Six to 18 large green conifers per acre (12 to 18 in connectivity blocks), and a minimum of three large hardwoods per acre (where available) would be retained in all regeneration harvest and overstory removal units to provide for biological legacies and large structure in the regenerating stands. The number varies between units to provide for potential snails and coarse woody debris or to provide site modification on more harsh sites.

In overstory removal units, trees would be felled away from residual reproduction and multiple landings would be used. These measures would be designed to prevent damage to residual regeneration.

4.2.3 Transportation

Dust abatement would be done, as determined by the Authorized Officer, during dry weather on roads used for hauling to prevent loss of fines in road surfacing.

Gates would be installed and roads closed as shown in Table IV-5 to prevent vehicles from causing erosion and limit disturbance to wildlife during the wet season.

Energy dissipaters and downspouts would be installed at cross-drain and stream culverts where necessary to protect road fill slopes that are not adequately protected by natural materials.

Road drainage improvement would consist of constructing a shallow water dip and armoring it with rock below cross-drain culverts and draw culverts at locations where they are prone to plugging. The road template would be outsloped where possible. Roads would be water barred on steep sections. The following design features would apply to this project for culvert installation or replacement in stream channels:

- the in-stream work period would be between July 1 and September 15 of the same year in accordance with State of Oregon regulations
- when replacing bottom-lay culverts, streams would be diverted around the work area whenever reasonably feasible in order to limit movement of sediment off-site during the low flow period. The diverted stream would not be returned to the channel and allowed to flow through the project site until all stream work has been completed.
- work would be temporarily suspended if rain saturates soils to the extent that there is potential for road damage and for excessive stream sedimentation.
- bare soil areas would be seeded with approved, certified seed (weed-free) after construction has been completed. Bare soil areas would be mulched with a cereal grain straw from weed-free, certified fields.

- Culverts would be designed to pass a 100 year flood in accordance with guidance in the Northwest Forest Plan.
- Culverts excavated from the road prism would be disposed of in an appropriate location.
- Hydraulic fluid and fuel lines would be in proper working condition in order to minimize leakage into streams.
- Waste diesel, oil hydraulic fluid and other hazardous materials would be removed from the site and disposed of in an approved site.
- Equipment refueling would be done where there is minimal chance that toxic materials could enter a stream.
- Equipment would not be stored in a stream channel overnight.

Road renovation, maintenance and log hauling (except roadside brushing outside of black stain period) on natural surface roads would be restricted to the dates prescribed for hauling. If the roads are deemed too wet (road surfaces are deforming and road damage or sediment production is likely) during a designated haul season (inclusive of the start and end dates), hauling would not be allowed until approved by the Field Manager.

Log hauling would be restricted to the following dates:

Paved roads	-	All year
Rocked roads	-	April 5 to November 15
Natural surface roads	-	May 15 to October 15
New construction	-	May 15 to October 15

Work would be suspended:

- when water is flowing on the road surface or ditchlines
- when snow on the road is melting
- when loaded log truck tire deflection exceeds 2 inches into the road surface anywhere over the entire road length
- snow removal (blading) on any road would not be authorized in order to prevent loss of rock surfacing.

Temporary spur roads would be built, discontinuously ripped with winged rippers, water-barred, seeded, mulched and log barricaded in the same year, between April 15 and October 15. Conifers would be planted at a later date. Native grass seed, if available, would be used for seeding immediately after ripping.

Decommissioning roads include discontinuous ripping with winged rippers, mulching, pulling culverts, water-barring and barricading, seeded with grass or planted with conifers (see Table IV-5). Work would be done between July 1 and October 15 of the same year.

Road 32-9-25.1 (in Section 25) would be decommissioned and blocked far enough in from the main road to allow for camping.

All bare ground disturbed by road construction activities would be mulched and seeded with certified seed prior to autumn rains.

Surface area of erodible earth exposed at any one time by grubbing and excavation for road construction would not exceed 0.5 acre after September 15 to avoid excessive erosion during fall rains.

Excess excavated material would be end-hauled to designated waste areas. Side casting of excess excavated material would not be allowed.

Landings would be located in approved sites, and designed with adequate drainage.

No new landings would be located in riparian reserves.

Step landings would be re-contoured, mulched and seeded following use.

The amount of road to be surfaced may vary depending on units to be selected for harvest and on the economics of the timber sale.

4.2.4 Fire

An array of treatments designed to reduce hazardous fuels is proposed for the project area. The type of treatment utilized is dependent on existing and projected fuel loadings, existing vegetative conditions, slope and access. Proposed treatments include manual methods in combination with prescribed burning.

Future underburns may also be implemented to help maintain the stand in its natural condition and prevent a future build-up of fuels. These underburns would be light treatments and help maintain the reduced fire hazard following the initial slashing and pile burning treatment. Typically, maintenance underburns would occur 2-7 years following the initial treatments but would be driven by the condition of the stand and regrowth of slashed vegetation.

Any areas planned for fuels treatment may be reexamined by resource specialists at any stage of treatment to determine if the planned fuels treatment is still applicable. At the discretion of resource specialists, planned treatments may be changed to better meet the objectives outlined in this EA. Proposed changes will be limited to treatments allowed under this EA or amendments to this EA.

Piles would be burned in the fall to winter season after 1 or more inches of precipitation has occurred. Piles would be burned during this season to reduce the potential for fire to spread outside each pile, and to reduce the potential for scorch and mortality to the residual trees and shrubs. Piles would also be burned when the soil and duff moisture is high to prevent soil damage.

Underburning would be conducted at anytime throughout the year when fuel and weather conditions would permit the successful achievement of resource objectives. Typically, burning would be conducted from fall through late spring. Summer or early fall would be less common, but can be

feasible when needed to meet resource objectives and when escape fire risk can be mitigated. Underburning would be designed to:

- minimize conflicts with smoke management.
- minimize the risk of control problems.
- avoid adverse impacts to nesting wildlife species.
- minimize consumption of soil organic matter and surface duff.
- meet silvicultural objectives to prepare the site and reduce competition with conifer seedlings.
- minimize the loss of large down wood.
- not exceed guidelines for exposing bare soil (Monitoring Handbook).
- slashing in Riparian Reserves would be done no closer than 25' of streams.
- prescription burning would not be within 50' of streams.

4.2.5 Air Quality

- Proposed forest management activities in the Bear Pen Analysis Area must be in conformance with the Oregon State Smoke Management Plan and the Oregon State Implementation Plan for Visibility Protection (USDA Forest Service 1995).
- broadcast burning would be minimized in favor of lower intensity underburning.
- emission reduction mitigation measures and smoke dispersal techniques would be used to the greatest extent practical.
- wildfire hazard reduction, site preparation and the use of prescribed fire for species habitat mitigation would be implemented in a manner consistent with ecosystem management objectives.
- where appropriate, dust abatement measures would be used during road construction and during wood product removal.

4.2.6 Port-Orford-cedar

- harvest units would not include Port-Orford-cedar.
- equipment would not be allowed within two tree lengths (340 ft) of West Fork Cow Creek due to presence of Port-Orford-cedar in riparian area. If it enters that area, equipment would be cleaned in accordance with the Port-Orford-Cedar Management Plan.

4.2.7 Special Status Wildlife Species and their Habitats

Reinitiation of consultation with the U.S. Fish and Wildlife Service would be completed before the sale is sold and/or timber harvest commences, if:

- new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent that was not considered in the biological opinion

- the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not considered in the biological opinion; or
- a new species is listed or critical habitat designated that may be affected by this action, then any operations causing such must cease pending reinitiation of formal consultation.

All naturally occurring dead and down woody debris greater than or equal to 16 inches dbh currently present in all units would remain on the ground and would not be removed. Any tree not designated for harvest that needs to be felled for safety purposes will also remain on the ground and not be removed.

In all regeneration or overstory removal harvest units, guidelines for coarse wood will conform to the December 11, 2000 Memorandum of Understanding by the SW Oregon PIEC, which defines levels of downed wood by plant association.

4.2.7.1 Northern goshawk

If a northern goshawk nest is identified, it will be protected with a 30 ac nest core, and there would be no human activity with 1/4 mile from March 1 - July 30, or until a biologist has determined there is non-nesting or the juveniles have sufficiently dispersed.

All raptor nests will be protected with the E-4 Special Provisions specified in the February 9, 1999 Instruction Memorandum No.OR-99-036.

4.2.7.2 Northern Spotted Owl

Spotted owl surveys will be conducted in the year the sale units are planned to be logged to ensure no owl pair has begun nesting in the unit.

If hatching year (fledgling) spotted owls are known or suspected *within or immediately adjacent* to a project area, the project activity would be delayed until June 30th or until a Glendale Resource Area biologist determines that young have sufficiently dispersed. This PDF may be waived in a particular year if nesting or reproductive success surveys conducted according to the FWS-endorsed survey guidelines reveal that spotted owls are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year. Previously known sites/activity centers are assumed occupied unless surveys indicate otherwise.

Work activities which have the potential to disturb nesting spotted owls, including tree falling, yarding, slashing, burning, road construction and renovation, and use of chain saws or other power equipment, would not take place within 1/4 mile of known spotted owl sites between March 1 - June 30. At a minimum, this PDF affects the following Units: 11-1, 11-5, 15-4, and 21-1 Other units may also be limited depending on surveys.

Mechanical fuels treatments will limit stem removal to trees less than 11"dbh to assure maintenance of potentially suitable northern spotted owl habitat.

No treatments will be permitted in the 100-acre northern spotted owl activity centers.

4.2.7.3 Marbled Murrelet

Timber sale units which remove or degrade suitable marbled murrelet habitat within the sale area would be surveyed for marbled murrelets to protocol standards (2 years) before the sale is sold. If occupancy behavior of marbled murrelets is documented during the surveys, reinitiation of formal consultation with the Fish and Wildlife Service would be required, and the site would be managed with a ½-mile no-cut buffer. If an active murrelet nest is located within or adjacent to a project area, the project activity may be delayed until September 15th or until a Glendale Resource Area biologist determines that no young are present. This PDF may be waived in a particular year if nesting or reproductive success surveys conducted according to the FWS-endorsed survey guidelines reveal that marbled murrelets are non-nesting or that no young are present that year. Waivers are valid only until April 1 of the following year.

Work activities within 1/4 mile of suitable unsurveyed habitat which have the potential to disturb nesting marbled murrelets will have daily operating restrictions from April 1 - August 6, confining operations to between 2 hours after sunrise to 2 hours before sunset.

4.2.8 Survey and Manage Wildlife Species

4.2.8.1 Oregon Red Tree Vole

All active red tree vole sites, either individual nest trees, or a collection of active and inactive nest trees within 100m, will receive a 10-acre minimum no-cut buffer, or a minimum one acre per nest tree, whichever is greater.

Due to susceptibility to heat and smoke which penetrates tree crowns, fuels prescriptions should direct heat and smoke away from red tree vole Habitat Areas.

4.2.8.2 Del Norte Salamander

The known Del Norte salamander sites in units 7-9, 13-2, and 13-3 will be protected by a buffer of one site-potential tree, or 100-foot horizontal distance, whichever is greater, surrounding the site. Within the site and its surrounding buffer, 40 percent canopy closure will be maintained, and no activities will be permitted which will disrupt the surface talus layer. Partial harvest within the buffer may occur provided 40 percent canopy closure is maintained and harvest is implemented with helicopters or high-lead cable systems to avoid compaction or other disturbance to talus.

Talus areas in Units #7-9, 13-2 and 13-3 will be protected from prescribed fire using all practicable means to minimize disturbance and loss of habitat for Del Norte salamanders. Yarding will be designed to minimize surface disturbance.

4.2.8.3 Great Gray Owl

If a great gray owl nest site is detected, a 1/4 mile no-cut buffer will be established around the known nest site.

4.2.9 Special Status and Survey and Manage Plant Species

Populations of Special Status, or Survey and Manage, vascular plants, lichens, and bryophytes will be buffered by about 100 feet. Survey and Manage species will have 200 foot buffers where they occur in timber harvest units that will retain less than 40% canopy cover (regeneration and overstory removal prescriptions). Buffers might be extended across existing roads where trees across roads provide shading. Timber harvest, prescribed fire, thinning, yarding corridors or road construction will not occur within these buffers. For Special Status species, buffers will occur around Bureau Sensitive and Assessment species but not Tracking Species. For Survey and Manage Species, the species to be buffered include Category A, B, C, D and E species

An effort will be made to prevent the spread of noxious weeds from the quarry operations. Heavy equipment would be washed before moving into the Analysis Area to remove soil and plant parts to prevent the spread of invasive and noxious weeds and disease into the Analysis Area.

The following noxious weed control measures would be implemented.

- In order to prevent the potential spread of noxious weeds into the Medford District BLM, the operator would be required to clean all logging construction, rock crushing and transportation equipment prior to entry on BLM lands.
- Cleaning shall be defined as removal of dirt, grease, plant parts and material that might carry noxious weed seeds into BLM lands. Cleaning prior to entry onto BLM lands might be accomplished by using a pressure hose.
- Only logging and construction equipment inspected by the BLM would be allowed to operate within the Analysis Area. All subsequent move-ins of logging and construction equipment as described above shall be treated the same as the initial move-in.
- Prior to initial move-in of any logging or construction equipment, and all subsequent move-ins, the operator shall make the equipment available for BLM inspection at an agreed upon location off federal lands.
- Logging and construction equipment would be visually inspected by a qualified BLM specialist, to verify that the equipment has been reasonably cleaned.
- The single site of diffused knapweed in Section 11 would be eliminated to the extent possible prior to harvest activities.

4.2.10 Fish/Streams/Riparian Habitat

All activities within riparian reserves would be consistent with the Aquatic Conservation Strategy of the Northwest Forest Plan.

Riparian reserves would be established along all intermittent and perennial streams in accordance with the Medford District RMP and ROD. Reserve widths would be 170 feet on each side of non-fishery

intermittent and perennial streams. Riparian reserve width on fish bearing streams would be at least 340 feet. Riparian reserve width on springs and seeps would be 100 feet.

Trees in riparian reserves and owl core areas that are accidentally knocked over during falling and yarding would be retained on-site for fish and wildlife habitat.

Directional falling away from streams and wet areas would be required within one site potential tree height of riparian reserves.

Fire lines would be water-barred to prevent movement of sediment into streams. Burning would not occur within 50' of streams.

4.3 MONITORING

Any timber sale within the Bear Pen Analysis Area as a result of this environmental assessment would be subject to the standard monitoring called for in the RMP. In addition, the following specific monitoring actions would be taken:

- roads where rock is applied would be monitored for the first two years to determine if noxious weeds have been introduced. If necessary, these infected sites would be treated to prevent plants from becoming established
- roads that are decommissioned would be monitored for a maximum of two winters to determine effectiveness of the treatment for correcting drainage problems
- monitoring will occur to ensure that special status and survey and manage plant sites are buffered from activities, according to mitigation measures. Monitoring will also occur to ascertain whether sites remain viable, and whether mitigation measures were effective.

4.4 COMPARISON OF ALTERNATIVES

A comparison of activities and outputs among alternatives is shown in Table IV-4.

4.4.1 Alternative 1

Alternative 1 is identified as the No Action alternative. Under this alternative, no action would be taken to respond to the Project Purpose and Need identified earlier in this report. No new timber harvest, road construction or road reconstruction would occur under this EA. Currently there are 11.7 miles of roads gated and 1.5 miles of road barricaded and an open road density of 4.4 miles per square mile in the Analysis Area (Table IV-5). This alternative would defer all proposed treatments of the Analysis Area at this time. With proper NEPA documentation, other projects such as fish habitat improvement, big-game habitat enhancement, recreation management, and watershed management activities could be initiated.

4.4.2 Alternative 2

Alternative 2, with a goal to provide maximum timber harvest in the Bear Pen Analysis Area, would harvest 1,035 acres across 59 harvest units (Figure IV-1) yielding approximately 11.3 MMBF of sawtimber (Table A-1).

In general, the regeneration harvest and overstory removal treatment units would harvest timber, leaving at least 6-8 large conifers in non-connectivity sections and 12-18 large conifers in connectivity sections and a minimum of three large hardwoods per acre where present, as well as snags and down logs. In some cases, additional trees would be retained to provide a source for snags and coarse woody debris or to provide additional shade for seedlings. On commercial thin units, the existing stand would be thinned to release the residual trees. In some cases, individual trees along roads in the sale area would be cut where they pose potential safety problems to people using the road.

Where available and economical, firewood, small wood (2-8" diameter) and boughs would be harvested after the timber harvest and before site preparation in regeneration harvest units.

Fuels in each treated unit would be treated according to the prescription shown in Table A-1.

Under alternative 2, there is no permanent road construction, about 1.6 miles of temporary road construction and 34 miles of permanent unpaved BLM System Roads in the Analysis Area would be renovated. Renovation of existing roads would consist of roadside brushing, reshaping and restoring the surface where necessary, applying rock surface where needed and improving drainage. Following completion of the project, approximately 11.7 miles of existing roads would remain gated and 2.6 miles fully decommissioned to protect watershed values (Table IV-5). No new gates would be installed.

4.4.3 Alternative 3

Alternative 3, with a goal to provide maximum timber harvest in the Bear Pen Analysis Area utilizing no permanent road construction, would harvest 838 acres across 49 harvest units yielding approximately 8.9 MMBF of sawtimber (Table A-2).

The selection of units under alternative 3 was similar to alternative 2. However, all units that required road construction or road renovation were deferred with the exception of those units that could be logged by helicopter rather than by cable. About 0.1 miles of temporary road would be constructed to a landing and no existing roads would be renovated.

In general, the regeneration harvest and overstory removal treatment units would harvest timber, leaving at least 6-8 large conifers in non-connectivity sections and 12-18 large conifers in connectivity sections and a minimum of three large hardwoods per acre where present, as well as snags and down logs. In some cases, additional trees would be retained to provide a source for snags and coarse woody debris or to provide additional shade for seedlings. On commercial thin units, the existing stand would be thinned to release the residual trees. In some cases, individual trees along roads in the sale area would be cut where they pose potential safety problems to people using the road.

Fuels in each treated unit would be treated according to the prescription shown in Table A-2.

4.4.4 Alternative 4

Alternative 4, with a goal to provide timber harvest in the Bear Pen Analysis Area while emphasizing objectives for fish, wildlife and other resource values, would harvest 430 acres across 29 harvest units yielding approximately 5.2 MMBF of sawtimber (Table A-3). To provide additional watershed protection, about 28.3 miles of natural surface roads have been selected to receive spot rocking. Details of this road surfacing and enhancement work are described below.

Reasons for deferring harvest units in alternative 4 are shown in Table IV-1. For example, unit 29A-1 was deferred to retain connectivity and units 33-3A,B and C were deferred because the riparian zone has been impacted by a road and by previous harvest activities on the opposite side of the channel. Unit 12-1 was deferred as it has a potential for slope instability. Units 19-4, 7 and 8 were deferred to maintain connectivity to the west in the Bear Creek Drainage. Units 29-3,4,5, and 7 and Unit 31-1 were deferred to provide big-game security habitat. Unit 13-4 was removed as Section 13 is a northern spotted owl critical habitat section.

In general, the regeneration harvest and overstory removal units would leave at least 6-8 large conifers in non-connectivity sections, 12-18 large conifers in connectivity sections, a minimum of three large hardwoods per acre (where present), as well as snags and down logs. In some cases, additional green trees would be retained to provide a source for snags and coarse woody debris or additional shade for seedlings. On commercial thin units, the existing stand would be thinned to release the residual trees. In some cases, individual trees along roads in the sale area would be cut where they pose potential safety problems to people using the road.

Fuels in treated unit would be treated according to the prescription shown in Table A-3.

Under alternative 4 about 0.1 miles of minimum temporary road would be constructed and 17.1 miles of existing roads would be renovated. Renovation of existing roads would consist of roadside brushing, reshaping and restoring the surface where necessary, applying rock surface where needed and improving drainage. Following completion of the project, an additional 14.7 miles of existing roads would be gated (Table V-5) to protect connectivity/diversity blocks and spotted owl core areas. The total amount of gated roads would be 26.4 miles. About 1.3 miles of existing road would be fully decommissioned. Open road density would be about 3.6 miles per square mile, a reduction of 0.8 miles per square mile below existing conditions.

Pit-run rock and crushed rock would be acquired from existing stockpiles shown above. Spot surfacing would be placed on roads or where surfacing has been depleted. The proposed surfacing would reduce road surface erosion (most often a significant source of fine sediments), reduce maintenance costs and extend the log hauling season.

Additional road improvements in this maintenance operation would include installing additional waterbars and waterdips where appropriate, replace deteriorating culverts, and install new culverts where needed.

One or more of the following developed rock quarry sites would be used as a source of surfacing material if needed.

1. Slotted Pen T32SR8WS5, NE1/4
2. Dad's Creek T32SR7WS21, SW1/4
3. Mt. Ruben T33SR8WS10, NW1/4
4. Private quarry T32SR8WS16, SW1/4
5. Private quarry T32SR8WS14, NE 1/4

4.4.5 Alternative 5

Alternative 5 was designed to improve conifer tree vigor and growth in the Bear Pen Analysis Area and would harvest and rehabilitate and treat 939 acres across 52 units (Figure IV-4). About 465 acres would be rehabilitated by restoration thinning, skid road ripping, brush control, and planting.

The same unit selection criteria was used in alternative 5 as was carried out in alternative 2. Units, however, planned for regeneration harvest or overstory removal where the understory is below the sapling size were deferred treatment. Units in which treatment is necessary to achieve the site growth potential were included in alternative 5. Priority 1 through 5 units were included (Table A-4).

Priority 1 – Restoration thinning in or adjacent to treated units.

Priority 2 – Restoration thinning to release conifers in other non-harvest units.

Priority 3 – Restoration to complete treatments in proposed units.

Priority 4 – Restoration to establish new stand – Douglas-fir/Tanoak/Madrone sites.

Priority 5 – Restoration to establish new stand – Douglas-fir/Tanoak/Live Oak sites.

In general, the overstory removal treatment units would harvest timber, leaving at least 6-8 large conifers in non-connectivity sections and 18 large conifers in connectivity sections and a minimum of three large hardwoods per acre where present, as well as snags and down logs. In some cases, additional trees would be retained to provide a source for snags and coarse woody debris or to provide additional shade for seedlings. No units where a regeneration harvest treatment has been prescribed would be treated. On commercial thin units, the existing stand would be thinned to release the residual trees. In some cases, individual trees along roads in the sale area would be cut where they pose potential safety problems to people using the road.

Fuels in each treated unit would be treated according to the prescription shown in Table A-4.

Under alternative 5 about 0.1 miles of minimum temporary road and 1.2 miles of existing road would be renovated. Following completion of the project, an additional 31.8 miles of existing roads would be gated for a total of 43.5 miles of gated roads (Table IV-5). About 2.0 miles would be fully decommissioned. Open road density would be 2.8 miles per square mile, and a reduction of 1.6 miles

per square mile below existing conditions. Roads proposed for gating and decommissioning are displayed in Table IV-5.

Figure IV-1 Alternative 2

Figure V-1. Alternative 2 Harvest Units.

