Douglas Cabin Late Successional Reserve Assessment

LSR: R0203

Location: Wasco County, Oregon

Lead Agency: USDA Forest Service

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Douglas Cabin LSRA Addendum

Add to (pg V-4) **"Thickets"** to the Vegetation discussion .

Thickets are made up of trees 1"dbh up to 10"dbh that have stem densities sufficient to cause mortality of low branches and provides hiding cover value. Generally the structure type of the thickets is Stem Exclusion or Fire Exclusion Multistory, however, Stem Initiation can be occurring. Crown Closure ranges from 60% to 100%. Brush may be present but are not part of the canopy closure. Patch size can be up to 2 acres. Other forested canopy layers can overtop the thicket.

Add to (pg V-5) a footnote between the table at the top of page and figure 5.1.

Footnote: Collapsing is acceptable until it threatens the surrounding stands and threatens the integrity of the LSR. (see page IV-3, under the mortality trigger for additional information on collapsing.)

Add to (pg V-5) in table at top of page, under Mappable Other Structures **"Collapsing"**.

Add to (pgVI-3) Mortality section, in addition to the flagged paragraph:

We agreed that if stand mortality equals or exceeds 15%, management action may be needed. Although a "total mortality" of 15% over the life of the stand certainly is not exceesive, 15% within a 1 to 5 year timeframe might be to high if similar losses are expected to continue in the future...(continue with flagged paragraph on bottom of page.)

Add to (pgVII-1) monitoring section, in the Introduction:

"Normal Operating Procedures"- Operating procedures would include but not be limited to the following: 1) Baseline stand exams, 2) a review of existing conditions and ground truthing, 3) TE&S monitoring, 4) stream surveys, 5) post harvest evaluation, 6) evaluation of subsequent treatments, 7) annual insect and disease reconnaissance, 8) review of aerial photos - post harvest, 9) any special recon needed after flood, fire, and wind events, 10) monitoring of the landscape and update databases to reflect the true existing condition, 11) update databases to reflect post treatment condition and structure.

The following information is for inclusion into the REO Exemption Letter dated July 26, 1996 (Appendix D in the Douglas Cabin LSRA). This exemption paragraph only pertains to the Douglas Cabin LSR.

Add to section titled **Stand Attributes**:

Three late successional structures, (Open Parklike, Open Intolerant Multistory, Cathedral) can be expected in the Douglas Cabin Late Successional Reserve. Fire exclusion and past treatments are interfering (e.g. nutrient cycling, diversity, excessive stocking, species composition, moisture stress, insects, fuel buildup) with stands evolving into these structures. All tree species and ages need evaluation for silvicultural treatments to promote late successional structure development.

Please add a note that **Stand Attribute #2** does not apply to Douglas Cabin.

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Chapter I--Introduction

Introduction

The Northwest Forest Plan created a network of areas dedicated to the development and protection of late seral habitat. Each such area requires an assessment to determine if it is functioning as intended. This document is the assessment for the Douglas Cabin Late Successional Reserve (LSR) - RO203 -, found on Barlow Ranger District, Mt. Hood National Forest. Like watershed analysis, LSR assessment is a continuing process. This report is the first iteration of this process. We will revise the assessment as we learn new information about the area and about providing for the needs of late seral dependent species, and as conditions change. Consistent with direction from the Chief of the Forest Service, this analysis and team focused on habitat quantity and quality, land capability, established needs of sensitive species, and the risks associated with maintaining old forests.

Previous analyses pertinent and contributory to this assessment include:

- **White River Watershed Analysis** 1995--Analyzed White River subbasin as a Tier 2 Key Watershed under the Northwest Forest Plan.
- **Eastside Partnership Access and Travel Management Plan** 1995--Recommendations on road management across the eastside districts of the Mt. Hood National Forest (Barlow, Bear Springs, and Hood River Ranger Districts).
- **Badger Jordan Planning Unit FEIS** 1978--Although this management plan was replaced by the Mt. Hood and Northwest Forest Plans, it contains historical information on the area not readily available elsewhere.

The area used for the analysis is the LSR and its immediate environs. We used a forest-wide scale to study habitat connectivity among neighboring LSRs on the Mt. Hood National Forest. This connectivity study occurred during the assessment of White River LSR.

Objectives

The objectives of this assessment are:

- To validate and refine the desired conditions for Douglas Cabin LSR as described in the White River Watershed Analysis.
- To assess the quality of ecosystem function as it pertains to the goals of Late Successional Reserves in the Northwest Forest Plan.
- To prioritize management action where improvement of function is possible through management, while indicating necessary mitigation, design parameters, and monitoring needs.
- To categorize present and future social use in terms of site specific interpretation of standards and guidelines in the Northwest Forest Plan.
- To develop triggers for future analysis of either this assessment or site specific management actions.

Context of Douglas Cabin LSR

Regional Setting. Douglas Cabin LSR is part of a regional network designed in association with other land allocations, such as riparian reserves, wilderness, wild and scenic rivers, National Parks, and so forth, to provide functional old forest habitat. The network is designed to provide long term dispersal and migratory pathways. Douglas Cabin LSR lies in the northern Oregon Cascade Range. The Columbia River, which breaches the Cascade Range, allows for mixing of eastside and westside species and genetic varieties.

Provincial Setting. Douglas Cabin LSR lies in the Deschutes Province. The Columbia River Gorge has a direct influence on climate, and hence habitat quality and quantity, as far south as White River. However, the local climate within Douglas Cabin LSR is more typical of climates found much further east, in the Blue Mountains and central Idaho. Douglas Cabin LSR provides refugia for certain species, but is too small and dry to provide a refuge or source for most species of concern in the Northwest Forest Plan, particularly during drought periods.

Local Setting. Badger Creek Wilderness abuts the 4,235 acre Douglas Cabin LSR to the north, west, and south. Road 2710, from Bonney Crossing on Badger Creek to a switchback just above Little Badger Creek, forms the eastern boundary (Figure 1.1). Elevation ranges from 2400 ft along Road 2710 to 4800 ft on Gordon Butte. There are no perennial streams within the LSR, although short segments of streams may have above ground water most of the year. Plant communities are only somewhat diverse, consisting primarily of Douglas-fir and dry grand fir plant associations. Only four tree species are common throughout the LSR--Oregon white oak, ponderosa pine, Douglas-fir, and grand fir. Some western larch, lodgepole pine, and western white pine are found around Gordon Butte. Scattered individual noble firs, Engelmann spruce, and mountain or western hemlock may be found. However, these trees are often severely stunted and slow growing.

The Vision Behind It

The members of this assessment team are all experienced field personnel. Most have participated in previous LSR assessments or in the previously mentioned large scale analyses. The reader may notice some original information in this document. This is the result of trying to apply criteria, data, or theories from other places and finding they don't reasonably represent conditions found in Douglas Cabin. It is also the result of a continuing refinement of ideas and theories expressed in various watershed analyses and other LSR assessments.

Every analysis portrays a philosophy that drives the direction of inquiry. Our philosophy is that single-species management or single-purpose projects are less useful than consideration of the function of habitats within an ecosystem as a whole. The disturbance processes that were typical before Euro-American settlement (pre-1855) provided the most resilient and long-lasting habitat conditions and provided a certain set of habitats. However, we recognize there is no going back to these exact same conditions.

Landscape elements and process are altered on both National Forest and adjacent lands. Many of these changes can be considered permanent. The purpose of analysis is to create enough knowledge to enable us to design a landscape which functions within the framework of present ecological capabilities, social needs, and financial wherewithal.

Participants

Louisa Evers--Team Leader, Ecology, Writer-Editor
Dale Wondercheck--Wildlife Biology
John Dodd--Soil Science
Caitlin Cray--Botany
Jeannie Blackmore--GIS
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Betty Daniel--Engineering
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Edan Lira--Reforestation
Douglas Anderson--Geology

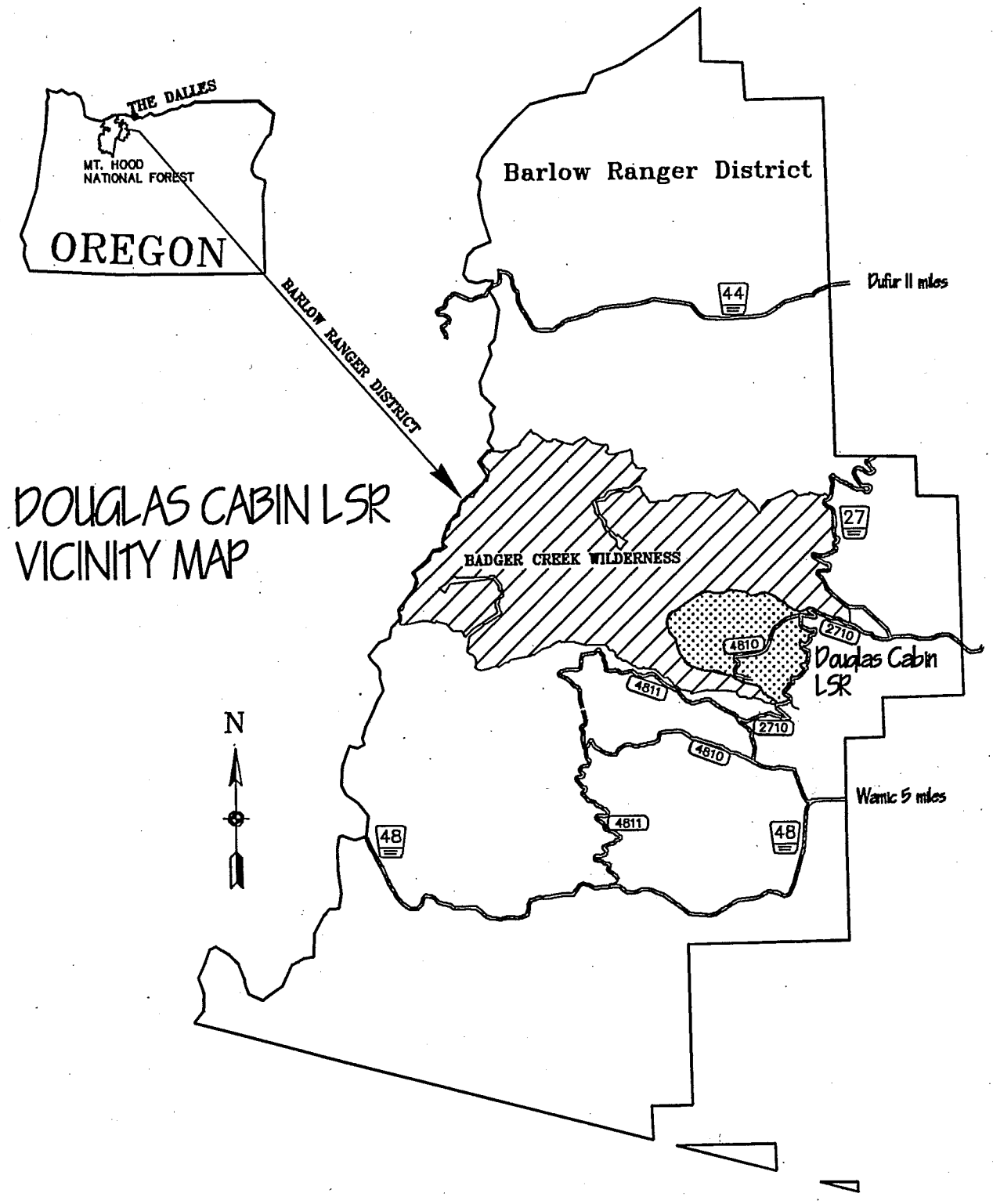


Figure 1.1. Vicinity map. Douglas Cabin LSR lies in the center of Barlow Ranger District.

Chapter II Past Conditions

Introduction

We know we must design current management to best fit today's social, biological, and physical processes. We also know we cannot accurately measure the landscape elements and processes which took place before the current time period. However, developing a vision of the past is just as important as developing a vision for the future. The past provides context, reference, and inspiration.

Geologic Processes

The Douglas Cabin LSR is a unique geologic area that lies southeast of Mt. Hood and east of the Cascade Mountain Range crest. It is part of the High Cascade Physiographic Province, which is generally described as less dissected and as a more gently sloping portion of the Cascade Mountain Range than the Western Cascade Physiographic Province. This area primarily drains from the northwest to the southeast and contributes runoff to either Badger or Little Badger Creeks. A significant slope break occurs between 3000 and 2800 feet and runs northeast to southwest. The LSR has three volcanic lava flow deposits, one volcanic sedimentary deposit, and one surficial deposit (Table 2.1 and Figure 2.1).

Most of the LSR is comprised of three formations: an andesitic lava flow which forms much of the Flats, thin rhyodacite and rhyolite lave flows and domes that form much of the Slopes, and a tuff breccia deposit that lies between the other two types. The rhyodacite and rhyolite lava flows and domes flowed and intruded over a vast area reaching northwest of Gordon Butte. On the ground, these rocks are a light purplish-grey to white with areas of reddish staining. The tuff breccia, a surficial unit, is a product of dome failures at or near the peak of Gordon Butte. This geologic deposit is commonly referred to as a block-and-ash deposit. It mantles the slope below Gordon Butte and is probably a product of a large landslide that originated from a collapse of the domes. The collapse occurred sometime after the dome building ceased but before erosion carved the modern canyons. Bennett Spring probably demarks the contact between the older basalt and andesite flows, and the younger rhyolitic rock. This has been inferred because the elevation of the contact in Badger and Little Badger Creeks is located at approximately the same elevation of Bennett Spring (2800 feet).

Table 2.1. Geology of Douglas Cabin LSR.

Rock Type	Abbreviation	Estimated Age	Source Area	General Location
Basalt	Tb	5 million years	Unknown	South-central border of LSR
Pyroclastic & sedimentary (Tygh Valley Formation)	Ttvp	4.9 million years	Unknown	Intermittent streams along east edge of LSR
Andesite	Talb	4.7 million years	Unknown	Eastern third of LSR
Rhyodacite and rhyolite lava	Trgd	3-4 million years	Unknown, possibly near Flag Point	Western half of LSR
Tuff breccia (block and ash)	Trgx	Uncertain	Deposits from large landslides resulting from collapse of Trgd domes	Band in central portion of LSR

The Douglas Cabin LSR area is positioned between an extensive fault that runs along Little Badger Creek in the north, and a heavily eroded glacial valley in Badger Creek to the south. The Douglas Cabin LSR area does not display either of these landform traits that are so obvious just beyond its boundaries. Evidently a combination of being in a rain shadow, which lowers the annual precipitation, low elevation, and a southeast aspect, which is not usually conducive to glacial development, has made this area quite

different from it's immediate surroundings. In the recent past, stream downcutting has been the primary erosional process on this land.

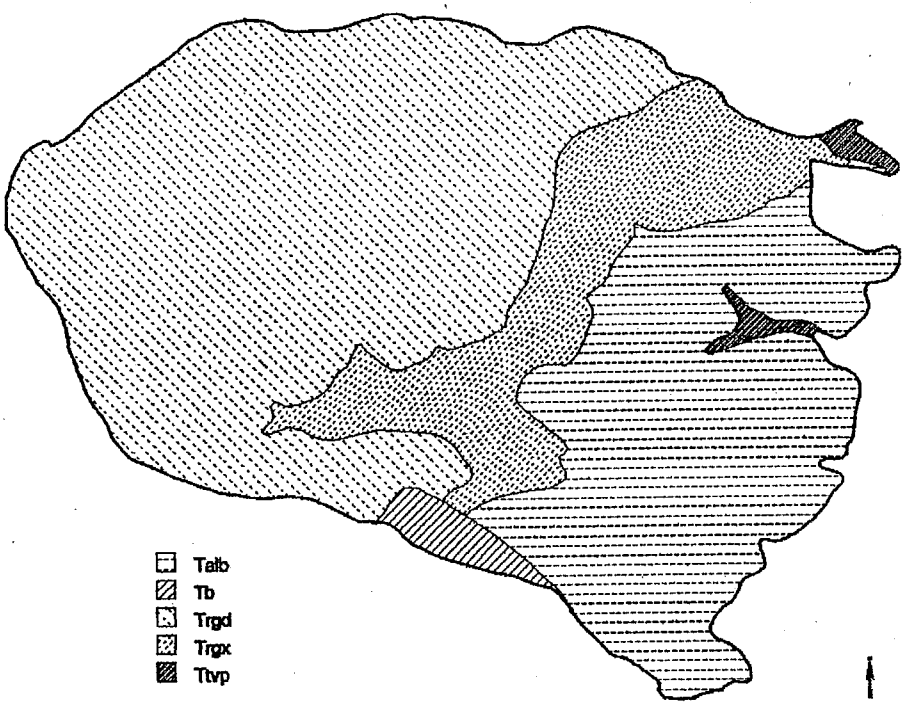


Figure 2.1. Geology. The steeper part of the LSR lies on very old rhyodacite and rhyolite while most of the gentler part lies on andesite.

Soils

Soil productivity was probably relatively high considering the available parent material available, characteristic plant communities, and climate of the area. The 1939 aerial photos indicate the most productive sites in terms of conifer size and stocking were on the Flats and north aspects of the Slopes. On hot, dry south and west aspects individual trees were still large, but there were fewer of them. The harshest sites contained scattered oak with an understory of native bunchgrasses, forbs, and shrubs. Approximately 20 percent of the acreage in the LSR is mapped on harsh south and west slopes (Table 2.2). Similarly, about 20 percent of the area is mapped on favorable north and east aspects, which is where we can expect the highest levels of productivity in the LSR.

