BEAR CUB ENVIRONMENTAL ASSESSMENT

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CHAPTER I

A. Introduction

This Environmental Assessment describes the analysis of project proposals in the Cub, Berry, and Hunter Creek subdrainages of the Upper Clackamas watershed. The analysis file includes maps, public involvement results, a biological evaluation and assessment, the cultural resource report, and other resource specialist reports.

The Bear Cub planning area is located approximately 80 miles south east of Portland, Oregon. The location of the proposed activities are in T.8 S., R.8 E.; T.8 S., R.7 E.; T.9 S., R.7 E.; Willamette Meridian. See Map which shows the vicinity of the Bear Cub planning area.

This action is proposed under the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (hereafter referred to as the Northwest Forest Plan), and the Mt. Hood National Forest Land and Resource Management Plan (hereafter referred to as the Mt. Hood Forest Plan). The Record of Decision (ROD) for the Northwest Forest Plan amends the Mt. Hood Forest Plan with the standards and guidelines of the selected alternative.

The Bear Cub project is in Matrix, a land allocation identified in the Northwest Forest Plan. No projects are proposed in riparian reserves. The Matrix is further divided into Mt. Hood Forest Plan land allocations. Proposed projects occur in the following land allocations: C1 Timber Emphasis, B2 Scenic Viewsheds and B11 Deer and Elk Summer Range. See the Northwest Forest Plan and the Mt. Hood Forest Plan for specific management direction related to these land allocations.

B. Desired Future Condition

The following desired future conditions are derived from the Mt. Hood Forest Plan.

Health	Forests have low levels of disease, damaging insect populations and storm damage. Four-92, FW-382; and Four-292, C1-22.
Growth	Stands are healthy and vigorous, and have growth rates commensurate with the sites potential (at a rate at which the mean annual increment has not culminated). Four-5, #44; and Four-86, FW-306; and Four-91, FW-372; and Four-90, FW-361.

Scenery	The forest is visually appealing with a wide variety of natural appearing landscape features. Forest stands and openings are blended with natural landforms and existing vegetation, and have natural shapes, edges, patterns, and sizes. This applies throughout the landscape with increased emphasis for areas seen from sensitive viewing positions such as road 46. Four-218, goal; Four-113, FW-558; and Four-108.
Deer & Elk	The forest provides high quality summer rearing habitat for deer and elk. The forest contains a mix of habitats including forage, thermal cover and optimal cover. Open road density is at a level which allows animals a sense of security. Four-277, goal; Four-278, B11-9 to 16; Four-72, FW-202 to 210.
C1	The forest consists of stands with an even distribution of age classes, up to approximately 120 years, running from seedlings to mature timber. Four-290.

The following statements describe desired future conditions from the Northwest Forest Plan.

Riparian	Riparian reserves contain the species composition and structural plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability. Riparian reserves provide mature forest connectivity. ROD page B11.
Aquatic	Streams have diverse structures with coarse woody debris sufficient to sustain physical complexity and stability. Streams have spatial and temporal connectivity within and between watersheds. The streams provide chemically and physically unobstructed routes to areas critical to fulfilling life history requirements of aquatic and riparian-dependent species. ROD page B-11.
Matrix	Early-seral stands are diverse and contain patches of green trees and snags as well as dispersed green trees and coarse woody debris.

The following statements describe desired future conditions from the Upper Clackamas Watershed Analysis.

Landscape design	Forests contain a mix of habitats including early, middle and late-seral stands dispersed across the landscape. LSRs and riparian reserves are mature or are rapidly moving toward a mature, diverse condition. There are large patches of late-seral interior habitats connected via riparian reserves. Matrix lands provide the majority of the landscape's early-seral habitats with a variety of sizes and shapes. The average size of early, mid, and late-seral patches will be greater than at present. Many patches will be large, resembling historical conditions. There will be a less fragmented forest than at present except in certain key deer and elk habitats where forage openings and edge are present.

C. Purpose and Need

Many areas do not meet some of the desired conditions described above. The following lists the need for action, the purpose of the project, and a detailed description of the proposed action.

1. Regeneration

Need	The project area contains stands which are growing slowly, are diseased and are exposed to repeated storm events which continually damage trees and blow them down. Approximately 2000 acres meet this criteria. One of the key landscape level issues identified in the Upper Clackamas Watershed Analysis is the fragmentation of late-seral forested habitats. Given that some landscapes, including those found in the Bear Cub planning area, are highly fragmented, the Watershed Analysis recommended that stand manipulations should be prioritized in a way that minimizes additional fragmentation of remaining late-seral interior patches, while focusing on isolated patches which have little or no interior value. The watershed analysis prioritized stands based on their degree of fragmentation. In the project area approximately 206 acres are highly fragmented and have little interior habitat.

Purpose

The objective of the project is to regenerate stands by removing most of the trees and preparing the site for planting. This conversion would result in young productive stands which are capable of growth commensurate with the site's potential.

Another objective is to focus on stands which are fragmented or otherwise isolated from the larger interior late-seral patches. This strategy accomplishes two things; it avoids the interior patches which are most valuable to species dependent on late-seral habitats, and it increases the average patch size. As these proposed plantations grow, they would blend in with adjacent existing plantations to form large contiguous patches which are closer to the patch size expected in unmanaged forests.

Proposed action

The proposed action is to regenerate approximately 206 acres of stands. The shelterwood method would be used to provide protection to seedlings. Fuels reduction and site preparation would occur prior to planting in most areas. Approximately 0.6 mile of roads would be constructed to access landings.

2. Thinning

Need

Within the planning area, there are some stands of second growth trees that are experiencing a slowing of growth due to overcrowding. Approximately 69 acres of 70 year old natural second growth are currently overstocked. If left unaltered, this overstocked condition would result in continued reduction of net annual growth and result in stands with reduced vigor and increased mortality.

Purpose

The objective is to increase health and vigor, and to enhance growth which results in larger trees.

Proposed action

The proposed action is to thin and fertilize approximately 69 acres. Approximately 1/10 mile of road would need to be constructed to access landings.

3. Forest Restoration

Need The project area contains stands which are understocked, growing slowly and are diseased. These stands are not fragmented and were given a low priority for regeneration treatment in the watershed analysis. Approximately 194 acres of stands meet this criteria.

Purpose The objective is to establish young trees in a way which does not contribute to fragmentation. This conversion would result in multi-aged stands which are capable of growth commensurate with the site's potential. It would involve some partial removal of trees and some planting.

Proposed action The proposed action is to treat approximately 194 acres of stands by partial harvesting and planting. Approximately 1 mile of road construction is needed to access this area.

4. Soil Restoration

Need The soils in portions of the project area have been compacted by past management activities. This compaction results in reduced growth and greater erosion. The need for this project was recognized in the watershed analysis.

Purpose The objective is to loosen compacted soils in certain skid trails, roads and landings. Another objective is to reduce erosion.

Proposed action The proposed action is to use a tractor to pull a winged scarifier capable of loosening soil to a depth of 24 inches. Approximately 300 acres would be treated. It also involves erosion control measures on three sites that have gullies.

5. Road Closures

Need Harassment of wildlife by vehicle traffic reduces habitat effectiveness. Open road densities are prescribed in the Forest Plan. The Hunter Creek watershed is the only area which is above its target level. It has 2.96 miles per square mile and the objective is 2.5 miles per square mile.

Purpose The objective is to reduce open road density in Hunter Creek to reduce harassment of wildlife.

Proposed action The proposed action is to close road #4672-230 using a guard rail barrier.

D. Scoping

A scoping process to request public input for this project was conducted. A letter describing the proposed project and requesting comments was sent out in February 1997. The project also appeared in

the Forest's Summer and Fall 1996 issue of Sprouts, a quarterly publication that is mailed to a wide audience. The interdisciplinary team developed issue statements based on input received and their own knowledge and experience. The following issues were developed as a result of this scoping.