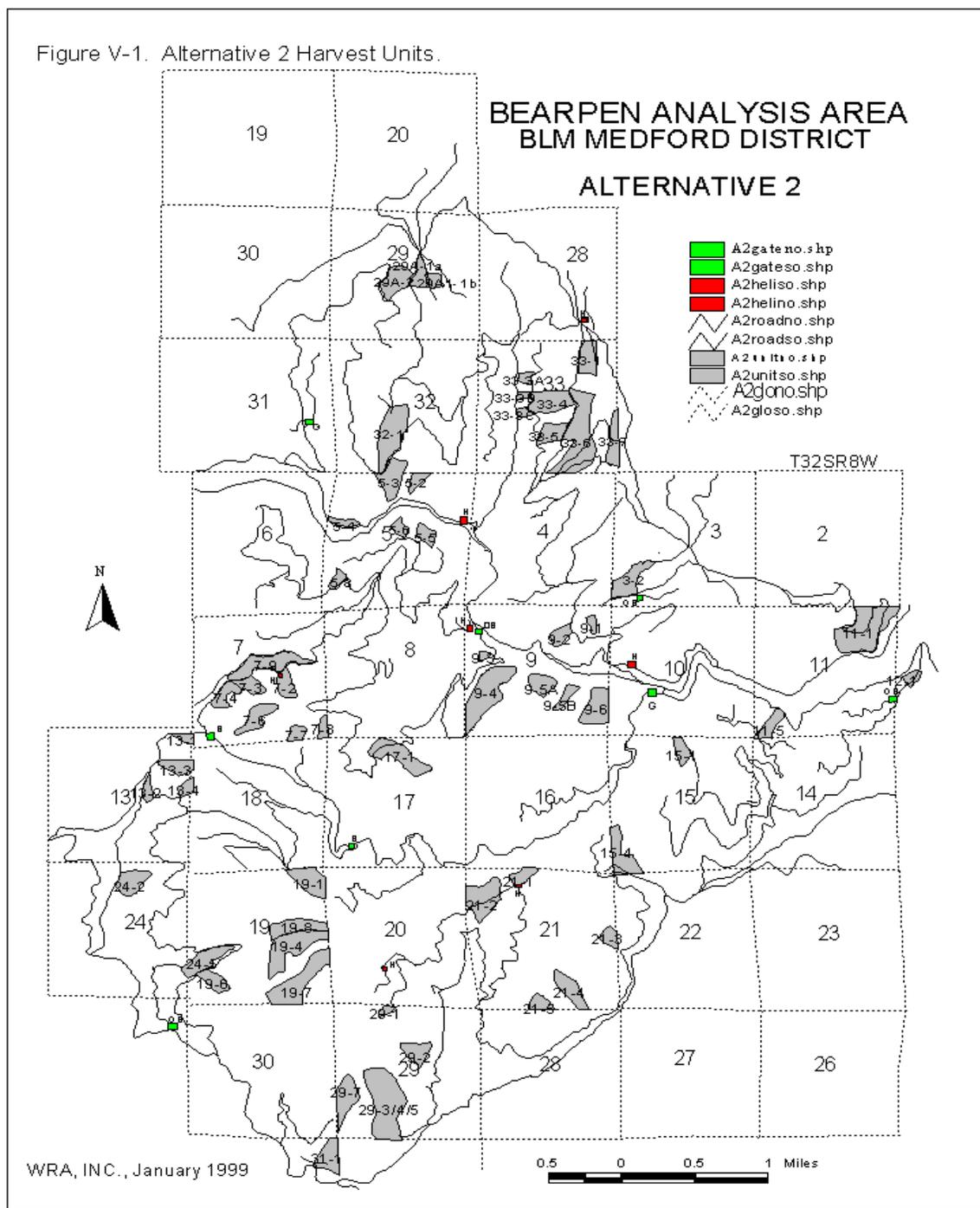


Figure IV-2 Alternative 3

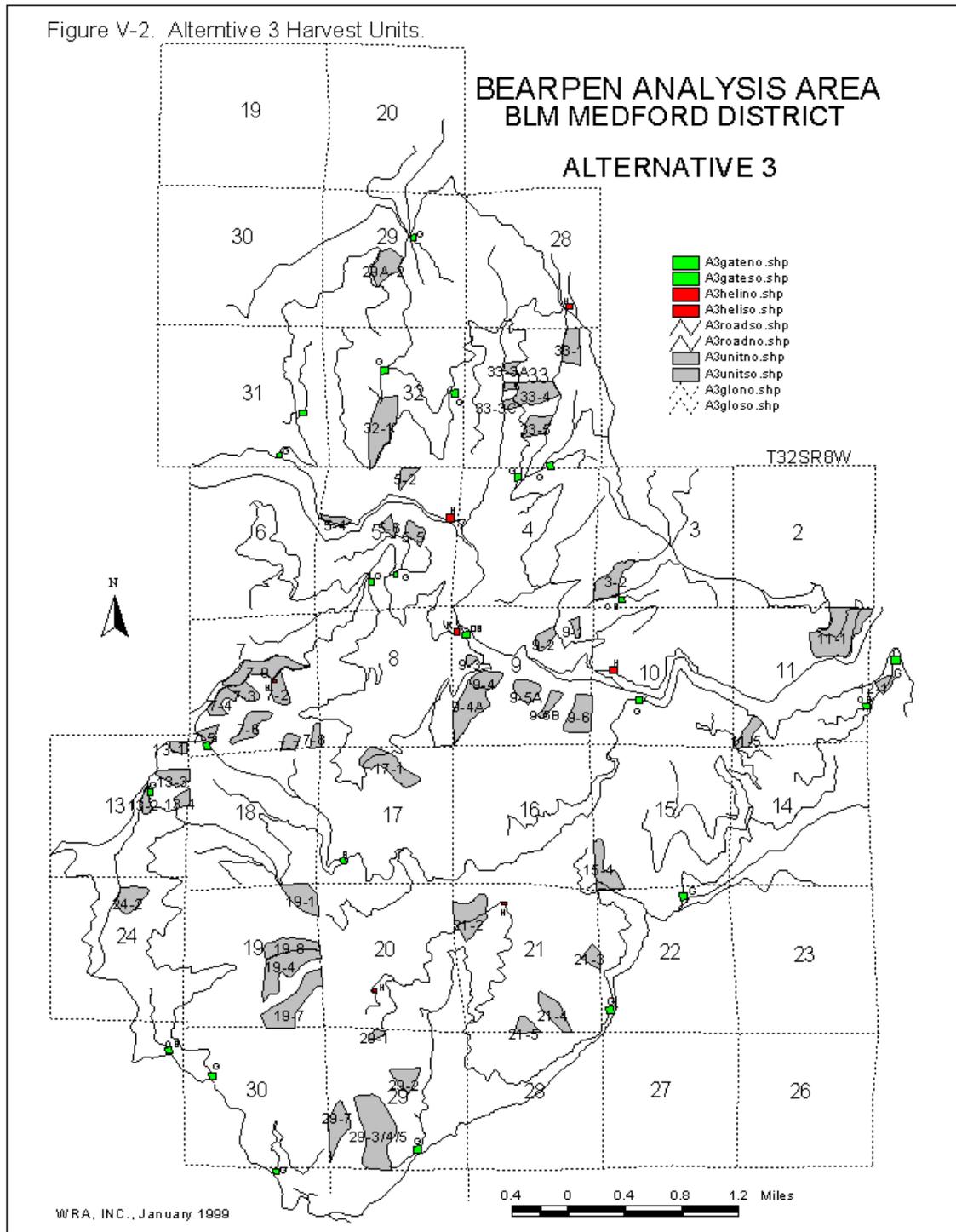


Figure IV-3 Alternative 4

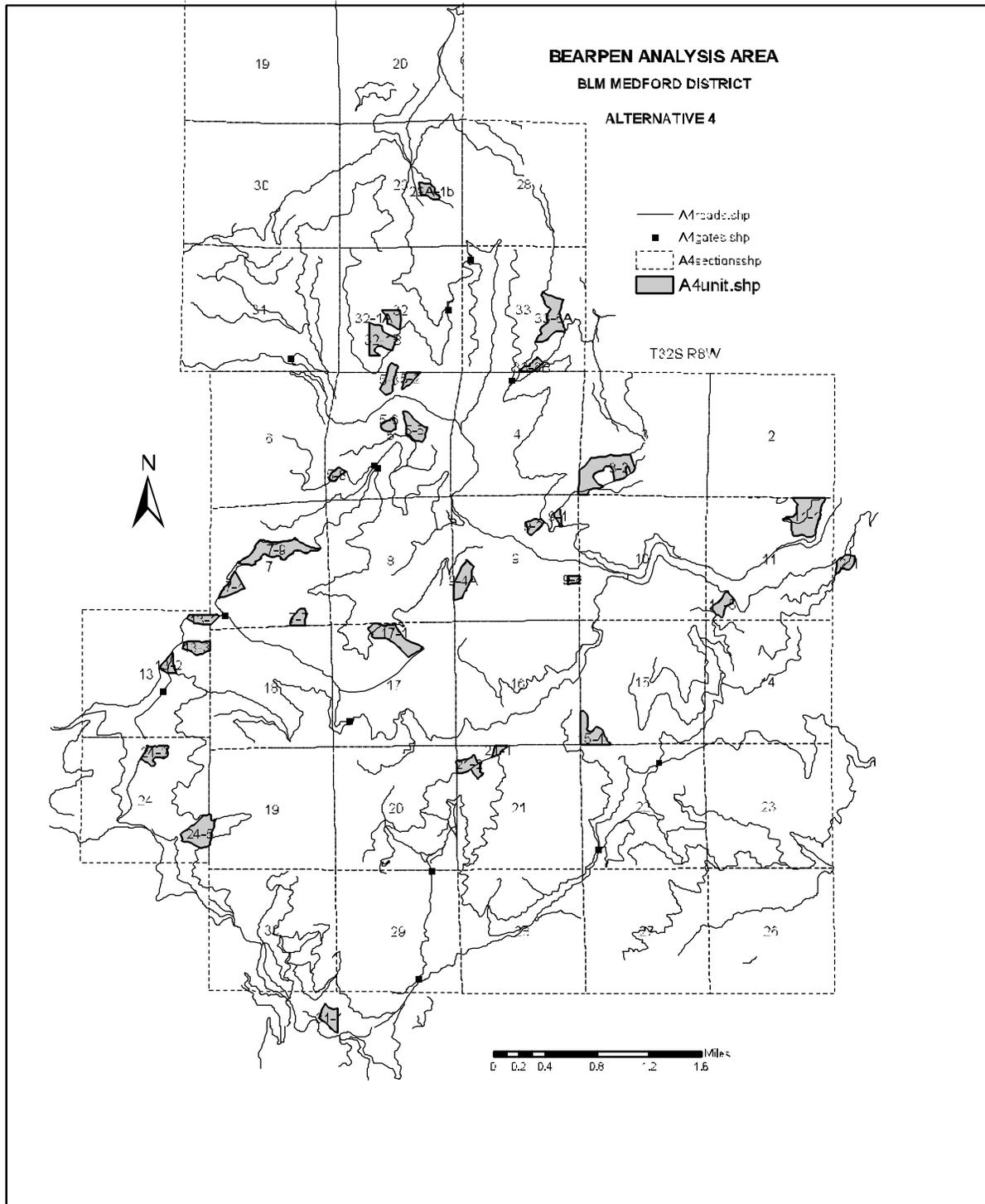


Figure IV-4 Alternative 5

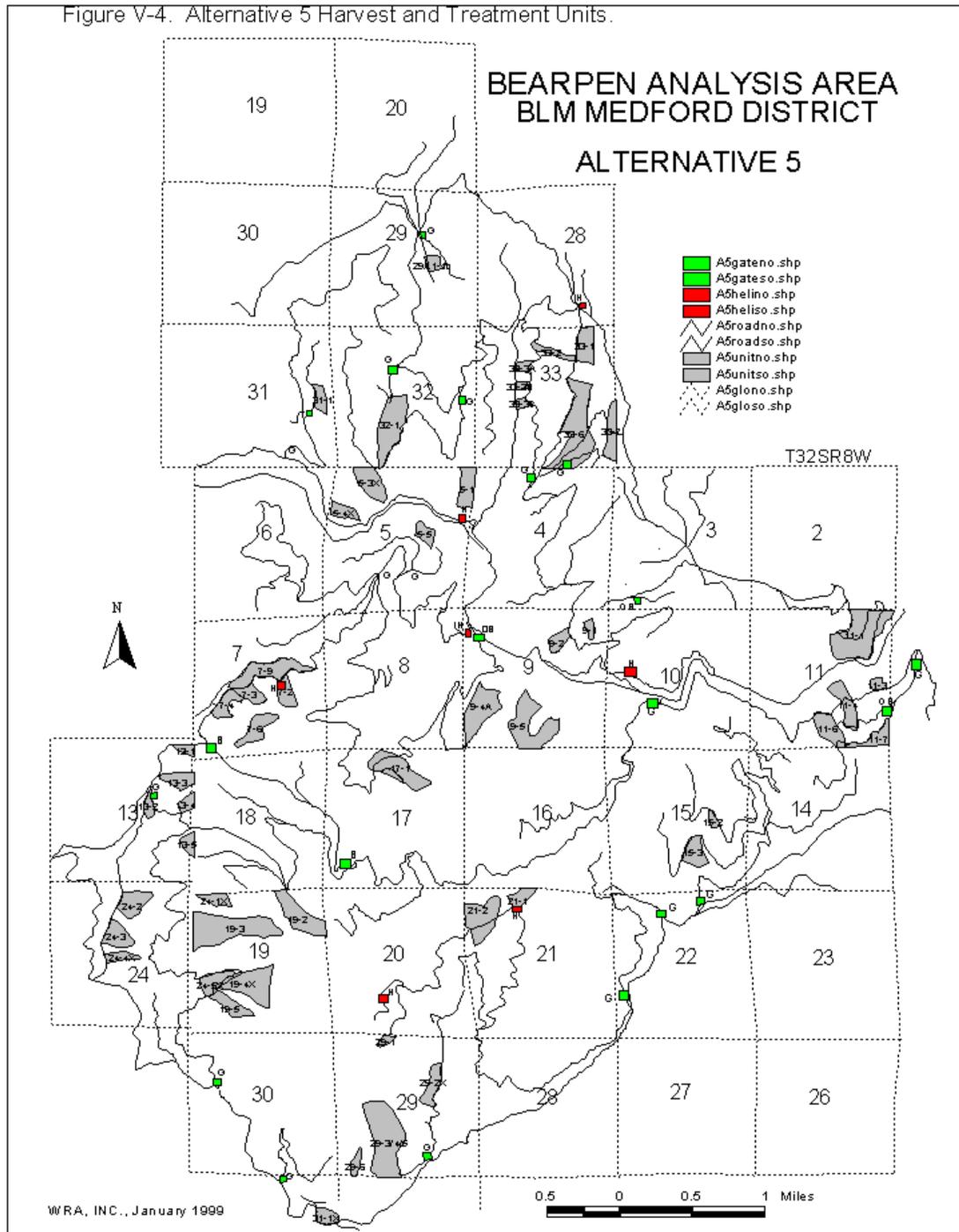


Table IV- 4. Summary of Specific Harvest Features by Alternative

SPECIFIC FEATURES	ALTERNATIVES				
	1	2	3	4	5
Timber Harvest Levels:					
Units Treated	0	59	49	29	52
Acres Treated	0	1,034.8	838.3	430	955.9
Volume Harvestable (MMBF)	0	11.3	8.9	5.2	4.5
Regeneration Harvest					
Units Treated	0	31	24	13	0
Acres Treated	0	517.3	410.9	196	0
Range in Unit Size (Acres)	0	3-43	3-43	3-45	0
Overstory Removal *					
Units Treated	0	16	12	7	13
Acres Treated	0	303.9	245.3	115	268.7
Range in Unit Size (Acres)	0	3-66	3-66	3-26	3-32
Commercial Thinning *					
Units Treated	0	14	13	9	16
Acres Treated	0	214	182	119	210.5
Range in Unit Size (Acres)	0	3-32	3-43	3-32	2-49
Restoration Thinning					
Units Treated	0	0	0	37	21
Acres Treated	0	0	0	583	465.3
Road Construction					
New (Miles)	0	0	0	0	0
Renovation (Miles)	0	34	0	17.1	1.2
Temp. Minimum Roads (Mi.)	0	1.6	0.1	0.1	0.1
Harvest Methods (Acres)					
Ground-based logging	0	132.5	36.9	60	105.5
Aerial Cable	0	518.4	289.5	153	222.0
Helicopter	0	383.5	511.5	217	142.0
Forest Residue Management					
Slash - Light (Acres)	0	62.3	30.8	80	9.0
-Medium	0	216.6	251.4	160	149.9
-Heavy	0	594.4	476.4	687	717.0

SPECIFIC FEATURES	ALTERNATIVES				
	1	2	3	4	5
Burn - -Broadcast	0	171.1	119.4	120	78.0
-Handpile Burn	0	260.7	160.6	657	642.5
-Underburn	0	221.5	176.8	164	165.9
Lop & Scatter	0	381.5	381.5	0	69.1
* Two harvest units have both overstory removal and commercial thin portions.					

Table IV- 5. Existing Road Segments Proposed to be Closed.

LOCATION	ROAD NUMBER	CLOSURE TYPE	ALTERNATIVE				
			1	2	3	4	5
T31SR8WS29 SW1/4 of NE1/4	31-8-29.1	NONE	-	-	0.5	0.5	0.5
T31SR8WS29 SW1/4 of NE1/4	4WD Trail	Gate	-	-	0.4	-	0.4
T31SR8WS31 SW1/4 of SE1/4	31-8-31.1	Farm Gate from 31-8-31.4	-	-	-	3.5	-
T31SR8WS31 NE1/4 of SE1/4	31-8-31.4	Remove and place on Rd. 31- 8-31.1	0.6	0.6	0.6	0.6	0.6
T31SR8WS32 SE1/4 of NE1/4	31-8-32	Renovate	-	2	2.8	2.0	2.8
T31SR8WS33 NW1/4 of NW1/4	32-8-33	Gate	-	-	1.1	.96	1.1
T32SR8WS3 NW1/4 of NW1/4	32-8-3.1	Earth Berm	-	0.4	0.4	0.4	0.4
T32SR8WS4 NE1/4 of NW1/4	32-8-4.1	NONE	-	-	-	0.0	-
T32SR8WS4 NE1/4 of NW1/4	32-8-4.2	Gate	-	-	1.3	1.3	1.3
T32SR8WS5 NW1/4 of SE1/4	32-8-5	Has Gate - Needs lock	-	-	1.2	1.2	-
T32SR8WS5 NW1/4 of SE1/4	32-8-5.2	NONE	-	-	-	-	-
T32SR8WS7 SW1/4 of NW1/4	32-8-7.1	NONE	-	-	-	-	-
T32SR8WS5 SE1/4 of SW1/4	32-8-9-lower	Gate	-	-	4.9	4.9	-

LOCATION	ROAD NUMBER	CLOSURE TYPE	ALTERNATIVE				
			1	2	3	4	5
T32SR8WS5 SE1/4 of SW1/4	32-8-9-upper	Gate	-	-	-	0.56	-
T32SR8WS9 SE1/4 of NE1/4	32-8-9.1	NONE	-	-	-	-	-
T32SR8WS9 NW1/4 of NW1/4	32-8-9.2	NONE	-	-	-	-	-
T32SR8WS7 SW1/4 of SW1/4 T32SR8WS17 SW1/4 of SW1/4	32-8-17	Remove earth berm at upper end and install gate	1.5	1.5	1.5	0.62	1.5
T32SR8WS10 NE1/4 of SW1/4	32-8-10	Earth Berm By jct.32-8-17	11.1	11.1	11.1	3.9	11.1
T32SR8WS10 NE1/4 of SW1/4	32-8-10.2	NONE	-	-	-	-	-
T32SR8WS11 NE1/4 of SE1/4	32-8-11	NONE	-	0.6	0.6	-	0.6
T32SR8WS11 NW1/4 of SE1/4	32-8-12	NONE	-	-	1.7	-	1.7
T32SR8WS12 NW1/4 of SE1/4 s	32-8-12	NONE	-	-	1.7	-	1.7
T32SR9WS13 SW1/4 of NE1/4	32-8-13.1	Gate - upper end Earth Berm - lower end	-	-	-	0.3	-
T32SR8WS15 NE1/4 of NE1/4	32-8-15.1	NONE	-	-	-	-	-
T32SR7WS19 NW1/4 of Nw1/4	32-7-19.3	NONE	-	-	-	-	-
T32SR8WS22 NW1/4 of NE1/4	32-8-22	Gate	-	-	7.6	2.6	7.6
T32SR8WS22 SW1/4 of SW1/4	32-8-22.1	Gate	-	-	5.4	5.4	5.4
T32SR8WS22 SW1/4 of NW1/4	32-8-22.2	NONE	-	-	1.9	-	1.9
T32SR8WS29 SW1/4 of SE1/4	32-8-29	Gate	-	-	2.1	1.0	2.1

LOCATION	ROAD NUMBER	CLOSURE TYPE	ALTERNATIVE				
			1	2	3	4	5
T32SR8WS30 SW1/4 of NW1/4	32-8-30.1	NONE	-	-	4.2	-	4.2
T32SR8WS31 SW1/4 of SE1/4	32-8-31.4	NONE	-	-	1.3	-	1.3
T32SR9WS25 NE1/4 of NE1/4	32-9-25.1	Earth Berm	-	0.6	0.6	0.57	0.6
T32SR8WS31 SE1/4 of NE1/4	32-8-31	NONE	-	-	-	-	-
Total Road Miles (mi.) =106.2			106.2	103.6	103.6	104.97	104.6
Miles of Open Road			94.5	94.5	52.7	9.8	2.7
Proposed Roads for Decommissioning (mi.)			0.0	2.6	2.6	1.3	2.0
Proposed New Roads for Construction (mi.)			0.0	0.0	0.0	0.0	0.0
Total Road Density (mi/mi ²)			4.9	4.8	4.8	4.8	4.8

Proposed Roads To Be Gated (mi.)	0.0	0.0	41.8	14.7	31.8
Total Gated Roads (mi.)	11.7	11.7	53.5	26.4	43.5
Open Road Density (mi/mi ²)	4.4	4.2	2.4	3.6	2.8

Proposed Temporary Roads (mi.)	0.0	1.6	0.1	0.1	0.1
Proposed Renovation (mi.)	0.0	34.0	0.0	17.1	1.2

5.0 AFFECTED ENVIRONMENT

5.1 INTRODUCTION

Chapter V describes the physical, biological, social components of the environment that might be affected by the alternatives. Discussion of the affected environment is divided into forest environment components. Most components are discussed from two viewpoints: the existing conditions of the area and the area that might be affected.

The following list of critical elements (BLM Handbook) were considered but only those elements present or affected have been analyzed.

Resource Affected	Y or N	Resource Affected	Y or N
Air Quality	Y	Threatened & Endangered Species	Y
ACEC	N	Wastes, Hazardous/Solid	N
Cultural	N	Water Quality	Y
Farmlands, Prime/Unique	N	Riparian Zones	Y
Floodplains	N	Wild & Scenic Rivers	N
Native American Religious Concerns	N	Wilderness	N
Invasive Species	Y	Environmental Justice	N
Energy	N		

5.2 DESCRIPTION OF THE AFFECTED ENVIRONMENT

Analytical Watershed (fifth field): West Fork Cow Creek
 Analysis Area (sixth field watersheds) Bear Creek
 Counties: Douglas and Josephine
 Legal Land Location: T.31S.,R.8W., Sec. 20, 29, 31,32 and 33
 T.32S., R.9W., Sec. 13, 24
 T.32S.,R.8W., Sec. 3, 5, 7, 9, 11, 12, 15, 17, 19, 21,
 29, 31
 Connectivity Sections: T.31S.,R.8W., Sec 29 and T.32S.,R.8W., Sec. 11, 15, 19

The BLM administers 7,642 acres (56 %) of the 13,692 Bear Pen Analysis Area. The remaining 6,050 acres (44%) are under private ownership. The 6th field Bear Creek Watershed forms the boundaries of the Analysis Area and part of the larger fifth field 55,843 acre West Fork Cow Creek Watershed.

Elevations within the Analysis Area range from about 1,000 feet at the mouth of West Fork Cow Creek to slightly over 3,000 feet at both the north and south ends of the Analysis Area. It is considered to have a Mediterranean climate with an average annual precipitation ranging from 42 to 88 inches, mostly as rain during the winter months. Extended summer drought is common.

Most of the BLM lands in the Analysis Area (5,199) has been designated General Forest Management Area (GFMA) in the Medford District Resource Management Plan. GFMA is the BLM allocation where timber harvest is a primary objective. The four “Connectivity/Diversity” blocks (sections) within the Analysis Area total 2,380 acres. There are nearly 780 acres of GFMA lands withdrawn from intensive timber harvest, mostly due to rocky soils which preclude successful replanting. There are about 74 acres of late successional reserve found in the southeast portion of T32S,R8W,Sec.3.

Connectivity/Diversity blocks are generally square mile sections in which at least 25-30 percent of each block will be maintained in late-successional forest conditions. They are designated to promote movement of late-successional wildlife species across the landscape and add richness and diversity to the land outside the late-successional reserves (LSRs).

The West Fork Cow Creek Watershed has been designated a Tier 1 Key Watershed in the District RMP and is an integral part of the Aquatic Conservation Strategy. Key watersheds are areas identified as being crucial for maintenance and recovery of habitat for “at-risk” stocks of anadromous salmonids and resident fish species. These refugia include areas of good, as well as, degraded habitat. Areas in good condition will serve as anchors for the potential recovery of depressed stocks. Areas with lower quality habitat, but with potential for restoration will become future sources of good habitat upon implementation of a comprehensive watershed restoration program.

There are 621 acres within the Analysis Area that have been designated as critical habitat for the northern spotted owl, a federally-listed threatened species. The primary purpose of the critical habitat units is to help provide east-west dispersal of owls between the Klamath and Coast Range provinces and the Cascade Mountain province.

The Analysis Area is part of the larger West Fork Cow Creek Elk Management Area.

5.3 AIR QUALITY

Air quality concerns in the Bear Pen Analysis Area are regulated by the 1963 National Clean Air Act as amended in 1966, 1970, 1977 and 1990. The 1977 amendment provided for the prevention of significant deterioration (PSD) program. The intent of the PSD program is to limit air degradation in those areas of the country where the air quality is much better than standards. Under this provision, certain national parks and wilderness areas were designated as Class I Airsheds whereas the remainder of the country was designated Class II. Although the PSD permit provisions of the Clean Air Act apply only to major stationary sources of air pollution (motor vehicles are mobile sources), the Environmental Protection Agency (EPA) uses them to determine the degree of potential impacts of other sources on air quality. Forest management activities in the Bear Pen Analysis Area do not require a PSD permit and are not located adjacent or near any National Park or Wilderness Class I Airsheds.

Three agencies have air quality responsibilities in Douglas County: the United States Environmental Protection Agency (EPA), the Oregon State Department of Ecology (ODE), and the Douglas County Clean Air Authority (DCCAA). The DCCAA, along with the EPA and the ODE, have primary air quality jurisdiction for all of Douglas County. The DCCAA has adopted the National Ambient Air Quality Standards (NAAQS) established by the EPA. The compounds identified in the NAAQS are termed “primary pollutants.” Primary pollutants of concern to the DCCAA are (1) inhalable particulate matter [PM_{10} and $PM_{2.5}$], (2) carbon monoxide [CO], (3) ozone [O_3], (4) sulfur dioxide [SO_2], (5) nitrogen oxides [NO_x] and (6) lead [Pb].