Table 2.2. Soils mapped on 1939 aerial photos by aspect and slope.

Slopes <30%	Slopes >30%	
All Aspects	North and East Aspects	South and West Aspects
2464 acres	873 acres	898 acres

Recent field observations in the Fivemile watershed indicate a gradient in soil organic matter development among different vegetation communities. Soils that developed under open canopies with grassy understories exhibited dark surface colors, good structure, and store most of the site nutrients underground in the form of fine roots from bunchgrasses, forbs, and shrubs, similar to typical grassland soils. Soils that developed under continuous and long-term canopy closure tend to be lighter in color and weakly structured, with most of the nutrient capital stored above the mineral soil in the duff and large

down woody material. Extrapolating this information to Douglas Cabin and due to the relatively open nature of the stands observed in the 1939 photos (especially on the south and west aspects), grassland soils probably were typical on the south and west aspects of the Slopes. Soils on the north and east aspects were the pale soils typical of closed canopy coniferous forest. Soils on the Flats likely exhibited characteristics intermediate to the dark colored soils of the grasslands and pale soils under the more continuous conifer cover of the north and east aspects.

Frequent light underburns in the past likely did not do much damage to the soil, except in small localized areas where fuels had accumulated. Large logs were charred and consumed to different degrees, with more down woody material present on the flats and north slopes than on the south slopes.

Hydrology

Given the more open stand conditions of the past, average water production probably was higher than it is today. Lower canopy closures meant higher potential snowpack accumulation and spring runoff. Peak flows may have been higher, and streams that are now intermittent may have flowed all year, at least in some reaches. However, there is no current vegetative evidence (several dead cedars along an intermittent, for example) to verify whether streamflows have been altered.

Climate

The climate in White River subbasin has changed much over time. In general, the Pleistocene was cool to cold; a small glacier occupied the upper portions of Badger Creek. The end years of the Pleistocene became warmer and drier, with this trend continuing into the Holocene. From about 10,500 to 8,500 years ago, the climate was similar to today's, warmer than the Pleistocene, but still relatively cool and moist. The Hypsithermal, from 8,500 to about 3,000 years ago was warmer and drier than today, although there were fluctuations in both time and space (Reese 1988). About 3,000 years ago, the climate became cooler, and sometimes more humid than at present. A distinctly cooler period, known as the Little Ice Age ended about 1850. During the Little Ice Age, glaciers advanced in Alaska and Mount Rainier, and probably on Mt. Hood. Even though regional climates can be broadly described for large areas over thousands of years, these sweeping pictures can mask local differences. For example, Douglas Cabin LSR lies in the rainshadow of Mt. Hood. How the rainshadow effect may have altered the local climate, compared to the regional climate, is unknown.

The general climate in Douglas Cabin is characterized by cool, moist winters and hot, dry summers. Most precipitation falls from mid-October through May. Snow depths vary considerably, both throughout a winter and between winters. Only in the highest elevations does snow tend to persist through the winter. June through September is usually quite dry with occasional showers and thunderstorms. Analysis of precipitation records for nearby communities suggests a dry-wet cycle of approximately 40 years (20 years of drought and 20 years of abundant moisture) since 1900.

During watershed analysis, we divided the subbasin into smaller analysis units. The primary units used are based on climate and geomorphology. The climatic division separates White River subbasin into three zones; Douglas Cabin LSR falls within two of these zones: Transition and Eastside.

Zone	Description	Climax Species	Major Early Seral Species	Minor Early Seral Species
Transition (Slopes)	Cool, moist winters with inconsistent snowpack. Warm to hot, dry summers.	grand fir Douglas-fir	Douglas-fir ponderosa pine Oregon white oak	western larch western white pine lodgepole pine western juniper
Eastside (Flats)	Cool, semi-dry winters where the snowpack often does not last all winter; hot, dry summers	Douglas-fir ponderosa pine Oregon white oak	ponderosa pine Oregon white oak	western juniper

Since the boundary between the Eastside and Transition zones is not well defined in Douglas Cabin, we elected to divide the landscape on the basis of landform (Figure 2.2). All subsequent discussions are based on this stratification.

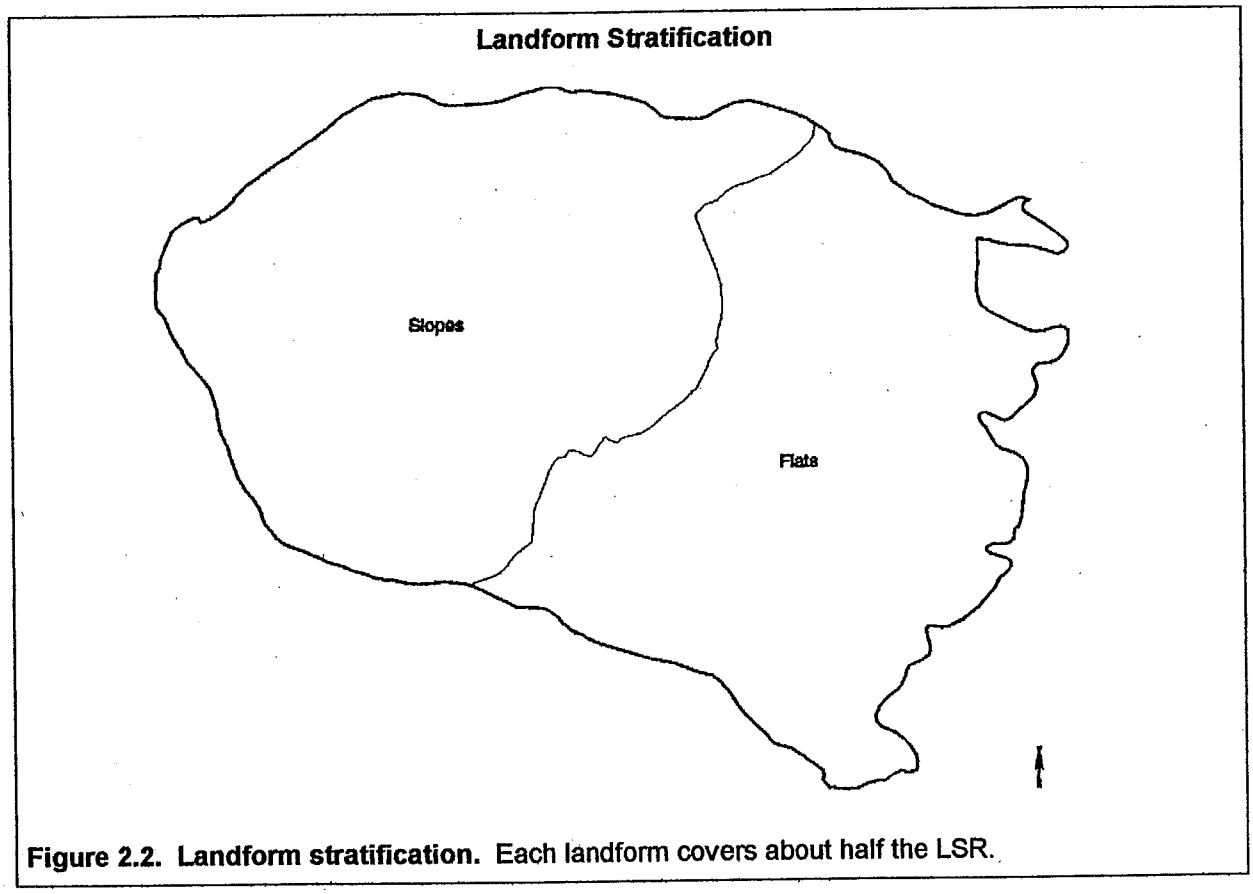


Figure 2.2. Landform stratification. Each landform covers about half the LSR.

Vegetation

In order to analyze past, present, and desired vegetation, we first described several forest stand structures. These descriptors are based on the scheme outlined by Oliver and Larson (1990) (Table 2.3). Detailed descriptions of these structure types are found in Appendix A.

Stagnation may occur in nearly any structure type with high stocking, but is more prone to occur in the Stem Exclusion, Mature Stem Exclusion, Fire Excluded Multistory, and Woodland structure types. A stand is considered stagnate if the stand density or species mix is such that tree growth has virtually ceased. Stagnate stands require some disturbance to move into another structure type and are indicated by an S appended to the structure abbreviation. In addition, these same structure types occur at very different canopy closures in pine-oak stands. Pine-oak stands are usually found on very hot, dry sites that cannot support a large number of trees per acre or canopy closure. Thus, the Stem Exclusion stage in pine-oak may occur at only 40% canopy closure, instead of 70-90%.

Establishing the probable range of natural conditions (RNC) for vegetation is a useful tool for helping us understand the ability of the Douglas Cabin LSR to provide for certain habitat types and features. Of most use would be information on vegetation (species compositions, stand structures, tree sizes, canopy closure, etc.) and wildlife prior to 1855. However, there is very little documentation of conditions within this area during that time period. We searched out the earliest information we could find and extrapolated, based on professional experience and judgment. Information sources included a 1901 survey of forest conditions in the Cascade Range Forest Reserve, 1901 survey notes from the General Land Office (GLO), aerial photography, early official letters, grazing records, and early fire and fuels atlases.

Table 2.3. Stand structure types and descriptors.

Structure Type	Abbreviation	Age Category	Size Category	Number of Layers	Canopy Closure	Old Growth	Disturbance Dependent
Stand Initiation	SI	young	<5" DBH	1	N/A	No	Yes
Stem Exclusion*	SE	young	5-9" DBH	1	70-90%	No	No
Mature Stem Exclusion*	MSE	middle-aged	9-20" DBH	1, or weakly 2	70-90%	No	No
Understory Reinitiation	UR	middle-aged	Overstory 12"+ DBH, Understory <5" DBH	2	50-90%	No	Yes
Fire Excluded Multistory	FEM	middle-aged to old	Variable	2-3	60-90%	No	No
Open Intolerant Multistory-Young	OIM-Y	young to middle-aged	Variable	2-4	30-60%	No	Yes
Open Intolerant Multistory-Old	OIM-O	old	Variable, overstory dominated by trees 21"+ DBH	2-4	30-60%	Yes	Yes
Open Parklike	OP	old	Variable, conifer overstory dominated by trees 21"+ DBH	1-2	15-50%	Yes	Yes
Cathedral	CAT	old	Dominated by trees 21"+ DBH	1, or weakly 2	50-90%	Yes	Yes
Woodland*	WOOD	all ages	Variable	1	<25%	Often	No
Collapsing+	COL	all ages	Variable	N/A	Decreasing	No	N/A

* Modifiers possible, see main text.
\+ Stand has high levels of mortality and is not expected to survive, moving into SI stage

Past Vegetation. Ponderosa pine visually dominated the LSR, although it may not have comprised the greatest basal area or trees per acre in a given location. In 1916, the entire LSR was considered to fall within the "yellow pine" region with ponderosa pine comprising 50-100% of the stands. In the 1930s, vegetation mapping was further refined to indicate a dominance of Douglas-fir on north aspects. Table 2.4 displays ranges of stocking levels within two general areas of the LSR.

Trees of all species typically had large wide crowns. The crown diameter in feet was greater than or equal to tree diameter in inches at DBH. For example, if the tree diameter was 30 inches, crown diameter was greater than or equal to 30 feet. Live crown ratios usually exceeded 50%. Oregon white oaks were mostly single-stemmed with a few double or triple-stemmed trees scattered through the area.

Table 2.4. Estimated stocking level ranges and species within Douglas Cabin LSR as of 1900.

Location	Trees per Acre	Basal Area per Acre	Species
Flats	79-101	40-220 ft^2	ponderosa pine, Oregon white oak, Douglas-fir
Slopes	64-114	80-360 ft^2	ponderosa pine, Douglas-fir

Slopes. Ponderosa pine was the dominant species. Douglas-fir was an important secondary species. Western larch was an occasional species on north aspects. Oregon white oak was restricted to very open, hot, dry, rocky areas, usually on south aspects. Lodgepole pine and western white pine were likely present near Gordon Butte, although not specifically documented.

Stands were semi-closed to closed canopied on north aspects and semi-closed to open on south aspects. The understory was likely dominated by grass in the more open stands and brush in the more closed stands. Fires varied from relatively frequent, low intensity burns on south aspects to relatively infrequent high intensity and mixed intensity burns on north aspects. The higher intensity burns created a complex of stand structures. Most created openings were less than 100 acres, with many probably less than 40 acres. Dense brushfields developed following stand replacement burning, particularly on north aspects. Common brush species were snowbrush ceanothus, willow, greenleaf manzanita, and golden chinkapin. Snag and downed log numbers were highly variable in both time and space, occurring both as clusters and as scattered individuals.

Cathedral stands were the most common old growth structure on north and east aspects, with Open Intolerant Multistory or Open Parklike stands found on most of the south and west aspects. Soils on these aspects are rocky and excessively drained. Occasionally areas within Cathedral stands would escape disturbance for many decades. These areas would develop a well defined second layer and a fuel complex capable of supporting mixed intensity and high intensity burning. In all three old growth structures, actual stand density and canopy closure varied through time, due to disturbances at a variety of timings and scales.

Riparian stand structures and species compositions probably did not differ significantly from the uplands. Valleys along the intermittent streams are narrow and V-shaped. Stand density and canopy closure were probably greater. Additional species were likely present, such as western redcedar in association with springs or perennial pockets, Pacific dogwood, and bigleaf maple.

Boundaries between different stand structure types varied from very distinct, such as along sharp ridges and in association with recent stand-replacement burns, to very indistinct, such as along long slopes. For example, the northernmost south aspect probably graded between Open Parklike on the upper half of the slope, to Open Intolerant Multistory on the lower half, to Cathedral immediately adjacent to the stream.

Flats. Stands were dominated by ponderosa pine-Oregon white oak or Douglas-fir-Oregon white oak. An occasional grand fir or western juniper likely was found, but both species were restricted to microsites. Only the presence of ponderosa pine, Douglas-fir, and Oregon white oak were specifically documented.

Stands were semi-open to open with a mix of grass and brush in the understory. Bunchgrasses, primarily prairie junegrass *(Koeleria cristata)*, bluebunch wheatgrass *(Agropyron spicatum)*, Idaho fescue *(Festuca idahoensis)*, and needlegrasses (*Stipa* spp.) provided most of the understory cover except in

brush thickets or vernally wet, rocky scablands. Winter annual grasses were absent. Typical brush species include deerbrush ceanothus, greenleaf manzanita, willow, and antelope bitterbrush. Fires were most often low intensity underburns on a relatively frequent return interval. Under extreme conditions, crown fires could burn, but such events were very rare. Snags and downed log numbers were variable, but low.

The characteristic old growth structure was Open Intolerant Multistory, with Cathedral stands developing on steeper north aspects of intermittent streams. Open Parklike areas were embedded in the general matrix of Open Intolerant Multistory. Under extreme conditions, stand replacing fires could burn in these open stand structures. The 1939 aerial photos reveal a large area just to the east of Douglas Cabin LSR that apparently burned as a stand-replacing event. The dryness of the area, however, resulted in the reestablishment of trees in pulses following a stand replacing fire, re-creating an uneven-aged structure out of an event that normally produces even-aged stands.

A similar situation currently exists just north of Badger Creek in a portion of the 1973 Rocky Burn. This fire crossed Badger Creek in the early morning as a high intensity event. The area of the rim was either an Open Parklike or Open Intolerant Multistory structure when it burned. This area still is an opening dominated by grass and brush 24 years later. Some trees have established along the edges of the burn area, but none in the middle despite intensive efforts at tree planting.

Riparian areas were very different even though all streams are intermittent with shallow slopes. Stands were noticeably thicker along the north aspects. Douglas-fir was a common species and Oregon white oak was probably relatively uncommon, unlike on the south aspects of the streams and the uplands.

Boundaries between different stand structure types were generally indistinct. The only distinct boundaries occurred in association with the south sides of the streams.

Wildlife

This discussion on past wildlife species presence and abundance is based on the probable stand structures and species compositions of the pre-1900 forests. We have no direct information of evidence of what species were actually present and in what numbers.

In general, stand conditions favored species associated with more open stand structures and with large diameter trees, especially ponderosa pine. Species such as flammulated owl, pygmy owl, and white-headed woodpecker likely had abundant habitat within and around the LSR. Bats that used large snags with loose bark for roost sites were relatively abundant. Only limited areas provided habitat for species more dependent on closed canopy stands. Northern spotted owls possibly were present in the western 1/3 of the LSR along north aspects. The lack of much thermal cover likely limited populations of deer and elk.

Given the probable vegetation conditions described and the generally low levels of human disturbance species such as wolf, grizzly, wolverine, and lynx likely used the LSR at least part of the year.

Connectivity

There were two main types of connectivity--connectivity for closed canopy associated species and connectivity for open canopy associated species. Connections to the greater landscape for closed canopy associated species existed over Gordon Butte and into Little Badger Creek in the northwest corner of the LSR. A lower quality connection into Little Badger Creek may have existed in the northeast corner of the LSR. No major connections across Badger Creek appear to have existed except for highly mobile species that could cross openings of limited width. In those cases a connection may have existed just west of the present-day Bonney Crossing Campground. Connections to the east were present for species with smaller home ranges associated with closed canopy forests. Larger home range species may not have been able to effectively use the narrow corridors along the intermittent streams.