E. Issues

The planning process is guided by issues developed during the scoping process. Analysis of these issues aided in formulating and evaluating alternatives, and defining project design criteria to meet resource management objectives.

Significant Issues

1. Biogeography

The proposed action would regenerate 16 fragments of mature forest. There is a concern that "islands" of forest are important as biodiversity "stepping stones;" areas for wildlife and plants to use until other surrounding stands grow to maturity. The Northwest Forest Plan and the Watershed Analysis provided for species with large home ranges and for species which require large blocks of mature forest, but there are many species of plants and animals that use isolated patches. The Watershed Analysis recommended that harvest opportunities be focussed on parts of the landscape which have minimal value to late-successional species. A qualitative rating will be used to describe the affects.

Other Issues

2. Water Quality and Fisheries

Both water quality and fish habitats are concerns for many people. The proposed actions are in the Cub, Berry, and Hunter Creek subdrainages of the Clackamas River. Even though the proposed actions have been designed to meet current standards there is still a general concern about ground disturbing activities and canopy removal both of which have the potential to affect hydrology and contribute sediment to streams.

3. Scenery

Portions of the project area can be seen from road 46 which is a primary travel route. It is also seen from other local roads. Most of the project area has been visually altered by past harvest. Even though the proposed actions have been designed to meet visual quality objectives, there is still a concern about how canopy removal would alter scenery.

4. Economics

The economic viability of proposed actions is a concern.

CHAPTER II - ALTERNATIVES AND DESIGN CRITERIA

A. Alternative A - No Action.

"Custodial" activities would occur, including but not limited to road maintenance, data gathering, fire suppression, and activities approved by other plans or documents. All of these custodial activities would also occur with any of the other alternatives.

B. Proposed Action

Alternative B is designed to move the area toward the desired future condition. It is designed with the intent of protecting or enhancing the resources listed under issues #2 and #3. The purpose and need section describes 5 actions.

Action 1 involves regeneration of stands using the shelterwood method. It targets "islands" or other areas where fragmentation is so extensive that no interior habitat remains. Fuels reduction and site preparation would be accomplished prior to planting. Short sections of temporary road would be built to access landings. Approximately 206 acres would be treated in this manner.

Action 2 involves thinning and fertilizing approximately 69 acres of second growth forest which is overcrowded. Short sections of temporary road would be built to access landings.

Action 3 is in an area which is not highly fragmented. It involves partial harvest of stands which are growing slowly and are diseased, as well as the shaping of edges of old clear cuts to soften them visually. This partial harvest would have irregular edges and varied spacing of leave trees so that the forest remains intact and is visually appealing while allowing the establishment of a healthy understory. This action involves a stand which is 194 acres in size.

/project/bearcub/bcmap_lyt.hp: No such file or directory

Action 4 involves the restoration of areas with excessive soil compaction. A winged ripper would be pulled behind a tractor on old skid trails and landings to increase infiltration. Mulch and seed would minimize new erosion. It also involves erosion control measures on three sites that have gullies.

Action 5 involves the closure of road 4672-230 using a guard rail barrier.

Connected projects includes the following activities.

Road Reconstruction - Portions of road 46 and other haul roads are in need of surface reconstruction.

Site preparation and fuels treatment are prescribed, including grapple piling, mechanical mastication, pile burning and concentration burning. Trees would be planted.

New roads constructed to access landings would be closed upon completion of projects.

C. Alternative C

This alternative was developed in response to issue #1. It would retain the "islands" targeted in the proposed action as intact forest. It would focus on the types of stands recommended for treatment in the Watershed Analysis, but it would not regenerate them. This alternative would treat approximately 206 acres (the same stands identified in alternative B), using light partial harvests and small patch openings less than 2 acres to create structural diversity.

Actions 2 -5 described above would be included in this alternative.

D. Mitigation Measures (also see Appendix A)

SEASONAL RESTRICTIONS

1. Soils: No operation of ground-based equipment would be permitted between October 1 and June 30. Units 3,5,6,7,8,10,12,13,15,18,20,21,22,23,24, and 25. Also applies to ground-based equipment on connected projects. This restriction may be waived if soils are dry.

2. Big Game Summer Range: No harvest operations, road construction, or blasting would be permitted in the B11 Summer Range land allocation during fawning, calving, and rearing season, generally April 1 through July 30. Unit 5.

3. Big Game Rearing: No harvest operations, road construction, or blasting would be permitted in key deer and elk rearing areas between May 15 and June 30. Units 5, 18, 20, 21 and 25.

4. Spotted Owls: No harvest operations, road construction, use of motorized equipment or blasting would be permitted within 1/4 mile of northern spotted owl activity centers between March 1 and June 30. This applies to unit 12 and to soils restoration projects adjacent to road 4672-225 and 4671-180.

5. Goshawks: No harvest operations, road construction, helicopter flight, or blasting would be permitted within 1/4 mile of goshawk nests between March 1 and August 15. Units 18, 19 and 25.

OTHER DESIGN CRITERIA

6. Following harvest activity, the contractor would remove slash created by harvest operations in units 7,8,13,14,15,23,24,25 within 100 feet of roads 6350, 4600, 4671 and 4672.

7. Blaze trees would be retained in two units, see heritage resources report.

OTHER PROJECTS

The following is a list of projects covered by other environmental documents that may receive funding through this project.

1. The 97 Restoration EA includes many flood repair projects, such as culvert replacements, road obliterations, and erosion control projects in the vicinity of Bear Cub.

2. Within the clearing limits of roads, trees often naturally seed in densely. Thin these small trees to improve tree vigor and to improve scenery. Trees would be chipped.

Comparison of Alternatives with Purpose

	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C
PurposeA Regeneration	Does not meet objectives. Growth would continue to decline. Fragmented landscape remains.	Fully meets objectives. Regenerates 16 islands, on 206 acres. Moves toward DFC for both forest health/growth and for creating contiguous early-seral patches.	Partially meets objectives. Regenerates 10% of 16 islands on 206 acres. Creation of contiguous early-seral patches would be delayed.
Purpose B Thinning	Does not meet objective. Growth would continue to decline. Health problems increase.	Fully meets objective. Enhances growth of 69 acres of young forest.	Same As B
Purpose C Forest restoration	Does not meet objective. Growth would continue to decline. Health problems increase.	Fully meets objective. Establishes multi- aged stand on 194 acres. Retains unfragmented contiguous forest canopy.	Same As B
Purpose D Soil restoration	Does not meet objective. Growth continues at reduced rate and erosion continues.	Fully meets objective. Corrects compaction problem on 300 acres. Growth and infiltration is enhanced.	Same As B
Purpose E Road Closure	Does not meet objective. Harassment continues.	Meets objective of reducing harassment. Closes 2.3 miles of road.	Same As B