No monitoring of these primary pollutants have occurred in the vicinity of the Bear Pen Analysis Area. Thus, there are no known baseline levels for these pollutants.

The federal Clean Air Act requires protection of air quality related values including visibility in mandatory “Class I” areas – public lands where the view is an important part of their value and includes certain national parks and wilderness areas.

The federal strategy for visibility improvement calls for a two-phased effort. Thus far, visibility program efforts have focused on large sources, referred to as Phase I sources, that have obvious negative impacts on visibility. Obvious impacts mean visual plumes extending from a large source to the area of visibility impairment. There are no visual plume/large source areas in the vicinity of the Bear Pen Analysis Area.

Phase II, regional haze, is more complex. While scientific and technical limitations to understanding regional haze have long prevented the EPA from proceeding with the development of a Phase II program to deal with regional haze, these issues have largely been overcome and the EPA is in the process of developing regulations.

5.3.1 Existing Conditions

Although there is no known historic air quality and visibility data for natural ecosystems in Oregon, burn mosaics of forest lands provide evidence that fire has historically played a role in the vegetative dynamics of the Bear Pen Analysis Area and surrounding forest lands.

In general, the amount of smoke generated annually from forest fires, including both wildfires and prescribed fire has generally decreased since the turn of the century. Prior to that time large fires infrequently occurred on lands in southwest Oregon (USDI BLM 1997). These fires would generate smoke for a period of a few hours to as long as three to four months. The effect of settlement and subsequent fire protection has been to reduce the amount of area burned and to reduce the duration of smoke emissions from wildland fires. In the case of prescribed fire, the amount of smoke generated has been reduced from earlier levels of post-settlement burning by scheduling burns during periods of good smoke dispersion.

Air quality in the Bear Pen Analysis Area, predominately affected by sea breezes off the Pacific Ocean, is generally considered good to excellent throughout the year. Smoke and dust accumulations may cause a late summer season deterioration of air quality. Smoke is generated from distant industrial

burning, prescribed forest burning, residential wood stoves and agricultural field burning. Dust, which is quite limited, results primarily from vehicle traffic on gravel and native-surface roads.

The key air resource issue is the protection of air quality. An indicator, the effects of the activity on Class I Airsheds, is used to determine if the proposed action would affect the air resource. The Bear Pen Analysis Area is not within or adjacent to any Class I Airshed. The closest Class I Airshed is Crater Lake National Park, more than 50 miles to the east. The Analysis Area is not in an Oregon “non-attainment” ambient air quality standard area.

BLM District air quality objectives are shown on Page 40 of the Resource Management Plan (USDI BLM 1995).

5.4 SOCIAL

Many communities within the zone of primary influence (Douglas and Josephine Counties) partially depend on the BLM Medford District. Population, economic well-being lifestyles, attitudes, beliefs, values and social structures are related to federal forest management activities to a certain extent. In fact, many of the issues, concerns and opportunities identified in developing the District’s Resource Management Plan reflect the importance of federal forest lands to both the local and regional economies.

5.5 FIRE

Fire has played an important role in the West Fork Cow Creek Watershed including the Bear Pen Analysis Area. Photographs taken in 1953 show a pronounced mosaic of burned and unburned stands and the 1916 revestment surveys contain frequent references to major burns. The fire frequency for southern Oregon has been reported as from “less than three years” to “more than 50 years” and from “20 to 200 years” (BLM 1992). While it is not possible to determine the exact fire frequency for the Analysis Area, it most likely averages about 50 years with hot, dry south faces being more frequent and cool, wet north faces probably greater than 100 years.

In the West Fork Cow Creek watershed, the highest fire hazard is associated with recent precommercial thinning activity. The high hazard generally persists for 2-4 years until the slash decomposes to some extent. Hazardous sites exist as isolated, scattered harvest units located throughout the Analysis Area. Widespread unthinned plantations 10-30 years old (common on private ground) were designated as having moderate hazard for fire.

A review of the ZAP database of recent lightning strikes (USDI BLM 1997) did not reveal any distinct area of high lightning occurrences in the West Fork Watershed. Thus, it is assumed that the probability of a lightning strike in the Analysis Area is relatively uniform. Rather than from natural storm induced lightening, the major fire risk appears to be along major travel routes.

Fire management activities are most concerned about the spread of wildfire into the high value Bobby Creek RNA/ACEC area to the west of the Analysis Area.

5.6 CULTURAL RESOURCES

The following information was provided in a personal communication from Kate Winthrop, October 15, 1998 (USDI BLM).

The former town of West Fork at the mouth of the West Fork of Cow Creek and near the Analysis Area has numerous historic trails leading through the area. The 1916 revestment survey notes list trails in T31SR8WS29 and T32R8WS3, 5, 7, 9, 11 and 17. Telephone lines and trails are listed in Section 11, north of West Fork Cow Creek.

There are no recorded sites in the proposed harvest units. However, site 35HS11-291 (Mystery Miners Cabin - Key Elk) is close to a unit in T31SR8WS31. There is also a house listed on the GLO notes which is near Jackass Prairie in T32SR8WS3, possibly close to a unit. There was a lookout on Ninemile Mountain.

Expected cultural resources that may be found in the Analysis Area include trails and trail markers (e.g. blazed trees); telephone lines; possibly historic cabins; and possibly prehistoric resources related to travel along trail routes.

5.7 MINERALS, GEOLOGY AND SOILS

There are no known mineral deposits or claims within the Analysis Area.

The Analysis Area is located within the Klamath geomorphic province and is characterized by a mixture of sedimentary, metasedimentary and metavolcanic rock types. Soils within the Analysis Area have developed from these rock types. Soils associated with the sedimentary rock type tend to be relatively deep and gently sloping. Soils developed from metasedimentary rock tend to be moderately deep on slopes less than 60 percent. Soils developed from metavolcanic rock types tend to be shallow.

The Douglas Count Soil Survey shows there are 10 soil types distributed across the Bear Pen Analysis Area:

- 230 Atring very gravelly loam; 60-90% slopes
- 239 Atring-Vermisa Complex; 60-90% south slopes
- 505 Acker-Norling Complex 30-60% north slopes
- 520 Dumont gravelly loam; 12-30% slopes
- 521 Pollard gravelly loam; 3-30% slopes
- 935 Bigdutch gravelly loam; 30-60% slopes
- 1182 Josephine-Speaker Complex; 30-60% south slopes
- 1236 Beekman-Vermisa Complex; 60-90% south slopes
- 1510 Acker Norling Complex 30-60% south slopes
- 2286 Kanid-Atring Complex; 60-90% north slopes

Primary erosion processes in the Analysis Area are the following.

- Road building
- Logging activities create soil disturbance.
- Translational and rotational land slides which make direct channel deposits and dam stream channels.
- Floods.
- Road traffic, especially log hauling in wet weather periods.
- Normal road maintenance activities.

Road building has created the largest erosion problem. The primary action adversely affecting watershed condition include roads undercutting the natural slide areas, inappropriate road location, interception of subsurface waters and channeling of surface waters.

Soil conditions present the largest variation within the Analysis Area in terms of timber productivity. The drier areas along with rocky, shallow soils in the Bear Creek Watershed markedly reduces timber productivity as compared to elsewhere in the West Fork Cow Creek Watershed.

5.8 NOISE

There are no noise issues in the Analysis Area. However, the use of helicopters in the vicinity of northern spotted owl habitat during the nesting period is of concern.

5.9 RECREATION

Most recreationists using the Bear Pen Analysis Area and the larger West Fork Cow Creek Watershed come from the Glendale, Riddle, Powers and Camas Valley areas with roughly 10 percent of the use coming from areas more than 50 miles away (USDI BLM 1997). Most of the users from outside the area are passing through on their way to or from the coast.

Hunters traditionally use a few dispersed recreation camp sites along the major travel routes. There are no maintained recreation camp sites within or adjacent to the Analysis Area.

There is some level of interest in the West Fork Cow Creek Watershed for both mountain and road biking. No formal trails or routes have been identified with the exception of the main Glendale-Powers Route which passes along the southern boundary of the Analysis Area.

Hiking is generally not a recreation activity that occurs within the Analysis Area. Recent concerns about population declines of salmon and trout has prompted the Oregon Department of Fish and Wildlife to close all streams in West Fork Cow Creek watershed to fishing to prevent mortality of juvenile salmon and steelhead.

5.10 SCENERY

There are no designated view corridors or scenic points of interest in the Analysis Area. There are no scenery issues associated with this analysis. All of the Bear Pen Analysis Area is classified as Visual Resource management (VRM) Class IV in the District RMP.

5.11 TRANSPORTATION

There are approximately 106.2 miles of road within the Bear Pen Analysis Area. Road density is a measure of drainage alteration and an increase of intermittent stream channels as well as affecting security habitat for wildlife. Road densities above 2 miles per square mile are cause for concern with respect to hydrologic response and 1 mile per square mile for wildlife security values. Analysis shows an average road density in the entire Analysis Area (HUC 6) of 4.9 miles per square mile.

5.12 VEGETATION

The major plant series within the Bear Pen Analysis Area is the Douglas-fir Series (*Pseudotsuga menziesii*) (USDA Forests Service 1996). This series is characterized by an overstory of Douglas-fir with a minor component of sugar pine (*Pinus lambertiana*), incense cedar (*Libocedrus decurrens*) and ponderosa pine (*Pinus ponderosa*). A major plant association within the Douglas-fir Series of special management concern is the Douglas-fir/tanoak/canyon live oak association (*Pseudotsuga menziesii-Quercus chrysolepis-Lithocarpus densiflora*). This plant association dominates the southerly aspects and shallow soils in the Bear Creek watershed.

In each of these vegetation types, the early seral vegetation is somewhat different than the understory vegetation in a later seral stage forest. Varnishleaf ceanothus and deer brush ceanothus are often dominant early seral shrub species on all but the drier, rocky shallow soil sites. Manzanita along with canyon live oak are early seral species on the drier sites such as the canyon live oak plant association.

Other special habitat features such as rock outcrops, cliffs, caves and talus slopes occur throughout the Analysis Area as scattered small inclusions.

There is little quantitative information on the naturally occurring levels of coarse woody debris (CWD) in the Analysis Area. Surveys in the nearby Elk Valley Creek and Bobby Creek subwatersheds of the West Fork watershed suggest natural CWD levels are quite variable. Observations in the area suggest that plant communities which do not support old-growth forest conditions likely do not have the levels of naturally occurring CWD specified in the District RMP.

Historically, the Analysis Area was primarily forested. Aerial photos taken in 1953, prior to any major timber harvest on BLM lands show an extensively forested landscape, although the Bear Creek area had a relatively sparse tree cover, particularly on ridges.

Effective fire suppression in Southern Oregon, beginning around 1900, has had an influence on the landscape as compared to pre-settlement times. The effects of decades of fire suppression has led to the encroachment of trees on areas that previously were more open. Historically, the acreage of mature and late seral forest was greater than at present due primarily to timber harvest since the 1960s. Also, the acreage of young forest and shrub vegetation was historically less than today primarily as a result of more recent harvest and reforestation practices. However, the forested areas in the watershed are slowly expanding and the competition from undergrowth is increasing (WA, 22).

Stands over 80 years with less than 70% crown closure are generally natural stands growing on shallow, rocky, droughty or low nutrient soils. These areas in the Analysis Area coincide with the present day vegetation community of the Douglas-fir/tanoak grouping that is dominated by canyon live oak. Canyon live oak occurs on rocky shallow soils, most frequently on south aspects.

The stands classified as “modified 80-200 year old” stands in the Analysis Area are generally modified stands that are the result of past partial cutting in heavy overstory stands. Some of the stands listed above may be included in the mapping of the “modified 80-200 year old” stands.

The current seral stage distribution on BLM lands within the Analysis Area has direct implications on timber production as well as for management for wildlife, especially those species associated with older forest conditions. The distribution of seral stages among the land use allocations is important; older forests are available for timber harvest only when they occur on GFMA lands. Conversely, older forests would provide long-term habitat for late-successional species only on lands designated as some type of reserve.

Port Orford Cedar (*Chamaecyparis lawsoniana*) has been located along the main stem of West Fork Cow Creek and some tributary streams.

5.13 SPECIAL STATUS AND SURVEY AND MANAGE PLANTS

5.13.1 Vascular Plants

Surveys for vascular plants were conducted in 1999 for potential timber sale and fuels units. Survey methods conformed to protocols (BLM IM OR-99-26). Twenty six *Allotropa virgata* populations were found. This is considered a late-successional species. *Allotropa virgata* has been removed from Survey and Manage in the Record of Decision for Amendment to the Survey & Manage, Protection Buffer, and Other Mitigation Measures Standards and Guidelines (2001).

Allium bolanderi var. *mirabile* is a Bureau Tracking species that was found in the Analysis Area. Tracking species do not require specific protection measures. *Asarum caudatum* var. *novum* and *Astragalus umbraticus* were also found but have been removed from the special status species list due to their relative abundance.

Fritillaria gentneri is listed endangered under the Endangered Species Act. Its range does not include the Analysis Area and was not found in plant surveys.

5.13.2 Non-vascular Plants - Lichens, Bryophytes and Fungi

All harvest units were surveyed for special status, and survey and manage, lichens and bryophytes. Pre-disturbance surveys are required for some lichens and bryophytes, but are not for fungi under the Record of Decision for Amendment to the Survey & Manage, Protection Buffer, and Other Mitigation Measures Standards and Guidelines (2001). The Oregon BLM list of Special Status Species also includes lichens, bryophytes and fungi. All of the Special Status fungi are Tracking species and surveys are discretionary (BLM Manual 6840).

Buxbaumia viridis is a moss that grows on down logs in an advanced state of decay. It is currently a survey and manage category D species, and protection is not required. It was found in several proposed units. A lichen, *Ramalina thrausta*, (survey and manage category A) was found. It is a late-successional species that grows sporadically in low elevation forests, often in riparian areas.

5.14 NOXIOUS WEEDS

Noxious weeds are occasionally found across the Analysis Area. Noxious weeds have no native enemies and are able to spread quickly, especially along road sides and disturbed areas. Because they are already present, mitigating measures will be taken to help slow their rate of spread. However, they are not considered to be a major problem at this time except Scotch broom and diffuse knapweed, which at the present time occur in Section 11 along the West Fork Cow Creek. Other species of concern include yellow star thistle, tansy ragwort, Canada thistle and meadow knapweed. Road maintenance, road building and road use are the primary means of spreading noxious weeds in the Analysis Area.

5.15 WATER

5.15.1 Hydrologic existing condition

Riparian connectivity on BLM lands is relatively intact in the Analysis Area as 71% of riparian reserve acreage is late successional (West Fork Cow Creek Watershed Analysis update, 3/10/99).

Transient Snow Zone openings (TSZ) percentages are used to evaluate the risk of rain-on-snow events which potentially can destabilize stream channels. Open area that exceeds 25 percent of the TSZ acreage has the potential for channel alternation. Several 7th field subwatersheds in the Bear Creek 6th field exceed this level of concern (West Fork WA, page 89).

Soil compaction where infiltration is reduced is correlated with increased runoff during rainfall events. These erosional forces and resulting sedimentation of stream courses are partially responsible for reduced spawning and rearing habitat for aquatic species. Compaction covering more than five percent of the watershed are considered problematic. About 9% of the Bear Pen Analysis Area is compacted and could be affecting peak flows.

Road density is one indicator of potential drainage alteration and an increase in intermittent stream channels. Road densities above 2 miles per square mile are cause for concern with respect to hydrologic response. There are about 106 miles of road within the Bear Creek HUC 6 Analysis Area with an average density of 4.9 miles per square mile.

The trigger value or level of concern associated with each of these four environmental parameters is approximate and may vary according to physical characteristics of individual watersheds. Appropriateness of each trigger value for site conditions is evaluated by a qualified resource specialist.

Streams within the West Fork watershed have been evaluated in terms of their Stream Functional Conditional Rating. This evaluation of streams includes bank channel stability, coarse woody debris,

and riparian vegetation as reported in the West Fork Cow Creek Watershed Analysis (USDI BLM 1997).

Flows in the West Fork Cow Creek watershed are highly variable ranging from a peak discharge of 15,700 cubic feet per second in 1964 to a minimum flow of near 3.0 cubic feet per second. The average maximum flood flow for the 87.25 square mile West Fork Cow Creek watershed is 180 cubic feet per second per square mile. Exceedingly high flows on streams were observed in the Analysis Area on November 30 and December 1, 1998 with much debris and sediment being transported.

Summer and early fall discharges drop to 0.1 cubic feet per second or less per square mile. This low flow regime causes pooling and slow water which allows for increased stream water temperatures. Ambient air temperature and direct solar radiation frequently warm stream water to temperatures higher than optimal for salmonid species. The absence of riparian vegetation to shade stream channels in some areas further contribute to high stream water temperatures.

As noted earlier in the Soils Section of this Chapter, road building has accelerated the erosional process, thereby, leading to accelerated stream sedimentation. Road building in the Analysis Area has resulted in the interception of surface and subsurface water flows. Roads have channeled water into ditches and interrupted springs and normal ground water flow. The compacted road surface has increased runoff. Improper maintenance of roads has led to failures of road prisms. The position of roads on mid-slopes and in riparian zones have also greatly altered hydrologic functions within the Analysis Area.

5.15.2 Fish Habitat

The West Fork Cow Creek watershed provides habitat for coho and chinook salmon, and cutthroat and steelhead trout.

Oregon Coast coho salmon has been listed as Threatened and Oregon Coast steelhead as a Candidate under the Endangered Species Act. Table II-1 shows the miles of streams known to support salmonid species in the Bear Pen Analysis Area. Non-game species such as speckled dace, Pacific lamprey, sculpin and redbside shiner also inhabit streams in the watershed. Fish population data in the Analysis Area are not available.

Table V-1. Miles of Fish Habitat within the Bear Pen Analysis Area.

STREAM	COHO	CHINOOK	STEELHEAD	CUTTHROAT TROUT
West Fork Cow Creek	6.1	6.1	6.1	6.1
Bear Creek	2.8	-	5.2	10.1
Slotted Pen Creek	0.0	0.0	0.3	0.3
Goat Trail Creek	0.3	-	0.5	0.8
Total	9.2	6.1	12.1	17.3

Use of the Klamath/Siskiyou Mountains Matrix of Factors and Indicators to evaluate stream, riparian and watershed conditions (Appendix C, USDI BLM 1997) suggest that most fish habitat in the Analysis Area is in fair condition. No streams were considered to be “Not Properly Functioning.” However, the fish habitat in Bear Creek and the main stem of the West Fork Cow Creek is in the poorest condition of habitat evaluated in the West Fork Cow Creek Watershed. The primary factors that appear to be causing reduction in fish habitat quality are timber harvest and roads on private lands. The three major factors affecting fish habitat in the Analysis Area are elevated stream water temperature, accelerated sedimentation, and reduced coarse woody debris.

5.15.3 Stream Water Temperature is one of the most important variables controlling habitat suitability for salmonids. Optimum temperatures are 55 to 60⁰ F with temperatures over 64⁰ F considered a threat to salmonid health. Because of stream channel widths, protection of riparian vegetation would provide shade for natural control of stream temperatures. Stream temperature has been monitored at the mouth of Bear Creek and the West Fork Cow Creek since 1993.

Stream temperatures in West Fork Cow Creek exceed the ODEQ water quality standard for fish bearing streams most days from mid-June to mid-September and from late-June through mid-August in Bear Creek. There is no temperature data for Slotted Pen Creek.

5.13.4 Sedimentation created by soil erosion from roads and naturally unstable areas, as well as past and current timber harvest units near streams is a major source of habitat degradation in the Analysis Area.

5.13.5 Coarse Woody Debris (CWD) is considered adequate for fish production and proper functioning streams in the Klamath province when there are two to three “key” pieces per 100 meters of stream. A “key” piece of CWD is defined as larger than 0.6m x 10m. The CWD levels for the reach of West Fork Cow Creek within the Analysis Area and for nearly all fish habitat in Bear Creek are far below this standard, ranging from 0 to 0.2 pieces per 100 meters of stream channel. CWD has not been quantified for Slotted Pen Creek, but it is believed to also be very low.

5.14 WILDLIFE

5.14.1 Late-Successional Habitat Characteristics

Historically, the late-successional habitat in the Analysis Area probably was more contiguous on the landscape, except for smaller inclusions of earlier seral stages and opening resulting from fire, wind storms, rocky soils or disease.

Most old-growth stands in the Analysis Area have a closed canopy, with widely spaced, large, old conifer trees. The lower canopy layers consist of hardwoods and pole-size conifers between the larger conifers. The oldest trees tend to occur on rocky talus slopes because there is less fuel buildup resulting in fewer fires and less competition with brush and other vegetation for resources. Intense stand replacing fires occurred less frequently in these stands and natural thinning has resulted in low density, nearly pure Douglas-fir stands. Deeper soils and more gradual slopes with better site productivity contain younger trees due to frequent fire incidence, and greater vegetative competition. It is unlikely

for trees within the Analysis Area to grow older than 400 years old because of the harsh conditions and historic fire incidence (WA 31).

Late successional habitat within the Analysis Area is currently highly fragmented due to land ownership and harvest practices. Moderately large, section-sized blocks of late-successional habitat, however, does occur in the Bear Creek drainage. About 5,133 acres, or 67 percent, of the federal lands in the Analysis Area is late successional forest. A large block of late-successional habitat remains fairly intact within the adjacent Bobby Creek watershed and would remain intact in the Research Natural Area.

The Analysis Area is located in a regional area of concern for dispersal and gene flows east and west between the Coast Range province and the Cascade province. Species with high mobility, such as northern spotted or great gray owls, can move fairly long distances between isolated refugia of late-successional habitat. Species with low mobility, such as salamanders and mollusks, are more restricted in their dispersal capability. Sufficient connectivity for these low mobility species is a primary concern in the Analysis Area.

The project area contains habitat for several mollusc species, including one survey and manage mollusc, the Oregon shoulderband, *Helminthoglypta hertleini*, whose habitat is associated with both rocky, coniferous, and hardwood stands.

The total amount of bat habitat in the project area is unknown. It appears from field visits that with patches of late-successional and old-growth forest, there is some bat roosting habitat spread throughout the analysis area

Riparian connectivity on BLM lands is relatively intact in the Analysis Area, since 71% of riparian reserve acreage is late successional (West Fork Cow Creek Watershed Analysis update, 3/10/99). Since most private lands in the Analysis Area have been logged in the past 40 years, connectivity has been greatly reduced, especially for species with low mobility. Four connectivity/diversity blocks and four spotted owl core areas are located in the Analysis Area.

The Endangered Species Act, Northwest Forest Plan, BLM District RMP and other regulations and policies state that the habitat of designated species will be managed to protect and enhance their viability. These designated species are known as “featured species” and include animals and fish on federal and state threatened and endangered lists; game and non-game animals of special interest and wildlife with special habitat that may be substantially affected by planned management activities.

In this analysis only those proposed, endangered, threatened, sensitive, featured and ecological indicators species that have been observed or assumed present based on the availability of suitable habitat shown in Table V-2 are discussed and evaluated.

Table V-2. Special Status Fish and Wildlife Species Whose Habitat or Sightings Have Been Made in the West Fork Cow Creek Watershed.

SPECIES	SELECTED CRITERIA
Peregrine Falcon	Federally-listed Endangered Species State-listed Threatened Species

Bald Eagle	Federal and State-listed Threatened Species
Northern Spotted Owl	Federal and State-listed Threatened Species
Marbled Murrelet	Federal and State-listed Threatened Species
Oregon Coast Coho Salmon	Federally-listed Threatened Species
Oregon Coast Steelhead Trout	Federally-listed Candidate Species.
Del Norte Salamander	Survey and Manage
Red Tree Vole	Survey and Manage
Great Gray Owl	Survey and Manage
Western Pond Turtle	BLM Sensitive, State Critical
Northern Goshawk	BLM Sensitive and Assessment Species, State Critical
Mountain Quail	BLM Sensitive
Townsend's Big-eared Bat	BLM Sensitive, State Critical

5.14.2 Peregrine Falcon (*Falco peregrinus anatum*)

Status – Endangered

No suitable habitat for breeding, nesting or feeding is present within the Analysis Area. Peregrine falcons may fly over the region during migration, but they are not expected to utilize the area other than for an infrequent overnight roost.

5.14.3 Northern Bald Eagle (*Haliaeetus leucocephalus*)

Status – Threatened

There are no known bald eagle nesting territories or winter roost sites within or adjacent to the Analysis Area. There is no suitable habitat for breeding, nesting or feeding in the area. Suitable winter roost habitat does exist, but it is generally too far removed from suitable feeding habitat to be used. Bald eagles may fly over the region, but they are not expected to utilize its habitat other than as an infrequent overnight roost.

5.14.4 Northern Spotted Owl. (*Strix occidentalis caurina*)

Status – Threatened

Four northern spotted owl core areas (100 acres each) are designated in the Analysis Area as part of 12 core areas in the West Fork Cow Creek Watershed. The spotted owl core areas are managed as unmapped LSRs in GFMA areas. There are 421 acres of NSO core reserve area within the Analysis Area.