Connections to the greater landscape for open canopy associated species existed primarily towards the east of the LSR as well as into Badger Creek. Highly mobile species, such as birds or large mammals, could easily cross the denser stands to the north into Little Badger Creek to reach the south face of Ball Point.

Primary flow of wildlife species seems to have been more east-west than north-south through Douglas Cabin LSR. Species flow north-south appears to have depended more on the landscape character found further west or east of the LSR where environmental conditions created more favorable stand structures. More open canopy stands dominated the landscape below 2200 feet elevation while more closed canopy stands dominated above 4500 feet. Between these elevations was a mix of closed and open canopy forest, with canopy closure levels strongly driven by aspect.

Disturbance Processes

In order to meet the LSR objectives, we need to understand, as best we can, the disturbance regimes that shaped vegetation, terrain, and habitat features before Euro-American settlement (defined in this general area as before 1855). While somewhat arbitrary, the time before 1855 is generally accepted as the time when our landscapes were "healthy", fully functional, and providing sufficient habitat to meet the needs of the wildlife species that inhabited the area. We also need to better understand how land use and management activities since 1855 have altered these disturbance regimes. Much of the information on disturbance processes considered typical to Douglas Cabin LSR is found in Appendix A of the White River Subbasin Watershed Analysis. This section summarizes that Appendix and adds to it. We have attempted to provide more detail based on ground verification and additional information learned since we prepared the Watershed Analysis. It also attempts to better describe the interactions between certain disturbance types.

Major Disturbance Process Before 1855. In this discussion, burning and other land management activities by American Indians are considered part of the "natural" regime. Humans used the White River subbasin for thousands of years before Euro-American settlement. These various peoples significantly affected the landscape patterns and plant communities found by Euro-American settlers.

Some disturbance types operating within the LSR are too irregular to effectively evaluate. Others occur only on a small scale as best we know. In these events, our land uses have not changed the frequency, intensity, or severity of the disturbance. There is little or no evidence that we have significantly affected the outcomes of these events. The primary examples include:

- Events related to the eruption of Mt. Hood (lateral blasts, pyroclastic flows, ashfall, etc.)
- Geologic erosion events (landslides, mass wasting, rockfalls, dry ravel, soil creep, etc.)

There are two irregular types of disturbances which may or may not differ between the typical event before 1855 and today. The first is an erosive event resulting from a high intensity fire followed soon after by a high intensity rainstorm or by a winter of deep wet snow that melts rapidly. The combination of a high intensity fire followed by a large pulse of water quickly delivered to the ground often results in very high erosion rates, particularly on steep slopes with coarser soils. In turn, these erosive events cause down-cutting in the steeper gradient, narrow channels of the intermittent streams and some deposition of sediment into the Flats or large pulse of sediment into Little Badger Creek.

The second event is widespread and extensive snow breakage of trees. Deep wet snowfalls and ice storms often cause the tops and branches to break out of trees. Hardwoods, such as oak, are more susceptible to snow breakage than conifers, and small diameter conifers typical of dense stands are more susceptible than large diameter, open-grown conifers. Snow breakage can lead to trees with dead tops, multiple tops, pruning, and stem decays. In extreme cases, snow breakage can lead to the death of the tree or patches of trees.

Land management since 1855 has altered the frequency, intensity, and severity of some events and altered the probable outcomes of several. In most cases, the current outcomes pose either a significant

risk to meeting the goals and objectives of the LSR, or the outcome is socially unacceptable. We focus our discussion on:

- Fire,
- Insect outbreaks,
- Disease (primarily root diseases and dwarf mistletoe),
- Winds, and
- Floods.

Of these disturbance processes, fire, insects, disease, and winds primarily affect the uplands. Floods primarily affect the riparian areas and streams. The upland disturbance processes can affect riparian areas, yet the riparian area disturbances rarely affect uplands.

Fire Regimes and History. Fire Ecology Groups, or Fire Groups, have been developed for the Mt. Hood National Forest (Evers et al., In Press). We mapped the Fire Groups within Douglas Cabin LSR and used these to depict the fire ecology and regimes of the area based on plant associations and typical pre-1855 conditions. Figure 2.3 shows where each Fire Group occurs.

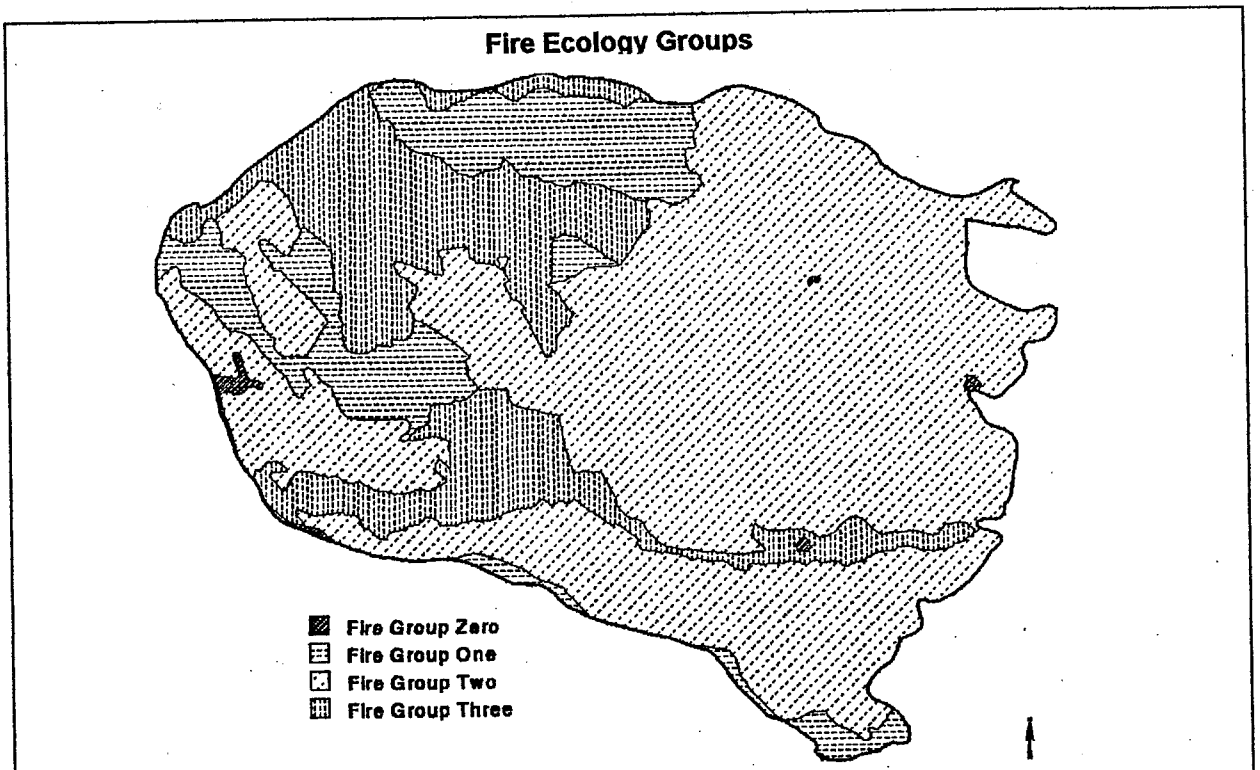


Figure 2.3. Fire Groups. Fire Group Two covers the largest part of the LSR, followed by Fire Group Three.

Fire Group Zero: Miscellaneous Special Habitats. This Fire Group consists of areas that are not coniferous forest within a forest matrix. Most examples of Fire Group Zero consist of rock outcrops, ponds, and rocky scabs. Patches of Fire Group Zero burn at highly irregular intervals, if at all, and generally with a return frequency similar to the surrounding Fire Group. Fire Group Zero occurs throughout the LSR, generally in small patches. No areas are large enough to serve as fuel breaks for fires of any intensity.

Fire Group One: Hot, Dry Pine-Oak and Douglas-fir. Fire Group One mostly lies on south aspects in the Slopes area of the LSR. Fire Group One underburned frequently with an estimated return interval of 5-10 years.

Fire Group Two: Warm, Dry Douglas-fir and Grand Fir. Fire Group Two occupies most of the Flats area and south aspects within the Slopes area. Underburning was the typical landscape level event in Fire Group Two with an estimated return interval of about 15-25 years.

Fire Group Three: Dry Grand Fir. Fire Group Three covers most of the Slopes area. Fire Group Three frequently underburned, but occasionally experienced stand-replacing fire. Moderate intensity fires (combination of underburning and stand-replacing fire) appears to have been the norm on north aspects. The fire return interval was highly variable, probably averaging around 30-60 years but with an estimated range of 15-100 years between events.

Moderate, or mixed, intensity fires involve a mix of stand-replacing fire and underburning. These fires can occur in younger stands that contain relatively low fuel loadings. Moderate intensity fires depend on the presence of "jackpots" of heavier fuel loadings in an otherwise lightly loaded area, at least a moderate lichen load in the overstory trees, and either moderate to high winds (generally greater than 10 mph) or steeper slopes (slopes 30% or greater). Wind and slope serve to increase fire intensity and the lichens serve as a fuel ladder into the tree crowns. The fire spreads primarily by crowning through the needles and lichens and some short-range spotting. In the absence of wind or steeper slopes, fire may spread slowly through what surface downed woody material exists and along older rotten logs. The pattern produced in the understory is one of small burned out patches and linear burned out strips ("cigarette" burns) where logs are consumed. The duff is usually too densely packed and just moist enough to not burn well away from the jackpots and dry logs. Moderate intensity burns cannot occur every year but can occur in many years. These fires usually burn between 50-300 acres. When the winds die down, these fires also die down and usually will not "kick up" again in the absence of another wind event.

In general, we believe that the local tribal groups burned the area frequently for a variety of purposes, such as maintaining travelways and promoting the growth and abundance of culturally important plants. Nothing specific has been documented in Douglas Cabin LSR, but it has been alluded to in early letters from the Forest Service. In addition, this type of activity has been documented throughout the western United States and we can find no reason why it would not have occurred here. In general, most American Indian fires were set in late summer and fall. Fires would occur at other times of the year since campfires were simply abandoned. Some burning in association with Oregon white oak may have occurred in late winter and early spring.

Diaries and letters suggest that early settlers copied many of the American Indian burning practices, particularly to maintain travelways and pasturage. The 1901 survey to subdivide the township that includes Douglas Cabin noted a medium sized, high intensity burn in the southwest portion of the LSR. This burn is obvious in 1939 aerial photos as are two older burns. One older burn was a small to medium sized, high intensity burn about ½ mile downstream from the burn noted in 1901. The other burn was a medium sized, mixed intensity fire on the north aspect along the northernmost intermittent stream in the Slopes area.

Insects. One species of defoliator insects and four species of bark beetles likely played a role in stand dynamics and landscape patterns prior to 1855 (Table 2.5). Insects that kill trees are a primary creator of snags and snag patches, particularly where fires are mostly low intensity, non-lethal events. In most cases, all these species operated on an endemic level, killing individual trees and small groups.

Table 2.5. Primary insect pests in Douglas Cabin LSR prior to 1855

Common Name	Scientific Name	Type of Pest	Host Species
western spruce budworm	*Choristoneura occidentalis*	Defoliator	grand fir, Douglas-fir, western larch
mountain pine beetle	*Dendroctonus ponderosae*	bark beetle	all pines
western pine beetle	*Dendroctonus brevicomis*	bark beetle	ponderosa pine
Douglas-fir bark beetle	*Dendroctonus pseudotsugae*	bark beetle	Douglas-fir
fir engraver beetle	*Scolytus ventralis*	bark beetle	grand fir, occasionally Douglas-fir

On north aspects and the western edge, small to medium scale outbreaks may have occurred on an irregular basis. Insect epidemics typically occur when trees are stressed and host tree species are common. Thus, epidemics in Douglas Cabin LSR were likely only in areas that were skipped by fires for several decades (i.e. 40-100 years). We believe that prior to 1855, outbreaks were rare and highly localized within the LSR. The extreme western edge may be an exception, since the characteristic plant community was changing to one typically found in moist and productive areas. The increasing numbers of western larch and western white pine found just inside the Badger Wilderness at Gordon Butte are indicators of both increased moisture and long intervals between fires. Outbreaks can occur in young to "middle-aged" stands. In these cases, the outbreaks served to thin the stands, reducing moisture and nutrient stress.

Localized Douglas-fir bark beetle outbreaks probably occurred following fires that created pockets of Douglas-fir logs. Western pine beetle was probably more common than mountain pine beetle since the stands were dominated by large diameter ponderosa pine.

Disease. Four diseases were probably prominent in stand dynamics: dwarf mistletoe (*Arceuthobium* spp.), Armillaria root rot (*Armillaria ostoyae*), Annosus root rot (*Heterobasidion annosus*), and laminated root rot (*Phellinus weirii*). There is little evidence that any of these diseases occurred at high levels. We believe they acted more on an endemic level, affecting small groups of trees. As with insects, root disease created snag patches, downed logs, and jackpots of fuels that would support mixed intensity fires. Trees killed by root disease are much less windfirm than trees killed by fire or insects. Thus, any snags created by root disease fell quickly.

Levels of dwarf mistletoe probably varied quite a bit through time, occasionally reaching high levels along the western edge and possibly on north aspects. Then as now, the most common species was probably Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*). We do not have enough information to estimate how much tree mortality actually resulted from dwarf mistletoe infections. We suspect that dwarf mistletoe primarily contributed to poor growth (leaving such trees more vulnerable to successful attack by insects and disease), deformity, top-kill, and high fuel loadings, particularly in old even-aged patches or stands of trees. Extensive dwarf mistletoe infection creates high surface fuel loadings from large branches that eventually break off, ladder fuels since mistletoe affected limbs do not shed easily, and initiation areas for crown fires. Occasional patches of heavily infected trees were likely present. Eventually such groups would torch during a fire, creating a snag patch.

Wind. Available evidence suggests that blowdown was not a major event in Douglas Cabin LSR. Winds strong enough to blow down trees weakened by root disease and along the edges of stand-replacement burns occurred along the ridges in the western half. Assuming the descriptions of disturbance regimes related to fire and disease are correct, then scattered, occasional blowdown was the norm.

Floods. The Slopes area lies in the transient snow zone, where rain-on-snow events can occur. Occasional flash floods in summer were also probable. Floods rearranged stream bedload and existing wood, scoured banks, and sent pulses of sediment into larger streams. Stream channel location and size also varied as the result of flooding. In the western half of the LSR, streams are incised enough that

undercutting of banks could occur, toppling trees into the channel. In the eastern half, the streams have somewhat broad floodplains and channels were not always well-defined.

Human Uses

Human uses within White River subbasin are discussed in some detail in Chapter 2 of the Watershed Analysis. This section will only discuss uses or probable uses specific to Douglas Cabin LSR. Few cultural resources surveys have been conducted within the LSR, so little use has been documented. Instead, this narrative attempts to interpret the information in the Watershed Analysis.

Before 1855, human uses appear to have been transitory uses, with little evidence of seasonal camps or semi-permanent use sites. Paleoindians and American Indians probably used Douglas Cabin area for hunting and gathering, with camps located further away near perennial streams. There is some evidence that high rocky ridges with good views to the south were used as vision quest sites or lookouts.

While there is no direct evidence, we suspect that burning was a major land management practice of American Indians in this area. Most early trails on the National Forest tended to follow well established American Indian travel routes. One such route may have lain along the east edge of the LSR between Little Badger and Badger Creeks. Since no fire control occurred, burns set along this travelway or in lower elevations could have easily burned into the eastern half of the LSR. Additionally, some burning in connection with Oregon white oak management may have happened. Comparing the openness of stands in 1939 with current stand conditions and fire occurrence rates in the area suggests that deliberate burning created and maintained very open stand conditions.

Chapter III The Transition Period

Introduction

This chapter describes the events and changes that occurred within or near Douglas Cabin LSR between approximately 1855 and the present. The format is somewhat different from Parts II, IV, and V in that it is partially a timeline. Thus, the discussion concentrates on a few subject areas, but not all of those mentioned, particularly in Part II. Most of the changes in the biological areas are the result of changes in types and intensities of human uses, thus human uses are discussed before biological topics, such as vegetation and wildlife habitat.

Climate

While the general climate of Douglas Cabin LSR has not changed, analysis of precipitation records reveal some important trends that affected stand and landscape dynamics (Table 3.1). Douglas Cabin LSR lies in the western portion of Zone 6, North Central Oregon, of the Oregon climate zones. The analysis for Zone 6 covers 1896 through 1995. Stations within Zone 6 include Hood River Experiment Station, The Dalles, Arlington, Moro, Hermiston, Milton Freewater, Pendleton (2 stations), Pilot Rock, Heppner, Condon, Antelope, Pine Grove, Kent, and Dufur.

In addition, precipitation records for Dufur, Oregon were retrieved from the Western Regional Climate Center. These records, plus additional monthly information from the Oregon Climate Service, provide a precipitation record that runs from 1915 through 1995. A 5-year running average was calculated for these data. Data analysis for Dufur was conducted on a calendar year basis, while the Zone 6 analysis was on a water year basis (October 1-September 30). The different annual analysis periods may account for some of the differences in the two data sets.