Comparison of Alternatives with Issues

	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C
Significant Issue #1 Bio-geography	Islands are fully retained. Species needing these areas have needs met.	Islands are regenerated. 10% of each area retained in clumps for green tree retention. These species also have needs met outside of harvest areas by retention of: Riparian Reserves, Late- Successional Reserves, Administratively Withdrawn lands, 100 acre owl reserves, and the Connectivity Network established in the Watershed Analysis.	Islands are retained. Partial harvest results in enhanced structural diversity. Species needing these areas have needs met.
Other issue #2 Water Quality and Fisheries (ARP standard is 65%)target year 1999	No mitigations necessary. Would not rip skid trails; erosion would continue in those areas. ARP= Hunter 78.3% Berry 81.2% Cub 82.9%	Project design and mitigations combine to meet standards. Slopes > 20% use skyline system. 10% of each area retained in clumps and 15 trees/acre in regen units. Leave clumps placed adjacent to riparian buffers for additional protection. BMP used for erosion control and dry season work. Compacted skid trails ripped. ARP= Hunter 76.8% Berry 80.6% Cub 81.2%	Same As B except for greater canopy retention. ARP= Hunter 77% Berry 80.8% Cub 82%
Other issue #3 Scenery	Existing straight edges retained. Continues with unacceptable visual modification.	Project design and mitigations combine to meet standards. Existing straight edges feathered /blended. 10% of each area retained in clumps and 15 trees/acre in regen units. Leave clumps placed strategically to minimize impact to scenery. 100% slash disposal near major roads. Moves landscape toward VQO.	Existing straight edges retained. 100% slash disposal near major roads. Continues with unacceptable visual modification.
Other issue #4 Economics	No investments made to correct growth deficiencies. Long-term loss of value.	Highest priority stands for treatment have the lowest timber value. Project as a whole would have positive short-term returns. There are long-term benefits to restoring growth. Carefully considered costs of proposed treatments: no helicopter, low standard roads, mostly tractor, considered comments from operators.	Most growth deficiencies remain. Some young trees established but growth not commensurate with sites potential. Costs are higher due to lower volume removal.

CHAPTER III - ENVIRONMENTAL EFFECTS

This section provides a comparison of alternatives. Alternatives are compared by the varying effects which they impart on several components of the environment. References are included for each resource to indicate where it is discussed in the Northwest Forest Plan Record of Decision (ROD) and the Mt. Hood Forest Plan and Final Environmental Impact Statement (FSEIS).

A. Late-Successional Forests, Connectivity and Biogeography (Significant Issue #1)

Mt. Hood Forest Plan References

Forestwide Diversity Standards and Guidelines - FW-158 to FW-169, page Four-67
Pileated Woodpecker/Pine Marten Habitat Area Standards and Guidelines - B5-1 to B5-42, page Four-242
See FEIS pages IV-90 and IV-155 to IV-167

Northwest Forest Plan ROD References

Ecological Principles for Management of Late-Successional Forests - pages B-1 to B-9
Current Plans and Draft Plan Preferred Alternatives: Exceptions - page C-3
Matrix Standards and Guidelines - pages C-39 to C-61

Existing Situation

The project contains "islands" of mature forest surrounded by young plantations. This situation developed over two decades as clearcutting altered forest structure and habitats. As the habitats becomes progressively more isolated from surrounding vegetation of similar form, it is eventually referred to as an "island" and some species which require larger areas are lost. The degree of isolation can be viewed as a continuum that is species-specific and is dictated as much by the biology of the species as by environmental conditions. The dispersal of certain plants and animals to or from isolated habitats is problematic and isolation has the effect of reducing diversity and habitat quality. Even if a species reaches a given island, the habitat might not be sufficiently diverse and complex to support it. The fragmentation of these areas has reduced the overall species richness but the islands provide landscape bridges and remnant reserves for species which are dependent upon the habitat and structural characteristics which these stands provide. The integrity of these stands is important to the survival of dependent species and the seasonal use by other species.

Units 13, 14, 15, and 21 are stands which have developed structural diversity and complexity. These stands will be the focus of the effects discussion. Other proposed treatments are in areas which are not as important in terms of biogeography.

Effects

Alternative B would alter the existing canopy. Most of the targeted stands are not in good enough condition to consider retaining due to past salvage, disease or wind damage. However, units 13, 14, 15, and 21 contain structural diversity and late-successional characteristics and have some value as "stepping stones". Within these units, alternative B would cause local extirpation of species which display limited dispersal capabilities. These species would be maintained in other land areas such as Late-Successional Reserves, Riparian Reserves, 100 acre owl reserves, administratively withdrawn lands, and within the connectivity network. They would also be retained in mature forests in the matrix that would not be harvested in the near future due to scheduling constraints.

Alternatives A and C would continue to allow organisms to disperse from one "refuge" to another without an increased susceptibility to predation and mortality. It would also continue to provide essential habitat characteristics for species who's ability to disperse are limited.

B. Water Quality and Fisheries (Issue #2)

Mt. Hood Forest Plan References

Forestwide Riparian Standards and Guidelines - FW-80 to FW-136, page Four-59
Forestwide Water Standards and Guidelines - FW-54 to FW-79, page Four-53
Forestwide Fisheries Standards and Guidelines - FW-137 to FW-147, page Four-64
General Riparian Standards and Guidelines - B7-28 to B7-39, page Four-257
See Mt. Hood FEIS pages IV-22, IV-47, IV-155 to IV-167

Northwest Forest Plan ROD References

Riparian Reserves - page A-5
Aquatic Conservation Strategy - pages B-9 to B-34
Riparian Reserves Standards and Guidelines - pages C-30 to C-38
Watershed Analysis - pages E-4, E-20 to E-21

Existing Situation

The Watershed Analysis contains the following statements which describe existing conditions.

- The existing quantity and quality of fish habitat in the Upper Clackamas watershed does not appear to limit anadromous fish production as much as other factors.

- The current condition of the landscape does not reflect altered hydrologic regimes.

- The river and streams have excellent water quality in terms of temperature.

- Some culverts that block or hinder fish passage have been identified. The correction of this problem has been analyzed in a separate document, but the funding of this restoration would be tied to this project.

Coho Salmon - Lower Columbia Stock (proposed for listing) - The Clackamas River contains the last significant run of wild late-run winter coho in the Columbia Basin. Coho salmon occupy the Clackamas River and the lower reaches of streams in the Upper Clackamas watershed. Adult late-run winter coho enter the Clackamas River from December through February. Spawning occurs mid-January to the end of April with the peak in mid-February. Peak smolt migration takes place in April and May.

Bull Trout (threatened)

While it is thought that bull trout were once prolific throughout the Clackamas River and its tributaries, fisheries biologists believe that bull trout no longer exist in this area. Stream temperatures fall within the optimum range for bull trout. Several years of intensive sampling have yielded no sightings of bull trout.

Steelhead - Lower Columbia Stock (proposed for listing)

Adult Clackamas winter steelhead migrate into the Forest April through June. Above North Fork Dam they use the mainstem and the larger tributaries as spawning and rearing habitat.

Effects of Alternatives

Implementation of the Aquatic Conservation Strategy of the Northwest Forest Plan has resulted in a shift in anticipated effects on riparian and aquatic dependent resources from direct effects to indirect effects. There are no proposed actions within Riparian Reserves. Possible affects to aquatic resources would be limited to projects outside the Riparian Reserve which involve canopy removal or ground disturbance. For new roads, the risk is in the increased stream channel network and fast delivery of water to streams. Canopy removal adjacent to Riparian Reserves may increase susceptibility to windthrow. Project design and mitigations combine to meet standards for water quality and fish habitat.

The proposed activities have been designed to meet the Aquatic Conservation Strategy and State Water Quality Standards, and therefore the Clean Water Act, through adherence to Best Management Practices. Project design and mitigation minimize effects to recreational fisheries. Proposed road closures are for roads which do not access fish bearing streams.

The Aggregate Recovery Percentage (ARP) index is often used to calculate cumulative effects of past and future harvest activities on hydrology. It evaluates the risk of increased peak flows from rain-on-snow events. In stands with little or no canopy, snow accumulation on the ground is subject to rapid melting during periods of rain. The ARP value for these subwatersheds would decline by 1 to 2% with the action alternatives with post treatment levels varying from 75 to 80%. The minimum Forest Plan level for these watersheds is 65%. For more information on cumulative effects of this project and others on watershed and fisheries, refer to Chapter 5 of the Upper Clackamas Watershed Analysis.