Critical habitat for northern spotted owl (NSO) was designated by the USDI Fish and Wildlife Service in 1992 and is a completely separate entity from the Late successional reserves which were designated under the Northwest Forest Plan (1994). There is some overlap between the two habitat designations. They were designed to serve a similar function, but they are separate in their legal definition. About 200 acres in the Analysis Area within Section 13 (T32SR9W) have been designated as NSO critical habitat.

5.14.5 Marbled Murrelet (*Brachyramphus marmoratus*)

Status – Threatened

While the western portion of West Fork Cow Creek Watershed contains 12,000 acres of suitable murrelet habitat (provides nesting characteristics) there appears to be no suitable habitat in the Analysis Area. Surveys conducted from 1992 to 1996 have failed to document any murrelet using the West Fork Cow Creek Watershed.

5.14.6 Oregon Coast Coho Salmon (*Oncorhynchus kisutch*)

Status – Threatened

Spawning and rearing occurs primarily in West Fork Cow Creek tributaries. Adult fish spawn in low gradient riffles between November and January and then die. Spawners have an affinity for streams or stream segments that are usually less than three percent gradient. Fry emerge from the gravel during late winter and early spring. After hatching most juvenile fish spend about 18 months in their natal stream, preferring pools and slack water areas associated with large wood, undercut banks and overhanging vegetation. Emigration to Cow Creek and the ocean occurs from late spring through early summer. Most coho spend about 18 months in the ocean before returning to spawn as 3 year olds; some also return precociously at age 2. There are about 9 miles of coho habitat in the Bear Pen project area.

5.14.7 Oregon Coast Steelhead (*Oncorhynchus mykiss*)

Status - Candidate

Adult steelhead spend 1-3 years in the ocean before they return to freshwater to spawn during winter and early spring. A small percentage are repeat spawners. Adult steelhead select spawning areas in low gradient riffles on small to moderate size gravel. Juveniles, which emerge from the gravel in late spring, often choose territories over rubble substrate and move from shallow, slow water at the stream margin to deeper, faster water as they grow. The majority of juvenile steelhead emigrate to the ocean during late spring at 8 to 10 inches in length after 1-3 years of residence in freshwater. There are about 12 miles of steelhead habitat in the Bear Pen project area.

5.14.8 Del Norte Salamander (*Plethodon elongatus*)

Status: Survey and Manage

Only existing habitat areas are protected.

5.14.9 Red Tree Vole (*Phenacomys longicaudus*)

Status: Survey and Manage

Surveys in 1995 and 1996 and analysis of spotted owl pellets have documented the presence of red tree voles where suitable habitat is less fragmented as it is in the Bear Creek drainage.

5.14.10 Great Gray Owl (*Strix nebulosa*)

Status: Survey and Manage

There is no known suitable meadow habitat in the Analysis Area. Great gray owls have not been documented in the West Fork Cow Creek Watershed, but recent tentative sightings have raised the possibility that this species may be present. Surveys will be conducted in the planning area to determine their occurrence.

5.14.11 Western Pond Turtle (*Clemmys marmorata*)

Status: BLM Sensitive

Western pond turtles have not been reported from the Analysis Area or adjacent sites. There are no known suitable aquatic habitat sites in the Analysis Area for western pond turtles.

5.14.12 Northern Goshawk (*Accipiter gentilis*)

Status: BLM Sensitive

A large number of stands in the Analysis Area meet the preferred habitat criteria except for the gentle northerly slope component. Surveys for northern goshawk have not been conducted in the Analysis Area. Unconfirmed sightings of immature birds have been sporadically reported. It is considered likely that at least one pair has a breeding territory in or immediately adjacent to the Analysis Area. Surveys are planned for the area.

5.14.13 Mountain Quail (*Oreortyx pictus*)

Status: BLM Sensitive

Mountain quail are found throughout the Analysis Area in small family groups. The extent of the total population is not known. There is a significant amount of suitable habitat across the West Fork Cow Creek Watershed.

5.14.14 Townsend's Big-eared Bat (*Plecotus townsendi*)

Status – BLM Sensitive

Surveys for bats of any species have not been conducted in the Analysis Area. Bat species occurrence and populations in the area are unknown. There are no known caves, abandoned buildings or other suitable habitat in or adjacent to the Analysis Area. If suitable habitat is located, surveys will be conducted.

5.14.15 Elk Management

The District RMP designates the Analysis Area and other nearby lands as an Elk Management Unit. The Watershed was identified by the Oregon Department of Fish and Wildlife as a priority for elk management, primarily in the northern portion of the watershed, with a lesser emphasis on the Analysis Area, since much of this portion is steep and rocky. Primary habitat components affecting elk populations are forage, hiding cover, thermal cover, optimal cover, and open road density. Of the four subspecies of elk (*Cervus elaphus*), Roosevelt elk occupy the coastal mountains in western Oregon. The primary habitat components affecting Roosevelt elk populations are forage, hiding cover, thermal cover, optimal cover and open road densities. Within the Analysis Area forage is widely available on clearcuts and overstory removal partial cut harvest units created on both federal and private lands. There are few permanent forage areas (open meadows) in the Analysis Area. Hiding cover is abundant, provided predominately by 15-50 year-old stands. Thermal cover, canopy cover of 70 percent or greater, is adequate throughout the Analysis Area. Optimal cover is provided by the mature and late successional stage stands in the Analysis Area LSR lands. The road density is about 4.62 miles per square mile, markedly above the Oregon Department of Fish and Wildlife recommendations of 1.5 miles of road per square mile of habitat.

Increased elk vulnerability due to high road densities, combined with a low bull/cow ratio, limits the number of elk in the unit. While there are small concentrations of elk elsewhere in the West Fork Cow Creek Watershed, their numbers appear to be limited on the steep, rocky slopes of the Bear Creek

Watershed. An exception is that some areas of recent timber harvest in the Bear Creek drainage provide high quality forage, but between higher road density and rapid overgrowth with shrubs and conifer regeneration these sites provide very little in value as elk habitat.

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 INTRODUCTION

Chapter 6 forms the scientific basis for the systematic comparison of alternatives and discloses the environmental consequences of carrying out the alternatives described in Chapter 4. Each alternative potentially affects the environmental factors described in the Affected Environment, Chapter 5.

Environmental impacts are discussed in terms of their direct, indirect and cumulative effects. Direct Effects are caused by the action and occur at the same time and place as the action. Indirect Effects are caused by the action and occur later than the action or are farther removed in distance (40CFR 1408.8). Cumulative Effects are those that affect the environment as a result of the incremental impacts of this action and other past, present and reasonably foreseeable future actions (40CFR 1508.7).

Project Design Features described in Chapter 4 were utilized in the design of the alternatives and would be included in the implementation of the selected alternative. The effects of the proposed action on resource values are summarized in Table VI-1 and further discussed in detail later on in this chapter.

Table VI- 1. Comparison of Outputs and Effects by Alternative for the Bear Pen Analysis Area.

RESOURCE INDICATOR	ALTERNATIVE				
	1	2	3	4	5
AIR QUALITY					
Conforms to Oregon SIP	Yes	Yes	Yes	Yes	Yes
Conforms to Oregon Smoke Mgmt. Plan	Yes	Yes	Yes	Yes	Yes
Changes in visibility and local air quality	None	Negligible	Negligible	Negligible	Negligible
FIRE					
Relative hazard rating	No	Low	Very Low	Very Low	Low
Acres of prescribe fire/slash control	Change 0.0	717.2	520.7	1004.5	908.6
HERITAGE RESOURCES					
Ability to avoid and protect traditional cultural properties (TCP's) while respecting and honoring any American Indian heritage that might be associated with the watershed.	N/A	Yes	Yes	Yes	Yes
MINERALS, GEOLOGY AND SOILS					
Geologic hazards present	Yes	Yes	Yes	Yes	Yes
Acres of ground-based logging systems on sensitive soils.	None	None	None	None	None
Percent increase in moderately and severely disturbed/compacted surface areas.	None	0.2	0.0	0.1	0.1
Acres of handpile burn fuels treatments.	None	365.0	259.0	291.7	673.4
NOISE - Changes in noise environment.					
Short-term	None	(-) Negligible	(-) Negligible	(-) Negligible	(-) Negligible
Long-term	None	None	(+) Very Low	(+) Negligible	(+) Negligible
RECREATION					
Amount and type of use and values affected.	None	None	Road Access Restricted by Gating	Road Access Restricted by Gating	Road Access Restricted by Gating
SAFETY					

RESOURCE INDICATOR	ALTERNATIVE				
	1	2	3	4	5
Amount of unsafe tree removal.	None	All haul routes	All haul routes	All haul routes	All haul routes
SCENERY					
Area meeting VRM objectives.	Yes	Yes	Yes	Yes	Yes
TRANSPORTATION					
Miles of permanent new road constructed.					
Miles of temporary minimum road.	0.0	0.0	0.0	0.0	0.0
Mile so road renovated	0.0	1.6	0.1	0.1	0.1
Miles of road to be closed by gating.	0.0	34.0	0.0	17.1	1.2
Miles of road to be decommissioned.	0.0	0.0	41.8	14.7	31.8
Open road density (miles/square mile)	0.0	2.6	2.6	1.3	2.0
	4.4	4.2	2.4	3.6	2.8
VEGETATION					
Acres treated	None	1,035	838	430	956
Volume harvested (MBF)	None	11,258	8,908	5,200	4,545
Regeneration Harvest– Number of units	None	31	24	13	0
Acres		517.	411	196	0
Overstory Removal – Number of units *	None	16	12	7	13
Acres		304	245	115	269
Commercial Thin – Number of units *	None	14	13	9	16
Acres		214	182	119	211
Restoration Thinning – Number of units	None	0	0	38	23
Acres		0.0	0.0	583	465
Pot. harvest of special forest products (acres).	None	517	0	0	0
	None	None	None	None	None
Change in species composition and distribution in the future	None	Mod. Increase	Mod. Increase	Low Increase	High Increase
	None	None	None	None	None
Change in conifer volume growth					
Acres and location of unique and special habitat affected.	Very Low	Low	Low	Very Low	Low
	None	Negligible	Negligible	Negligible	Negligible
Potential for unwanted/noxious plant invasion					
Loss of Threatened, Endangered, sensitive plant species					
WATER RESOURCES					
Acres of riparian habitat disturbance.	0.0	0.0	0.0	0.0	0.0
Increases in accelerated erosion affecting sediment yield and turbidity	None	Negli short term None long term			

RESOURCE INDICATOR	ALTERNATIVE				
	1	2	3	4	5
Changes in % early seral vegetation	None	5.0	4.0	1.9	1.3
Changes in % transient snow zone openings	None	9.6	7.3	2.4	0.8
Changes in watershed compaction (%)	None	0.2			
Changes in open road densities. (mi/mi ²)	0	-0.2	-2.0	-0.8	-1.5
Changes in water yield and timing.	None	Negligible	Negligible	Negligible	Negligible
Changes in peak streamflow.	None	Negligible	Negligible	Negligible	Negligible
Changes in water quality, especially stream sedimentation ²	low/neg ¹	Negli - Improve	Small Improv.	Small Improv.	Small Improve.
Changes in channel stability.	None	None	None	None	None
Effects on wetland functionality.	None	None	None	None	None
Effects on groundwater.	Low ¹ Neg	None	None	None	None
Potential changes in fish habitat.	Yes	None	None	None	None
Attainment of ACS objectives ³	170	Yes	Yes	Yes	Yes
Minimum Riparian Reserve width (feet).		170	170	170	170
WILDLIFE					
Presence of additional human disturbance.	None	Moderate	Negligible	Very Low	Low
Presence of coarse woody debris	Yes	Yes	Yes	Yes	Yes
Critical habitat affected (acres)	None	31	31	None	38
Changes in big-game thermal cover .	None	Very Low (-)	Very Low (-)	Negligible	Negligible
Changes in big-game hiding cover/security.	None	Moderate (-)	Very Low (-)	Very Low (-)	Very Low (-)
Changes in big-game forage habitat.	None	Low (+)	Low (+)	Negligible (+)	Negligible (+)
Acres of late-successional forest and suitable habitat components.	5,133	4,388	4,445	4,826	4,931
Impacts to habitat diversity.					
Changes in corridors and late-successional fragmentation.	None	Very Low (+)	Very Low (+)	Very Low (+)	Very Low (+)
	None	Negligible	Negligible	Negligible	Negligible
Ratings: None – no activity; Negligible – activity would occur, but effects would be negligible; Very Low – activity would occur but effects are very unlikely to occur; Low – activity would occur, but measurable effects are unlikely to occur; Moderate – Measurable effects are likely to occur. ¹ The absence of road renovation, gating and renovation under alternative 1 might lead to continued and future sedimentation that would have a low negative impact on fish habitat. ² A small improvement in stream sediment levels is expected as a result of road gating and decommissioning. ³ Will watershed management objectives outlined in the West Fork Cow Creek Watershed Analysis (USDI BLM 1997) be met? * Two harvest units contain both overstory removal and commercial thin portions.					

6.2 AIR QUALITY

Current air quality within the Bear Pen Analysis Area is considered to be excellent. Few sources of pollutants exist within the area and the ones that do are minor. The Bear Pen Analysis Area is not prone to atmospheric inversions.

The key issue is the protection of air quality within the Analysis Area and surrounding lands as well as the protection of Class I Airsheds. The issue indicator identified in Table III-1 is whether the proposed action conforms to the Oregon Air Quality State Implementation Plan (SIP) for Visibility Protection and the Oregon State Smoke Management Plan (See Chapter II, Air Quality)

6.2.1 Effects Common to All Alternatives

The Clean Air Act requires each state to develop and implement a State Implementation Plan (SIP) to ensure that National Ambient Air Quality Standards are attained and maintained for particulate matter (PM₁₀). Within the implementation plan developed for Oregon, a goal to reduce particulate matter emissions (PM₁₀) by 50 percent by the year 2000 was established. PM₁₀ was also identified by the State Implementation Plan as the basis for non-attainment within the Grants Pass and Ashland/Medford area.

All management activities proposed under the action alternatives will comply with air quality standards and rules administrated by the United States Environmental Protection Agency and the Oregon Department of Environmental Quality. Pollutants of concern are both particulate matter (PM) and inhalable particulate matter (PM₁₀ and PM_{2.5}). Nitrous oxide, sulfur dioxide and ozone are pollutants of concern, but are at such low levels in the forest environment in Western Oregon that changes in levels are not further considered in this analysis.

Short-term adverse effects to air quality, primarily from smoke, cannot be avoided in the range of alternatives. Prescribed fire is a useful tool in the management of healthy vigorous forest stands on the Medford District. Under all alternatives, stands would remain at risk for wildfire. Wildfires generally occur at times and under conditions that impact local air quality to a greater extent than do prescribed fires.

Road construction/maintenance, vehicle emissions and dust along with silvicultural practices also contribute slightly to the temporary degradation of air quality in the Analysis Area. Prescribed burning and dust from roads and machinery would temporarily affect local air quality, but would not constitute an irretrievable or irreversible commitment of resources.

The use of prescribed fire to reduce flammability and excess levels of fuels would affect long-term forest productivity by reducing the risks and consequences of a major wildfire. The temporary impacts of smoke from prescribed fire would have minor effects on the use of forest resources, such as recreation sites and scenic resources. Long-term benefits of using prescribed fire to reduce natural fuels would more than outweigh the short-term impacts to air quality.

The project area is approximately 25 miles from the Grants Pass non-attainment area and over 45 miles from the Medford/Ashland non-attainment area. Due to the distance involved, it is expected that prescribed fire operations will have little to no effect on these non-attainment areas. The project area is adjacent to only a small number of smoke sensitive areas. Since the Kalmiopsis and Rogue Wilderness areas are directly west of the planning area, the prevailing winds would prevent smoke intrusions.

6.2.2 Direct and Indirect Effects

All action alternatives would affect air quality by the addition of certain pollutants (Particulate Matter (PM₁₀) and Particulate Matter (PM_{2.5})). In comparison, the difference among alternatives is very small. At these levels and following prescribed fire management guidelines in the Oregon Smoke Management Plan there would be negligible direct or indirect effects on air quality under all action alternatives.

An analysis of PM-10 and PM-2.5 emissions for the project area by prescribed fire treatment type was performed using the CONSUME fire behavior modeling computer software package. Table VI-2 displays the expected tons of emissions of particulate matter (size categories PM-10 and PM-2.5) produced from burning under the alternatives. PM-10 is the current national ambient air quality standard that prescribed fire activities are measured against, however, it is anticipated that within the near future, PM-2.5 will become the standard. For this reason, both PM-10 and PM-2.5 emissions have been modeled although PM-10 emissions will be the numbers referred to for this analysis. Of the action alternatives, Alternative 5 would produce the least amount of PM-10 emissions while Alternative 2 would produce the most. There would be no effects on air quality under Alternative 1.

Table VI-2. Expected tons of emissions of PM-10 and PM-2.5 particulates produced from burning.

Treatment	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	PM-10	PM-2.5	PM-10	PM-2.5	PM-10	PM-2.5	PM-10	PM-2.5	PM-10	PM-2.5
Handpile Burn	0	0	3.92	3.39	2.42	2.09	9.87	8.55	9.65	8.36
Underburn	0	0	48.18	44.2	43.37	35.4	35.75	32.8	36.19	33.2
Broadcast Burn	0	0	41.90	37.62	29.16	26.18	29.62	26.6	19.11	17.16
SubTotals:	0	0	94	85.21	74.95	63.67	75.24	67.95	64.95	58.72
Total Emissions:	0		179.21		138.62		143.19		123.67	

It is important to note, however, that the emissions shown in Table VI-2 are totaled for all the acres in all the stands proposed to be treated. Treatments, in actuality, would not occur at the same time and place, but would occur over a period of several years, with several burn days in any one year. In addition, the exact locations of the burning would be dispersed throughout the Planning area which would also reduce any concentrated, local impacts. The net result is that the emissions over any one period of time would be considerably less than those shown in Table VI-2. However, the figures do represent a valid estimate of the cumulative emissions to be produced under the proposals.

Under all proposed action alternatives, prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. Prescribed burning under all alternatives is not expected to effect visibility within the Crater Lake National Park and neighboring wilderness smoke sensitive Class I areas (Kalmiopsis and Rogue Wilderness) during the visibility protection period (July 1 to September 15). Prescribed burning is not routinely conducted during this period primarily due to the risk of an escape wildfire.

Prescribed burning emissions, under all alternatives, is not expected to adversely effect annual PM10 attainment within the Grants Pass and Medford/Ashland non-attainment areas. Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration.

Prescribed burning would be scheduled primarily during the period starting in January and ending in June. This treatment period minimizes the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content, which reduces the amount of material actually burned. Broadcast burning, handpile burning, and underburning 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.

The greatest potential for smoke intrusions into the non-attainment areas would come from underburning activities. Current avoidance strategies for prescribed fire assumes that smoke can be lifted from the project site and dispersed and diluted by transport winds. However, underburning requires a low intensity burn that would not have the energy to lift the smoke away from the project site. Smoke retained on site could be transported into portions of non-attainment areas if it is not dispersed and diluted by anticipated weather conditions. Localized concentration of smoke in rural areas away from non-attainment areas may continue to occur during prescribed burning operations.

6.2.3 Cumulative Effects

The negligible direct and indirect impacts on visibility would be additive to existing conditions where visibility and air quality appear to be excellent. Thus, there would be a negligible effect on air quality including visibility under alternatives 2, 3, 4 and 5. Burning would be done in accordance with smoke management clearance where cumulative effects of smoke would be minimized.

6.3 FIRE

Fire has been a normal occurrence in the Bear Pen Analysis Area. Fire frequency in southern Oregon has been reported to range from “less than three years” to “more than 50 years” and from “20 to 200 years” (BLM 1992). While it is not possible to determine the exact fire frequency for the Analysis Area without an extensive site specific field study, it is most likely averages about 50 years with hot, dry south faces being more frequent and cool, wet north faces probably greater than 100 years.

Hand piling and burning would be designed to remove approximately 50 to 75% of the fuel between 1 and 6 inches in diameter and greater than 2 feet in length. Fuel outside this size range would be left untreated, however, some smaller fuels would be included in the piles to create optimal ignition conditions. Piles would be covered to create a dry ignition point and piles would be burned in the fall to winter season after 1 or more inches of precipitation has occurred. Piles would be burned during this

season to reduce the potential for fire to spread outside each pile, and to reduce the potential for scorch and mortality to the residual trees and shrubs. Piles would also be burned when the soil and duff moisture is high to prevent soil damage.

Underburning is the application of prescribed fire within areas where residual trees and shrubs are present. The prescribed fire objective is to reduce the fuel hazard from both dead and down woody material and to reduce the amount of “ladder” fuels present. Ladder fuels consist of both live or standing dead vegetation such as shrubs and small trees in the understory and live and dead branches close to the ground level on overstory trees. Underburning would be conducted at anytime throughout the year when fuel and weather conditions would permit the successful achievement of resource objectives. Typically, burning would be conducted from fall through late spring. Summer or early fall would be less common, but can be feasible when needed to meet resource objectives and when escape fire risk can be mitigated. Fire lines would be constructed by hand on slopes greater than 35%. One-pass fire line construction with a brush blade would be used for tractor fire lines.

For all prescribed fire activities, a prescribed fire plan would be prepared that includes both resource and fire objectives. Fuel moisture and weather parameters would be developed based on these objectives. The timing of the burn would be based on achieving these objectives, occurrence of the parameters, predicted weather, and the availability of adequate fire suppression resources as a contingency plan in the event of fire escape. Prescribed fire effects can include mortality in both the overstory and understory vegetation. The prescribed fire plan includes acceptable mortality levels. These levels typically limit overstory mortality to 10-15% or less, and understory mortality to 20-50% or less depending on resource objectives. When prescribed fire is used to “thin-out” understory vegetation (as opposed to thinning with chainsaws), the higher acceptable percentages of mortality would apply. An underburn treatment prescription can range from burning 30% of the area (a “mosaic” burn) up to 90% of the area. Burning would be conducted under conditions that would prevent damage to soils, and consumption of large, woody debris. This would ensure long-term site productivity. Machine fire lines would not be constructed in riparian reserves.

Prescribed burning would be conducted during a time of year when the likelihood of fire escaping into the tree canopy is lowest, but could occur any time of year under appropriate weather conditions

6.3.1 Direct and Indirect Effect

The fire issue indicator of concern is the potential for increasing fire hazard within the Analysis Area as a result of the proposed activities. The most important issues concern the potential spread of wildfire into the high value Bobby Creek RNA/ACEC area to the west of the Analysis Area and large fires in high value forests within the Analysis Area.

Residue from the proposed forest management activities including restoration thinning has the potential for increasing fire hazard. Forest residue management treatments areas proposed by alternatives are shown in Table VI-4. Alternative 4 would have the largest short-term potential fire hazard with both the proposed restoration thinning and residue treatment areas. Alternative 3 would create the least fire hazard while alternatives 2 and 5 would have a moderate hazard. There would be no increase in fire hazard under alternative 1.

Table VI- 4. Forest Residue Treatments and Fire Hazard Rating by Alternative.

FUEL TREATMENTS/HAZ.	ALTERNATIVE				
	1	2	3	4	5
Slash - Light (Acres)	0	62	31	80	9
Medium	0	217	251	160	150
Heavy	0	594	476	687	717
Burn - Broadcast	0	171	119	120	78
Handpile Burn	0	261	161	657	643
Underburn	0	221	177	164	166
Lop & Scatter	0	381	381	0	69
Relative Hazard (1 = low)	1	3	2	5	4

6.3.2 Cumulative Effects

Untreated areas in all alternatives would perpetuate current conditions and in many mature stands growth and deterioration would increase fuel loading. These conditions over time would increase the potential for a stand replacement fire within and/or adjacent to the Bear Pen Analysis Area. All action alternatives propose treatments to reduce fire hazard and decrease long-term adverse cumulative effects. This opportunity to reduce fire hazard would not occur under alternative 1.

6.4 CULTURAL RESOURCES

No known cultural resources exist within any harvest or treatment units proposed under alternatives 2 through 5. Any potential impacts to presently unknown historic properties in the Analysis Area would be avoided by timber sale unit and post-sale project design. Protective requirements in the form of timber sale contract provisions would be used in the Analysis Area for any contracts, cooperative agreements or work instructions. This provision would ensure that the contract holder is aware that cultural resources are protected by law; that discovery of such resources would be promptly reported to the Bureau of Land Management; and that all previously known and recently discovered heritage resources will be protected during the contract holder’s operation.

6.5 MINERALS, GEOLOGY AND SOILS

6.5.1 Effects Common to All Alternatives

An irretrievable loss in soil productivity would occur in timber harvest landings, skid trails and slash piles created by ground-based logging. Road construction represents an irretrievable loss, even after the road is closed and re-vegetated. Prescribed burning can also reduce soil productivity. For a thorough discussion of the potential effects of timber harvest activities on soils, refer to the Medford District RMP Volume pp. 4-10 to 4-14. PDFs to minimize these effects are found in Volume II of the RMP and in Chapter 4. The soil and water District RMP and ACS guidelines are designed to avoid or reduce the potential for irreversible losses from proposed management activities.