Table 3.1. Precipitation fluctuation through time in the area including Douglas Cabin LSR.

Location	Precipitation Maximums	Drought Minimums
Zone 6	ca. late 1890s early 1950s early 1980s	mid- to late 1920s mid-1960s mid-1990s
Dufur	ca 1915 early 1950s early 1980s	early 1930s mid-1960s mid-1990s

Human Uses

General Information. Early Euro-American emphasis in the Northwest was based on exploration and fur trade. The first known uses in White River subbasin occurred in the 1840s when the Barlow Road was scouted and established as an overland route to Oregon City in the Willamette Valley. Some of these pioneers began to settle in Tygh Valley, to the east of the LSR, by the 1850s. The forested areas to the west of Tygh Valley proved timber for buildings and fencing, rangelands for grazing, wild game for meat, and furs for personal use and trade. Evidence suggests that most of the harvesting took place further east in more accessible areas north of Little Badger Creek and south of Badger Creek. Douglas Cabin area was more likely used for grazing, hunting, and fur trapping. Douglas Cabin, from which the LSR takes its name, was built in the early 1900s at the head of an intermittent stream. Douglas was a fur trapper who may have had several other cabins in this general area.

In 1893, the Cascade Range Forest Reserve was created. The Transfer Act in 1905 created the Forest Service as part of the Department of Agriculture. The Cascade Range Forest Reserve became the Cascade Forest Reserve in 1907, and was divided into several National Forests in 1908. At that time,

the Douglas Cabin area was part of the Oregon National Forest. In 1924, the name was changed to Mt. Hood National Forest.

Grazing. Uncontrolled grazing occurred prior to 1906. Grazing was known to occur as early as 1893, and probably occurred much earlier (Wamic Cattle Allotment Plan 1949). The earliest grazing records that cover Douglas Cabin LSR date to 1915. Allotment boundaries, number of permittees, and utilization standards have changed several times throughout the years, but examining these records gives some idea of the intensity of grazing. Douglas Cabin has always been a small portion of any allotment. The LSR has lain within the Threemile-Little Badger Allotment, Wamic Cattle and Horse Allotment, and Badger Cattle Allotment.

Grazing levels were very high in 1906 (Figure 3.1), probably because this year represents a transition between uncontrolled grazing under the Forest Reserve system to controlled grazing under the National Forest System. In 1907, permitted numbers were approximately half those in 1906. Year-long grazing of at least some animals occurred between 1906 and 1916. After 1917, grazing was restricted to late spring (May) through summer or early fall (September or October). During World War I, it appears that as many people as possible were encourage to graze on National Forest lands, apparently to provide as much meat, wool, and leather as possible to support the war effort. These years saw a large number of individual permittees, but often few animals for each permittee. The highest grazing levels appear to have occurred from 1958-1963. During this period, one permittee was allowed 400 cow-calf pairs on the Wamic Allotment.

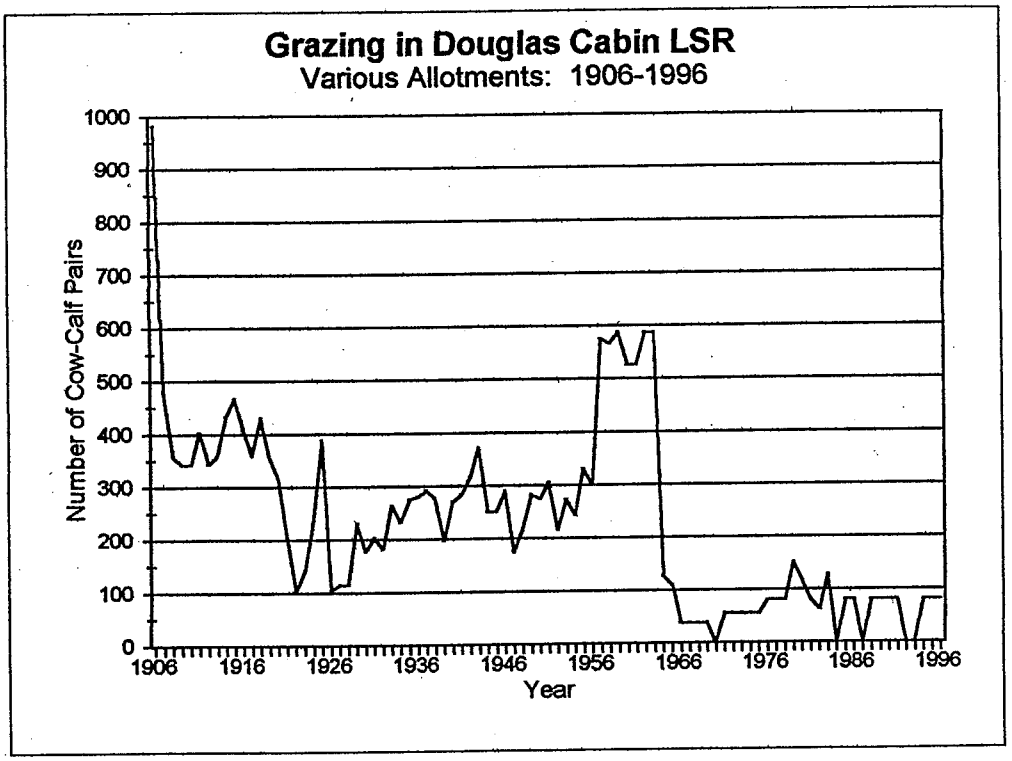


Figure 3.1. Grazing levels. Current grazing levels are 80 cow-calf pairs per year.

Prior to 1966, we are unsure exactly where the cattle grazed, only how many pairs were permitted. The allotment boundaries were considerably larger than Douglas Cabin LSR. Descriptions of individual pastures or grazing areas within an allotment are rather vague. At that time, Wamic Allotment extended from Little Badger Creek to White River and from the eastern Forest boundary to the western Barlow

District boundary. In 1965, the Wamic Cattle Allotment was divided into two allotments, which came into effect in the 1966 grazing season. Douglas Cabin LSR became part of the Badger Cattle Allotment. Badger Allotment was subdivided into pastures; Douglas Cabin LSR comprises about ½ of the Douglas Cabin pasture. Copies of annual operating plans are available beginning in 1972. Grazing use has varied from a low of 55 cow-calf pairs in the early 1970s to a high of 151 yearling dairy cows in 1979. Since 1985, permitted use has been 80 cow-calf pairs.

Salt blocks were placed throughout the allotment. There were three salting locations within the LSR in the 1940s and six in the 1970s. Two ponds were constructed in the 1970s--Eagle Pond in 1974 and Redtail Pond in 1976. Both ponds are filled by intermittent streams and both leak badly, although Redtail Pond holds water better than Eagle Pond. Eagle Pond has never filled to capacity. The fences around both ponds are in very poor repair. The surface area of each pond has not been measured, but probably is less than 1 acre.

It is difficult to evaluate the actual impact grazing has had since the LSR has always been a very small portion of any allotment which included it. We suspect that the lack of water limited actual use unless the cattle were driven into the LSR area. While Figure 3.1 depicts the maximum number of animals potentially present, in reality far fewer animals were likely present within the LSR boundaries at any given time.

Timber Harvesting. Intensive timber harvesting in Douglas Cabin LSR evidently did not begin until 1959, with the Douglas Cabin timber sale (Table 3.2). Early harvesting efforts concentrated on removal of the large diameter trees, primarily ponderosa pine, in selective cuts. Later harvesting emphasized commercial thinning, clearcutting, and shelterwood cutting based on even-aged management. Since Douglas Cabin timber sale, other sales within the LSR include Jumper, Doughty, Cabin, and Out. The most recent sale was Cabin, completed in 1988. Portions of the Douglas Cabin sale area were precommercially thinned and pruned in the early 1970s. All sales harvested the three main conifer species found in the LSR; only Doughty Timber Sale removed more Douglas-fir volume than ponderosa pine.

Table 3.2. Documented timber sales in Douglas Cabin LSR

Sale Name	Year Sold	Volume (MMBF)	General Prescriptions
Douglas Cabin	1958	22.70	Overstory Removal, Group Selection
Little Badger	~1961	???	Clearcuts
Jumper	1975	1.68	Clearcut, Overstory Removal, Thinning
Out	1978[1]	5.77	Clearcut, Overstory Removal
Doughty	1985	1.20	Shelterwood, Thinning, Final Removal
Cabin	1986	11.90	Clearcut, Shelterwood, Thinning
[1] Harvest did not begin until 1985			

Roads and Trails. Construction of an extensive network of trails across the district began with creation of the Forest Reserve. Initially, most trails followed well established travel routes created by American Indians. The Douglas Cabin Trail connected Douglas Cabin with Flag Point and probably followed an old travelway for much of the route. Later, a way trail network was established to provide access routes for fire control. Steed Crossing Way Trail crossed the LSR along the toe of the Slopes area, west of present-day road 2711. Flag Mountain Way Trail ran up the ridge that forms the northern boundary. An unnamed way trail connected with Steed Crossing Way Trail along the southern boundary, ran to the east and eventually turned north along either the approximate alignment of the present-day road 2710 or the approximate alignment of the North-South road (road 2710-130 currently) just to the east of the LSR.

By 1924, construction of a major road network on the District had begun, also intended to provide access for fire control. A letter in 1939 coupled with aerial photos from that same year clearly show that fire exclusion was very effective in allowing a dense layer of conifer regeneration to establish. The first roads into the LSR were constructed in 1958 as part of the Douglas Cabin Timber Sale.

Recreation. Prior to the 1960's most human uses were related to extraction of natural resources for use elsewhere, such as timber harvesting and grazing. Beginning in the 1960's a large change occurred in American lifestyles. Hiking, camping, hunting, fishing, and other outdoor activities necessary to the survival of American Indians and early emigrants, began to increase rapidly and shifted to a recreational emphasis. New outdoor activities were created, such as mountain biking, cross-country skiing, snowmobiling, and off-road travel. In general, these types of activities had little impact in Douglas Cabin LSR. Some recreational hiking trails were constructed or designated, such as Douglas Cabin Trail (Trail 470), but lack of perennial water and poor access limited use levels. The Badger Creek Wilderness, which borders the LSR on three sides, was created in 1984.

Vegetation

Around 1900, stands were generally open. Areas where distinct stand-replacing fires had burned were either brushfields or dense stands of young conifers. Stand density and canopy closure increased, on average, from the eastern to the western boundary. By 1939, fire exclusion had allowed a dense layer of regeneration to establish under the main canopy. The amount of grass and brush probably was beginning to decrease as tree canopy coverage increased. In 1959, extensive timber harvesting began with a focus on cutting large diameter trees. Sometimes the purpose of such harvesting was to remove trees under attack by bark beetles or deemed at high risk of such attack.

Eurasian plants such as cheatgrass *(Bromus tectorum)*, bulbous bluegrass *(Poa bulbosa)*, ventenata *(Ventenata dubium)*, diffuse knapweed *(Centaurea diffusa)*, and Canada thistle *(Cirsium arvense)* were inadvertently introduced to the area - most likely carried in as weed seed in hay or in seed mixes used for erosion control or forage enhancement following logging activities. Domestic grasses such as orchard grass and timothy were routinely sown on landings and skid trails.

Most of the species inadvertently introduced were weedy forbs and grasses which were well adapted to dry, disturbed sites and which had left natural predators, competitors, and other population control mechanisms behind in their native lands. These winter annual grasses and tap-rooted weedy forbs colonize disturbed soils quickly and can out-compete native bunchgrasses for moisture in late winter and early spring. Populations of these introduced species increased over time, while native bunchgrass cover diminished. Changes in understory species composition may have precipitated changes in burn patterns as annual grasses form a uniform, continuous cover of light, dry fuel, unlike the scattered, discreet clumps formed by bunchgrasses. Soil flora may also change as bunchgrasses which generally host vesicular-arbuscular (VA) mycorrhizal species are replaced by annual grasses which are either non-mycorrhizal or facultatively mycorrhizal. Changes may have also occurred in above- and below-ground water movement as thickly tufted, fibrous and deep rooted perennial bunchgrasses were replaced with tap-rooted biennial forbs, and shallow and sparse-rooted, slender annual grasses.

By the 1960s, average stand density had increased significantly and multilayered stands were found throughout the LSR. Litter and duff had generally replaced brush and grass in the understory. Oregon white oak was becoming shaded out in much of the area. In the 1980's, timber harvesting increased in intensity and shifted to a definite even-aged emphasis. Commercial thinning began to occur in stands where the large diameter trees had been removed in the 1960s and 70s. In the early 1980s, this portion of Oregon entered a major drought. A major western spruce budworm outbreak began across the District in the mid-1980s. Spraying for insect control occurred in 1988, but the Badger Creek Wilderness was not sprayed. By 1989, western spruce budworm populations began increasing outside Badger Creek Wilderness and inside the area that would become Douglas Cabin LSR. This outbreak was not sprayed. By 1994, significant levels of tree mortality began to appear in the westernmost stands of the LSR.

Figures 3.2 and 3.3 display how stand structures have changed in the LSR over time. Structures for the present are based on 1995 aerial photos and field visits. Structures for 1939 are based on aerial photos and relating those to similar stand conditions seen today. Structures for 1900 are based on extrapolating back from 1939 with the assumption that fire control efforts were not yet effective. Figure 3.2 depicts stand structures as mapped, while Figure 3.3 compares the acres in each structure category. Several stand structure categories were assumed to be absent in the 1939 and 1900 stand conditions. These

include Fire Excluded Multistory, Open Intolerant Multistory-Young, and Collapsing. Two structure categories (Stem Exclusion-Pine-Oak and Mature Stem Exclusion) may have been present but were impossible to detect. It is also possible that three other categories (Stand Initiation, Stem Exclusion, and Understory Reinitiation) were more common in 1900 than shown, but the actual extent was impossible to estimate. Approximately 3 acres of Nonforest currently exist in the LSR in the form of 2 small stock ponds and a closed rock pit.

To summarize:

- In 1900, open stands, such as Cathedral, Open Intolerant Multistory, and Open Parklike, dominated the LSR.
- By 1939, understory reinitiation was widespread.
- By 1960, multistoried, semi-closed to closed canopy stands dominated. Native bunchgrass cover was decreasing and populations of Eurasian weeds and domestic grasses were increasing.
- By 1980, many of these multilayered stands were definitely in the Fire Excluded Multistory structure type. Bunchgrass understory had been largely replaced by introduced grasses and weedy forbs.
- In 1989, a western spruce budworm epidemic appeared in the western edge of the LSR.
- In 1994, the western stands began to collapse.

Thus, 20-30 years of fire exclusion allowed understory reinitiation to begin. A major drought occurred between 1900 and 1940, with the lowest precipitation levels during the mid-1920s. Approximately 20-40 years later, the Fire Excluded Multistory structure type was well established across the landscape. About 90 years after fire exclusion began, stand collapse from insect outbreaks began.

Also of interest is the timeframe for burn areas to recover from stand-replacing fire, as depicted by one stand in the southwest quarter of the LSR in a series of aerial photos. Survey notes in 1901 documented a recent burn towards the upper end of the major intermittent in the southern half of the LSR. The burn was a dense brushfield with standing charred snags within it. By 1939, tree regeneration was evident around the edges, but brush still dominated the center of the burn. By 1947, tree regeneration was well established in ½ to 2/3's of the burn area. In the 1958 aerial photos, about 4/5's of the burn area is well stocked. The 1967 aerial photos show the entire burn area fully stocked; it was commercially thinned in 1987.

Thus, under natural conditions on a productive site, natural regeneration took about 60 years to fully restock the burn area (approximately 100 acres). However, most of the establishment took place within 40-50 years. Tree growth was sufficient to allow commercial thinning within 30 years of most of the establishment. The Stand Initiation stage lasted about 50 years, but parts of the burn area entered the Stem Exclusion stage approximately 40 years after the fire. In this case, the stand moved from the Stem Exclusion stage into the Mature Stem Exclusion stage. Thinning moved it into the Understory Reinitiation stage, although insufficient time has passed since treatment for enough of an understory to development to meet the full definition of the structure type.

Early in the 1970s, the District recognized a need to begin restoring fire to the eastern stands. A natural fuels prescribed burning program on the district was begun in the late 1970s following an analysis conducted as part of a Technical Fire Management project. Prescribed burning of natural fuels began within the LSR in 1989. Additional burns were conducted in 1991 and 1992. Approximately 1,000 acres were underburned in the three projects.