Other projects occurring in these watersheds include the many restoration projects identified in the 97Restoration EA. These projects include the removal of culverts which restrict fish passage and the obliteration of roads. Even though these projects are approved in another document, funding sources are limited. Many of the restoration projects in the Bear Cub area could be funded by the Knudsen-Vandenberg funding mechanism which allows the collection of timber receipts to pay for adjacent restoration projects.

C. Scenery (Issue #3)

Mt. Hood Forest Plan References

Forestwide Visual Resource Management Standards and Guidelines - FW-552 to FW-597, page Four-107
Scenic Viewsheds Standards and Guidelines - B2-12 to B2-42, page Four-221
See Mt. Hood FEIS pages IV-127, IV-131, IV-142, and IV-155 to IV-167
See Clackamas National Wild and Scenic River and State Waterway Environmental Assessment and Management Plan, Appendix F - Clackamas River Management Plan

Existing Situation

Portions of the project area can be seen from Road 46 which is a primary travel route. From this viewing position, the visual quality objective is foreground partial retention and background modification. Views into the project area are screened by roadside trees except where recent harvest units removed the trees right up to the road. At these points, large portions of the landscape to the west of road 46 can be seen. The view can be described as rolling topography where forests are fragmented into a patchwork of interspersed plantations and mature timber. Straight edges and stand shapes result in a landscape that does not meet the partial retention visual quality objective.

Effects of Alternatives

Alternative A would result in a continuation of the current unacceptable visual condition.

Alternative B involves the removal of forest canopy. Project design and mitigations combine to move the landscape toward its desired visual condition. Since fragmented forest patches are targeted with this alternative, the existing straight edges would be feathered or blended. 10% of each harvest area would be retained in clumps and 15 trees/acre would be retained outside of the clumps in regeneration units. Leave clumps would be placed strategically to minimize impact to scenery. To reduce visual impacts, 100%

slash disposal would be required near major roads. Units 19, 23 and 24 are partial harvest prescriptions which would retain their current visual character which is contiguous unfragmented forest.

Alternative C involves very little canopy removal resulting in a visual condition similar to alternative A.

D. Economics (Issue #4)

Mt. Hood Forest Plan References

Forest Management Goals - 19, page Four-3
See FEIS page IV-112

The objectives for this project involve the targeting of stands which have marginal economic value.

Alternative B: Units 6, 7, 8, 23 and 24 are understocked and are not growing up to the sites potential. Unit 19 is a thinning from below which utilizes an expensive logging system. Since the larger trees would be retained in these units, the value of the timber removed compared with the costs of logging results in a marginal situation. However when the value of the other units is combined, the project as a whole would have a positive net value. This project would have a benefit/cost ratio of 1.22.

Alternative C would have higher costs due to reduced volume per acre removed. It would result in a benefit cost ratio of 0.8 (1.0 is the break even level, this alternative has costs that exceed benefits).

Alternative A would result in a long-term reduction in site productivity. Stands which are not growing commensurate with the sites potential would remain.

E. Botany

Mt. Hood Forest Plan References
Forestwide Threatened, Endangered and Sensitive Plants and Animals Standards and Guidelines - FW-170 to FW-186, page Four-69
See FEIS pages IV-76 and IV-90

Northwest Forest Plan ROD References

Survey and Manage Standards and Guidelines - pages C-4 to C-6
Survey and Manage Species List - pages C-49 to C-61

Surveys have been conducted and no threatened, endangered or sensitive plants were located. Potential habitat does exist for two sensitive plants which occur in wet areas: *Corydalis aquae-gelidae* and *Botrychium montanum.* These two plants have been located within a mile of proposed projects and could be effected by sedimentation. Riparian Reserves, project design and mitigations combine to minimize erosion. The biological evaluation indicates that all alternatives would result in a rating of "Low Effect."

There are several other rare plants which are listed on Table C3 of the Northwest Forest Plan. At this time, the management of known sites is required for certain species. In addition to the two plants above, *Hydrotheria venosa* is known to occur near the project area. This lichen also occurs in wet areas and all action alternatives would result in low risk.

F. Wildlife

Mt. Hood Forest Plan References

Forestwide Diversity Standards and Guidelines - FW-162, page Four-68
Forestwide Wildlife Standards and Guidelines - FW-187 to FW-214, page Four-71
Deer and Elk Standards and Guidelines - B10-12 to B10-28, page Four-274, B11-9 to B11-25, page Four-278, B8-11 to B8-24, page Four-263, B2-18 to B2-31, page Four-224, See FEIS page IV-90
Forestwide Threatened, Endangered and Sensitive Plants and Animals Standards and Guidelines - FW-170 to FW-186, page Four-69. See FEIS pages IV-76 and IV-90

Northwest Forest Plan ROD References

Protection Buffers - pages C-19 to C-21
Matrix Standards and Guidelines - pages C-39 to C-61
Consultation - Endangered Species Act - page A-2
Critical Habitat for Northern Spotted Owl - page A-3
Standards and Guidelines Common to All Alternatives: Exceptions - page C-3
Survey and Manage Standards and Guidelines - pages C-4 to C-6
Known Spotted Owl Activity Centers - pages C-10 and C-45
Protection Buffers - pages C-19 to C-21, C-45 to C-48
Additional Protection for Bats - page C-43
Survey and Manage Species List - pages C-49 to C-61

Northwest Forest Plan FSEIS References

Chapters 3&4: Affected Environment and Environmental Consequences - pages 205-258

Northern Spotted Owl (threatened)

With alternatives B and C, one proposed harvest unit (unit 12) would be within 1/4 mile of an owl activity center. The application of a limited operating season would reduce the affect of noise disturbance on nesting owls. Nesting, roosting and foraging habitat as well as dispersal habitat would be altered with these alternatives. The project effect rating would be "May effect individuals, but would not pose a threat to the population." Units 18, 19 and 21 to 25 are in a critical habitat unit (OR-13). Alternative A would have no effect.

Peregrine Falcon (endangered)

The project area is near two high potential/known sites (1804FAPEBBCCH-north; 1804FAPEBBCBA-south), however the primary nesting protection zone would not be affected by project implementation. Units 18, 19, and 25 fall within the secondary nesting protection zone; a seasonal restriction would protect this species. The effect rating for all alternatives would be "No Effect."

Wolverine (sensitive)

The wolverine is a wide ranging species whose presence has been established in the drainage. Historically, most of the Upper Clackamas watershed provides high quality wolverine habitat. Increased human access since the 1950's has decreased the habitat quality for wolverines. Wolverines are capable of living in a variety of habitats as long as enough food and security is available. The closure of roads and the eventual reduction in human access would improve habitat availability for wolverine. The effect rating for all alternatives would be "No Impact."

Red Tree Vole (survey & manage)

The red tree vole is primarily associated with mature forests. The Bear Cub project focuses on fragmented forests which are not as valuable since connectivity and dispersal habitat features are lacking. Survey protocol requires surveys only in watersheds which have low levels of mature forest. The Upper Clackamas Watershed has enough mature forest to support viable populations of red tree voles even with anticipated levels of harvest.

Deer and Elk (indicator species)

An analysis of deer and elk habitats was conducted. Four permanent analysis areas (which roughly correspond to subdrainages) overlap the project area. The following table shows percentages of optimal, thermal, and hiding covers as well as forage.

Type and minimum ( )	Hunter	Berry	Cub	B11
Optimal Cover (20)	45	50	36	23
Optimal and Thermal Combined (30)	55	62	49	57
Additional Hiding Cover not listed above	10	9	27	15
Forage	35	28	25	28

Alternative B and C primarily affect thermal cover. Since only 0.5 to 1.5% would be altered, the minimum standards would be met, and effects to deer and elk due to habitat alteration would be minimal. Seasonal restrictions would protect animals during important calving and rearing seasons.