6.5.2 Direct and Indirect Effects

There would be no effects of the proposed action under any alternative on mineral resources. One or more of the four quarry sites listed in Chapter V (Slotted Pen, Dad's Creek, Mt. Ruben, private quarry) would be used for extraction of this mineral resource if necessary; however spot surfacing rock is currently available in stockpiles.

Approximately 780 acres of the Analysis Area have been removed from potential timber harvest because of geologic conditions including steep slopes that might contribute to slope instability and possible mass failures. A review of the Analysis Area indicates that the most active and probable slope instability area outside those areas already identified is in the north facing slope in the southeast corner of T.32S.,R.8W.,Sec 11 and adjacent Section 12. There is currently mass movement in Section 11 affecting road conditions and water quality. No proposed harvest units under any alternative have been proposed in the affected portion of Section 11.

Soils in the Analysis Area are typical of forest soils within the West Fork Cow Creek Watershed. Depth to bedrock varies from 12 to 40 inches, depending on the soils complex. The Timber Production capability classification system used by the Medford District BLM excludes over-steepened slopes (>65%) and unplatable ground. These areas have been mapped and harvest was not considered in those areas. Onsite inspection of each potential harvest unit is conducted by BLM personnel to further insure slope stability and regeneration potential of the site.

Soil types, their management limitations along with the units in which each soil type and the alternative in which the unit would be harvested or rehabilitated are shown in Appendix B Table B-1. While there are differences in soil types among proposed harvest units, the soil limitations as defined by the Douglas County Soil Manual show little difference in major soil management limitations. Therefore, all proposed harvest units can be considered to be on sensitive soils and appropriate project design features described in Chapter IV would be utilized for all action alternatives. However, proposed harvest units on the Kanid-Atring Complex appear to have the highest risk for slope failure and surface erosion in the Analysis Area. Most importantly on these units soil and water best management practices (BMP's) as shown in the District RMP must be followed rigorously to prevent any possible impacts on water quality.

As alternative 2 would have the largest area impacted by harvest activities and the most area of the Kanid-Atring Soil Complex affected, this alternative would have the largest direct effect on the soil resource. Alternative 5 would have the second largest direct effect and alternative 4 would have the smallest impact. Alternative 1 would have no direct effect on the soil resource.

6.5.3 Cumulative Effects

Past, proposed and future foreseeable forest management activities would continue to reduce soil productivity by removing lands from the production base due to the construction of roads and landings. However, this direction would be partially offset by the rehabilitation activities proposed in alternative 5 and the decommissioning of roads under all action alternatives. In addition, increased soil surface exposure by harvesting and road construction and use increases the probability that more severe adverse effects would be generated under unusual climatic effects, e.g., intense rainfall or rapid snowmelt. Under normal conditions this cumulative effect would be negligible under all alternatives. However, once every 50 to 100 years within and nearby the Analysis Area, a serious watershed impact might occur such as

occurred in the West Fork Cow Creek in 1964. Under these assumptions alternative 2 would have the largest cumulative effects and alternative 4 would have the least effects.

To minimize the impacts of the action alternatives, forest practices have been designed to minimize long-term cumulative effects. No permanent roads would be constructed. Approximately 1.3 to 2.6 miles of existing road would be decommissioned. Aerial logging of steep slopes would be used to minimize soil surface disturbance. In addition, BMP's and mitigation measures shown in Chapter V would be utilized to minimize impacts.

Based on these implementation practices, all alternatives would meet soil and water management standards set in the RMP and the Aquatic Conservation Strategy of the Northwest Forest Plan.

6.6 NOISE

6.6.1 Direct and Indirect Effects

The sounds of human activities most often go unheard within the Bear Pen Analysis Area. There are no known residences that will be directly affected by the noise from this project. Timber harvesting under the proposed action, however, would reintroduce for a short period the sounds of chainsaws, falling trees and logging equipment that would be heard by wildlife and human visitors to the Analysis Area. The largest noticeable noise impact on visitors and wildlife, most importantly northern spotted owl, would be the sound of helicopters. To avoid disturbing spotted owl from noise effects, helicopters would not be used for harvest in the Analysis Area during the period March 1 through June 30.

The direct noise effect by alternative would be related to the amount of helicopter yarding use. Under alternative 3, 511 acres would be helicopter yarded and have the largest direct effect on noise. Alternative 5 would be the action alternative with the least noise effect where 142 acres would be helicopter yarded. Alternative 4 would have an additional noise effect above that created by helicopter yarding. Rock would be quarried, crushed and distributed by truck on roads in the Analysis Area. Additional noise from road renovation and construction would occur at various levels in all action alternatives. Alternative 2 would have the second largest noise effect and alternative 4 would have the third largest effect. There would be no effects on the noise environment by alternative 1.

6.6.2 Cumulative Effects

In the long-term, the noise from human activity would be reduced in the Analysis Area under alternatives 3, 4 and 5 by the reductions of roads open for general travel. Alternative 3 which would have the largest area proposed for gating and decommissioning would have the largest beneficial impact on reducing noise.

6.7 RECREATION

6.7.1 Direct and Indirect Effects

As noted in Chapter V, the Analysis Area is not a high use recreation area other than occasional big-game hunters and upland game bird hunters. All tributaries in West Fork Cow Creek are currently closed to fishing. Under all alternatives, there would be an increase in logging truck traffic which might have some minor effect on recreational use of roads within and adjacent to the Analysis Area during the period of harvest. In addition, some log hauling might be on main route of the Glendale-Powers Bicycle Area possibly affecting this recreational use. However, the proposed harvest action under all alternatives would have a negligible effect on the recreation resource.

Under alternatives 4 and 5 approximately 15 and 32 miles of roads would be closed by gating or decommissioning and would have a moderate direct effect on recreational use. The gated roads will be closed year round and would directly affect their present recreational use. This amount of gate closures would reduce the miles of roads open to public use for hunting and other forms of recreation during the wet season. Observations in the Fall of 1998, indicate that poaching occurs in the Bear Pen Analysis Area. Reducing the miles of open road with gate closures would reduce poaching, and over the long-term, provide a higher quality recreation hunting opportunity in the West Fork Cow Creek Watershed. Most roads proposed for gating are not on roads commonly used for recreation.

6.7.2 Cumulative Effects

Cumulative effects of the proposed action might occur under alternatives 1 through 5. The possible cumulative effects on recreational use by current or proposed maximum future gating and decommissioning under alternatives 4 and 5 within the Analysis Area is unknown. One of the larger recreation cumulative effects under alternatives 4 and 5 might be an increase in big-game populations in the West Fork by providing increased security habitat and increased future big-game hunting opportunities through reduced road access by closures in the Analysis Area. There would be no cumulative impacts on recreational use by road closures under alternatives 1,2 and 3.

6.8 SAFETY

There are no known non-operational safety issues other than the felling of roadside trees that might be hazardous to users of roads in the watershed. Guidelines for hazardous tree removal are provided in the District RMP.

6.9 SCENERY

6.9.1 Effects Common to All Alternatives

Timber harvest and road construction can affect the visual resource because of contrasts created between natural forest landscapes and those modified by management activities. These contrasts consist of changes in line, form, color and texture of the vegetation and landform. The effects these alterations have on these features are dependent on individual human values. The ability to control how disturbances appear depends upon the harvest system used, landform, soil type, silvicultural system employed and fuels disposed.

While the proposed action has been designed to comply with the District RMP, there would, nonetheless be some scenic impact under all action alternatives. An irretrievable loss of the natural scenic character of the landscape would occur in areas where timber harvest and road construction occurs. In these areas, a natural-appearing forested landscape would take several decades to replace. After that period, the area would have a more pre-European settlement appearance if no future harvesting occurred.

6.9.2 Direct and Indirect Effects

The landscape and scenic quality of the Analysis Area will not remain static even for the no action alternative 1. The incidence of insect attacks, disease, or fire in future years would determine the extent of the long-term effects. Any one of these factors, acting independently or in concert, would have the potential to alter the landscape to a greater extent than proposed harvest in the action alternatives.

As near 43 percent of the lands within the Analysis Area are in private ownership and have been mostly harvested by regeneration harvest methods in the past 40 years, the line, form, color and texture of the existing landscape is visually highly variable. While the proposed harvest activities under all alternatives would be additive to this visually variable character, the visual impact will be small as it becomes part of the existing conditions.

Alternative 2 would have the largest direct and indirect effect on visual character of the Analysis Area with the proposed regeneration harvest on 517 acres. The effects on the visual resource by regeneration harvest units would be less in alternative 3 with 411 acres, and 196 acres under alternative 4. There would be no effects on the visual resource by regeneration harvest units under alternatives 1 and 5.

From an overall activity level, alternative 2 would have the largest direct effect as a result of near 1,035 acres of harvest activities and 1.5 miles of associated temporary road construction. Alternative 4 would have the least impact of the proposed action alternatives with 430 acres proposed for harvest.

6.9.3 Cumulative Effects

While the visual vegetative component of the landscape will continue to change under alternative 1 as a result of ecosystem dynamics, it is expected that harvest operations that have occurred on private lands in the past will continue in the future. The direct effects of the proposed action, particularly in alternatives 2 and 3 will be additive to the past harvest activities on both federal and private lands that have modified the landscape. These visual effects would continue into the foreseeable future or until the new stands grow to provide similar forest cover as now exist. Within the Analysis Area, all action alternatives would continue modification of the existing landscape character and would lead to a further departure in scenic value from the modified conditions that now exist.

6.10 TRANSPORTATION

6.10.1 Effects Common to All Alternatives

Roads are long-term impacts that can provide various levels and types of use over time. Wildlife use the created openings resulting in roadways being used for travel corridors and for foraging. Wildlife are at

risk to vehicle accidents, hunting including poaching, and harassment when people use these roads. The intensity and duration of human activities may effect future wildlife populations. Roads, however, provide access to points of interest in the Analysis Area to many who would not otherwise have it. They also increase compacted area and may influence the timing and magnitude of streamflow.

6.10.2 Direct, Indirect and Cumulative Effects

No roads of any type would be constructed , nor would there be any road renovation to protect resource values under alternative 1. Roads that have been damaged by past storm events, most notably natural surface roads, would continue to deteriorate and directly or indirectly affect water quality in the Analysis Area under alternatives 1 and 3.

To reach landings, 1.6 miles of temporary minimum roads would be required under alternative 2 and 0.1 miles under alternatives 3,4, and 5. Under alternative 2, 34 miles of unpaved BLM System Roads would receive renovation (See glossary for definition). There would be 17.1 miles of renovation under alternative 4, and 1.2 in Alternative 5. Renovation includes spot-rocking. No roads would be renovated under alternative 3. Renovation could contribute a pulse of sediment to streams during the first major rainstorm of the wet season but it also would have a direct or indirect positive impact on water quality within the Analysis Area in the long term and would also have a positive cumulative effect by reducing future road effects on water quality and fish habitat.

There are about 106.2 miles of road within the Analysis Area with a road density of 4.9 miles per square mile. Between 1.3 and 2.6 miles of road would be decommissioned in all action alternatives. All roads proposed for decommissioning are on BLM lands and are not needed by private industry to access their lands. As with renovation, decommissioning would have a direct or indirect positive impact on water quality and fish habitat within the Analysis Area. Total road density (4.9 miles per square mile) would not measurably change at the project scale under any alternative.

Extensive road closures (gates and barricades) are proposed under several alternatives. Presently 11.7 miles have been gated (11.1 miles is the Bear Creek Road). Approximately 32 road miles would be gated under alternative 5, 15 in Alternative 4 and 42 in Alternative 3 to protect connectivity/diversity blocks and spotted owl core areas. Eliminating vehicular traffic on these mostly natural surface roads during winter would reduce erosion and steam sedimentation. Roads that appear to have recreational use, were not gated or decommissioned.

The direct, indirect and cumulative effects of road decommissioning and gating will be further discussed under the sections in this Chapter on Water, Recreation and Wildlife.

6.11 VEGETATION

6.11.1 Direct, Indirect and Cumulative Effects

Timber Resource

With or without additional natural or human-related disturbances the timber resource in the Bear Pen Analysis Area will change over time. Douglas-fir will remain the principal timber species, but the age distribution, stocking levels and condition will change. The rate of change associated with human-caused modifications to the environment has been the subject of numerous studies and is somewhat predictable. The discussion in this section will summarize the changes in the timber resource that are likely to occur as a result of implementing each of the proposed alternatives.

Historically, most of the area was dominated by a mosaic of stands ranging from near 0 to about 300 years in age created by large stand replacement wildfires. This is most evident with the absence of decadent large woody debris in the existing mature stands within the Analysis Area. The area is now dominated by a large component of early seral stage stands, mostly on private lands, and a mixture of age classes on federal lands. In general, the Analysis Area has been highly impacted by timber harvest activities over the past 40 years.

Four silvicultural treatments were proposed on the lands chosen for harvest and treatment. They included regeneration harvest where no substantive current conifer understory exists, overstory harvest where conifer understory exists, commercial thinning in medium age stands for stocking control and restoration thinning, stocking control in young stands.

No stands would be treated under alternative 1. Under alternative 2, 1,035 acres would be harvested with 517 acres by regeneration harvest, 304 acres by overstory removal and 214 acres by commercial thinning.

Alternative 3 would harvest 838 acres with 411 acres by regeneration harvest, 245 by overstory removal and 182 by commercial thinning. Alternative 4 would harvest 430 acres with 196 acres as regeneration harvest, 115 acres as overstory removal and 119 acres as commercial thinning. Alternative 5 would treat 956 acres with no acres receiving a regeneration harvest, 269 acres receiving an overstory removal, and 211 acres receiving a commercial thinning. Also under alternative 5, 465 acres would be restoration thinned. Alternatives 2, 3, and 4 would have 15 acres harvested in a group selection overstory removal harvest.

Alternative 2 followed by alternative 5 would have the largest direct as well as cumulative effect on increased conifer growth and timber productivity in the Analysis Area. Alternatives 3 and 4 would have a moderate direct effect on increased conifer growth and timber productivity while the present levels would continue or possibly decline under alternative 1.

No other foreseeable timber harvest activities are planned in the Bear Pen Analysis Area.
Special Forest Products

Providing for special forest product removal (firewood, small wood and boughs) in regeneration harvest units under alternative 2 would make these products available to the market and would generate some level of employment and receipts to the government. Because the Analysis Area is far from any communities, the level of economic impact is very uncertain, but is likely to be low.

Removing firewood and small wood would also remove some of the fuels in those units, which would reduce fire intensities and smoke emissions. Adverse impacts associated with this proposal would be additional ground disturbance if cable systems are used to remove firewood and small wood, additional impacts to roads from hauling the material, some level of noise disturbance from saws and other machinery, and a loss of future soil productivity due to the export of materials generally higher in site nutrients than in the bole wood harvested. These effects are expected to be negligible to low, but might be more evident in localized areas.

In addition, removing this material might pose logistical problems in scheduling the work without interfering with site preparation and burning activities. Prescribed burning in particular, is often constrained by appropriate weather conditions. These effects would not occur under alternatives 3, 4 and 5 as no special provisions would be made to provide these products.

In all action alternatives, the proposed timber harvest and other management activities would not interfere with normal access to the area for the purpose of collecting special forest products. Some short spurs might be closed for a short time to protect logging equipment, but the area would remain open for firewood cutting, bough and greenery collections and other products. Under all alternatives, it is likely that logging slash would be available for firewood cutting at selected landings.

Coarse Woody Debris

While no field surveys were conducted it was observed on inspection of the proposed harvest units that coarse woody debris in some units might be less than required by the RMP (See Chapter V). Based on surveys to be done prior to treatment, merchantable material would be used to supplement existing levels on any harvest units found with insufficient levels of coarse woody debris. The only direct, indirect or cumulative impact anticipated relative to this habitat resource would be positive as a result of providing additional coarse woody debris on harvest units where it is currently lacking or insufficient.

Unique and Special Habitat

Alternative 1 would result in no change to unique and special habitat conditions. There are no direct, indirect or cumulative impacts anticipated to unique and special habitats under any of the four action alternatives. Surveys for unique and special habitats will be performed on all units proposed for harvest before implementing harvest activities. All sites known to have unique or special habitat qualities or those found prior to or during harvest will be protected according to management/mitigation plans previously discussed in this Environmental Assessment.

Unwanted/Noxious Plant Invasion

The potential for invasion of unwanted/noxious plants is directly related to the amount of weeds currently growing in the area, the increase in road surface area, the amount of disturbed soils in harvest units and the increased usage of existing and new roads. The increase in disturbed soils and usage of new/existing roadways can be assumed to be proportional to the number of harvest units/acres and harvest volumes expected under each alternative. Alternative 2 proposes to construct about 1.54 miles of temporary roads, renovate all systems roads and harvest 11.3 MMBF from 1,035 acres across 59 units.

Alternative 3 proposes construction of 0.1 miles of new temporary roads and would harvest 8.9 MMBF from 838 acres across 49 units. Alternative 4 proposes construction of 0.1 miles of new temporary roads, renovation of 17.1 miles of existing roads and would harvest 5.2 MMBF from 430 acres across 29 units. Alternative 5 proposes construction of 0.1 miles of new temporary roads and renovation of 1.2 miles of existing roads and would harvest 4.5 MMBF from 956 acres across 52 units.

The potential for invasion of unwanted/noxious plants would be unchanged, remaining very low, under alternative 1. Although low, the potential for weed invasion under alternative 2 is the highest of all action alternatives due to the greater level of road construction and harvest activities proposed. The potential for invasion under each of alternatives 3, 4 and 5 is considered to be very low, as the relative amounts of roadway, usage and harvest treatment disturbance of soils compensate in offsetting ways. Of the four action alternatives, alternative 3 has the lowest potential for unwanted/noxious plant invasion as a result of its much reduced road construction, greatly reduced road usage and reduced harvest unit soils disturbance due to primarily helicopter logging. All alternatives would follow the BLM Medford District Noxious Weed Prevention and Control Mitigation Measures (See Project Design Features, Chapter V).

Alternatives 2,4 and 5 propose to restrict future road usage by gating or decommissioning new and existing roads (Table V-5). Alternatives 4 and 5 would close access to 14.7 and 31.8 miles of roads, respectively. Alternatives 2 would decommission 2.6 miles of roads, alternative 4 would decommission 1.3 miles and alternative 5 would decommission 2.0 miles. The direct, indirect and cumulative effects of this action with the proposed harvest activities would be a net reduction in potential for unwanted/noxious plant invasion across the Analysis Area.

6.11.2 Effects to Special Status and Survey and Manage 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, BLM IM OR-2000-042).

Buffers would provide protection to plant populations which could be directly impacted by timber harvest, pile burning and ground disturbance, and would protect interior forest microclimate. In general, no-cut buffers will be about 100 feet around plant sites, except that, for old-growth associated species that appear to require an interior forest microclimate (Survey and Manage species), buffers should be about 200 feet in units that will retain less than 40% canopy cover. These buffer widths are intended to retain interior forest microclimate, with their widths being suggested by literature review. Microclimate measurements show that interior conditions might 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). Also, clearcuts are not proposed in this sale; the most intensive prescriptions will retain about 10-15% canopy cover, probably lessening the depth of edge effects. Thinning prescriptions retain up to 60% canopy. Based on the numbers in the literature, modified by consideration of the prescriptions, plant sites in regeneration cuts or similar cuts that retain less than

40% canopy should have 200 foot buffers, and others should be 100 feet. These are no-entry buffers, as thinning, yarding corridors or road construction would lessen the protection of microclimate and possibly disrupt mycorrhizal connections. Buffers might extend across existing roads, as trees across roads provide shading. Prescribed fire would generally not be done in buffers, as some plants would be killed by direct heat.

No effects to threatened or endangered plants, including *Fritillaria gentneri*, are anticipated, as the species has not been found in the planning area, and the planning area is outside of its range.

Alternative 1, No Action

No effects would occur to Special Status or Survey and Manage Plants.

Action Alternatives

No effects are anticipated to known populations of those Special Status, or Survey and Manage plants that require protection. Isolated populations of species that do not require protection (Tracking species, S&M category F species) might be extirpated, although others will not, as they fall within areas protected for other resources. The fuels treatments in the action alternatives might have an indirect beneficial effect in that the chance of catastrophic wildfire could be lessened, lessening associated risks to plant populations.

Alternatives 2, 3

These alternatives involve greater amounts of ground disturbance, and would be more likely to affect species that are not protected, such as tracking species.

6.11.3 Cumulative Effects on Plants

There might be a long term negative effect for old growth associated species due to reduction of late-successional interior forest habitat in the area as a consequence of timber harvest adjacent to the sites and buffers. Isolated populations might eventually become extinct, and habitat fragmentation could prevent recolonization. This long-term negative effect would not occur under the no action alternative. Retention of riparian reserves and areas protected for other resources should mitigate this effect. Alternatives with less intensive timber harvest would provide more time for the reserve areas to become late-successional before all late-successional stands are removed from matrix lands.

6.12 WATER

6.12.1 Effects Common to All Alternatives

No additional long-term adverse effects to the water resource or beneficial downstream uses are expected to occur under the proposed alternatives. A long-term positive benefit to the water resource, however, would occur with the proposed road gating, decommissioning, renovation and drainage

improvement. Roads would become a smaller future source of sediment than under the existing conditions.

6.12.2 Direct and Indirect Effects

Water Quality

Roads most often have the greatest impact on stream sedimentation and water quality. The Analysis Area has already been noticeably impacted by roads with an existing road density of 4.90 miles per square mile. Any action that reduces stream sedimentation in the longterm would be beneficial.

Alternatives 2 and 4, which call for renovating 34 and 17 miles of road, respectively, would have the greatest short-term potential for contributing sediment to streams but also among the highest potential of all alternatives for reducing stream sedimentation in the long-term. None of the alternatives appreciably reduces total road density in the project area (6th field HUC) because only 1.3 to 2.6 miles out of over 106 miles of road in the watershed would be decommissioned under any action alternative. Some loose soil that is generated by road renovation, decommissioning and hauling would be transported to streams during the first major rainstorm of the fall wet season, even though appropriate BMPs would be used to minimize impacts. The amount of sediment that reaches streams would most likely be minor and remain in the stream channel for no longer than one year and would be well within the range of natural variation.

Alternative 3 proposes gating nearly 42 miles of mostly natural surface road during winter to reduce potential stream sedimentation, somewhat more than alternative 5 (31.8) but nearly 3 times more than alternative 4 (14.7). No gates would be installed under alternative 2. Road renovation, gating and decommissioning would reduce the amount of sediment that enters streams over the long-term and would benefit fish, amphibians and other aquatic life.

Construction of temporary spur roads would displace soil and cause surface compaction but is not likely to result in stream sedimentation because soils exposed by construction would be on or near ridges and several hundred yards from any stream. In addition, these temporary roads would be discontinuously ripped, water-barred and seeded during the dry season of the same calendar year that they are built.

All action alternatives would have a negligible to very low indirect adverse effect on water quality when implementing best management practices, emphasizing yarding systems that minimize the exposure of bare mineral soil and by restricting road-related work and hauling to the dry season.

The Minerals, Geology and Soils section of this Chapter, showed that numerous proposed harvest units are on the Kanid-Atring Soil Complex with very steep slopes and reportedly are highly susceptible to slope failure, requiring an on-site investigation before initiating harvest activities. All units were field inspected by a qualified resource specialist for indications of current or potential slope instability; problem areas were deleted from further consideration. Log yarding would cause varying amounts of soil compaction, depending on the method used. Helicopter yarding would cause the least site disturbance, compaction and soil movement and tractor yarding the most. Subsoiling with winged rippers in tractor units reduces compaction by about 80 percent. Subsoiling compacted ground, including existing skid roads, would allow water to percolate subsurface, largely restore natural hydrologic flow to the area, help

prevent soil from entering streams and improve soil productivity. Although compaction in the project area would be reduced by ripping selected skid trails, landings and spur roads, and by decommissioning roads, there would no measurable change in the percentage of the watershed that is compacted because treated acreage would be small compared to total acres. Hand piling without burning would not reduce site productivity. While broadcast burning is proposed to be done under cool, moist conditions, there is a possibility that the fire could be more intense than desired. If so, there would be a short term loss of soil productivity. Prescribed burning would improve planting access. The District RMP Volume I pp. 4-10 to 4-14 provides a thorough discussion of the potential effects of timber harvest activities on soils. PDFs to minimize these effects are found in Chapter 4 of this EA and Volume II, Appendix 2 of the District RMP.

The short-term addition of sediment to streams as a result of road renovation and decommissioning would not occur under alternative 1. On the other hand, the beneficial long-term effects of these actions plus gating roads would also not occur. The net effect would be to allow the present levels of erosion and sedimentation to occur and increase over time, causing an adverse effect on aquatic habitat.

Water Quantity

It is highly unlikely that the proposed activities would create a measurable increase in stream flow because:

- (a) units have been dispersed across several seventh field subwatersheds
- (b) about 90 percent of the forested acres in the Bear Creek sixth field watershed is greater than 30 years of age (Watershed Analysis, Appendix G) and therefore hydrologically recovered from past natural and human disturbance. This would decrease to about 88% if the preferred alternative is implemented.
- (c) road density would not increase
- (d) riparian reserves would tend to use excess groundwater from harvest units upslope
- (e) soil depth is adequate in harvest units to allow precipitation to percolate into forest soils during storm events for slow release.
- (f) compacted ground from tractor yarding and temporary spurs would be subsoiled and water barred to largely restore soil permeability

Summer (base) flows are not expected to decrease as a result of timber harvest because tree removal would not occur near streams. Opening the tree canopy near streams can stimulate growth of alder, maple and other riparian hardwoods that consume large amounts of water.