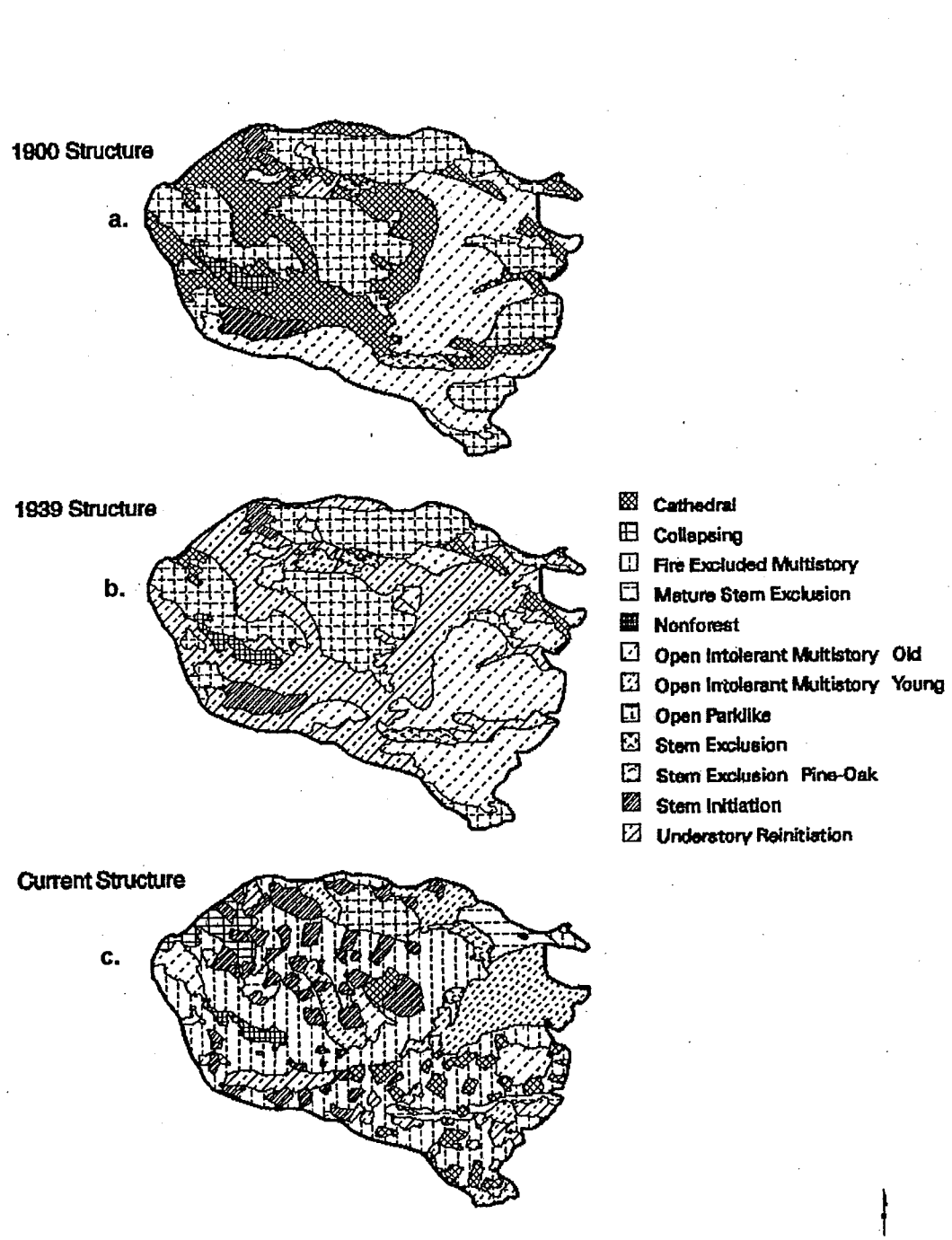


Figure 3.2. Stand structure changes. Timber harvesting has fragmented the LSR while fire exclusion has greatly increased stand densities and shifted the species compositions to the more fire sensitive grand fir and Douglas-fir.

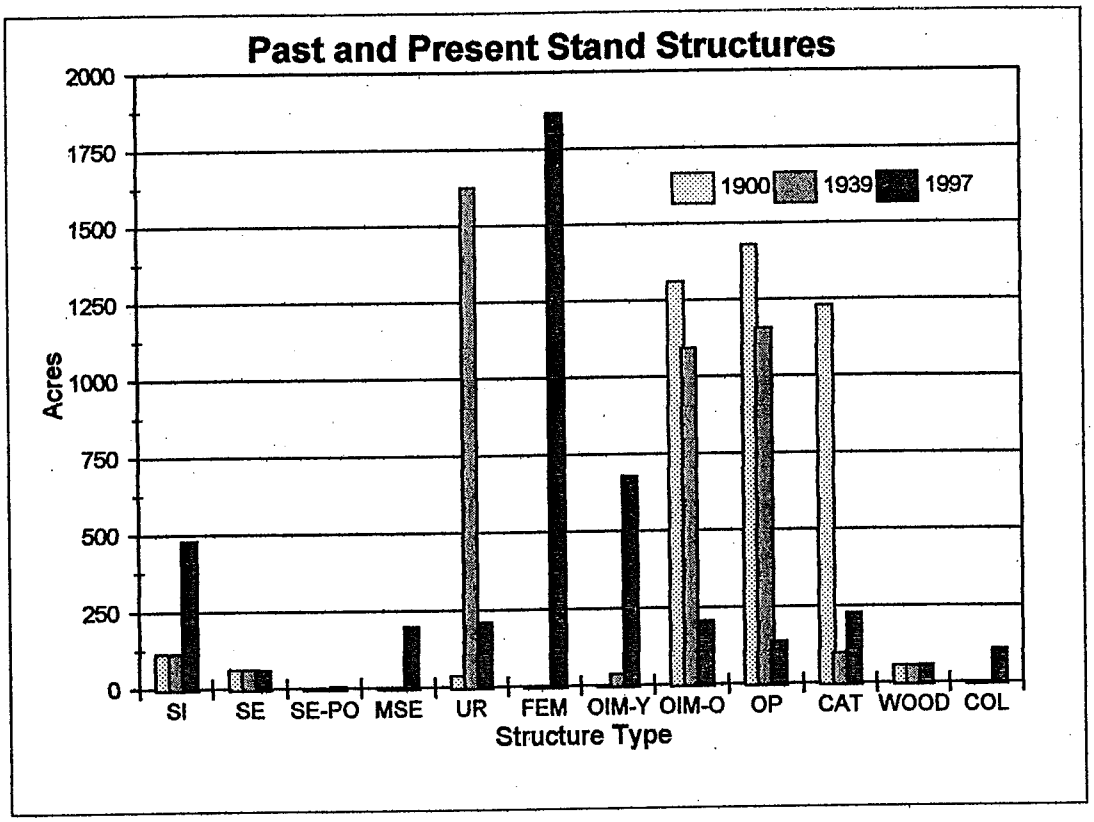


Figure 3.3. Past and present stand structures. Old growth stands have declined greatly.

Wildlife Habitat

Changes in wildlife habitat quality and quantity closely follow changes in vegetation, both species compositions and stand structures. Prior to 1900, the stand structures greatly favored those species associated with open stands and large diameter trees, particularly ponderosa pine and Douglas-fir. Oregon white oak was abundant in the Flats and likely consisted mostly of single stemmed or double stemmed trees. Since oak is often infected with heart rots, these trees provided abundant den and cavity sites both as live and dead trees. Unknown is the abundance and consistency of the acorn crop. Acorns can be a very important source of winter protein and fat for a wide variety of species. Typical species favored under these conditions were white-headed woodpecker, pygmy owl, flammulated owl, western gray squirrel, and their associated predators. Habitat for species associated with closed stands and large diameter trees was generally restricted to the western edge of the LSR and north aspects in the Slopes area. These species, such as northern spotted owl and northern goshawk, were probably not very abundant.

By the 1930s habitat quantity and quality began to decline for those species associated with open forests and improve for species associated with denser stands. Since the stand conditions were more two storied than multistoried, conditions for species able to use a wide variety of stand conditions, such as deer and elk, were better than conditions for either open or closed canopy forest associates. The regeneration improved hiding and thermal cover, while the forage base was still relatively abundant. However, extensive cattle grazing may have reduced the available forage during winter, driving deer and elk down to the farmlands. White River Game Management Area was created about this time, in part to fence deer and elk out of farmer's fields and keep them on public lands (state and federal). Species that depended on large trees, but were relatively insensitive to stand density, were probably still abundant. Wild turkey was introduced into the area.

By the 1960s, stand densities had increased to the level very favorable for species dependent on closed canopy forests, such as northern spotted owl and northern goshawk. Habitat for species dependent on open canopy forests was becoming very limited. Douglas Cabin Timber Sale resulted in the removal of many large diameter ponderosa pine and some Douglas-fir. Thus, habitat for species such as white-headed woodpecker, pygmy owl, and flammulated owl was greatly reduced. Deer and elk habitat also began to decline as stands became too dense to maintain a good forage base. Grazing levels had reduced significantly, so that more of the forage that remained was available.

By the late 1980s, little or no habitat remained for species dependent on open stands and large diameter trees. The combination of timber harvesting and insect epidemics was reducing habitat availability for species associated with closed stands and large diameter trees. Habitat conditions for species which use a variety of stand conditions began to improve. Timber harvesting and underburning in particular began to improve the forage base for deer, elk, and wild turkey. Since Oregon white oak had never been actively managed, large diameter trees virtually disappeared. Multistemmed oaks and small diameter trees became the norm and acorn crops became small and very inconsistent. Fewer oaks survived in the denser stands.

Figure 3.4 is a conceptual diagram of how habitat conditions have changed over time. The diagram focuses on species associated with open stands and large diameter trees, closed stands and large diameter trees, and mixed stand structures and tree sizes.

In addition to changes in wildlife use driven by changes in vegetation, were those changes driven by increasing levels of human use. Grizzly bears were extirpated from Oregon by 19XX. Wolves were likely extirpated by 1946. Species that do not tolerate much presence by humans, such as lynx and wolverine, were essentially driven out, although they may continue to use parts of the adjacent Badger Wildemess.

Disturbance Processes

Fire Regimes and History. Initially with Euro-American settlement, the emigrants to the area copied many of the fire practices of the local American Indian groups. Thus, there was little change in the season of burning, reasons for burning, and fire intensity or severity. With creation of the Forest Reserve, came a policy of fire exclusion. All fires were attacked as rapidly as possible and put out. An active campaign against human-caused fires began when the Forest Service was created.

The effectiveness of early fire control efforts were readily apparent by 1939. Aerial photos taken in 1939 reveal a dense layer of regeneration under the main tree canopy. A letter from the District Ranger to the Regional Forester in 1939 also boasts of the amount of regeneration covering much of the district due to successful fire control efforts, and the reduction in available forage for grazing livestock, mostly as a result of this same regeneration.

With timber harvesting came a need to treat the resulting slash to reduce the risk of large fires. Up until the mid-1970s, most prescribed burning took place in the fall, usually late August through October. Although the season of burning remained similar to the past, fire intensity and severity were much greater due to the amount of material burned. Typical loadings of slash far exceeded typical loadings in needles and grasses. In partial cut areas, such as Douglas Cabin, most slash was piled and burned, rather than underburned. As a result, fire effects on soils were often extreme under the piles and minimal elsewhere. In addition, the combination of tractor skidding and machine piling often led to high levels of compaction and erosion.

After the mid-1970s, broadcast burning and underburning shifted to the spring season. Since it is necessary for the slash to dry to a certain point before successful burning could occur, burning often occurred at the time when plants and trees were actively growing and most vulnerable to fire. During the period of active growth, plants are more susceptible to heat and have low levels of root reserves to recover from fire damage. However, overall fire intensity and severity decreased since large logs were often still wet or moist, and soil and duff moisture were high enough to minimize burning and heat

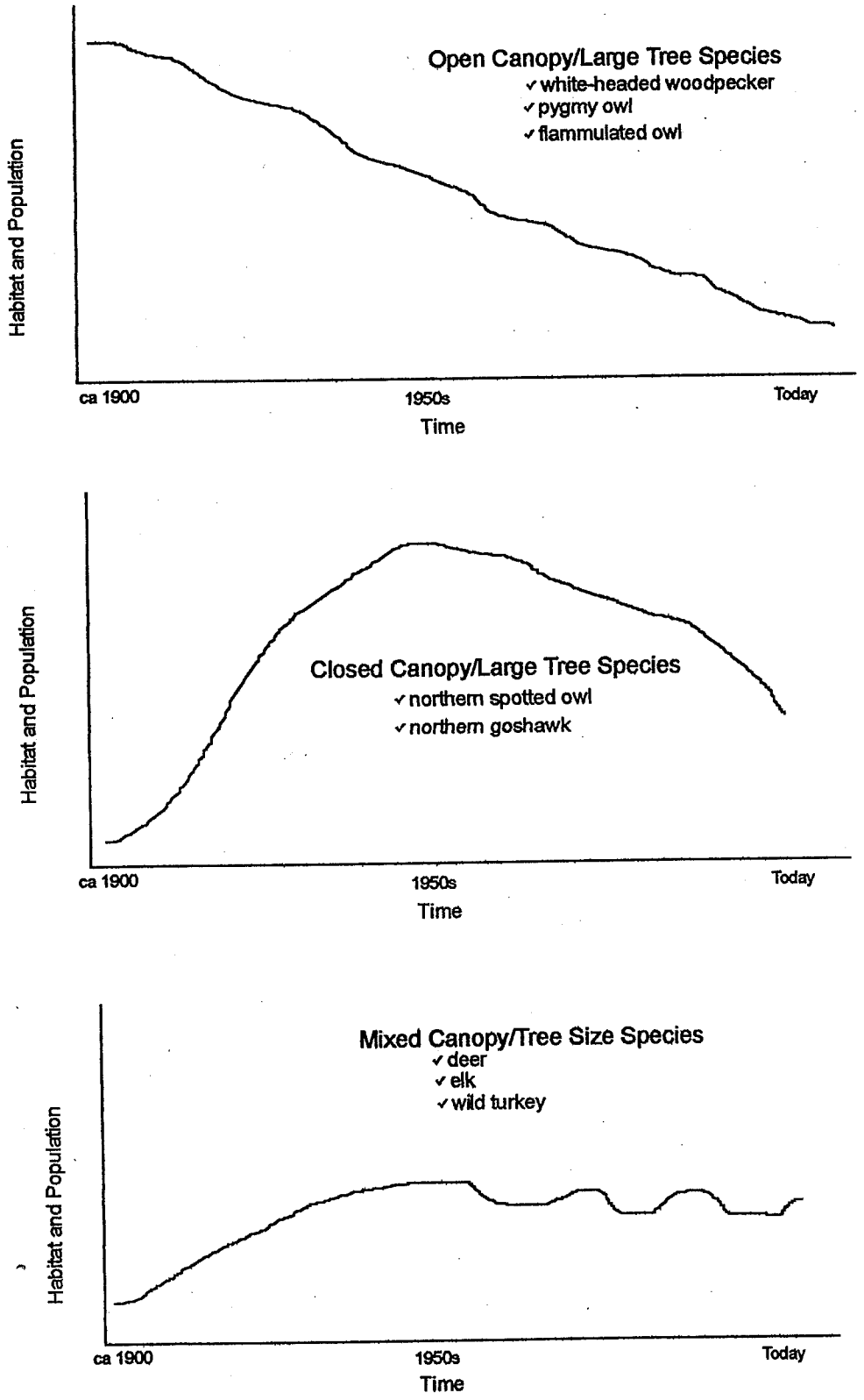


Figure 3.4. Changes in habitat availability. Habitat for open canopy species has steadily declined.

effects. Spring burning also reduces smoke emissions, better complying with provisions in the Clean Air Act and Oregon's Smoke Management Plan. Piling slash was used on slopes less than 25% since it was a cheaper treatment method than broadcast burning or underburning. Underburning was not a feasible tool where the residual stand was dominated by fire sensitive tree species. Pile burning occurred in the fall, typically in October through November.

Insects. No documentation of insect outbreaks has been found that directly pertain to Douglas Cabin LSR until 1980. However, pine beetle outbreaks were documented in the general area of Douglas Cabin LSR by the late 1920s. Although the pest involved is never specifically identified, we suspect it was mostly western pine beetle since the primary tree species attacked was large ponderosa pine. Another western pine beetle outbreak occurred north, south, and east of the LSR in the late-1960s and early 1970s. In both cases, the combination of beetle activity and high risk harvesting removed most of the large diameter ponderosa pine from the southeastern quarter of the District.

Disease. No specific information on disease has been found for Douglas Cabin. Elsewhere on the District, harvesting to control dwarf mistletoe levels was common and may have been a factor in the Douglas Cabin Timber Sale.

Wind and Floods. No information has been found documenting extensive blowdown or flooding within Douglas Cabin LSR. The major flood event in December 1964 probably had some impact, but nothing was documented.

Flash flooding may have increased in both magnitude and frequency due to the changes in understory forbs and grasses discussed under Vegetation. Infiltration rates would normally be higher in areas where the understory is dominated by species with deep, fibrous roots, such as perennial bunchgrasses. Water usually infiltrates the soil by traveling along existing plant roots or channels created by decomposed roots. As the dominate type of root structure changes towards shallow, sparse roots, such as those on annual grasses, infiltration rates decrease due to fewer number of "entry" points into the soil and the lesser depth at which those points penetrate. In turn, lower infiltration rates likely means an increase in erosion rates from more surface runoff.

Chapter IV Present Conditions

Introduction

This chapter describes the current conditions within the LSR with respect to vegetation, wildlife habitat, disturbance processes, and human uses. It also describes events and pathways that created the existing conditions from the past conditions. The format is similar to Part II--Past Conditions. It builds on information already revealed in Parts II and III.

Geologic Processes

This area is considered to be moderately stable, primarily because it is partially protected by the rain shadow of the Cascade crest. If it was exposed to normal west-side annual precipitation, the Slopes area would be highly unstable. Intermittent streams are prone to accumulating soil, rock, and organic debris until an extreme high water event flushes the system clean. The high water event mobilizes the detritus in the channel and can develop into large debris flows that can damage facilities downstream. The channel heads of these streams are steep and relatively susceptible to shallow debris slides during a prolonged rainfall or seismic event. If a shallow landslide occurs at the channel head then it could transform into a potentially damaging debris flow, but it would lose most of its momentum shortly after it reached the slope break near Bennett Spring.