Alternatives B and C would involve the construction of short temporary roads which would be closed at the end of project implementation. It would also close 2.3 miles of roads which are currently open. This closure would move the landscape toward its desired future condition and would reduce harassment. With alternative A no roads would be closed.

Pine Marten and Pileated Woodpecker (indicator species)

Most of the proposed harvest units contain habitat for Pine Marten and Pileated Woodpecker. Alternative B would remove this habitat and Alternatives A and C would retain it. The Northwest Forest Plan provided for the needs of these species by the delineation of late-successional reserves and other land allocations. The Upper Clackamas Watershed Analysis recommended that the habitat management areas set aside for these species in the Mt. Hood Forest Plan (B5) were not needed and they were deleted.

Caddisfly (sensitive)

Four species of caddisfly (Mt. Hood Primitive Caddisfly, Mt. Hood Farulan Caddisfly, One-spot Caddisfly, and Cascades Apatanian Caddisfly) are thought to reside in high elevation small streams. They have never been found in the Clackamas basin.

Larch Mt. Salamander (survey & manage)

No potential habitat (talus) has been identified near the project area.

Mollusks (survey & manage)

Many listed species are associated with riparian areas which would not be affected by this proposal. There are no known sites and surveys are not required for mollusks at this time.

Other Wildlife Habitats

Project design and mitigation measures combine to ensure adequate levels of habitat for species which depend on snags and down wood. An analysis done during Watershed Analysis indicates that snag densities across the landscape averages greater than 4 snags per acre. This existing level combined with the levels left in proposed harvest units would ensure that the landscape level situation for snag dependent species would exceed 40% biological potential. (Upper Clackamas Watershed Analysis page 17). See Appendix A for other wildlife design features.

G. Soils

Mt. Hood Forest Plan References

Forestwide Soil Productivity Standards and Guidelines - FW-22 to FW-38, page Four-49
Forestwide Geology Standards and Guidelines - FW-1 to FW-21, page Four-46
Earthflow Standards and Guidelines - B8-28 to B8-41, page Four-264
See Mt. Hood FEIS pages IV-11, and IV-155 to IV-167

Northwest Forest Plan ROD References

Coarse Woody Debris Standards and Guidelines - page C-40
Soil Disturbance Standards and Guidelines - page C-44
Modify Fire and Pesticide Use, Minimize Soil and Litter Disturbance Standards and Guidelines - page C44
Fire and Fuels Management Standard and Guideline - page C-48

Existing Situation

The Soil Resource Inventory for the Mt. Hood National Forest contains maps of soils types. Soils in the project area 302, 303, 304, 305 and 332. Because of high elevations, extreme temperatures, and a high coarse fragment content of the soil profile, these soil types present regeneration challenges. The shelterwood method may be appropriate on these sites. Surface soil erosion and compaction are not serious problems in these soil types.

Effects of Alternatives

Alternatives B and C would decompact certain old skid trails and landings which would increase infiltration and improve long-term productivity. Harvest units were examined and determined to be suitable for timber management in terms of soil productivity. Potential soil disturbances that have been considered (for avoidance or mitigation) include compaction from heavy equipment, and the displacement of soil and organic matter by harvesting equipment, site preparation equipment, and erosion. Other factors considered were the potential effects caused by fire, the effects to mycorrhizae, and effects to long-term site productivity. Mitigation measures and project design for harvest units and road construction would result in meeting applicable standards for soil protection. With Alternative B, most of the units would be either logged via a skyline system or a loader logging system both of which result in very low soil impacts. Tractors would only be used where loader logging is not feasible. Due to the leave tree density with alternative C, loader logging is not feasible and tractors would be used. Alternative C would therefore have slightly greater effect on soils than B.

H. Management of Competing and Unwanted Vegetation

1. Management Objectives

Site-specific vegetation management objectives have been developed. They are based on the objectives stated in the FEIS for Managing Competing and Unwanted Vegetation, FEIS for the Standards and Guidelines in the Pacific Northwest Regional Guide (1984), Mt. Hood National Forest Plan, and the Northwest Forest Plan. Vegetation management projects would be designed to minimize potential adverse impacts to the environment, project workers, and the public. The following list of objectives were used to identify the "damage thresholds" for vegetation management, vegetation management strategies and the feasible treatment methods.

Site Specific Objectives:

Meet the recommended stocking levels within 5 years after harvesting.
Maintain conifer stocking at levels that would produce an economical thinning at the earliest possible time.
Meet the Mt. Hood Forest Plan standards for minimizing soil erosion and compaction.
Maintain adequate levels of downed woody debris and snags that provide for habitat diversity and the maintenance of long-term productivity.

2. Site Conditions

Stands proposed for regeneration harvesting have a low to moderate level of existing understory vegetation. This vegetation could become a physical barrier during tree planting. Currently, the overall fuel loading in the proposed harvest units in the 0-3 inch size class averages well below 12 tons/acre. Slash created during harvesting could become a physical barrier during tree planting and can create an unacceptable fuel hazard level. Removal of this live vegetation and slash prior to planting may be necessary in order to meet management objectives for conifer seedling establishment. Past experience in this area shows that if shelter trees are retained to ameliorate the effects of an otherwise harsh site, and if trees are established immediately after site preparation, no release treatments are required to meet the stand growth objectives.

3. Damage thresholds:

1. Greater than 20% cover of live vegetation.
2. Less than 350 "well" distributed planting spots per acre.
3. Greater than 15 tons/acre of slash in the 0-3" size class.

A post harvest/pretreatment survey would be conducted on all harvest units to identify those that exceed these thresholds. If this survey determines that any of the harvested units are below these thresholds, then the no treatment alternative would be chosen, and tree planting would take place as soon as possible.

4. Strategy Selection

Several strategies were considered and appropriate treatments methods were selected for proposed harvest units.

No Action includes natural decomposition of slash. If a post-harvest review determines that the damage thresholds would not be exceeded, this treatment option could be chosen.

Prevention would be applicable to intermediate harvest prescriptions which would not create much slash and where planting is not needed. Shelterwood retention is also a technique which can be used to enhance early reforestation success which in turn minimizes the risk of brush competition.

Correction involves the treatment of brush and slash where damage thresholds are exceeded.

a. Grapple piling would involve a track-mounted vehicle with a grapple type device to pile a large portion of the slash. It would also be used to pull the larger live vegetation and place it in the pile with the slash. These piles would then be burned under a very specific set of weather and fuel moisture conditions.
b. Machine crushing and cutting would use a track-mounted masticating machine to chip or grind up smaller dead limbs, create planting spots, and cut live vegetation.
c. Hand piling would involve a combination of use of chain saws and manual labor to pile the slash and remove the live vegetation.
d. Broadcast burning is the intentional application of fire, usually on larger more contiguous fuels where the use of other treatments is not appropriate. It would be applied under a very specific set of weather and fuel moisture conditions. Measures that would be used to minimize the loss of green trees during burning. Burning would be executed in compliance with Oregon Smoke Management Regulations.

I. Air Quality

Mt. Hood Forest Plan References

Forestwide Air Quality Standards and Guidelines - FW-39 to FW-53, page Four-51
See Mt. Hood FEIS pages IV-19, and IV-155 to IV-167

Effects of Alternatives

With the action alternatives, some burning would occur. Prescribed burning has the potential to degrade air quality over areas for short periods of time. The principle impact on air quality from prescribed burning would be the temporary visibility impairment caused by smoke to recreational forest users. The effects on air quality would be minimal due to scheduling of burning, which would be during primary burning seasons (March to early June, and October to early December) or periods of inclement weather. Prescribed burning would be done in compliance with the Oregon State Smoke Management Plan as amended and with the Final Environmental Impact Statement for Management Competing and Unwanted Vegetation and the Mediated Agreement. Burning would be accomplished only when State Smoke Management Advisories are favorable.