Water Temperature

Summer stream temperatures may increase if vegetation cover is removed from a watershed, particularly from the riparian zone. Conversely, management practices that create increased vegetative cover in the riparian zone may reduce stream temperatures during the critical summer month periods. Stream temperatures may also be reduced if increased baseflow occurs during the warm summer months, thereby, benefitting the downstream users including fisheries. No activities are proposed in the riparian

reserves and baseflow is not expected to be modified in the Analysis Area. Thus, there would be no effect on stream temperature under any alternative.

Channel Stability

Timber harvest would not directly destabilize streambanks because there is no harvest in Riparian Reserves and the reserves are at least one site potential tree height in width. Several OR and RH units (29-A1 in Slotted Pen; 13-2, 31-1, 24-5 in Bear Creek: 7-4, 7-6 in Goat Trail and 33-6A in an unnamed trib to West Fork Cow Creek) are planned where the amount of TSZ in open condition exceeds the level of concern (Watershed Analysis, p. 89). Field inspections of several randomly selected non-fishery streams in these subwatersheds indicate that streambanks are very stable in spite of a large amount of the TSZ already being in open condition. ODFW stream surveys also indicate that streambanks in coho salmon habitat (West Fork Cow, Bear and Goat Trail creeks) are stable also. Streambank destabilization is highly unlikely under any of the proposed alternatives for reasons discussed in the Water Quantity section.

6.12.3 Cumulative Effects

The Watershed Cumulative Effects (WCE) Analysis Method (USDI BLM 1992) has been used to analyze the cumulative effects of the proposed activities in the Bear Pen Analysis Area. This WCE analysis utilizes the management history of all land (BLM and non-BLM) within a small watershed, generally 1,000 to 7,000 acres, to assess the hydrologic conditions based on three types of hydrologic analyses: %early seral <30 years, compacted area (CA), and Openings in the transient snow zone (TSZ). The results of this cumulative effects in the Analysis Area are shown at the Bear Creek HUC 6 scale in Table VI-6.

The magnitude of change in hydrologic condition of the Analysis Area varies considerably according to alternative. The largest change would be increases of about 5% in early seral vegetation and about 10% in TSZ openings under alternative 2. Change in these parameters would be considerably less under alternative 5, increasing the amount of early seral and TSZ openings by about 1 percent each. Changes in these parameters for the alternative 4 would be only slightly higher than in alternative 5. Alternatives 2 and 3 could locally increase runoff during rain-on-snow events, especially in the TSZ but effects would be negligible in coho streams and would not be measurable at the HUC 6 project scale. Potential for increasing water yield under alternatives 4 and 5 would be minimal, if any. Potential for RH units to increase peak flows is negligible because the units are scattered across the entire HUC 6 watershed. Overstory removals in the TSZ would have little or no effect on peak flows because existing overstory trees are scattered or clumped and have a well-developed conifer understory. This understory would grow rapidly, fully occupy the site and pre-harvest hydrologic conditions would be quickly restored. Estimated time to hydrologic recovery in RH units would be about 30 years, 10 years in CT units, and less in OR and CT/OR units.

Tractor logging and temporary road construction would have negligible or no net effect on compacted areas. Residual effects of compaction are discussed in the Medford District RMP Volume I pp. 4-10 to 4-14. PDFs to minimize these effects are found in Chapter 4 and of this EA and Volume II, Appendix 2 of the RMP.

The combination of longterm environmental benefits from road renovation, decommissioning and gating in combination with the absence of appreciable (if any) hydrologic effects from timber harvest make alternatives 4 and 5 the best for improving water quality, maintaining the timing, duration and magnitude of base or peak flows in the watershed, and at the same time protecting habitat for coho salmon and other aquatic species.

Table VI-6. Watershed Cumulative Effects Analysis for the Bear Pen HUC 6 Analysis Area.

WCE FEATURES	ALTERNATIVE									
	1		2		3		4		5	
	Acre	%	Acre	%	Acre	%	Acre	%	Acre	%
% Early Seral <30 years old Total Acres In The HUC 6: 13,855	1,388	10.0	2073	15.0	1944	14.0	1657	11.9	1559	11.3
Transient Snow Zone Openings Total Acres Of TSZ in the HUC 6: 4121	1072	26.0	1466	35.6	1375	33.3	1172	28.4	1103	26.8
Compacted Area	1,243	8.9	1,276	9.1	1,250	8.9	1,258	9.0	1,257	9.0

Fish Habitat

All watershed and habitat indicators in the National Marine Fisheries Service (NMFS) Matrix of Pathway Indicators Checklist would be maintained in the longterm at the fifth field watershed scale (West Fork Cow Creek). This project is consistent with ACS Objectives (ACS Consistency Analysis) and with terms and conditions of the NMFS LRMP/RMP Biological Opinion (March 18, 1997). The NMFS concurred with the BLM, in their letter of concurrence dated July 15, 2002, that the Bear Pen Analysis Area is “not likely to adversely affect” OC coho salmon and OC steelhead.

When the effects of the proposed action are added to the environmental baseline and cumulative effects elsewhere in this fifth field watershed, it is concluded that there would be no substantial effects on Oregon Coast coho salmon and its Critical Habitat, OC steelhead or to Essential Fish Habitat (for salmon) (Magnuson-Stevens Act).

6.13 WILDLIFE

Surveys for all Special Status species were surveyed in proposed harvest units.

6.13.1 Effects Common to All Alternatives

During management activities, especially those related to timber harvests, individual birds and mobile mammals would be displaced to adjacent habitats, thermal and hiding cover would be lost, and big-game and larger predator security would be decreased. Displacement of animals would present different problems to different species. To wide-ranging species, such as elk and deer, the displacement would result in a slightly reduced home range or moderately lower populations in areas of displacement. Smaller animals, such as squirrels, could also be forced into territories of other individuals of their species and therefore, be placed in a highly competitive situation. Some of these effects would be temporary, lasting from days to a few years. Longer-term or permanent adverse effects would result from some small mammals, such as red tree voles, and soil-dwelling animals, such as molluscs, possibly perishing, as well as experiencing reduced habitat quality and quantity for decades due to timber harvest, post-sale activities, road construction or removal of snags for safety reasons.

Timber harvest may also provide short-term benefits to some wildlife species, including elk and deer, by providing more forage. Decreasing road densities as proposed under all alternatives would increase the security habitat for these big-game animals. Wildlife habitat would be removed or disturbed. None of the alternatives is expected to greatly reduce the long-term productivity of any species.

Under all action alternatives, a short-term loss of wildlife cover and displacement of wildlife would occur in proposed timber harvest units. Also, some loss of snag habitat would occur in timber harvest units and because of new road construction. The loss of existing snag habitat would be an irretrievable commitment of resources.

All 420 acres of northern spotted owl core areas, the 74 acres of late successional reserve and riparian reserves would be protected under all alternatives. No activities are proposed in any of these areas.

6.13.2 Direct, Indirect Effects

Critical Habitat

There is one Spotted Owl Critical Habitat Unit (#OR-67) in the planning area which would be affected. There would be no direct or cumulative impacts to critical habitat in Section 13 under alternative 1 and the impacts to OR-67 in the other action alternatives would be minimal, since only 22 acres would be removed through regeneration harvest in unit #13-2, with an additional 13 acres degraded through commercial thinning in units #13-1 and 13-3.

An additional seven acres for a total of 38 acres would be modified by the same form of timber harvest under alternative 5. Therefore, there would be a direct as well as a cumulative effect by converting more than one-half of the existing NSO nesting and foraging habitat within the Analysis Area portion of Section 13 to NSO dispersal habitat. However, there is extensive NSO roosting and nesting habitat in the more than 200 acres of Section 13 outside the Analysis Area.

Further discussion of the effects of critical habitat modification on NSO is presented in the section on NSO below. Besides NSO, there is no other species for which critical habitat has been designated in the Analysis Area.

Special Status Wildlife Habitat

Special habitat for various wildlife species listed as Threatened, Endangered, Sensitive, Proposed, Survey or Manage exist across the Analysis Area. Certain special habitat site locations (e.g., northern spotted owl nesting territories and Del Norte salamander occupied talus) are known. Surveys of special habitat sites for all listed species that might occupy harvest units have been conducted.

Alternative 1 would not impact existing special habitat conditions and would provide no further surveys within the Analysis Area. Under action alternatives 2 through 5, all sites known to have special habitat qualities or those found prior to or during harvest will be protected according to management/mitigation plans discussed in Chapter IV of this EA. It is possible that sites occupied by some of the Special Status or S&M species would not be found and could be lost by the harvest action proposed under alternatives 2, 3, 4 and 5. Although local populations of some species might be extirpated, relative to population viability of the species it is expected that this loss would be negligible. Since there are no known Threatened or Endangered species that are exclusively dependent on the Analysis Area, the minor loss of critical habitat or incidental loss of an individual animal would result in no measurable direct, indirect or cumulative impacts to Special Status or S&M animal species populations.

There would be no direct, indirect or cumulative effects by any alternative on the 74 acres of designated late successional reserve habitat located within the Analysis Area.

Big-Game Habitat

Suitable thermal cover (forest canopy closure of 70 percent and at least 20 feet in height) for big game species occupies about 85 percent of the existing big-game habitat in the Analysis Area. Alternative 1 would not change this habitat component. Alternatives 2 and 3 would reduce thermal cover within the Analysis Area by less than 3 percent and alternatives 4 and 5 would result in less than a one percent reduction in thermal cover. The direct, indirect and cumulative impacts of these losses are negligible.

Due to the heavy understory vegetation, suitable big-game hiding cover (habitat in which big-game can not be seen at a distance of 100 feet) occupies over 90 percent of the Analysis Area. Security cover (hiding cover greater than 1/8 mile on either side of primary and secondary travel routes) is available on an estimated 8,600 acres of the Analysis Area. Alternative 1 would result in no change to this value. The direct impacts is moderate for alternative 2 and very low negative for alternatives 3, 4 and 5. The indirect and cumulative impacts of these changes in security habitat to adjacent habitats would be considered very low to negligible.

Alternatives 2, 3, 4 and 5 propose to restrict future road usage to some extent beyond the current, alternative 1, conditions (Table II-5). Alternatives 2 and 3 would decommission 2.6 miles, alternative 4 would decommission 1.3 miles and alternative 5 would decommission 2.0 miles of road. Alternative 3 gates an additional 41.8 miles of road for protection of wildlife and watershed values. Alternative 4 gates 14.7 miles to protect primarily connectivity blocks and northern spotted owl core areas for wildlife

values. And alternative 5 gates 31.8 miles of road for the same reasons as alternative 3 with some heavily used recreational areas left open. The direct effect of this action under alternatives 3, 4 and 5 following the proposed harvest activities would be a net increase in security habitat across the Analysis Area. The largest direct effect on increasing security habitat would be under alternative 3. There would be no change in security habitat under alternatives 1 and 2.

Open-canopy seedling/sapling forest generally considered suitable as big-game foraging habitat covers about 16 percent of the Analysis Area. Due to heavy understory vegetation growth throughout most forested stands in the Analysis Area, the actual available foraging habitat is much greater. Alternative 1 would result in no change to foraging habitat. As a result of proposed harvest activities, alternatives 2 and 3 would provide an additional six percent foraging habitat (a low net positive change) and alternatives 4 and 5 would create an additional two percent each (a negligible change). The direct impact of these activities in the Analysis Area would be negligible and the indirect and cumulative effects outside the area would not be measurable.

Late-Successional Forest Habitat

The proposed action may adversely affect late-successional and old growth associated species and their habitats. General impacts of cutting Late-Successional and Old Growth (LSOG) habitat are discussed in the final RMP/EIS (USDI 1995). All the units are considered LSOG habitat except the commercial thin units.

These units are generally small, more isolated stands scattered throughout the project area. Therefore, the proposed action would not result in greatly increased fragmentation of large blocks of continuous habitat.

About 5,133 or 67 percent of the BLM federal lands within the Analysis Area is in late successional forest habitat. Alternative 1 would not immediately impact this habitat component, but as the stands age increases insect and disease infestations would create early-successional openings of various sizes scattered across the Analysis Area. Regeneration and overstory removal harvests proposed in alternatives 2, 3 and 4 would reduce late successional habitat on federal lands by 14.5, 13.4 and 5.8 percent, respectively (Table VI-7). Overstory removal harvest under alternative 5 would reduce late successional forest by approximately 3.9 percent. Relative to the existing extent of late-successional habitat within the Analysis Area and elsewhere in the fifth-field West Fork Cow Creek Watershed, the direct impact of this reduction in habitat would be considered low for alternatives 2 and 3 and very low impact for alternatives 4 and 5. The indirect and cumulative impacts in the context of a much larger geographic area, would be considered negligible.

The potential reductions in late-successional forest habitat under action alternatives 2 through 5 would result in similar reductions in suitable habitat for northern spotted owls, marbled murrelet and other late-successional dependent wildlife species. No harvest activities would occur within known spotted owl core areas or designated late successional reserve areas. There are no known marbled murrelet nest sites within the Analysis Area.

As mandated by the RMP, late-successional forest habitat would be maintained on more than 15 percent of federal lands in the fifth-field West Fork Cow Creek Watershed. There are approximately 14,400

acres of late-successional habitat in the West Fork Cow Creek Watershed representing 58 percent of the federal BLM lands. There are additional late successional habitat on Forest Service federal lands in the Watershed.

Table VI-7. Distribution of Late-successional Forest by Alternative.

LOCATION		ALTERNATIVE				
Twn/Rng	Section	1	2	3	4	5
31S,8W	19	3	3	3	3	3
	20	15	15	15	15	15
	29*	387	353	365	387	381
	31	93	93	93	93	93
	32	80	40	40	54	40
	33	216	147	147	193	187
32S,9W	13	72	66	66	65	66
	24	60	60	60	30	53
	25	30	30	30	30	30
32S,8W	3	132	132	132	87	132
	5	294	273	279	246	285
	7	303	258	258	289	272
	8	42	42	42	42	42
	9	324	224	224	297	324
	11*	492	471	480	481	492
	12	39	33	33	32	39
	14	27	27	27	27	27
	15*	423	399	399	393	423
	17	405	374	374	384	374
	19*	621	479	479	621	621
	21	543	466	476	520	501
	27	6	6	6	6	6
	29	507	400	400	507	507
31	19	0	19	3	19	
Total LS Acres		5,133	4,388	4,445	4,826	4,931
Total LS Acres Harvested		0	745	688	307	202
Percent of Total LS Area		0	14.5	13.4	5.8	3.9
*Connectivity/Diversity Blocks						
LS – late-successional forest on federal lands in the Analysis Area.						

Habitat Diversity

Structural diversity of existing habitat on federal and private lands across the Analysis Area is relatively low with 67 percent being closed-canopy, multi-layer forest, 16 percent is open-canopy, sapling/pole young forest and the remaining 16 percent is shrub/seedling regenerating forest. There would be no change in habitat diversity under alternative 1. Alternatives 2 and 3 would shift less than 4 percent from

large tree closed-canopy forest to shrub/seedling stage and alternatives 4 and 5 would result in less than a 1 percent change. All four action alternatives would result in a less than 4 percent change from large tree closed-canopy forest to open-canopy sapling/pole/small tree forest.

Although slightly detrimental for late-successional dependent species, these changes in habitat diversity would provide a more balanced representation of seral habitat stages and are positive in nature for many wildlife species. With these activities being spread across the 13,692-acre Analysis Area, the direct positive or negative impacts on wildlife would be negligible. Anticipated indirect and cumulative impacts relative to even larger areas of habitat are likewise, insignificant.

Corridors and Late-successional Fragmentation

Regeneration harvests and overstory removals proposed for all action alternatives would result in loss of late-successional habitat. Since one of the recommendations of the West Fork Cow Creek Watershed Analysis (USDI 1997) was to maintain a higher level of connectivity in the Bear Creek sub-watershed to promote connectivity between LSR's, some regeneration harvest and overstory removal units have been deferred in alternative four. In this alternative, several regeneration and overstory removal units remain in the area identified in the Watershed Analysis for General Forest Management Act connectivity, including Units # 13-2, 24-5,3-2, 7-4,7-7, 9-4, 11-1, 11-5, 12-1, 15-4, 17-1, 9-6, 21-1, 21-2, and 31-1, totaling 270 acres. The effects of regeneration harvest and overstory removal are expected to be large enough that there may be some reduction of habitat use and impedence of movement by late-successional affiliated wildlife. The effects of these treatments on closed-canopy north-facing slopes would be greater here than in other areas because of their strategic importance relative to providing an east-west older forest link. As described in the Watershed Analysis, some of the largest blocks of unfragmented forest occur in the project area, and removal of these older forest patches may eliminate any refugia for late-successional species.

Connectivity/Diversity Blocks

There are four connectivity/diversity blocks within the project area and are intended to provide effective habitat to the extent possible (USDI 1995). While this allocation is expected to provide some core reserve habitat patches or refugia adequate for dispersal of high mobility species, their value in connectivity is reduced for species with low mobility (USDI 1997). All action alternatives would have direct, indirect and cumulative effects on the connectivity/diversity blocks in T.31S.,R.8W., Sec. 29 and T.32S.,R.8W., Sec.11, 15 and 19 within the Analysis Area. Alternative 2 would have the largest impact with 211 acres of regeneration harvest and 15 acres of commercial thinning within connectivity/diversity blocks. Under alternative 3, there would be 187 acres of regeneration harvest and 15 acres of commercial thinning in these blocks. Alternative 4 would have 30 acres of regeneration harvest and overstory removal treatments in connectivity blocks. Alternative 5 would only have 6 acres of overstory removal and 15 acres of commercial thinning treatments. Alternative 5, however, would have 243 acres of restoration thinning. There would be no effects on these sections under alternative 1.

While roads are proposed for gating or decommissioning under alternatives 3, 4 and 5, road closures proposed under alternative 4 were specifically designed to protect connectivity blocks and NSO core areas from human disturbance. About 16 miles of road would be closed to provide this protection.

Under alternatives 2 and 3 regeneration harvest treatments are proposed on 34 and 22 acres respectively in connectivity/diversity block T31SR8W Section 29. These proposed harvest units are currently relatively disjunct late-successional stands. Although 12 to 15 overstory trees would be retained in these units, there would be a degradation of these stands from suitable to dispersal habitat status for some species including northern spotted owls. Alternative 5 proposes an overstory removal harvest treatment on six acres of land, resulting in an insignificant loss of habitat relative to surrounding stands. Thirty percent of the block would remain in late-successional habitat following all proposed action. A 0.05-mile temporary spur road is proposed in Section 29 under alternatives 2 and 5.

Alternatives 2 and 3 propose 15 acres of commercial thinning and 12 acres of regeneration harvest, while alternative 4 proposes no commercial thinning in the Section 11 connectivity block. With the retention of 12 to 15 overstory trees in these units there would be a small reduction in late-successional closed canopy forest habitat, but not a loss in dispersal habitat within this connectivity block. Alternative 5 proposes restoration thinning on 77 acres of the block, which should not markedly change the availability of connectivity features. No road construction is proposed within the Section 11 connectivity block.

Alternatives 2 and 3 propose 34 and 24 acres of regeneration harvest treatment, respectively in the Section 15 connectivity block. Alternative 4 proposes 30 acres of overstory removal and alternative 5 proposes 20 acres of restoration thinning. This block is currently relatively undisturbed. The small acreage and disjunct nature of stands selected for harvest treatment stands would maintain the block as primarily late-successional forest habitat. In Section 15, 0.42 miles of temporary road is proposed under alternative 2.

Alternative 2, 3 and 4 propose 142, 129 and 0 acres of regeneration harvest, respectively in the Section 19 connectivity block. Alternative 5 proposes 145 acres of restoration thinning. Although suitable corridor habitat is retained, alternatives 2 and 3 would result in a loss of connectivity block character. The 24 acres of harvest unit 19-1 are already somewhat unconnected to other late-successional habitat and the harvesting of this stand would not markedly affect existing connectivity. The restoration thinning treatments proposed under alternative 5 would not impact wildlife use of the Section 19 block for travel. In Section 19, 0.24 miles of temporary road is proposed under alternative 2.

There is one overstory removal unit, #15-4, totaling 30 acres, proposed in connectivity blocks. This block currently has approximately 50% of its habitat in a mature or old-growth condition, and the reduction of an additional 30 acres is expected to minimally affect its function.

Late-Successional Reserve

There will be no direct, indirect or cumulative effects on the 74 acres of designated Late-Successional Reserve habitat located within the analysis area in any of the alternatives.

Individual Species

Northern Spotted Owl

All of the action alternatives are expected to adversely affect northern spotted owls, a federally listed (Threatened) species. The proposed action would result in a “take” of four pairs of spotted owls, based upon information from Table 2, in which spotted owls are taken when the number of acres is:

(1) already less than 40 percent of the 1.3 mile radius circle and harvest of timber would take this number to even lower levels, or

(2) more than 40 percent of the 1.3 mile radius circle and the harvest of those stands would take the number below the provincial level (1336 acres).

Three of the activity centers already have less than the amount considered necessary for the site to remain viable for nesting, and any additional habitat removal is considered a “take.” The fourth site, 201 Extension, currently has sufficient suitable habitat for nesting. Under alternatives two, three, and four, the proposed harvest will reduce this site below the level of habitat considered necessary to maintain viable nesting, and will therefore also be a “take”.

Spotted Owl site history - Bear Pen timber sale

Spotted Owl Site Name	Master Site Number	Pair Status	Last year Reproduction
Crafty Dutch	2407	Pair	2001
Haystack	2662	Single	1994
Cain and Mabel	2622	Pair	1994
Bear Roost	2016	Pair	2001
201 Extension	0936	Pair	2001

Table VI-8. Pre-harvest and Post-harvest Suitable and Dispersal Habitat Within 1.3 miles of Known Activity Centers for Northern Spotted Owls.

NSO SITE LOCATION	ACRES OF SUITABLE HABITAT WITHIN 1.3 MILES OF ACTIVITY SITES ¹					DISTURBANCE WITHIN 1/4 MI. OF ACTIVITY	UNITS AFFECTING ACTIVITY SITE
	Pre-harvest Suitable (acres)	Pre-harvest Dispersal (acres)	Suitable Removed (acres)	Dispersal Removed (acres)	Post-harvest Suitable (acres)		
Haystack							Units
Alt. 1	739	1,297	0	0	739	No	29A-1, 29A-2,
Alt. 2	739	1,297	100	0	639	Yes	31-1, 32-1, 33-
Alt. 3	739	1,297	87	0	652	Yes	1, 33-2, 33-3A,
Alt. 4	739	1,297	6	0	733	Yes	33-3B
Alt. 5	739	1,297	72	0	677	Yes	
Cain and Mabel	1,138	1,330	0	0	1,138	No	3-2, 11-1, 11-
Alt. 1	1,138	1,330	100	0	1,038	Yes	3, 11-4, 11-5,
Alt. 2	1,138	1,330	55	0	1,083	Yes	11-6, 11-7, 12-
Alt. 3	1,138	1,330	100	0	1,038	Yes	1, 15-1, 15-2,
Alt. 4	1,138	1,330	25	0	1,113	Yes	15-3,
Alt. 5							
Bear Roost							
Alt. 1	1,177	640	0	0	1,177	No	15-1, 15-2, 15-
Alt. 2	1,177	640	132	0	1,045	Yes	3, 15-4, 17-1,
Alt. 3	1,177	640	112	0	1,065	Yes	21-1, 21-2, 21-
Alt. 4	1,177	640	78	0	1,099	Yes	3, 21-4, 21-5
Alt. 5	1,177	640	63	0	1,114	Yes	

201 Extension							
Alt. 1	1,413	1,503	0	0	1,413	No	24-1, 24-5, 19-1, 19-2, 19-3,
Alt. 2	1,413	1,503	349	0	1,064	Yes	19-4, 19-4x,
Alt. 3	1,413	1,503	295	0	1,118	Yes	19-5, 19-6, 19-
Alt. 4	1,413	1,503	84	0	1,329	Yes	7, 19-8, 21-2,
Alt. 5	1,413	1,503	47	0	1,366	Yes	21-4, 21-5, 29-1, 29-2, 29-2x,
							29-3/4/5, 29-6,
							29-7, 31-1, 31-1x
							7-4, 7-5, 7-6,
							13-1, 13-2, 13-3, 13-4, 13-5,
							24-1, 24-2, 24-3, 24-4, 24-5,
							19-1, 19-2, 19-3, 19-4, 19-4x,
							19-5, 19-6, 19-7, 19-8, 29-1

¹ Suitable Acres on BLM lands within Bear Pen Analysis Area.

² As all stands on private lands are mostly less than 40 years, these lands have been identified as dispersal habitat.

Spotted Owl Critical Habitat

There is one Spotted Owl Critical Habitat Unit (#OR-67) in the planning area, in T32S, R9W, S13, which would be affected by the action alternatives. The actions which are proposed may affect northern spotted owl critical habitat through habitat removal and habitat degradation, which can appreciably slow the development of suitable spotted owl habitat.

There would be no direct or cumulative impacts to critical habitat in Section 13 under alternative 1, and the impacts to OR-67 in the action alternatives would be minimal, since only 7 acres would be removed through regeneration harvest in unit #13-2, with an additional 13 acres degraded through commercial thinning in units #13-1 and 13-3.