Soils

Soil productivity has been impaired locally due to compaction and organic matter damage from past harvest and burning. On a larger scale and of more concern is a suspected decline in productivity based on changes in plant community structure. Where nutrients were once stored underground in the fine roots of grasses and protected from fires, they are now stored above ground in litter, duff, small standing dead trees, collapsed jackpots of fuel, and standing green trees that have come in since fire suppression activities started. This valuable organic matter is currently vulnerable and would contribute to fire intensities that would severely damage soil productivity. Should such a fire occur, it could take several hundred years to return to pre-fire site productivity (Harvey et al. 1986).

Not only are litter and duff more exposed to loss from fires, the nutrients within litter and duff are not in a form readily available to plants. The decay process results in available forms of nutrients, especially nitrogen, but decay rates are temperature and moisture dependent. Decay rates within Douglas Cabin LSR, although never directly measured, are assumed to vary by aspect and human caused disturbance. For example, Harvey and others in 1987 describe the 'fertilization effect', which results when a stand is opened due to harvesting, fire, or wind. As soil temperatures and moisture levels increase, organic matter decomposition is accelerated by microbial action (or pyrolysis in the case of fire), releasing nutrients tied up in organic matter. This effect usually only lasts one year and nutrient concentrations do not change radically unless the disturbance is severe.

It is likely we have had this effect within the harvested areas in the LSR, especially in clearcuts on south aspects where it may now take several decades to return to optimal site productivity. In addition, within clearcuts (again especially on south and west aspects) there is now information showing that mycorrhizae die within nine months once all host trees are removed (Ingham, pers. communication). In clearcuts, this means that much of the mycorrhizae die out before the area is replanted. Without mycorrhizae, especially on harsh sites, reforestation is extremely difficult. Shelterwoods and thinnings leave enough trees to maintain a mycorrhizal network, allowing for more rapid regeneration of the stand. These partial cuts also serve to moderate surface soil temperatures by shading and leave more on site organic matter, which maintain more favorable conditions for both mycorrhizae and tree seedlings.

Hydrology

Road crossings have intercepted subsurface flow, "popping" water to the surface throughout the year. In high summer, these areas are apparent not so much by the presence of surface water, but by soft soils, changes in plant communities (such as the presence of rushes, sedges, and ninebark), and the presence of green vegetation when the surrounding vegetation is cured.

Past management actions have directly and indirectly lead to a lack of large logs in the stream channels. The flow regime is intense enough in some years to create log jams even though all streams are intermittent. These log jams would serve to trap sediment for slower release and cause some stream meandering. Any such log jams created would not last as long as a similar jam in a perennial stream due to more rapid decay rates in logs that are dry part of the year.

Field visits were made during February 1997 to parts of three of the larger intermittent streams. The area was still snow covered with snow depths ranging from 1-3 feet. All streams that crossed road 2710 were flowing well. The culvert at 2710 on the southernmost stream was partially blocked, with water pooled up behind the culvert and the culvert mouth below water. At the time of the visit, flow rate into the pool apparently equaled the flow rate through the culvert as the pool was neither rising nor falling. There was much evidence, however, that earlier in the year the pool came within 0.5-1 foot of cresting over road 2710. This same culvert partially plugged during the February 1996 floods.

The one stream visited that crossed road 2711-120 was dry at that point, but flowing well as it crossed 2710. Above road 2711-120, this stream is incised with areas of downcutting. Numerous large logs cross the channel. The streambed is sandy and gravely with many larger rocks. We found at least one major spring area above this stream on the north side. The spring area was flowing with relatively large volumes of water, yet the stream below was dry. One of the old Douglas Cabin Timber Sale roads intercepts two of the springs, causing water to channel down the road for a short distance. The water leaves the roadbed outside of any natural stream channels. The only vegetation noted on the roadbed was a dense patch of alders associated with the springs. Otherwise, it appears that the roadbed has only forbs and grasses, even though this road has not been used for over 30 years.

Some intermittent streams in the Flats show extensive signs of scouring with little or no downed wood of any size along the banks or in the channels. Others were not scoured and, although they lacked large wood, there were numerous jams comprised of small wood that created pools and channel complexity. The unscoured streams also had more evidence of vegetation in the areas bare of snow and had more low shrubs sticking up through the snow.

One stream in the Flats has left its natural channel and is flowing down an old roadbed for approximately 300-500 feet. This road had been subsoiled in summer 1993 to obliterate it. Apparently the road decommissioning effort did not adequately recognize the presence of the streambed at the point the road crossed the stream (there was no culvert to pull). The roadbed is now heavily scoured to a gravely bottom.

One stream in the Flats has a very wide floodplain with at least two main channels and numerous side channels. This stream is forced down to a single channel at the culvert on road 2710. Vegetation was most diverse in this floodplain, with tree sized alders and willows, and ninebark (*Physocarpus* spp.). Ninebark is an uncommon shrub species on Barlow Ranger District. In summer, this same stream is dry, but sedges and rushes grow near the road crossing. Uprooted trees with very shallow roots indicate a high water table, even though it is dry most of the year.

The highest road densities in the LSR occurred during the Cabin Timber Sale. Most roads have since been closed or obliterated. Drainage structures are inadequate along all or parts of three roads, causing extensive erosion from rain or snowmelt runoff. Deep ruts are present on 2711-120 between 2711 and the gate. Only eight drainage structures were placed on road 2711-140 and the road currently has extensive damage on approximately 1/2-3/4 miles. No drainage structures were placed on road 2711-150; this road has not been evaluated for runoff damage. None of the culverts meet the 100 year flood requirement in the Northwest Forest Plan and it appears that many culverts are too small to handle typical flows during rapid snowmelt in wet periods.

Increased stand density overall has probably reduced the period of time in which the intermittent streams carry surface water. Only one named spring, Bennett Spring, is currently known in the LSR. However, other springs likely exist in the headwalls of the major intermittent streams. One probable location is in section 21 at the bottom of Cabin 43. Water was seen and heard flowing from the bottom end of this clearcut when it was burned in spring of 1990. Douglas Cabin was located at the head of an intermittent stream. It seems unlikely that anyone would build a cabin in that location unless more-or-less permanent water was nearby.

Climate

Last year, 1996, revealed a possible interesting relationship between precipitation patterns and large fire occurrence. Assuming the Dufur data is reflective of north central Oregon in general and that the situation seen in 1996 is a true relationship, then it could have important consequences for future management. Even though 1995-96 water year was very wet in general, the summer months were much drier than average. The fire season in much of eastern Oregon was considered unusually severe, with many large fires and more burned acres than "normal". It appears that the wet fall, winter, and spring months allowed for high levels of grasses and herbs to grow. All this biomass then cured rapidly in the very dry summer, providing high available fuel loadings by August.

Vegetation

Plant Associations. Douglas Cabin LSR is dominated by two vegetation series characteristic of the Eastside and Transition climate zones--eastside Douglas-fir and dry grand fir. The Douglas-fir-western fescue plant association covers almost all of the Flats area. Two grand fir associations (grand fir/oceanspray and grand fir/snowberry) are found along the largest intermittent stream. Beginning at the toe of the Slopes area, grand fir associations dominate the north and east aspects, while Douglas-fir associations dominate on the south and west aspects. Grand fir/snowberry is the most common grand fir association, while several Douglas-fir associations are present. All plant associations found within the LSR (Table 4.1) are indicative of dry conditions.

Table 4.1. Plant associations documented in stand exams in Douglas Cabin LSR.

Series	Plant Association	Number of Stands	Fire Group
Douglas-fir	Douglas-fir/elk sedge	4	1
	Douglas-fir/western fescue	21	2
	Douglas-fir/oceanspray/elk sedge	1	2
	Douglas-fir/pinemat manzanita	5	2
	Douglas-fir/common snowberry	2	2
dry grand fir	grand fir/elk sedge	3	2
	grand fir/oceanspray	1	3
	grand fir/snowberry	12	3

Suitability. Although Douglas Cabin LSR is no longer part of the timber base, evaluating the are for timber suitability provides much information on site capability. Some suitability analysis was conducted under the Mt. Hood Forest Plan, shortly after the plan was released in 1990. Approximately 194 acres were rated as unsuitable due to insufficient growth rates or stocking (Screen 1 - Nonforest) or difficulties in Regeneration (Screen 4). In addition to the four screens used through Region 6 to evaluate timber suitability, the Mt. Hood National Forest has a Separate Suitability Component (SSC). Lands in SSC are considered marginal for timber production with expected yields lower than typical ponderosa pine stands due to harsh environments and competition.

We further evaluated the suitability of the south aspects in the Slopes area, based on concerns raised in other planning efforts, aerial photo interpretation, soils mapping, and reforestation evaluations. We tentatively identified an additional 618 acres that we believe meet the criteria for SSC at least (Figure 4.1). At least some of this area will likely be rated as Unsuitable under Screen 4. If these designations are confirmed, approximately 19% of the LSR would fall into the Unsuitable and SSC categories.

Actually designating areas as unsuitable or in SSC requires more on-the-ground evaluation than was possible during this assessment.

Suitability designation carries with it a connotation associated with even-aged management of closed canopy forests. In many cases, areas that rate as Unsuitable under Screen 4 and in SSC could be managed under uneven-aged strategies that produce open canopy forests, such as Open Parklike and Open Intolerant Multistory-Old. Clearcutting, and perhaps shelterwood cutting, is not appropriate in these areas, but selective cutting where all size classes are managed, should succeed.

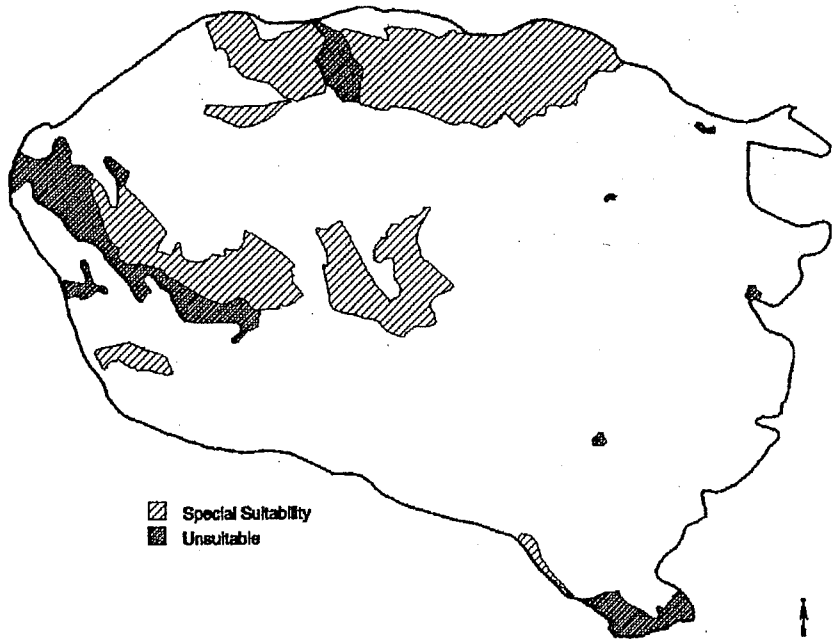


Figure 4.1. Suitability. About 19% of the LSR is either unsuitable or only marginally suitable for producing closed canopy forests..

Current Stand Conditions. Timber harvesting has generally fragmented the LSR, particularly Cabin Timber Sale (see also Figure 3.2). Stands in the Flats area are dominated by Douglas-fir with ponderosa pine an important secondary species. Conifers have overtopped most of the Oregon white oak, such that it is a minor species at best. Large diameter trees (21"+ DBH) are relatively rare, especially ponderosa pine. Unharvested and unburned stands are generally dense and multilayered. Many Douglas-fir trees have high levels of dwarf mistletoe infection (Hawksworth ratings of 3 or higher).

Scattered patches of grass and brush are present, primarily on the harshest south and west aspects where site conditions have maintained a more open stand structure. Understory in Flats area typically consists of junegrass, ventenata, bulbous bluegrass, and weedy annual forbs. Western fescue *(Festuca occidentalis)*, wildrye *(Elymus glaucus)*, and snowberry *(Symphoricarpos albus, S. mollis)* are common in the sparse understory of the Slopes. While weedy annual grasses and commercial forage species such as orchard grass are widespread in Douglas Cabin LSR, the two listed noxious weeds known to occur in the LSR [diffuse knapweed and common toadflax *(Linaria vulgaris)*] are limited to roadsides and old skid trails. Litter and duff dominate the understory elsewhere. Some moderate sized bush patches and jackpots of fuel are found within the Cabin Underburn, primarily along road 2711. Table 4.2 displays the changes in habitat for selected plant species.

Table 4.2. Changes in habitat quality or quantity for selected species since 1900.

Species	Habitat	Habitat Condition	Reasons
native bunchgrasses	open canopy forest and openings	significantly reduced	weed infestation, tree encroachment
Bryoria tortuosa (C3 lichen, suspected)	large branches of pine and oak	reduced	loss of large diameter ponderosa pine and Oregon white oak
Scribneria bolanderi (R6 sensitive, suspected)	vernally moist scabland	no change	species composition has not changed significantly, fuel loading unchanged
Pilophorus nigricaulis (C3 lichen, suspected)	rock faces, talus	no change	
Cantharellus subalbidus or *formosus* (C3 fungi, known)	closed canopy forest with Douglas-fir	uncertain	increased tree density may have provided more extensive habitat but decreased stand health may diminish habitat quality

Several vascular plants identified in the FEMAT report as strongly associated with "late successional" forest are known to occur within Douglas Cabin (Table 4.3). All the species listed are associated with closed canopy old forest. The species listed in Table 4.3 are common and widely distributed across Barlow Ranger District and do not present management concerns at this time. Douglas Cabin may harbor populations of Survey and Manage fungi but no surveys have been conducted. No other sensitive plants or Survey and Manage lichens, plants, or bryophytes are suspected to occur either because no suitable habitat is present or because this LSR lies outside the range of these species.

Table 4.3. Vascular species found in Douglas Cabin LSR and strongly associated with closed canopy late successional forest (FEMAT 1993).

Common Name	Scientific Name	Remarks
mountain arnica	*Arnica latifolia*	Special Forest Product - flowers collected for medicinal use
vanillaleaf	*Achlys triphylla*	Scattered individuals along intermittent streams in Slopes area
pipsissewa	*Chimaphila menziesii*	Special Forest Product - shoots collected for flavoring
common pipsissewa	*Chimaphila umbellate*	Same as pipsissewa
calypso orchid	*Calypso bulbosa*	
striped coralroot	*Corallorhiza striata*	
Pacific coralroot	*Corallorhiza maculosa*	
western coralroot	*Corallorhiza mertensiana*	
glacier lily	*Erythronium montanum*	
hawkweed	*Heiracium scouleri*	
woodland pinedrops	*Pterospora andromeda*	
white vein pyrola	*Pyrola picta*	
side-bells pyrola	*Pyrola secunda*	
yerba buena	*Satureja douglasii*	
trillium	*Trillium ovatum*	

Open Intolerant Multistory-Young and Fire Excluded Multistory are the dominant structure types (Table 4.4). Most of the Doughty thinnings fall into the Cathedral category, even though the average diameter of the remaining trees is just under 21" DBH. Doughty shelterwoods were classified as Understory

Reinitiation, primarily because these units have been planted with ponderosa pine. The Mature Stem Exclusion structure type is found in association with one of the larger intermittent streams.

Stands in the Slopes area are dominated by grand fir on north and east aspects, and Douglas-fir on south and west aspects. Ponderosa pine is a secondary species, generally not as common in association with grand fir as with Douglas-fir. Western larch and western white pine are minor species on north aspects and along the extreme western edge. A western spruce budworm epidemic that came out of Badger Creek Wilderness has resulted in very high levels of mortality on 109 acres. Two recent wet years (1995 and 1996) apparently caused a drop in western spruce budworm populations. However, some level of activity remains evident in the northwest quarter of the LSR. As in the Flats area, many Douglas-fir trees have high levels of dwarf mistletoe infection.

Fire Excluded Multistory is the dominant structure type on the Slopes. We classified the Cabin clearcuts and shelterwoods as Stand Initiation. A large portion of the northernmost south aspect falls into the Open Parklike structure type, which is also the largest example of an old growth structure type within the LSR. This area was recently moved into the Open Parklike structure through a combination of timber harvesting and underburning. The sole Woodland area consists of a very rocky area with scattered, short ponderosa pine and an occasional Oregon white oak and western juniper. Even though all species of trees probably average only 40 feet tall and less than 15" DBH, it appears that the current stand is the best this site can produce.

In addition to changes in species, general tree architecture has changed. Currently, most trees have small, narrow crowns. The crown diameter, in feet, is usually less than the tree diameter, in inches, at DBH. Live crown ratios are usually less than 30%. Because many trees grew under high stocking level conditions, they are taller and have smaller diameters than trees of similar age and species grown under moderate to low stocking levels.

Table 4.4. Existing stand conditions in Douglas Cabin LSR.