J. Heritage Resources

Mt. Hood Forest Plan References

Forestwide Timber Management Standards and Guidelines - FW-598 to FW-626, page Four-118
See FEIS page IV-149 and IV-155 to IV-167

Surveys conducted for this project located ten new sites. Site types located in the Bear Cub planning area include historic trails, peeled cedars, and lithic pieces. This project is discussed in heritage resource report number 97-03-02. There are no anticipated effects on heritage resources. Project design criteria have been incorporated to protect heritage resources and are described in Chapter II.

The project contracts would contains provisions for the protection of sites found during project activities.

K. Other

1. Effects upon minority groups, women, and civil rights (Secretary Memorandum 1662, Supplement 8 and OMB Circular A-19, see also FSM 1730): Minority groups and women would benefit to the extent that they would be able to participate in additional employment generated by the projects.

2. There would be no effect upon prime farm land or prime range land.

3. No flood plains or wetlands are affected by the alternatives.

4. There are no conflicts between the proposed action and the objectives of Federal, Regional, State, laws and local land use plans, or policies.

5. The relationship between short-term uses and the maintenance of long-term productivity; no significant reductions in long-term productivity are expected. See soils section.

6. Irreversible and Irretrievable Commitments. The use of rock for road surfacing is an irreversible resource commitment.

CHAPTER IV - CONSULTATION WITH OTHERS

List of Other Agencies Consulted

U.S. Fish and Wildlife Service
National Marine Fisheries Service
Oregon Historic Preservation Office

The publication "Sprouts" is a quarterly newsletter sent out by the Mt. Hood National Forest to notify interested people, organizations, and other agencies of proposed projects and solicit comments on them. This project appeared in the winter, summer and fall 1996 issues. A letter describing the project and requesting comments was sent out to a district mailing list.

From these public involvement efforts, six different letters were received. They are in the analysis file. Several of the comments expressed concern about fisheries, water quality, scenery, and regeneration success.

CHAPTER V - LIST OF PREPARERS

Jim Roden
Craig Edberg
Robert Penson

Appendix A

Clackamas River Ranger Districts Standard Management Requirements and Design Criteria

See Alternative Section for mitigation specific to each alternative.

1. To reduce erosion, bare soils would be revegetated. Grass seed, fertilizer and mulch would be evenly distributed at appropriate rates to ensure successful establishment. Biodegradable erosion control mats would be used at stream crossing reconstruction sites and steep, unstable slopes. Effective ground cover would be installed prior to October 1 of each year.

   Native plant species would be used to meet erosion control needs and other management objectives. Appropriate plant and seed transfer guidelines would be observed. Non-native species may be used if native species would not meet site specific requirements or management objectives. Non-native species would be gradually phased out as cost, availability, and technical knowledge barriers are overcome. Undesirable or invasive plants would not be used.

   Grass seed would preferably be certified by the states of Oregon or Washington or grown under government-supervised contracts to assure noxious weed free status. In certain cases non-certified seed may be used if it is deemed to be free of State of Oregon listed noxious weeds.

   When straw or hay is used as mulch, it would preferably originate from the state of Oregon or Washington fields which grow state certified seed or be grown under government-supervised contracts to assure noxious weed free status. In certain cases, straw or hay from non-certified grass seed fields may be used if is deemed to be free of State of Oregon listed noxious weeds.

2. Avoid fertilizer use in close proximity to live streams and wetlands. Generally a 10 foot buffer would be used for manual applications and a 100 foot buffer would be used for aerial applications. This would be adjusted based on site specific conditions.

3. To minimize surface erosion and sediment delivery; road reconstruction, landing construction, and log haul would NOT occur during periods of prolonged wetness.

4. No new landing construction would occur within riparian reserves if it involves road cut or fill-slope preparation. Avoid log landing within riparian reserve if at all possible. If not, existing landings may be used within a riparian reserve if it is located at least 125 feet from streams.

5. Avoid road construction within Riparian Reserves. If not possible, roads would be located in a manner which minimizes impacts to aquatic resources.

6. Where thinning is planned for riparian reserves, no-cut areas adjacent to streams and wet areas would be "custom designed" on-the-ground with assistance and review by a fisheries biologist. The location of the no-cut boundary and the degree of thinning in the riparian reserve would be designed to achieve aquatic conservation strategy objectives by maximizing tree size, and

minimizing the potential for sediment delivery to aquatic systems and to adequately protect the zone of shade influence along perennial streams.

7. Trees would be directional felled away from the interior of the riparian reserve to minimize yarding disturbances.

8. Avoid cutting of hardwoods in Riparian Reserves.

9. To reduce erosion, temporary roads, landings, skid trails, and skyline corridors would have water bars installed where needed, prior to October 1.

10. Avoid ground disturbance within riparian reserve by using techniques such as full log suspension in skyline units. (If not feasible, one-end log suspension may occur within the dry portions of the Riparian Reserves.) For tractor units, skid trails would generally be located outside of the riparian reserve and trees would be directionally felled and winched.

11. Avoid yarding corridors through riparian reserves where possible. Logging systems for each unit would be designed in a manner to minimize the total number of yarding corridors and landings within riparian reserves. Parallel settings with spacing approximately 150 feet between corridors and corridor width less than 15 feet are preferred over radial settings. The types of settings need to weighed in relation to the number of landings needed to log the unit while affording the most protection to riparian reserve values.

12. Locate green tree retention clumps to minimize risk of wind throw. Where possible, leave clumps around known locations of sensitive/rare species, around concentrations of hard snags, on rocky soils, around wetlands less than 1 acre, or around patches of Pacific yew trees.

13. Snags would be retained at the level of 2.7 per acre. If this level is not present, live replacement trees would be retained. If a post contract review of snag levels indicates that units do not meet this level, blasting or girdling of live trees would create sufficient snags. Snags would be greater than 22 inches in diameter and 40 feet tall.

14. In regeneration harvest units, leave a minimum of 240 linear feet of decay class 1 or 2 logs per acre greater than or equal to 20 inches in diameter and more than 20 feet in length. In partial cutting harvest units, retain a minimum of 100 linear feet per acre.

15. Avoid the use of ground based operations (tractors, skidders, etc.) on slopes greater than 20%, because of the risk of damage to soil and water resources. Skid trails for ground-based equipment would be designated to meet Mt. Hood Forest Plan standards for soils. Existing skid trails would be used where possible. Restrict ground-disturbing activities to nonsaturated soil areas.

16. Retain effective ground cover on approximately 60% of each unit for soil erosion protection.

17. Maintain a minimum of 25 tons per acre of dead and down woody material evenly distributed throughout the harvest unit.

18. Projects would be designed to achieve combined detrimental soil impacts of 15% or less. If impacts exceed this level based on a post project review, soils would be restored to a level of less than 15% by deep soil tillage using an approved forest cultivator.

19. Following harvest activity, the contractor would remove slash created by harvest operations in units within 100 feet of mainline or secondary roads as shown in the Access and Travel Management Plan.

20. All prescribed burning would be done in accordance with state and local air quality regulations. To protect visibility in Class I areas, burning would not occur from July 4 to Labor Day.

21. When slash is piled in harvest units, one pile per acre would be retained unburned for use by wildlife.

22. When manual slash treatments, manual competing vegetation treatments, or other manual labor projects are considered, projects would be designed to reduce the exposure of workers to hazardous conditions.