An additional seven acres, for a total of 27 acres, would be modified by the same form of timber harvest under alternative 5. Therefore, there would be a direct as well as a cumulative effect by converting more than one-half of the existing NSO nesting and foraging habitat within the Analysis Area portion of Section 13 to NSO dispersal habitat. However, there is extensive NSO roosting and nesting habitat in the more than 200 acres of Section 13 outside the Analysis Area. Treatment of this small area is not expected to adversely modify the Critical Habitat Unit (CHU), because essential functions of the CHU would be maintained outside the analysis area.

Although the action alternatives would remove and degrade spotted owl habitat, the extent to which this would occur is greatly reduced from the potential amount originally envisioned in the Northwest Forest Plan and District RMP. Evaluation of the overall impact to the species was accomplished in the United States Fish and Wildlife Service Biological Opinion (1-7-01-F-032).

Marbled Murrelets

Over 600 surveys have been conducted in the Glendale Resource Area with no detections of murrelets (USDI 2000). The results of these surveys, and additional surveys on the Siskiyou and Rogue River National Forests and statistical modeling of surveys at far inland sites, support the conclusion that within southwestern Oregon, murrelets occur in the western hemlock/tanoak vegetation zone, but rarely occur beyond this zone in the mixed conifer/evergreen zone (USDA/USDI 2001). All of the proposed regeneration and overstory removal units in the proposed action occur in the mixed conifer/evergreen zone in far inland sites (greater than 35 miles from the Coast), and it is therefore expected the proposed action will have little or no effect on marbled murrelets.

Marbled Murrelet Critical Habitat

The entire analysis area is outside marbled murrelet critical habitat, and is therefore expected to have no effects on marbled murrelet critical habitat.

Bald Eagles

There are no known bald eagle nest sites within the proposed action area, and it is therefore expected there will be no effects on bald eagles as a result of the proposed action.

Oregon Coast Coho Salmon

Although timber harvest under all alternatives could cause small, highly localized changes in streamflow, harvest would not alter the timing, duration or magnitude of base or peak flows in Oregon Coast coho salmon critical habitat.

Road renovation and decommissioning could result in some sediment reaching coho salmon streams, even though appropriate BMPs are used to minimize impacts. However, the chance for it to adversely affect OC coho salmon and their critical habitat would be insignificant. Eliminating vehicular traffic use on several natural surface roads during the wet season would reduce erosion and stream sedimentation.

All watershed and habitat indicators in the National Marine Fisheries Service Matrix of Pathway Indicators Checklist would be maintained in the long-term at the fifth field watershed scale (West Fork Cow Creek). This project is consistent with ACS Objectives (ACS Consistency Analysis) and with terms and conditions of the NMFS LRMP/RMP Biological Opinion (March 18, 1997). The NMFS concurred with the BLM in their letter of concurrence dated July 15, 2002 that stated the Bear Pen Analysis Area is “not likely to adversely affect” OC coho salmon and OC steelhead

When the effects of the proposed action are added to the environmental baseline and cumulative effects elsewhere in the 5th field watershed, it is concluded that none of the alternatives are likely to adversely affect OC coho salmon and its critical habitat, OC steelhead and would have no effect on Essential Fish Habitat (Magnuson-Stevens Act) (coho and chinook salmon).

Del Norte Salamanders

Del Norte salamanders are known to occur in the project area. Known sites will be protected with a buffer, and therefore the effects to this species as a result of proposed treatments is expected to be small.

Red Tree Voles

The action alternatives would result in the loss of a large amount of canopy closure as a result of regeneration harvest and overstory removal treatments, and a lesser reduction in canopy closure through commercial thinning treatments. Management recommendations for this species (USDA/USDI 2000) cite several concerns, including forest fragmentation, increased geographic isolation of remaining populations, and management activities that target the removal of older trees which could alter forest microclimate conditions.

Alternative two would have the greatest effect, reducing late-successional canopy closure by approximately 14.5%, with alternative three resulting in a 13% reduction, and alternative four comprising a 6% reduction.

It is expected there will be a small direct effect on red tree voles as a result of the proposed regeneration harvest and overstory removal treatments, with a lesser effect as a result of commercial thinning operations. Prior to implementation, surveys would be conducted and buffers will be established to minimize adverse effects..

Great Gray Owls

No suitable habitat for great gray owls is known to occur in the Analysis Area. Therefore, the proposed actions under all alternatives would have no impact on this species.

Mollusks

The Oregon Shoulderband, *Helminthoglypta hertelini*, is less closely associated with late-successional forest than other mollusc species. Management recommendations (USDA/USDI 1999) note the importance of vegetative cover for this species, and consider one of the major threats to be activities which create increased temperatures, such as those which will result from overstory removal and regeneration harvest treatments.

It is expected there will be a small direct effect on the Oregon Shoulderband as a result of the proposed regeneration harvest and overstory removal treatments. Prior to implementation, surveys will be conducted and buffers will be established to minimize adverse effects.

Bats (fringed myotis, silver-haired, long-eared myotis, long-legged myotis, pallid, and Townsend's big-eared bats)

The total acreage of bat habitat in the project area is unknown. Preliminary surveys indicate that habitat is present in the sale area. The proposed action is expected to have a small impact on bat roost trees, including green trees and dead snags which will be removed, possibly contributing to a decline in local bat populations. Changes in microclimates may also result from trees near bat roosts being harvested. The total direct effects to these species is unknown.

Great Gray Owls

The project area contains little suitable great gray owl habitat. No great grey owls have been detected in the Glendale Resource Area, and it is thus expected the proposed treatments will have little or no effect on great gray owls.

Other Wildlife Species

Big-Game Habitat

Suitable thermal cover (forest canopy closure of 70 percent and at least 20 feet in height) for big game species occupies about 85 percent of the existing big-game habitat in the Analysis Area. This alternative would result in less than a one percent reduction in thermal cover. The direct, indirect and cumulative impacts of these losses are negligible.

Due to the heavy understory vegetation, suitable big-game hiding cover (habitat in which big-game can not be seen at a distance of 100 feet) occupies over 90 percent of the Analysis Area. Security cover (hiding cover greater than 1/8 mile on either side of primary and secondary travel routes) is available on an estimated 8,600 acres of the Analysis Area. The direct impacts are expected to be a very low

negative for this alternative. The indirect and cumulative impacts of these changes in security habitat to adjacent habitats would be considered very low to negligible.

Alternative 4 proposes to restrict future road usage to some extent beyond the current conditions (Table IV-5). Alternative 4 would decommission 1.3 miles of road for protection of wildlife and watershed values. Alternative 4 gates 14.7 miles to protect primarily connectivity blocks and northern spotted owl core areas for wildlife values. The direct effect of this action under alternative 4 following the proposed harvest activities would be a net increase in security habitat across the Analysis Area.

Open-canopy seedling/sapling forest generally considered suitable as big-game foraging habitat covers about 16 percent of the Analysis Area. Due to heavy understory vegetation growth throughout most forested stands in the Analysis Area, the actual available foraging habitat is much greater. As a result of proposed harvest activities under alternative 4, there is expected to be an additional two percent of foraging habitat (a negligible change). The direct impact of these activities in the Analysis Area would be negligible and the indirect and cumulative effects outside the area would not be measurable.

Cumulative Effects

Past timber harvest on federal and private lands in the West Fork Cow Creek watershed have reduced the quality and quantity of late-successional habitat in the analysis area. Virtually all of the commercial timber on private lands within the watershed has been cut (USDI 1997). The current proposal further reduces the quality and quantity of late-successional habitat in the analysis area.

The extensive network of roads associated with logging activities within the watershed has added to the fragmentation and direct removal of older forests, reducing the effectiveness of late-successional patches even further. The temporary and permanent road construction to support timber harvest in the proposed action is expected to result in a small increase in these effects.

7.0 LIST OF PREPARERS

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8.0 AGENCIES CONSULTED

National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS).

Public Notification

The notification that this environmental assessment is available for review will be published in local newspapers. The EA will be sent to several interested parties who have requested to be on the mailing list for such documents. In addition several state agencies and local governments will be notified. The

EA will be available for review on the Medford District website. Comments, including names and street addresses of respondents, will be available for public review.

Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety

Martin Lew
Ecosystem Planner
Reviewed for format and consistency

ACRONYMS AND GLOSSARY

Abbreviations:

ACS	Aquatic Conservation Strategy
BLM	Bureau of Land Management
BMP(s)	Best Management practices
CA	Compacted Area
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CT	Commercial Thinning
DBH	Diameter at breast height
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOA	Equivalent Open Acres
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
GFMA	General Forest Management Area
GIS	Geographic Information System
IDT	Interdisciplinary planning team
LSR	Late Successional Reserve
MA	Management Area
MBF	Thousand Board Feet
MMBF	Million Board Feet
MR	Management Requirement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NSO	Northern Spotted Owl
ODFW	Oregon Department of Fish and Wildlife
OR	Overstory Removal
PCT	Precommercial Thinning
Special Status	Endangered, Threatened and Sensitive
PNV	Present Net Value
RH	Regeneration Harvest
ROD	Record of Decision
RT	Restoration Thinning
S&M	Survey and Manage
SIP	State Implementation Plan
SMZ	Snowmelt Zone
TCP	Tradition Cultural Properties
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USF&WS	United States Fish and Wildlife Service
VRM	Visual Resource Management

Accelerated Erosion. Any increase in the natural rate of erosion process such as landslides, stream channel scour, or dry ravel. Accelerated erosion can be caused by management activities that (1) alter the natural erosion resisting forces (root strength, inter-particle binding), (2) alter the flow of ground or surface waters, or (3) change the natural slope locations of soil or rock materials.

Affected Environment. The natural, physical, and human-related environment that is sensitive to changes due to proposed actions.

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

Airshed. A geographical area that, because of topography, meteorology and climate, shares the same air.

Alternative. One of several policies, plans or projects proposed for decision-making.

Anadromous Fish. Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Salmon and steelhead are examples.

Analysis Area. A delineated area of land subject to analysis of (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and range land outputs and environmental quality objectives, and (2) economic and social impacts (FSM 1905). Identified as tracts of lands with relatively homogeneous characteristics in terms of the outputs and effects by management.

Anthropogenic. Action created by man.

Aquatic Ecosystem. The stream channel and associated riparian habitat, lake or estuary bed, water, biotic communities and habitat features that occur within them.

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)).

Big-game. Those species of large mammals normally managed as a sport-hunting resource and include such animals as deer, elk and bear.

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

Biological Corridor. A habitat band linking areas reserved from substantial disturbance.

Biological Diversity. The variety of life and its processes.

Biological Legacies. Large trees, down logs, snags, and other components of the forest stand left after harvesting for the purpose of maintaining site productivity and providing structures and ecological functions in subsequent stands.

Broadcast Burning. Allowing a prescribed fire to burn over a designated area within well defined boundaries for reduction of fuel hazards or as a silvicultural treatment, or both.

Candidate Species. Those plants and animals included in Federal Register “Notice of Review” that are being considered by the U.S. Fish and Wildlife Service for listing as threatened or endangered.

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

Cavity Excavator. A wildlife species that digs or chips out cavities in wood to provide a nesting, roosting, or foraging site.

Cavity Nester. Wildlife species, most frequently birds, that require cavities (holes) in trees for nesting and reproduction.

Cavity Habitat. Snags, broken-topped live trees and down logs used by wildlife species that excavate and/or occupy cavities in these trees.

Class I (air quality) Areas. Special areas (i.e., national parks and certain wilderness areas) protected for their air quality related values.

Clearcut Harvest. A regeneration method under an even-aged silvicultural system. When suitable seed trees are either non-existent or unprotectable, all trees within a defined area are removed at one time. Regeneration then occurs from (1) natural seeding from adjacent stands, (2) seed contained in the slash or logging debris, (3) advance growth, or (4) planting or direct seeding. An even-aged forest usually results.

Climax Vegetation. The culminating stage in plant succession for a given site. The species composition of the vegetation has reached a highly stable condition over time and perpetuates itself unless disturbed by outside forces.

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.

Handpile burning. Prescribed fire used to remove man-made or natural collections of concentrated woody debris. Generally the fire is hotter than in broadcast burning or underburning.

Connectivity. A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.

Core Area. That area of habitat essential in the breeding, nesting and rearing of young, up to the point of dispersal of the young.

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.

Council on Environmental Quality. An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies and advises the president on environmental matters.

Critical Habitat. Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that might require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.

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

Dispersed Recreation. Outdoor recreation in which visitors are diffused over relatively large areas.

Draft Environmental Assessment. Required by environmental laws to assess effects of certain actions. It is an initial report on reasons for, and effect of these actions (projects, procedures, etc.) It usually includes alternative actions including a no-action and a proposed action alternatives along with additional alternatives showing varying degrees of action.

Developed Recreation Site. Distinctly designated areas where facilities are provided for concentrated public use, e.g., campgrounds, picnic areas, boating sites, and ski areas.

Dispersed recreation. Outdoor recreation that takes place outside developed recreations sites or in wilderness areas.

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.

Endemic. The population of plants, animals, insects, or diseases at their normal levels. Often relating to endemic populations of potentially injurious forest insects, in contrast to epidemic levels not in balance with predator populations.

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.

Environmental Impact Statement (EIS). A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major federal action.

Ephemeral Streams. Streams that flow only as a direct response to rainfall or snowmelt events. They have no perennial baseflow.

Epidemic. An abnormally high population of potentially injurious plants, animals, or diseases. A population that exceeds its normal balanced level, in contrast to endemic levels.

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.

Essential Habitat. Areas with essentially the same characteristics as critical habitat but not declared as such. These habitats are provided to meet recovery objectives for endangered, threatened, and proposed wildlife species.

Eutrophication. Natural process in shallow lakes where plant growth in the lake increases and the ability to decompose organic material decreases. This action leads to the gradual filling in of the lake.

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 grazing or harvested for feeding.

Forage Areas. Vegetated areas with less than 60 percent total combined canopy closure of trees and tall shrubs (greater than seven feet in height).

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.

Forest Succession. The orderly process of change in a forest as one plant community or stand conditions is replaced by another, evolving towards the climax type of vegetation.

Forb. Any herb other than grass.

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

Fuels Management. Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

General Forest Management Area (GFMA). Forest land managed on a regeneration harvest cycle of 70-110 years. A biological legacy of six to eight green trees per acre would be retained to assure forest health. Commercial thinning would be applied where practicable and where research indicates there would be gains in timber production.

Habitat Diversity. The distribution and abundance of different plant and animal communities and species within a specific area.

Habitat Fragmentation. The breaking up of habitat into discrete islands through modification or conversion of habitat by management activities.

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.

Heritage Resource. Any definite location or article associated with past human activity identifiable through field survey, historical documentation, or oral evidence; includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

Hiding Cover. Vegetation capable of hiding 90 percent of a standing adult deer or elk at 200

feet or less. Includes those shrub and forested stand conditions that provide adequate tree stem or shrub layer density to hide animals. In some cases, topographic features also can provide hiding cover.

Hydrologic. Pertains to the quantity, quality and timing of water yield from forested lands.

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

Indicator Species. Species of fish, wildlife, or plants adapted to a particular kind of environment, which reflect ecological changes to the environment caused by land management activities.

Indirect Effects. Secondary effects which occur in locations other than the initial action or significantly later in time.

Interdisciplinary Approach. Utilization of more than one individual, representing numerous areas of knowledge and skill, focusing on the same task, problem, or subject. Team member interaction provides needed insight to all stages of the process.

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.

Irretrievable. Refers to losses of production, harvest, or a commitment of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports (recreation) site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible. Refers primarily to the use of nonrenewable resources, such as minerals, or cultural resources, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future operations.

Issue. A point, matter, or question of public discussion or interest, to be addressed or resolved through the planning process.

Issue Indicator. A specific, measurable element which expresses some feature or attribute relative to an issue.

Land Use Allocation. Allocations of a land area which defines allowable uses/activities, restricted uses/activities, and prohibited uses/activities. Each allocation is associated with a specific management objective.

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.

Limiting Factor. Physical or biological condition that constrains a population size of a species in a defined geographic area, e.g., winter range for elk.

Lop and Scatter. A forest fuels reduction treatment where following tree felling, limbs and branches are cut-off and scattered in the harvest unit.

Management Area (MA). Geographic areas, not necessarily contiguous, which have common management direction, consistent with the District Plan allocations.

Management Direction. A statement of multiple use and other goals and objectives, along with the associated management prescriptions and standards and guidelines to direct resource management.

Management Prescription. A set of land and resource management policies that, as expressed through Standards and Guidelines, creates a Desired Future Condition over time.

Mass Movement. The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not include surface erosion.

Matrix Lands. Federal lands outside of reserves and special management areas that will be available for timber harvest at varying levels.

Mature Stand. A mappable stand of trees for which the annual net rate of growth has peaked. Stands are generally greater than 80-100 years old and less than 180-200 years old. Stand age, diameter of dominant trees, and stand structure at maturity vary by forest cover types and local site conditions. Mature stands generally contain trees within a small average diameter, less age class variation, and less structural complexity than old-growth stands of the same forest type. Mature stages of some forest types are suitable habitat for spotted owls. However, mature forest are not always spotted owl habitat, and spotted owl habitat is not always mature forest.

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.

Multi-aged Stand. A forest stand which has more than one distinct age class arising from specific disturbance and regeneration events at various times. These stands normally will have multi-layered structure.

Multi-layered Canopy. Forest stands with two or more distinct tree layers in the canopy; also called multi-layered stands.

National Ambient Air Quality Standards (NAAQS). Standards designed to protect public health and welfare, allowing an adequate margin of safety. For particulate matter less than ten microns in size (PM₁₀), 50 micrograms per cubic meter annual average and 150 micrograms per cubic meter, 24-hour average; not to be exceeded more than once per year.

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.

National Environmental Policy Act (NEPA) Process. An interdisciplinary process, which concentrates decision making around issues, concerns, alternatives, and the effects of alternatives on the environment.

Natural Regeneration. Renewal of a tree crop by natural means using natural seed fall and/or tree regeneration existing before stand harvest.

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.

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

Non-point Pollution. Pollution whose source is an area, a collection of sites or some other type of “group” source. Erosion and sedimentation are examples. Exhaust from many autos, as in a parking lot, is generally considered non-point pollution. It is compared with point pollution.

Noxious Weeds. Rapidly spreading plants that can cause a variety of major ecological or economic impacts to both agriculture and wildland.

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).

Old-growth-dependent Species. An animal species so adapted that it exists primarily in old-growth forests or is dependent on certain attributes provided in older forests.

Open Road Density. The linear measure of road system open to use relative to total habitat available (miles/square mile).

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

Overstory Removal. The final stage of cutting where the remaining overstory trees are removed to allow the understory to grow. Overstory removal is generally accomplished three to five years after reforestation and when adequate stocking has been achieved.

Peak Flow. The highest amount of stream or river flow occurring in a year or from a single storm event.

Percent Early Seral. A metric is used to indicate the likelihood that natural or human disturbance in a watershed may affect the timing and magnitude of peak flows.

Perennial Streams. Streams that flow continuously throughout the year.

Plant Community. An association of plants of various species found growing together in different areas with similar site characteristics.

Point Pollution. Pollution which originates at a single identifiable source, such as a sewage treatment plant or fireplace. It is compared with non-point pollution.

Precommercial Thinning. The practice of removing some of the trees less than merchantable size from a stand so that remaining trees will grow faster.

Preferred Alternative. The alternative recommended for implementation based on analysis developed in the EIS (40 CFR 1502.14).

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.

Rain-on-Snow Event. A winter storm that is characterized by precipitation falling as rain, rather than snow, and melting of existing snowpack.

Range of Alternatives. A range of alternatives provides a set of different ways for managing public lands, offering many different levels of goods and services. Each alternative is one way of managing the Federal Forest, expressed as management emphasis leading to a unique set of goods and services being available to the public.

Raptors. Predatory birds, such as falcons, hawks, eagles, or owls.

Reforestation. The natural or artificial restocking of a forest area with trees--includes measures to obtain natural regeneration, as well as tree planting and seeding. Reforestation is used to produce timber and

other forest products, protect watershed functioning, prevent erosion, and improve other social and economic values of the forest, such as wildlife, recreation, and natural beauty.

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

Regeneration Harvest. A silvicultural system using stand regeneration methods that include modified versions of the seed tree, shelterwood and overstory removal harvest methods. Stands remaining after regeneration harvest will generally resemble reserve seed tree cuts.

Rehabilitation. To return unproductive lands, other than roads and trails, to good health through stabilization so as to produce the same vegetation (or similar species) as found in adjacent areas.

Renovation – Roads. Protection of the road investment by surface grading, reshaping ditch lines, improving and installing additional drainage structures and replacement of deteriorating culverts. Renovation also includes converting road prisms from ditched to out-sloped roadbeds with waterdips, which reduces long-term maintenance costs and properly drains roads during storm events.

Residual Stand. Trees remaining in forested stand after some event, such as selection cutting.

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).

Restoration Thinning. The silvicultural practice of manually removing competitive vegetation so that the remaining trees will grow faster.

Riparian Areas/Habitats. Areas of land that are directly affected by water, usually having visible vegetation or physical characteristics reflecting the influence of water. Streamsides, 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.

Road Maintenance. The upkeep of the entire road system including surface and shoulders, parking and side areas, structures, and traffic-control devices necessary for its safe and efficient utilization.

Scenic Resource. The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit might have for visitors.

Scoping. The procedure by which the Forest Service determines the range of issues and extent of analysis necessary for a proposed action. This includes but is not limited to: the range of actions,

alternatives, and impacts to be addressed; the identification of significant issues related to a proposed action; and establishing the depth of environmental analysis, data, and task assignments needed.

Sediment. Any material carried in suspension by water, which would ultimately settle to the bottom. Sediment has two main sources: from the water channel itself and from disturbed upland sites.

Seed Tree. A tree selected as a natural seed source within a shelterwood or seedtree harvest cut. Sometimes, these trees are also reserved for seed collection.

Seedlings and Saplings. Non-commercial-size young trees, generally occurring in plantations.

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.

Site Tree/Index. A measure of forest productivity expressed as the height of the tallest trees in a stand at an index age. This value is estimated at 170 feet for the Bear Pen Analysis Area.

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.

Soil Productivity. Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

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

State Implementation Plan (SIP). A state document required by the Clean Air Act. It describes a comprehensive plan of action for achieving specified air quality objectives and standards for a particular locality or region within a specified time, as enforced by the state and approved by the Environmental Protection Agency.

Stream Order. Streams are systematically classified based on the network of tributary branches within a drainage basin. Each non-branching channel segment (smallest size) is designated a first-order stream. A stream which receives water from only first-order segments is termed a second-order stream, and so on. The order of a particular drainage basin is determined by the order of the principle or largest segment.

Streambed Particle Size Distribution. A graphical representation of the size class composition of a cross section of streambed. The composition is statistically determined by sampling the composition of particle sizes in the streambed, not the area covered by individual particles.

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.

Succession. A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax. An example is the development of series of plant communities called seral stages following a major disturbance.

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

Suitable Forest Land. Forest land (as defined in CFR 219.3, 219.14) for which technology can ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions; for which there is reasonable assurance that such lands can be adequately restocked (as provided in CFR 219.4); and for which there is management direction that indicates that timber production is an appropriate use of that area.

Surface Erosion. The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills or dry rattle.

Suspended Sediment. Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

Thermal Cover. Vegetative cover used by animals to modify the adverse effects of weather. A forest or shrub stand at least 5 feet in height with tree canopy cover of at least 70 percent provides thermal cover for mule deer. For elk thermal cover is defined as 30 to 60 acres in size, 40 feet tall or greater coniferous stands with crown closure exceeding 70 percent. Deciduous and conifer stands might serve as thermal cover in summer, but deciduous stands are not effective in winter.

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.

Underburning. The use of prescribed fire, most often below an overstory canopy to remove excess forest fuels. Generally conducted in the spring months and a cooler fire than broadcast burning.

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

Viable Population. A wildlife or plant population that contains an adequate number of reproductive individuals to appropriately ensure the long-term existence of the species.

Viewshed. Portion of the Forest that is seen from a major travel route, or high use location.

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

Water Yield. The quantity of water derived from a unit area of watershed forming streamflow.

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.

Wildlife Diversity. The relative abundance of wildlife species, plant species, communities, habitats or habitat features per unit area.

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

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APPENDIX A

Proposed Harvest Units and Treatments By Alternative

Table A-1. Proposed Harvest Units and Treatments Under Alternative 2.