Structure Type	Acres	Percent of Area	Tree Species~	Understory~
SI	481	11.5%	Mostly ponderosa pine, Douglas-fir	grasses, forbs, brush
SE	59	1.4%	ponderosa pine	needle litter, duff, forbs
SE-PO	5	0.1%	ponderosa pine, Oregon white oak	needle litter, oak leaves, grasses, forbs
MSE	197	4.7%	Douglas-fir, grand fir, ponderosa pine	litter* duff, scattered forbs
UR	209	5.0%	Douglas-fir, grand fir, ponderosa pine	litter, duff, forbs (scattered grasses in Flats)
FEM	1,865	44.6%	grand fir, Douglas-fir, scattered other species	litter, duff, scattered forbs and grasses
OIM-Y	678	16.2%	Douglas-fir, grand fir, ponderosa pine, scattered Oregon white oak	litter, forbs, brush, duff, grasses
OIM-O	207	4.9%	ponderosa pine, Douglas-fir, Oregon white oak	litter, forbs, duff, grasses
OP	138	3.3%	ponderosa pine, Oregon white oak, Douglas-fir	forbs, brush, grasses, litter
CAT	227	5.4%	Douglas-fir, ponderosa pine, grand fir	litter, duff, scattered forbs and grasses
WOOD	57	1.4%	ponderosa pine, Oregon white oak, occasional western juniper	rock, grasses, forbs, brush
COL	109	2.6%	grand fir, Douglas-fir, ponderosa pine, occasional western larch and western white pine	heavy downed logs, litter, duff
Nonforest	3	0.0%	N/A	N/A
Total	4,235	101.3%		

~ items listed in approximate order of occurrence
* includes downed woody material under 3" diameter

Stand Structure Changes Through Time. In order to better understand how the current stand conditions developed and how they may have developed in the past, we created a conceptual successional diagram of how stands change over time (Figure 4.2). These diagrams are based on the characteristic old growth structures we believe are typical of Douglas Cabin. The disturbances in the

diagrams can be of any type, including combinations of disturbance types. The approach used is similar to the one used in the Columbia River Basin (CRB) Assessment. The primary differences between the two approaches are that the CRB approach uses fewer stand structure types, is based around major tree communities, and evaluates each disturbance type separately.

These diagrams could also be used to develop prescriptions and predict outcomes of certain disturbance intensities under current stand conditions. All high intensity disturbances result in the area reverting back to the Stand Initiation stage. Movement into a subsequent stage depends on either no disturbance or a given intensity of disturbance. In all cases, the intensity is related to how much stocking levels change in the tree layer. No attempt was made to predict changes in other layers due to lack of information on how different species respond to a variety of disturbance types. For example, while there is much information to predict how various shrubs, grasses, and forbs may respond to different intensities of fire, there is little or no information on how they may respond to insects or disease, or even what species of insects and disease may attack them.

Reforestation. Average regeneration unit size in Douglas Cabin LSR is eight acres, well below the district average of 18 acres. Much reforestation success in this area can be attributed to edge effects of natural seeding, shade, and less severe microclimates than in larger units. Many regeneration cuts were shelterwoods, which also helps regeneration survival. Appendix B details the reforestation and timber stand improvement (TSI) status of all regeneration units in Douglas Cabin LSR.

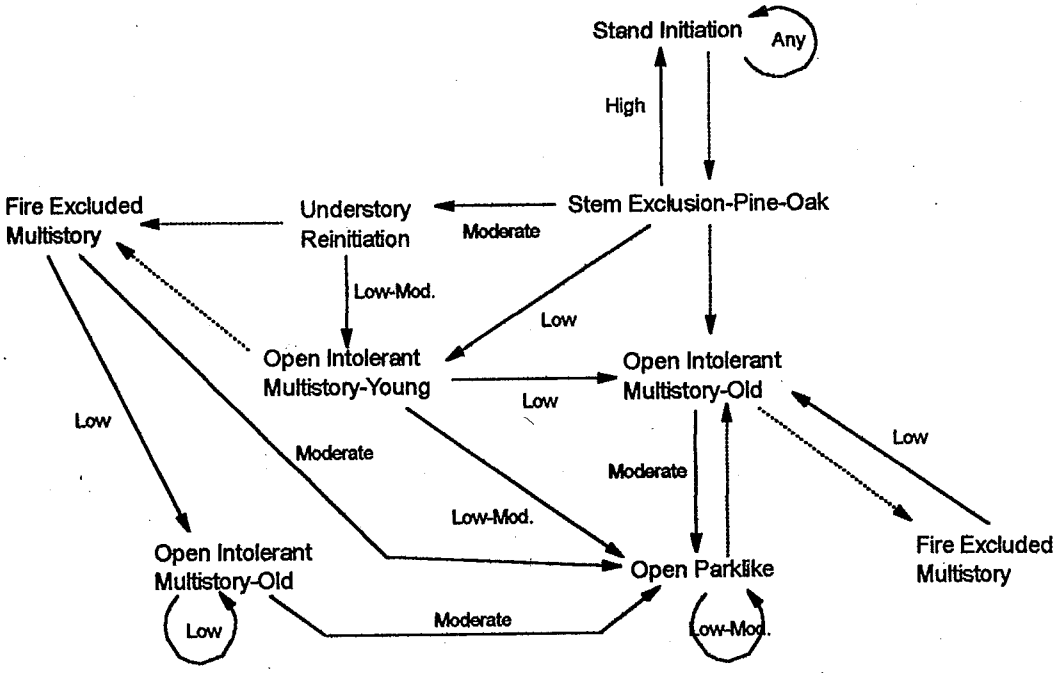
Nonetheless, reforestation in Douglas Cabin is moderately difficult. Most units have been planted twice and the more troublesome units are scheduled for a third planting in 1997. Reforestation difficulties can be attributed to some combination of soil compaction, harsh sites, competition from grasses seeded to improve wildlife forage, and pocket gophers. Over half the units (53.8%) were tractor logged and the slash in many of those were machine piled. Fifty-eight percent of the units have a southerly aspect or are flat. Almost 70% of the units were clearcut. Most units in the Flats were forage-seeded with sod-forming or very competitive nonnative grasses, such as orchardgrass and intermediate wheatgrass.

Despite all these difficulties, only 9% of the acres are below Mt. Hood Forest Plan stocking guideline of 125 trees per acre (FW-361). Another 12% of units are marginally stocked with 125-200 trees per acre. These are the units scheduled for planting and gopher control in 1997 (Figure 4.3).

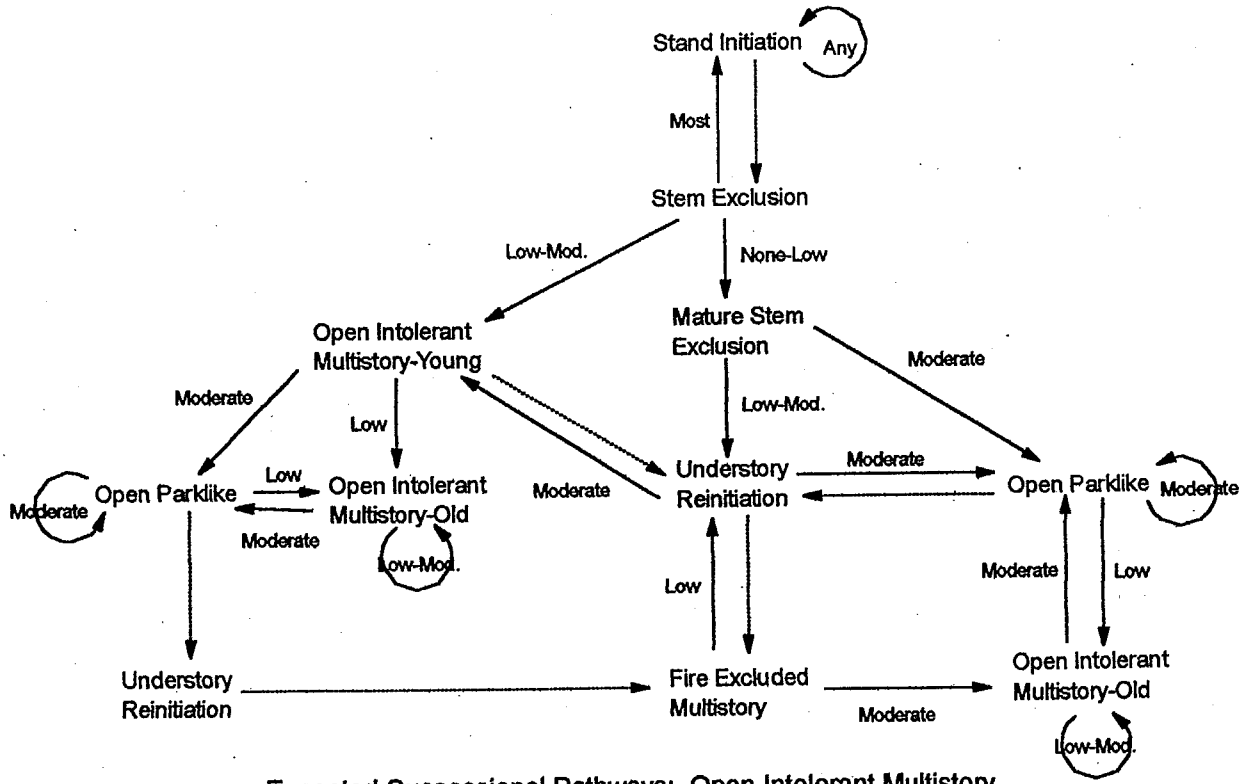
Species diversity in the units is relatively low, ranging from one species per unit to six, with most units consisting of only 1-3 species. This low diversity is reflective the general stand conditions. For this analysis, Oregon white oak was included as a contributor to species diversity since it is an important component of the units where it occurs. Ponderosa pine is found in every unit. Douglas-fir is found in 71% of the units, while grand fir is present in about half the units. Species such as western white pine, western larch, lodgepole pine, Engelmann spruce, mountain hemlock, Oregon white oak, and bigleaf maple comprise a minor component of various units. We plan to verify the presence of mountain hemlock in Cabin 30, believing this species was misidentified. According to the stocking surveys, subalpine fir is present in Cabin 32, but we believe that grand fir was misidentified in that case.

Eighty percent of the units in Douglas Cabin should need no further reforestation treatments. Eleven percent of the area is considered fully reestablished (Jumper units, Little Badger units, and some Out units). Instead, these units will need monitoring to determine when thinning is needed. The remaining 20% of units will likely require special treatment, such as shade cards or mulches and aggressive gopher control, in order to reestablish the stands.

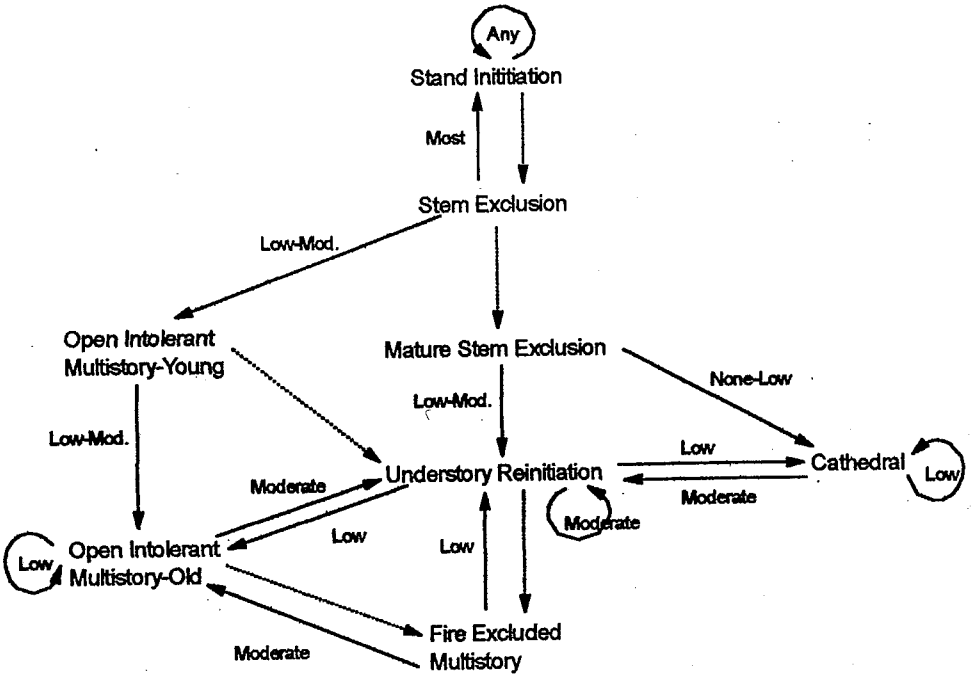
Snags and Downed Logs. The number of large snags and downed logs are not known throughout the LSR, with the exception of the Collapsing stands. Infrared aerial photos taken in 1995 reveal scattered dead trees throughout the LSR. Field visits made in January and February 1997, suggest that many of the larger snags are grand fir. Even large true fir snags tend to last only a short period of time before rotting and falling. These same visits also suggest that large logs are relatively rare at present. Log numbers will increase when the grand fir snags fall, but these logs have a relatively short longevity.



Expected Successional Pathways: Open Parklike



Expected Successional Pathways: Open Intolerant Multistory



Expected Successional Pathways: Cathedral

Path via UR = weakly 2-latered Cathedral stand
Path via MSE = single-layered Cathedral stand

Notes

High intensity disturbances always take stand back to SI.

Some level of UR occurs with Low & Mod. intensity disturbances.

Disturbances not readily noticed, such as natural self-thinning, are not included.

Where have None-Low disturbance intensity in pathway, can move if stand density is low enough. In all, if have high density stocking, then absence of disturbance leads to stagnation.

→ Pathway with no disturbance

→ Pathway with specified intensity of disturbance

Figure 4.2. Conceptual changes in stand structures. In each old growth structure types, different disturbance intensities result in the various potential stand structures.

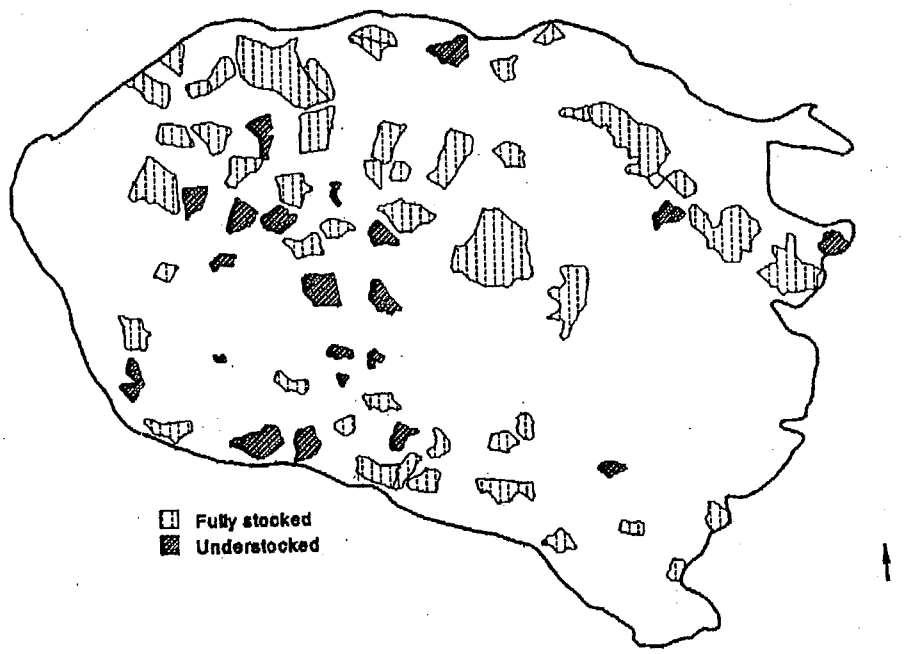


Figure 4.3. Reforestation status. Most of the understocked stands are found on harsh sites.

The highest small snag and downed log numbers are found in the areas underburned in 1989, 1990, and 1991. However, most of the snags under 18 inches DBH have already fallen. Most downed logs fall into decay classes 3 and 4, with very few logs in decay classes 1 and 2. In the Collapsing stands, snag numbers are considerably higher than downed log numbers at present. Within 5-10 years, this situation should reverse itself (more logs than snags).

Snags were created in the Doughty units (Flats area), mostly by blasting the tops out of large ponderosa pines. Walk-through surveys indicate that cavity nesting species have used a fair portion of these created snags. However, the trees blasted and subsequently killed were often of desirable size and health to retain as living trees for seed sources and to eventually produce larger diameter snags. While past harvesting was primarily responsible for removing large diameter trees, the snag blasting further reduced the limited available numbers of remaining large ponderosa pines.

We developed conceptual diagrams on how large snag and downed log numbers change over time under the characteristic disturbance regimes that created certain old growth structure types (Figure 4.4). Throughout Douglas Cabin LSR, numbers of both habitat elements fluctuate around some average value with Open Parklike stands having the lowest variation about this mean and Cathedral stands having the highest. The important conclusion is that some level of large snags and downed logs should always be present throughout Douglas Cabin at the landscape scale. Assuming these diagrams are appropriate, them the number of large logs currently present are probably below RNC and inadequate to meet the needs of wildlife and long-term site productivity. The number of large snags may be within RNC, except in clearcuts, but the primarily species that comprise the large snags is "wrong". Under past conditions, species such as ponderosa pine and Douglas-fir would have comprised most of the snags. Snags and downed logs formed by shade intolerant conifers tend to last much longer than snags and downed logs composed of shade tolerant conifers.