23. Firewood would be made available to the public at landings where feasible.

Appendix B

Response to Comments for Bearcub Environmental Assessment

NEPA

1. Comment: The range of alternatives is inadequate to provide the decision maker with a clear comparison of effects.

   Response: Alternatives are generated after an examination of the project specific significant issues that arise with scoping. The decision maker has already reviewed the issues and the range of alternatives and has found them adequate to make an informed decision.

2. Comment: There was an insufficient analysis of the effects of the no action alternative.

   Response: The no action alternative is discussed and analyzed throughout the document.

3. Comment: There should have been an alternative that emphasized rehabilitation and does not degrade the environment. Bearcub: Close road 4671-190 and 4671-180.

   Response: Many rehabilitation and restoration projects have been evaluated in separate documents. For example the Restoration 97 Environmental Assessment includes dozens of road repairs and stream enhancements. The proposed actions were based on the identified resource needs of the planning area.

4. Comment: An Environmental Impact Statement should have been prepared.

   Response: An Environmental Impact Statement is generally completed if it is determined that significant effects would be caused by the proposed action. The interdisciplinary team found that the effects were well within the expected range of effects that were evaluated during the development of the Mt. Hood Forest Plan and the Northwest Forest Plan, both of which were supported by an Environmental Impact Statement. This project is also supported by a Watershed Analysis which contains substantial documentation of existing resource conditions as well as projected trends and recommendations. Environmental Assessments are intended to be short summaries of pertinent information and are not "encyclopedic" all inclusive documents.

5. Comment: Cumulative impacts of past logging and road activities were not adequately addressed. A more detailed and comprehensive analysis should have been prepared.

Response: The effects of past logging and road building are included in all effects discussions where they are pertinent. For example, in a discussion of hydrologic conditions, all stands are included, not just the proposed harvest units. Similarly, when discussing wildlife habitats, a large scale landscape analysis is used which includes all stands in the analysis area.

6. Comment: You must prepare biological evaluations for threatened, endangered, and sensitive species.

   Response: Biological Evaluations are completed and are on file.

7. Comment: The Forest Service should provide the public with maps detailing current conditions of surrounding forest, past management practices, and hydrologic recovery of the area. This would give interested parties the information needed to give substantive comments on Forest Service proposals.

   Response: It is difficult to display this type of spacial information on an 8.5 x 11 inch page format. Maps used by the interdisciplinary team are often two to three feet wide. These maps are available for review at the Ranger Station.

8. Comment: In order to avoid the requirement to survey for Category 2 C3 species, the Forest Service has incorrectly interpreted the word "implementation" to mean the date the decision notice is signed instead of the date that ground disturbing activities take place.

   Response: This comment is outside the scope of this document. This type of interpretation is made at the regional level after consultation with the people who wrote the standards.

Old Growth

9. Comment: These remnant stands of old growth should be preserved to provide refugia for old-growth dependent species and to provide diversity.

   Response: Individual plants and animals would be displaced from the proposed harvest areas, however species of concern would be maintained across the landscape in many areas including late-successional reserves, riparian reserves, 100 acre owl reserves, administratively withdrawn lands, and within the connectivity network. They would also be maintained in the mature forest areas in the matrix that would not be harvested in the near future due to scheduling constraints. Some may also be retained in the green tree retention patches that are retained in harvest units.

10. Comment: There is not enough information to assess the contribution of these stands to connectivity of old-growth habitats and interior old-growth habitat.

Response: The Watershed Analysis contains an analysis of interior habitat and connectivity. It also contains recommendations to focus harvesting on stands which are fragmented and have the least amount of interior forest, as displayed in the Landscape Analysis and Design map. This project implements those recommendations from the Watershed Analysis.

11. Comment: Do you plan to retain 15% of the old growth in the project area and in the subbasin?

Response: For the watershed as a whole there is sufficient late-successional forest in land allocations which are not available for timber harvest to meet more than the 15% required. This is displayed in the Watershed Analysis. In addition, within each proposed harvest unit other than thinning, at least 15% of the stand will be retained in small blocks and individual trees as required in the Northwest Forest Plan.

12. Comment: Old growth should be retained for future generations.

Response: This is outside the scope of this analysis. Setting aside forests for future generations and for wildlife and other resource considerations has been done in the Mt. Hood Forest Plan and the Northwest Forest Plan. The stands targeted by this analysis were recommended for harvest in the Watershed Analysis.

13. Comment: You should state the quantity of old growth removed and the definition you use for old growth.

Response: The Northwest Forest Plan focusses on late-successional forests which includes old growth and mature forests since most species of concern do not discriminate between the two. Our environmental assessments also analyze effects to late-successional forest (sometimes referred to as late seral) since our data bases categorize stands this way. Participants and commenters express varying degrees of interest in different types of stands. Some are interested in stands over 200 years of age, while others focus on the size of trees and structural characteristics, and still others object to harvest of any mature forests. The current accepted definition of "old growth" can be found in Pacific Northwest Research Publication 447. Many stands included in this assessment do not meet the strict 447 definition, but intensive field reconnaissance that would be needed to make a precise determination is very time consuming, and funding is not available to do this work.

14. Comment: Your analysis fails to highlight the benefits derived from retaining old growth.

Response: These benefits are adequately described in the Northwest Forest Plan and the Watershed Analysis.

15. Comment: This timber sale is likely to be highly controversial because of their old growth characteristics.

Response: The Northwest Forest Plan preserved large quantities of late-successional and old-growth forests. It also provided direction for continued harvest at a greatly reduced rate. The Watershed Analysis contained recommendations to focus harvesting on stands which are fragmented and have the least amount of interior forest. These concepts may continue to dissatisfy some people.

Visual Resource

16. Comment: Visual Quality Objectives should not contain a discussion of shapes, it should discuss how many trees are cut in a given area. The EA does not address the percent of visual disturbance in the watershed as required by the Mt. Hood Forest Plan.

Response: Forest landscape architects no longer use the concept of "percent visually disturbed" to determine compliance with Visual Quality Objectives. The EA on page 18 discloses that past harvest and road building has resulted in a situation where the Visual Quality Objective of Partial Retention is not being met due to the patchwork of straight edges and unnatural shapes. A calculation of percent visual disturbance would probably indicate the same thing.

17. Comment: No consideration was given to the effect of blowdown on visual quality.

Response: Past wind damage was included in the discussion of scenery. The potential for future wind damage was considered in the design of the proposed harvest units including the shape, size, the windfirmness of retained trees, and the placement of the green tree retention patches.

18. Comment: Because the viewshed is decimated, tree removal should be limited.

Response: The effects to visual resources were identified as an issue in the EA. The project is designed to reduce the unnatural lines and shapes to the extent possible.

Water Quality/Municipal Watershed/Floods/ARP

19. Comment: The Clackamas is a municipal watershed. It should be classified as a Tier 2 watershed and a Special Emphasis Watershed.

Response: This is outside the scope of this analysis. These determinations were made by the Mt. Hood Forest Plan and the Northwest Forest Plan.

20. Comment: Road construction and logging could affect water quality, harming fish and downstream water users. This proposal and other proposals for logging in the basin will increase peak flows, increase sedimentation, increase the likelihood of downstream flooding, and could reduce summer water quantities due to earlier snow melt. The water quality section of the EA is inadequate. The information provided is not adequate to disclose risks associated with additional roads. Do not log or build roads.

    Response: The hydrologic analysis indicates that water quality would be maintained. The EA tiers to the detailed Watershed Analysis.

21. Comment: The Aggregate Recovery Percentage value would decline by 1% to 2%. Did you consider the combined effects of past and present logging? The combined effects of logging activities are likely to be substantial. The Aggregate Recovery Percentage minimum should be raised from 65% to 85%.

    Response: The aggregate recovery model does include the effects of past and present logging and is calculated for subwatersheds. Changing the minimum standard is outside the scope of this analysis. The Watershed Analysis concluded that these subwatersheds were in good condition.