UNIT ID	BLM ID	ACRES	SILVICULTURAL TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	N. ROAD (MILES) ³
2-1	29A-1*	12.4	Regen. Har.	30	273	Gr/Cable	Sl(1)/Ub	.05 T/0.19 R
2-2	29A2*	21.8	Regen. Har	25	545	Cable	Sl(1)/Ub	
2-3	32-1	40.5	OR	12	486	Cable	Sl(2)/L&S	0.16T/0.2R
2-4	33-1	17.9	OR	20	358	Cable	Sl(2)/Hb/P11/ 2	0.35 T
2-5	33-3A	4.5	OR	4	18	Cable	Sl(3)/L&S	
2-6	33-3B	2.8	OR	8	22	Cable	Sl(3)/L&S	
2-7	33-3C	3.7	OR	3	11	Cable	Sl(3)/L&S	
2-8	33-4	25.8	Regen. Har	14	362	Cable	Sl(3)/Br	
2-9	33-5	14.5	Regen. Har	4	58	Cable	Sl(3)/Br	
2-10	33-6	62.9	OR	10	629	Ground	Sl(3)/Hb	0.71 R
2-11	33-7	17.3	OR	5	86	Ground	Sl(2)/Hb	0.19 R
2-12	13-1	4.8	CT	5	24	Cable	Sl(1)/Ub	

UNIT ID	BLM ID	ACRES	SILVICULTURAL TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	N. ROAD (MILES) ³
2-13	13-2	6.3	OR	22	139	Ground	Sl(2)/Hb	
2-14	13-3	12.9	CT	8	103	Cable	Sl(2)/Ub	
2-15	13-4	6.7	OR/CT	8	54	Cable	Sl(2)/Hb	
2-16	24-2	18.8	CT	9	169	Cable	Sl(3)/Ub	
2-17	24-5	22.0	Regen Har.	15	330	Cable	Sl(3)/Br	0.19T/0.52 R
2-18	3-2	21.5	Regen. Har.	10	215	Gr./Cable	Sl(1)/Hb	
2-19	5-2	6.9	Regen Har.	7	48	Helic	Sl(3)/Br	
2-20	5-3	23.8	Regen Har.	5	119	Cable	Sl(2)/Br	1.5 R
2-21	5-4	5.5	Regen Har.	5	28	Ground	Sl(3)/Hb	
2-22	5-5	9.4	CT	7	66	Cable	Ub	
2-23	5-6	6.1	Regen Har./CT	20	121	Cable	Sl(2)/Ub	
2-24	5-8	5.9	Regen Har.	30	175	Cable	Sl(2)/Br	
2-25	7-2	13.1	CT	4	52	Cable	Ub	
2-26	7-3	11.5	CT	4	46	Cable	Ub	
2-27	7-4	13.6	OR/CT	7	95	Cable	Hb	
2-28	7-6	6.0	OR/CT	8	48	Cable	Sl(2)/L&S	
	7-6	11.6			93	Helic.		
2-29	7-7	7.3	OR/CT	10	73	Helic.	Sl(3)/L&S	
2-30	7-8	6.5	OR/CT	10	65	Helic.	Sl(3)/L&S	
2-31	7-9	32.4	CT	4	129	Cable	Ub	
2-32	9-1	4.2	CT	12	50	Gr./Cable	Sl(1)/Hb	
2-33	9-2	9.6	CT	6	57	Cable	Sl(2)/Ub	
2-34	9-3	2.7	Regen Har.	16	44	Helic	Sl(3)/L&S	
2-35	9-4	49.0	Regen Har./CT	8	392	Helic	Sl(3)/L&S	
2-36	9-5A	14.2	Regen Har.	18	256	Helic	Sl(3)/L&S	
2-37	9-5B	8.1	Regen Har.	16	130	Helic.	Sl(3)/L&S	
2-38	9-6	26.3	Regen Har.	16	421	Helic	Sl(3)/L&S	
2-39	11-1*	15.0	Grp. Sel./CT	20	300	Gr./Cable	Sl(2)/Hb	

UNIT ID	BLM ID	ACRES	SILVICULTURAL TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	N. ROAD (MILES) ³
2-40	11-5*	12.4	Regen. Har	7	87	Cable	Sl(3)/Ub	
2-41	12-1	6.0	Regen Har.	12	72	Gr./Cable	Sl(3)/Br	
2-42	15-1*	10.1	Regen. Har	6	60	Cable	Sl(3)/Hb	0.25T/2.94 R
2-43	15-4*	24.0	Regen. Har	6	144	Cable	Sl(2)/Ub	0.17 T
2-44	17-1	21.0	OR	7	147	Cable	Sl(3)/Hb	
	17-1	10.0	OR	7	70	Helic	Sl(3)/Hb	
2-45	19-1*	24.1	Regen. Har	11	265	Cable	Sl(2)/Hb	0.24T
2-46	19-4*	40.3	Regen. Har	6	242	Helic	Sl(3)/L&S	
2-47	19-6*	13.2	Regen. Har	4	53	Cable	Sl(3)/Ub	4.1 R
2-48	19-7*	43.0	Regen. Har	8	344	Helic	Sl(3)/L&S	
2-49	19-8*	21.8	Regen. Har	8	175	Helic	Sl(2)/L&S	
2-50	21-1	9.8	OR	12	117	Cable	Sl(3)/Hb	0.1 R
2-51	21-2	31.9	OR	23	734	Cable	Sl(3)/Br	
2-52	21-3	8.4	Regen Har.	10	84	Cable	Sl(3)/Br	
2-53	21-4	18.4	Regen Har.	15	275	Helic	Sl(2)/L&S	
2-54	21-5	8.7	Regen Har.	15	131	Helic	Sl(2)/L&S	
2-55	29-1	3.6	Regen Har.	18	65	Gr./Cable	Sl(3)/Br	
2-56	29-2	14.8	OR	10	148	Helic	Sl(3)/Hb	
2-57	29-3/4/5	66.1	OR	8	529	Helic	Sl(3)/L&S	
2-58	29-7	22.3	Regen Har.	22	348	Helic	Sl(3)/Br	
2-59	31-1	19.1	Regen Har.	25	478	Gr./Cable	Sl(1)/Ub	0.1 R
Total		1,034.8			11,258			

* Unit is in a connectivity block section.

¹ Silviculture Treatments: Regen. Har. – regeneration harvest; CT – commercial thin; RT– restoration thin; OR – overstory removal

² Fuels Treatments: Sl(1) – light slash; Sl(2) – moderate slash; Sl(3) – heavy slash; Br – broadcast burn; Hb – handpile burn; L&S – lop and scatter; Ub – underburn; Cub – cool underburn (in CT).

³ Road Type: T – temporary; R – Renovation

Table A-2. Proposed Harvest Units and Treatments Under Alternative 3.

UNIT ID	BLM ID	ACRES	SILVICULTURE TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	TEMP. ROADS (MILES) ³
3-1	29A2*	21.8	Regen. Har	25	545	Cable	SI(1)/Ub	
3-2	32-1	40.5	OR	12	486	Helic.	SI(2)/L&S	
3-3	33-1	17.9	OR	20	358	Helic.	SI(2)/Hb/P11/2	
3-4	33-3A	4.5	OR	4	18	Cable	SI(3)/L&S	
3-5	33-3B	2.8	OR	8	22	Cable	SI(3)/L&S	
3-6	33-3C	3.7	OR	3	11	Cable	SI(3)/L&S	
3-7	33-4	25.8	Regen Har.	14	362	Cable	SI(3)/Br	
3-8	33-5	14.5	Regen Har.	4	58	Cable	SI(3)/Br	
3-9	13-1	4.8	CT	5	24	Cable	SI(1)/Ub	
3-10	13-2	6.3	OR	22	139	Ground	SI(2)/Hb	
3-11	13-3	12.9	CT	8	103	Cable	SI(2)/Ub	
3-12	13-4	6.7	OR/CT	8	54	Cable	SI(2)/Hb	
3-13	24-2	18.8	CT	9	169	Cable	SI(3)/Ub	
3-14	3-2	21.5	Regen Har.	10	215	Gr./Cable	SI(1)/Hb	
3-15	5-2	6.9	Regen Har.	7	48	Helic	SI(3)/Br	
3-16	5-4	5.5	Regen Har.	5	28	Ground	SI(3)/Hb	
3-17	5-5	9.4	CT	7	66	Cable	Ub	
3-18	5-6	6.1	Regen Har./CT	20	121	Cable	SI(2)/Ub	
3-19	7-2	13.1	CT	4	52	Cable	Ub	
3-20	7-3	11.5	CT	4	46	Cable	Ub	
3-21	7-4	13.6	OR/CT	7	95	Cable	Hb	
3-22	7-6	17.6	OR/CT	8	141	Helic.	SI(2)/L&S	
3-23	7-7	7.3	OR/CT	10	73	Helic.	SI(3)/L&S	
3-24	7-8	6.5	OR/CT	10	65	Helic.	SI(3)/L&S	
3-25	7-9	32.4	CT	4	129	Cable	Ub	0.06 T
3-26	9-1	4.2	CT	12	50	Gr./Cable	SI(1)/Hb	
3-27	9-2	9.6	CT	6	57	Cable	SI(2)/Ub	
3-28	9-3	2.7	Regen Har.	16	44	Helic	SI(3)/L&S	

UNIT ID	BLM ID	ACRES	SILVICULTURE TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	TEMP. ROADS (MILES) ³
3-29	9-4	49.0	Regen Har./CT	8	392	Helic	Sl(3)/L&S	
3-30	9-5A	14.2	Regen Har.	18	256	Helic	Sl(3)/L&S	
3-31	9-5B	8.1	Regen Har.	16	130	Helic.	Sl(3)/L&S	
3-32	9-6	26.3	Regen Har.	16	421	Helic	Sl(3)/L&S	
3-33	11-1*	15.0	Grp. Sel./CT	20	300	Gr./Cable	Sl(2)/Hb	
3-34	11-5*	12.4	Regen. Har	7	87	Cable	Sl(3)/Ub	
3-35	12-1	6.0	Regen Har.	12	72	Gr./Cable	Sl(3)/Br	
3-36	15-4*	24.0	Regen Har	6	144	Helic.	Sl(2)/Ub	
3-37	17-1	31.0	OR	7	217	Cable	Sl(3)/Hb	
3-38	19-1*	24.1	Regen Har.	11	265	Helic.	Sl(2)/Hb	
3-39	19-4*	40.3	Regen Har.	6	242	Helic	Sl(3)/L&S	
3-40	19-7*	43.0	Regen. Har	8	344	Helic	Sl(3)/L&S	
3-41	19-8*	21.8	Regen. Har	8	175	Helic	Sl(2)/L&S	
3-42	21-2	31.9	OR	23	734	Cable	Sl(3)/Br	
3-43	21.3	8.4	Regen Har.	10	84	Cable	Sl(3)/Br	
3-44	21-4	18.4	Regen Har.	15	275	Helic	Sl(2)/L&S	
3-45	21-5	8.7	Regen Har.	15	131	Helic	Sl(2)/L&S	
3-46	29-1	3.6	Regen Har.	18	65	Gr./Cable	Sl(3)/Br	
3-47	29-2	14.8	OR	10	148	Helic	Sl(3)/Hb	
3-48	29-3/4/5	66.1	OR	8	529	Helic	Sl(3)/L&S	
3-49	29-7	22.3	Regen Har.	22	348	Helic	Sl(3)/Br	
Total		838.3			8,908			

* Unit is in a connectivity block section.

¹ Silviculture Treatments: Regen. Har. – regeneration harvest; CT – commercial thin; RT– restoration thin; OR – overstory removal

² Fuels Treatments: Sl(1) – light slash; Sl(2) – moderate slash; Sl(3) – heavy slash; Br – broadcast burn; Hb – handpile burn; L&S – lop and scatter; Ub – underburn; Cub – cool underburn (in CT).

³ Road Type: P – permanent; T – temporary; R - Renovation

Table A-3. Proposed Harvest Units and Treatments Under Alternative 4.

BLM ID	ACRES	SILVICULTURE TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	TEMP/RES ROADS (MILES) ³
29A-1a	6.4	RT				SI(2)/Ub	
29A-2	21.8	RT				SI(1)/Ub	
33-1	17.9	RT				SI(2)/Cb	
33-2	7.5	RT				SI(3)/Cb	
33-3A	4.5	RT				SI(3)/Cb	
33-3B	2.8	RT				SI(3)/Cb	
33-3C	3.7	RT				SI(3)/Cb	
33-4	25.8	RT				SI(3)/Br	
33-5	14.5	RT				SI(3)/Br	
24-5	11.0	RT				SI(3)/Br	
5-1	17.1	RT				SI(3)/Cb	
5-2x	6.9	RT				SI(3)/Br	
5-3x	21.5	RT				SI(3)/Br	
5-4x	9.8	RT				SI(3)/Cb	
7-2	13.1	RT				Ub	
7-3	11.5	RT				Ub	
9-5	45.2	RT				SI(3)/Cb	
11-1	15.0	RT				SI(2)/Cb	
11-3	4.8	RT				SI(3)/Ub	
11-4	19.2	RT				SI(3)/Ub	
11-6	20.6	RT				SI(3)/Cb	
11-7	23.1	RT				SI(3)/Ub	
13-4	6.7	RT				SI(2)/Cb	
13-5	7.1	RT				SI(2)/Cb	
15-2	4.0	RT				SI(3)/Cb	
15-3	16.3	RT				SI(3)/Cb	
17-1x	6.1	RT				SI(3)/Cb	
19-2	31.1	RT				SI(3)/Cb	
19-3	60.6	RT				SI(3)/Cb	

BLM ID	ACRES	SILVICULTURE TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	TEMP/RES ROADS (MILES) ³
19-4x	37.8	RT				SI(3)/Cb	
19-5	15.3	RT				SI(3)/Cb	
24-3	16.6	RT				SI(3)/Cb	
24-4	6.0	RT				SI(3)/Cb	
29-2x	14.2	RT				SI(3)/Cb	
29-5	22	RT				SI(3)/Cb	
29-6	5.7	RT				SI(3)/Br	
31-1x	10.0	RT				SI(3)/Cb	
29 A-1b	6	CT	30	180	Cable	SI(1)/Ub	
32-1A,B	26	OR	12	312	Helic	SI(2)Hb	
33-6A	23	RH	10	230	Ground	SI(3)/Hb	
33-6B		CT	5		Helic	SI(3)/Hb	
3-2	45	Regen Har.	10	450	Gr./Cable	SI(1)/Hb	
5-2	9	Regen Har.	7	63	Helic	SI(3)/Hb	
5-3	10	Regen Har	20	200	helic	SI(3)Hb	
5-5	8	Regen Har.	7	56	Cable	Ub	
5-6	5	Regen Har.	20	100	Helic	SI(2)/Hb	
5-8	3	Regen Har.	30	90	Cable	SI(2)/Hb	
7-4	6	OR/CT	7	42	Cable	Hb	
7-7	8	OR/CT	10	80	Helic.	SI(3)	
7-9	30	CT	4	120	Cable	Ub	
9-1	1	CT	12	12	Gr./Cable	SI(1)/Hb	
9-2	3	CT	6	18	Cable	SI(2)/Ub	
9-6	10	Regen Har	20	200	Helic		
13-1	6	CT	5	30	Cable	SI(1)/Hb	
13-2	7	OR	22	144	Ground	SI(2)Hb	
13-3	7	CT	8	56	Helic	SI(2)Hb	
24-2	24	CT	9	216	Cable	SI(3)Ub	

BLM ID	ACRES	SILVICULTURE TREATMENT ¹	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ²	TEMP/RES ROADS (MILES) ³
24-5	30	Regen Har	20	600	Heli	SI93)BR-plant	
9-4	17	Regen Har	8	136	Helic	SI(3)	
11-1*	34	Grp. Sel./CT	20	680	Cable	SI(2)/Hb	
11-5*	15	Regen Har	7	105	Helic	SI(3)/Ub	
12-1	7	Regen Har	12	84	Gr./Cable	SI(3)/Br	
15-4	30	OR	6	180	Helic	SI(2)Hb	
17-1	21	OR	7	126	Helic	SI(3)/Hb	
21-1	6	Regen Har	12	72	Cable	SI(3)/Hb	
21-2	17	OR	23	391	Cable	SI(3)/Br	
31-1	16	Regen Har	20	320	Cable	SI(3)Hb	
	430			5,293			

* Unit is in a connectivity block section

¹ Silviculture Treatments: Regen. Har. – regeneration harvest; CT – commercial thin; RT – restoration thin; OR – overstory removal

² Fuels Treatments: SI(1) – light slash; SI(2) – moderate slash; SI(3) – heavy slash; Br – broadcast burn; Hb – handpile burn; L&S – lop and scatter; Ub – underburn; Cub – cool underburn (in CT).

³ Road Type: P – permanent; T – temporary; R – Renovation.

Table A-4. Proposed Harvest Units and Treatments Under Alternative 5.

UNIT ID	BLM ID ₁	ACRE S	SILVI TREAT. ₂	PRIORITY	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ³	N. ROAD (MILES) ⁴
5-1	29A-1	6.3	OR	1	5	32	Gr/Cable	PCT/Sl(2)/Ub Rehab.	.05 T/0.19 R
5-2	31-1	8.3	RT	4				Sl(3)/Br-Plant	
5-3	32-1	40.5	OR	1	12	486	Helic	Sl(2)/L&S	
5-4	33-1	17.9	OR	1	20	358	Helic.	Sl(2)/Hb/P11/2	
5-5	33-2	7.5	RT	1				Sl(3)/Hb	
5-6	33-3A	4.5	OR	1	4	18	Cable	Sl(3)/L&S	
5-7	33-3B	2.8	OR	1	8	22	Cable	Sl(3)/L&S	
5-8	33-3C	3.7	OR	1	3	11	Cable	Sl(3)/L&S	
5-9	33-6	62.9	OR	1	10	629	Ground	Sl(3)/Hb	0.71 R
5-10	33-7	17.3	OR	1	5	86	Ground	Sl(3)/Hb	0.19 R
5-11	13-1	4.8	CT	1	5	24	Cable	Sl(1)/Ub	
5-12	13-2	6.3	OR	1	22	139	Ground	Sl(2)/Hb	
5-13	13-3	12.9	CT	1	8	103	Cable	Sl(2)/Ub	
5-14	13-4	6.7	OR/CT	1	8	54	Cable	Sl(2)/Hb	
5-15	13-5	7.1	CT	1	3	21	Cable	Sl(2)/Hb	
5-16	24-1	6.6	OR	2/3	5	33	Cable	Sl(3)/Hb (E1/2)	
5-17	24-2	18.8	CT	1	9	169	Cable	Sl(3)/Ub	
5-18	24-3	16.6	CT	2	3	50	Cable	Sl(3)/Hb	
5-19	24-4	6.0	CT	2	3	18	Ground	Sl(3)/Hb	
5-20	24-5	11.0	RT	5				Sl(3)/Br – Plant	
5-21	5-1	17.1	RT	2				PCT Sl(3)/Hb	
5-22	5-3x	21.5	RT	2				PCT/Sl(3)/Br	
5-23	5-4x	9.8	RT	4				Sl(3)/Hb –P11/2	
5-24	5-5	9.4	CT	1	7	66	Cable	Ub	
5-25	7-2	13.1	CT	1	4	52	Cable	Ub	
5-26	7-3	11.5	CT	1	4	46	Cable	Ub	

UNIT ID	BLM ID ₁	ACRE S	SILVI TREAT. ₂	PRIORITY	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ³	N. ROAD (MILES) ⁴
5-27	7-4	13.6	OR/CT	1	7	95	Cable	Hb	
5-28	7-6	17.6	OR/CT	1	8	141	Helic.	Sl(2)/L&S	
5-29	7-9	32.4	CT	1	3	97	Cable	Ub	0.06 T
5-30	9-1	4.2	CT	1	12	50	Gr./Cable	Sl(1)/Hb	
5-31	9-2	9.6	CT	1	6	57	Cable	Sl(2)/Ub	
5-32	9-4x	35	CT	5	4	140	Helic	Sl(3)/Hb	
5-33	9-5	45.2	RT	5				PCT/Sl(3)/Hb	
5-34	11-1	15.0 10.0	CT RT	1	20	300	Gr./Cable	Sl(2)/Hb PCT Sl(2)/Hb	
5-35	11-3	4.8	RT	5				Sl(3)/Ub -P11/2	
5-36	11-4	19.2	RT	5				Sl(3)/Ub -P11/2	
5-37	11-6	20.6	RT	2				PCT Sl(3)/Hb	
5-38	11-7	23.1	RT	5				Sl(3)/Ub- Plant	
5-39	15-2	4.0	RT	2				PCT Sl(3)/Hb	
5-40	15-3	16.3	RT	2				PCT Sl(3)/Hb	
5-41	17-1	31.0	OR	1	7	217	Helic	Sl(3)/Hb	
5-42	17-1x	6.1	RT	1				PCT Sl(3)/Hb	
5-43	19-2	31.1	RT	2				PCT Sl(3)/Hb	
5-44	19-3	60.6	RT	5				PCT/Sl(3)/Hb/Pl	
5-45	19-4x	37.8	RT	5				PCT/Sl(3)/Hb	
5-46	19-5	15.3	RT	5				PCT/Sl(3)/Hb	
5-47	21-1	9.8	OR	1	12	117	Cable	Si(3)/Hb	0.1 R
5-48	21-2	31.9	OR	3	23	734	Cable	Si(3)/Br	
5-48	29-2	14.8	OR	1	10	148	Helic	Sl(3)/Hb	
	29-2x	14.2	RT	1				PCT Sl(3)/Hb	
5-49	29-3/4/5	66.1	RT	5				PCT Sl(3)/Hb	
5-50	29-6	5.7	RT	5				Sl(3)/Br - Plant	
5-51	31-1x	10.0	RT	1				PCT Sl(3)/P&B	

UNIT ID	BLM ID ₁	ACRES	SILVI TREAT. ₂	PRIORITY	HARVEST VOLUME (MBF/A)	HARVEST VOLUME (MBF)	HARVEST SYSTEM	FUELS TREATMENT ³	N. ROAD (MILES) ⁴
Total		955.9				4,545			

* Unit is in a connectivity block section.

¹ Unit numbers include those proposed for restoration thinning (22 units on 465 acres)

² Silviculture Treatments: Regen. Har. – regeneration harvest; CT – commercial thin; RT– restoration thin; OR – overstory removal; RT- Restoration Thinning.

³ Fuels Treatments: SI(1) – light slash; SI(2) – moderate slash; SI(3) – heavy slash; Br – broadcast burn; Hb – handpile burn; L&S – lop and scatter; Ub – underburn; Cub – cool underburn (in CT).

⁴ Road Type: P – permanent; T – temporary; R – Renovation

APPENDIX B

Soil Types in Harvest Units

Table B1. Soil Limitations by Proposed Harvest Unit and Alternatives.

SOIL TYPE	SOIL LIMITATION ¹	BLM UNIT	ALT..
230 - Atring very gravely loam, 60-90% slopes	Steepness of slope	13-3	2,3,4,5
	Hazard of surface erosion		
	Hazard of slope failure		
	Shallow depth		
239 - Atring Vermisa Complex; 60-90% South Slopes	Steepness of slope	13-4	2,3,4,5
	Hazard of surface erosion	13-5	5
	Hazard of slope failure	21-3	2,3,4
	Shallow depth	24-1	5
505 - Acker-Norling Complex 30-60% North Slopes	Steepness of slope	7-9	2,3,4,5
	Hazard of surface erosion	9-4A	2,3,5
	Moderately slow permeability	19-7	2,3
	Shallow depth	21-1	2,4,5
		21-2	2,3,4
		21-4	2,3,4
		21-5	2,3,4
		29-3,4,5	2,3,5
		29-6	5
29-7	2,3		
521 - Pollard gravelly loam; 3-30% slopes	Hazard of compaction and surface erosion	3-2	2,3
	Slow permeability	9-1	2,3,4,5
	Low soil strength	9-2	2,3,4,5
1182 - Josephine –Speaker Complex; 30-60% South slopes	Steepness of slope	33-4	2,3
	Moderately slow permeability	33-5	2,3
	Shallow depth	33-6	2,4,5
1236 - Bookman- Vermisa Complex; 60-90% South slopes	Steepness of sloped	29A-1	2,5
	Hazard of surface erosion	29A-2	2,3
	Hazard of slope failure	32-1	2,3
	Shallow depth	33-1	2,3,4,5
		33-2	5
		33-3A,B &C	2,3,5
		33-7	2,4,5
		5-2	2,3,4,5
		5-3	2,5
5-4	2,3,4,5		
11-1	2,3,4,5		
1510 - Acker-Norling	Steepness of slope	13-1	2,3,4,5

SOIL TYPE	SOIL LIMITATION ¹	BLM UNIT	ALT..
Complex: 30-60% South slopes	Hazard of surface erosion Moderately slow permeability Shallow depth	13-2	2,3,4,5
		24-2	2,3,4,5
		24-3	5
		24-5	2,5
		7-2	2,3,4,5
		7-3	2,3,4,5
		7-4	2,3,4,5
		9-6	2,3
		19-2	5
		19-3	5
		19-4	2,3
		19-5	5
		19-6	2
		29-1	2,3,4
		29-2	2,3,4,5
31-1	5		
2286 - Kanid-Atring Complex; 60-90% North slopes.	Steepness of slope Hazard of surface erosion Hazard of slope failure Shallow depth	5-5	2,3,4
		5-6	2,3,4,5
		5-8	2,4,5
		7-6	2,3,4,5
		7-7	2,3,4
		7-8	2,3,4
		9-3	2,3
		9-4	2,3
		9-5	5
		9-5A	2,3
		9-5B	2,3
		11-3	5
		11-5	2,3
		11-6	5
		11-7	5
		12-1	2,3
		15-1	2
		15-2	5
		15-3	5
		15-4	2,3
17-1	2,3,4,5		
19-1	2,3,4		
19-8	2,3		
31-1	2		
¹ Slopes greater than 65% and units with regeneration problems were not considered for harvest.			