22. Comment: There was not an adequate discussion of the effects of the 1996 floods.

    Response: The project area was not flooded in 1996. Due to the inherent stability of this area, these watersheds came through that stormy period with very little damage. A discussion of storm damage elsewhere in the Clackamas drainage can be found in other documents such as the Restoration 97 Environmental Assessment.

23. Comment: Unit 15 should not be logged because clearcutting this steep, roaded unit will increase the potential for landslides.

    Response: Units 15 is not particularly steep (less than 20% slope) or unstable.

24. Comment: Chemical fertilizers could damage water quality.

    Response: Monitoring of water quality is routinely conducted during fertilization. No-treatment buffers have been found to be adequate to protect water quality.

Fish/Riparian Reserves

25. Comment: The EA must state which fish species and stocks are found within the watershed and whether they are found within the planning area.

Response: A discussion of fish and their distribution is found in the EA and the Analysis File as well as in the Watershed Analysis.

26. Comment: The Forest Service must discuss how decreases in Riparian Reserve widths will benefit terrestrial species.

Response: No changes in Riparian Reserve widths have been proposed. The widths are based on site potential tree height as described in the Northwest Forest Plan.

27. Comment: The EA does not adequately disclose how imperiled fish may be harmed.

Response: The Biological Evaluation for fish is summarized in the EA. This project has been submitted to the National Marine Fisheries Service for conferencing.

28. Comment: No consideration is given to the fact that Lower Columbia Steelhead are being considered for listing under the Endangered Species Act and Lower Columbia Coho are listed as Sensitive.

Response: Effects to these fish are discussed in the EA and the Biological Evaluation.

Soils

29. Comment: Soils should not be degraded because mitigation measures never fully restore the hydrologic function of a healthy forest floor.

Response: Forest Plan standards recognize that some soil impact is inevitable with logging and the maximum disturbance level has been set at 15% for most areas. While skidtrail ripping does not fully restore a healthy forest floor it does reduce compaction and increase infiltration.

30. Comment: The Forest Service should disclose the current percentage of soils disturbance in the project area.

Response: Forest Plan Standards for soil protection contain guidance for proposed harvest areas. Some of the proposed harvest areas have minor levels of soil disturbance due to past salvage operations, but for the most part the soils have not been altered. When evaluating compliance with Forest Plan standards within the harvest unit, impacts of past salvage is added to the impacts of the current project.

31. Comment: The analysis files should include a report that addresses the loss of mychorrhizae fungus and soil nitrogen as a result of timber harvesting.

Response: Current standards for green tree retention result in the retention of mychorrhizae which in turn benefit the future stand established in regeneration harvest areas.

32. Comment: Many stands in the project area contain poor soils which may fail to regenerate. These areas should not be harvested.

Response: All proposed harvest units have been examined to deterimine their suitability for timber management.

Exotics/Chemicals

33. Comment: Log trucks could introduce exotic species. Trucks should be washed.

Response: All vehicles that drive on forest roads are potential carriers of the seeds of exotic species. Washing all vehicles is impractical and washing only log trucks would be ineffective.

34. Comment: The EA should state whether any herbicides, insecticides, or other toxic chemicals will be applied.

Response: No herbicides, insecticides, or toxic chemicals will be applied.

Spotted Owls

35. Comment: The noise from logging and road building is likely to harm the spotted owls and their habitat. Reducing canopy closure removes vital nesting habitat characteristics that the spotted owl needs for survival. Please drop the unit that is within 0.25 miles of an owl activity center.

Response: The survival of the species is addressed in the Northwest Forest Plan. Consultation with U.S.Fish and Wildlife Service is complete. All recommendations are being followed.

36. Comment: How could a determination of "May affect individuals, but would not pose a threat to the population" have been made when several units are in a Critical Habitat Unit? Unless the Forest Service or the US Fish and Wildlife Service are monitoring owl populations in Late-Successional Reserves, the agency can not claim or assert that the population will not be threatened by proposed logging.

Response: The U.S.Fish and Wildlife Service concurred with this effect determination for the critical habitat unit. Monitoring in Late-Successional Reserves is outside the scope of this analysis. This type of monitoring is done under the Northwest Forest Plan.

Peregrine Falcon

37. Comment: There should be no logging or road building near the two high potential peregrine sites identified in the EA because it would destroy the habitat of an endangered species.

Response: The Biological Evaluation/Assessment indicated that there would be no direct effects and that a seasonal restriction would reduce noise during the breeding season.

California Wolverine

38. Comment: Measures should be taken to assure protection of the wolverine, including no road building. Decommissioning roads would be a better alternative for wolverines.

Response: The Biological Evaluation/Assessment indicates that risks to habitat, individuals, and to the population is low and that there would be no impact to wolverine. Past and proposed road closures benefit wolverine.

Deer and Elk/Road Density

39. Comment: A Habitat Effectiveness Index analysis should be performed to provide information on how this sale will impact big-game habitat and maintain well-distributed, viable populations of big-game species. It should also include big-game travel corridors, water availability, fawning and calving habitat, and off-road vehicle use. Road density analysis should take into account roads that are being utilized due to ineffective closures.

Response: The Forest Plan requires that other habitat assessments be used. For example the quantities of optimal cover, thermal cover, forage, and open road density are examined on a landscape scale.

40. Comment: New roads would harm the deer and elk that use the area for summer rearing habitat.

Response: Newly constructed roads would be closed and rehabilitated following harvest and will not contribute to an increased open road density. The proposed action would also close currently open roads resulting in a net reduction in open road density.

TES/C3 Plants

41. Comment: *Corydalis aquae-gelidae,* a C3 species, could be negatively impacted by any logging and road building activity. You justify harming this rare, uncommon, threatened, and imperiled species by saying that Aggregate Recovery Percentage will only be decreased by 1% or 2%. Did you base your analysis on the 1995 Watershed Analysis or on data collected more recently and subsequent to the 1996 flood event? The ARPs should be analyzed in terms of risks of downstream flooding in addition to risks to downstream species.

Response: The hydrologic situation was assessed after the 1996 storms and the Aggregate Recovery Percentage is well above the minimum standard. The botanical biological assessment indicates that effects would be minimal, temporary, and unlikely to negatively impact corydalis.

42. Comment: Measures must be taken to ensure that the proposed activities will not further degrade the already unstable populations of sensitive/C3 plant species in the project area. Plants within a mile of the project area are likely to be adversely impacted.

Response: The botanical biological assessment indicates that risk to these species is low.

Economics

43. Comment: Clearcutting ancient forest is not a sustainable management practice and harms, rather than aids, the stability of local and regional economies. Clearcutting of publicly owned ancient forest serves as a "transfer payment" to the timber industry at the expense of other industries such as commercial and sport fishing, outfitting, tourism, and private tree farms. Please document how the proposed sales meet the economic goals indentified in the Northwest Forest Plan.

Response: One of the goals of the Northwest Forest Plan is to maintain a "sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies on a predictable and long-term basis". The attainment of Probable Sale Quantity was identified as one component of meeting that goal. Probable Sale Quantity and its subsequent effect on regional economics was analyzed in the Northwest Forest Plan and is outside the scope of this analysis.

44. Comment: Standing forests should be considered a capital asset when calculating the cost/benefit of timber harvest. Intact old-growth ecosystems help provide clean air, clean water, genetic and biological diversity, climate moderation, and recreational opportunities, all of which have a significant economic value that should be displayed in the analysis.

Response: These resource interactions are evaluated in the Northwest Forest Plan and are outside the scope of this assessment. This project does not alter "intact old-growth ecosystems."

Other

45. Comment: Several responses indicated a preference for a particular alternative or for a specific project.

Response: Thank you for your input.