The "wildcard" in the snag and downed log numbers and longevity is Oregon white oak. Virtually all Oregon white oaks over 6 inches DBH on Barlow Ranger District have extensive heart rot. These trees

may provide many cavity functions typical of dead and dying conifers while remaining live and relatively vigorous. The longevity of oak snags and downed logs is unknown. However, due to the presence of extensive heart rot before an oak dies and the lack of resins to slow decay rates, once dead or down, oak may not persist very long.

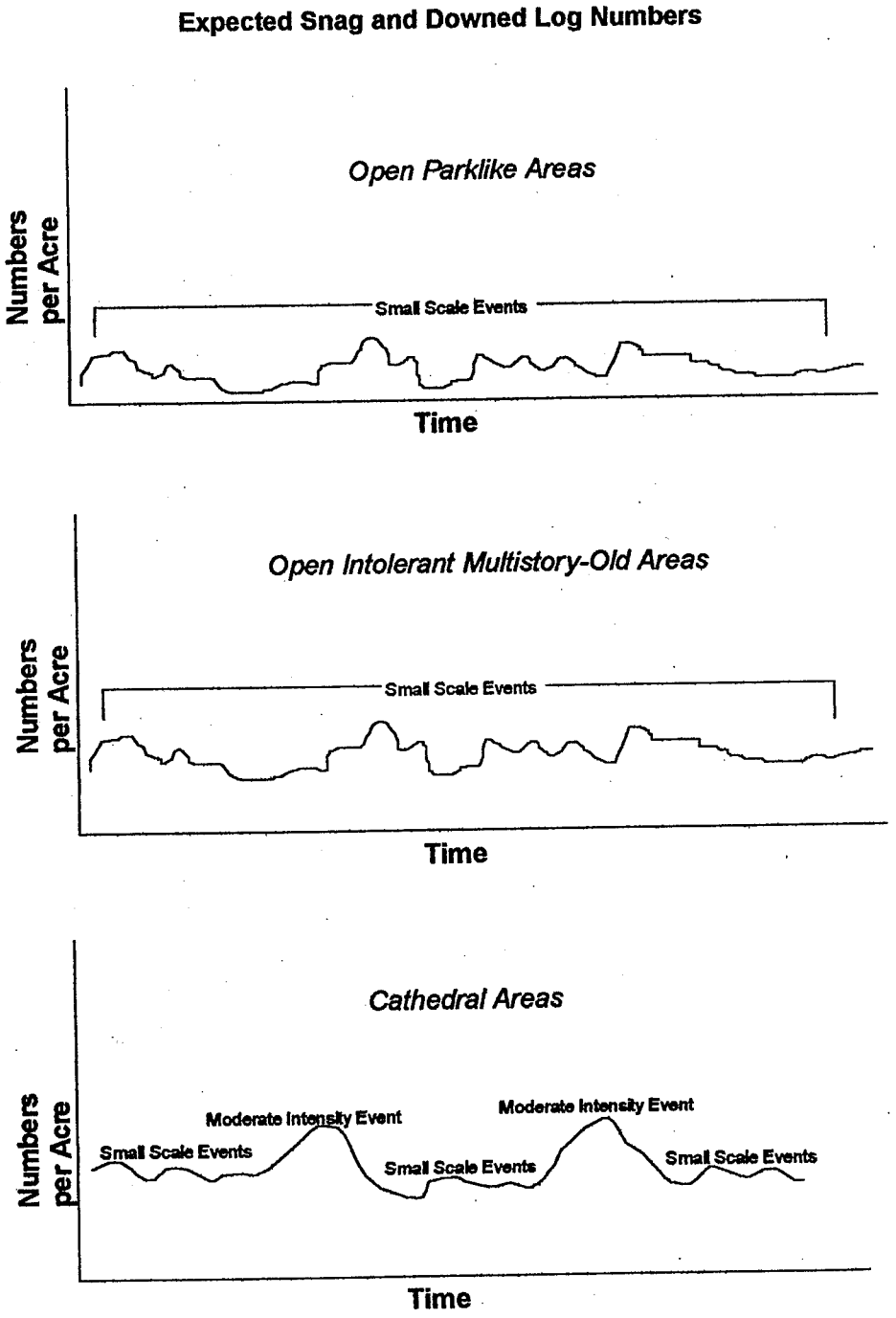


Figure 4.4. Conceptual changes in snag and large downed log numbers. As the typical stand density increases, the amount of variation around the mean increases.

Wildlife Habitat

This section discusses wildlife habitat as it relates to species of management concern identified in the Northwest Forest Plan with conflicting habitat needs, species with management emphasis in the Mt. Hood Forest Plan that potentially conflict with objectives in the Northwest Forest Plan, species extirpated from the area, and introduced species. Table 4.5 displays changes in habitat quality or quantity for selected species known or suspected to reside within Douglas Cabin LSR. Not all of these species are late successional associated species. The connectivity and interior habitat needs of selected wildlife guilds and species are discussed in next major section.

Table 4.5. Changes in habitat quantity or quality for selected wildlife species since 1900.

Species	Habitat Condition	Reasons
C-3 bats	Significantly reduced	loss of large diameter, thick-barked trees, loss of open stands for foraging
white-headed woodpecker	Virtually none remaining	loss of large diameter ponderosa pine, loss of open stands
pygmy owl	Virtually none remaining	loss of large diameter ponderosa pine, loss of open stands
flammulated owl	Reduced and declining	loss of large single stemmed oak
goshawk	Declining, although higher than before 1900	increased stand densities over critical threshold, and clearcutting
northern spotted owl	Declining, although higher than before 1900	clearcutting, grand fir encroachment, stand collapse
wild turkey	Stable to slowly declining	increased stand densities, loss of large diameter roost trees
deer and elk	Stable to slowly declining	clearcutting increased available forage but road densities increased disturbance, conifer encroachment slowly decreasing forage
silver-grey squirrel	Declining	loss of large oak and pine, loss of pine-oak habitat to other conifers

Species of Management Concern and Conflicting Habitat Needs. Appendix C lists the amphibian, bird and mammal species of concern within the LSR. Most of the species listed in Appendix C will have their habitat maintained or improved through management to achieve late-successional habitat. The white-headed woodpecker, pygmy nuthatch and flammulated owl (not in Appendix C) are addressed under the section on Connectivity and Interior Habitat. The needs of lynx are addressed below, under Species Extirpated.

The black-backed woodpecker is the only other species of concern identified that may have needs that conflict with late-successional LSR objectives. The standard of 12 hard 17+ inch snags per 100 acres, plus the other cavity-nesting species snag requirements amounts to about 400 snags per 100 acres in the first 30 years plus about 280 per decade thereafter. At about 100 years to grow a 20 inch tree (with healthy basal areas of from 160 to 200+ square feet per acre in the mixed conifer types), the snag requirements would use up to 25 percent of the standing basal area. Assuming growth occurs constantly within the stands, leaving larger trees can mean leaving fewer (and potentially less of the basal area) because of their greater longevity.

Within the Douglas Cabin LSR, there are no lodgepole pine stands nor does there ever appear to have been. Black-backed woodpeckers are probably using some of the dead grand fir in the collapsing stands, similar to beetle infested lodgepole. Under natural conditions, large outbreaks of insects resulting in "beetle infested stands" were probably rare because the natural fire regime kept the stands more open and resistant to beetle attack. The higher productivity within the Cathedral stand structure areas (see Part V - Desired Future Conditions) can probably achieve the snag retention standards and

remain within the potential range of natural variability. These conditions will likely maintain some resident black-backed woodpeckers.

Species with Management Emphasis from the Mt. Hood Forest Plan Potentially Conflicting with the Northwest Forest Plan. Prior to designation as an LSR, about 950 acres (22%) of Douglas Cabin LSR had been allocated as B4 Pine-Oak habitat with emphasis on silver-grey squirrel and wild turkey habitat, and critical winter range value for deer and elk. Virtually the entire LSR (99%) has been identified as inventoried winter range. Adjacent lands to the east are also critical winter range, however conditions are even drier with less ability to meet thermal cover standards than in the LSR. Much of the National Forest lands to the east have been harvested or prescribed burned, reducing the size and number of thickets which are very important to proper functioning of the winter range. Large blocks of private lands to the east (also in the critical winter range area) were virtually clearcut in the late 1980's and early 1990's, leaving essentially no cover over large areas.

For the most part, the needs of the silver-grey squirrel and wild turkey do not conflict with LSR objectives. However, both species use acorns from Oregon white oak as an important food source, particularly when acorns are abundant. Increased stand densities in LSRs would mean further reductions in the numbers of Oregon white oak and smaller crowns on the trees that remain. In turn, this would mean a lower potential for acorns, requiring both species to depend more on other foods, such as pine seeds and ground dwelling insects.

The needs of deer and elk on the winter range are in conflict with maximizing closed canopy late successional habitat. Within the B4 land allocation, Mt. Hood Forest Plan standard was to maintain at least 50% of the area in thermal cover, defined as stands of trees at least 40 feet tall with 70% crown closure. Although this standard could theoretically be met, several unavoidable conflicts would arise. First, the closed canopy late successional stands (Fire Excluded Multistory) cannot be maintained through time because of the dry nature and frequent fire history of the area. Secondly, much of the foraging and often the thermal needs of wintering deer and elk cannot be met with large areas of closed canopy stands. Highly variable and patchy stands with thickets, small openings and generally variable crown closures (30-70%), appear to best meet deer and elk needs on the winter range in this area as long as some larger stands of thermal cover can be maintained in the better growing sites. These conditions allow each stand to meet the wintering animals' needs of forage, reduction of thermal stress, and snow interception and security, instead of the animals having to constantly lose energy (fat reserves) moving across the landscape to find suitable conditions from day to day and hour to hour. The Mt. Hood Forest Plan standard and guide for inventoried winter range of 35% thermal cover, is not in conflict with the LSR objectives because of the better growing conditions at the higher elevations.

Existing habitat within the previous B4 allocation consists of about 500 acres (53%) thermal cover (excluding thickets less than 2 acres in size). An additional 100 acres (10%) is in thickets of 1/8-2 acres in size. About 280 acres (20%) is hiding cover, leaving about 17% in forage areas. The remainder of the inventoried winter range in the LSR consists of about 53% thermal cover, 10% hiding cover and 37% forage.

Species Extirpated. The lynx, wolf, and grizzly bear likely inhabited the LSR under natural conditions, but are considered extirpated (Appendix C). Of these three species, lynx is most likely to still be present on the Mt. Hood National Forest.

Lynx (*Felis canadensis*) probably inhabited portions of Douglas Cabin LSR and the surrounding Wilderness. Although categorized as a late successional species, the lynx is heavily dependent on snowshoe hare for survival, tending to occupy higher elevations and deeper snow conditions than the bobcat. Although the snowshoe hare is a generalist in it's use of habitat, the most favorable habitat seems to be found in the earlier successional conditions provided by the stem initiation, stem exclusion, and understory reinitiation structural stages. These conditions most likely would have occurred within the Crest Zone where large scale fires at a 100-200+ year interval often resulted in the regeneration of stands before a late successional or old growth structural stage was reached. *Within Douglas Cabin LSR there is and probably always has been very little of this habitat as the LSR is outside the Crest Zone.*

Currently, some of the best habitat in this condition is found in the Marion and Dog River landscape units of Surveyors Ridge LSR, in the Twin, Barlow Ridge, Boulder, and Iron landscape units of White River LSR, and the western half of Badger Creek Wilderness. On a larger landscape scale, such as the province level, such habitat was relatively constant through time. In the future, there would not likely be many areas to support lynx within the LSR.

Gray wolf (*Canis lupus*) was officially extirpated from Oregon in 1946. However, since that date persistent reports of wolf sightings have occurred throughout the Oregon Cascades. Several sightings of wolf-like canids in Crater Lake National Park have occurred from the 1960s through the 1980s by park personnel (review of files of Crater Lake National Park). Individual wolf-like canids were observed and photographed in the late 1980s on the Rogue River National Forest. Conclusions of presence of wolves on the Rogue River National Forest in the early 1970s (Forest Supervisor H.M. Seeley's letter to L. David Mech in Rogue River National Forest files) as well as numerous other reports by less reliable sources have occurred up to the present. Actual information within or adjacent to the LSR has been limited to unconfirmed reports of a "wolf" crossing US Highway 26 near Blue Box Pass and a report of "sighting of a wolf" near Mt. Hood (exact location unknown).

Although the probability that native wolves still inhabit the Oregon Cascades is quite low, potentially suitable wolf habitat conditions do appear to remain within Oregon and Douglas Cabin LSR. Healthy and relatively abundant deer and elk populations are necessary as a food source and the lack of human interference are the two most important factors in providing for viable wolf populations.

In general, deer and elk populations are probably at or near their peak at this time within the general area of the LSR. Being dependent on grasses, shrubs, and forbs for forage, their populations will likely decline as the early seral stages currently present become less abundant within both the LSR and adjacent Matrix lands. However, declining deer and elk populations are not considered to be the primary limiting factor in allowing wolves to reoccupy the area. Instead, human disturbance is a much greater limiting factor.

Relatively large unroaded areas, such as Yellowstone National Park or the vast wildernesses of Idaho, or other limited access to the public, such as open road densities of 1.0 miles per square mile or less, provide for limited human interference. Since the LSR is not large enough to provide for all the needs of even one wolf pack, adjacent areas would also have to be in a favorable condition.

Grizzly bear (*Ursus arctos*) undoubtedly occupied the general area and portions of the LSR under natural conditions but was extirpated from the Oregon Cascades. Grizzlies are present in the northern Washington Cascades. There is probably sufficient forage and shelter within and adjacent to the LSR to support some number of grizzlies. However, the level of human use throughout the year and the extremely large area needed to provide security from such disturbance probably precludes a viable population from successfully occupying the habitat.

Introduced wildlife species. The only known or suspected nonnative birds and mammals in the LSR are wild turkey, starling, English sparrow, Szechwan pheasant, and Virginia opossum. The effects of the starling and English sparrow on native species is thought to be minimal. These two species tend to be most closely associated with human habitation, so presence within the LSR is believed to be minimal. Similarly, the effects of Virginia opossum are expected to be minimal since this species is more associated with perennial riparian areas, which Douglas Cabin lacks. Opossums living around Little Badger and Badger Creeks may forage for eggs and nestling birds along the northeastern and southeastern edges of the LSR. However, there is no evidence that opossum occur in significant numbers within this area or that their effects can be measured.

The wild turkey, both Merriams and Rio Grande races, has been introduced into the LSR and its surroundings. Within Douglas Cabin LSR, the greatest use is probably in the Flats area. The principal effect of this species seems to be consumption of mast (mostly acorns, hazel nuts, and pine seeds) most of the year and ground-dwelling insects in spring. Competition for mast could affect the native silver-grey squirrel, but that species is not considered a late successional associate. Pygmy and

flammulated owls also forage on insects in the spring and potentially could be affected by competition with wild turkey, but this seems unlikely. Nesting requirements for turkey (brush, slash, or other cover) does not appear to conflict with any native species.

The Szechwan pheasant, a close relative of the ring-necked pheasant, was recently introduced on Oregon Department of Fish and Wildlife lands east of the LSR. These pheasants are more closely associated with brushy or shrubby habitats than the ring-necked pheasant. Szechwan pheasants were seen on National Forest lands adjacent to the LSR in summer 1996, indicating they are probably present and could become a permanent resident. The principal effect of this species would likely be consumption of seeds, including pine seeds, and ground-dwelling insects. Competition for pine seed could affect the western gray squirrel, but that species is not considered a late successional associate. Pygmy and flammulated owls also forage on insects in the spring and could be affected by competition with the pheasant, but this seems unlikely. Most likely the pheasant would compete with turkey, blue grouse, and ruffed grouse. No late successional species is thought to be detrimentally impacted by the Szechwan pheasant.

Connectivity and Late Successional Habitat

The lack of data limits landscape level discussions of connectivity and late successional habitat between LSRs to data provided through the HABSCAPES model developed by Kim Mellon (Mt. Hood/Gifford Pinchot National Forests, wildlife ecologist), Mark Huff (Pacific Northwest Research Station, wildlife/forest ecologist), and Rich Hagestedt (Mt. Hood National Forest, forest analyst). Within the model, species are assigned to species guilds based on expected responses to different amounts and distributions of habitat across the landscape. Home range size, patch configuration use, and general habitat use (stand scale) were used to group species. The guilds were then linked to the vegetation database for the Mt. Hood National Forest. Appendix C lists late successional associated vertebrates known or suspected to occur within Douglas Cabin LSR.

The HABSCAPES model uses vegetation structure components of open, small tree, large tree, and contrast. These criteria appear to be similar to vegetation criteria used on the Mt. Hood National Forest to describe "old growth". Discussions with other biologists on the Forest indicates this information seems reasonably accurate for areas west of the Cascade crest but does not fit areas east of the crest. Habitat availability and use by late successional species is severely under predicted. Further, the emphasis is on late successional species associated with closed canopy forests. Late successional species associated with open canopy forests are treated poorly, if at all.

The Douglas Cabin LSR vegetation analysis consists of components such as Stand Initiation through Cathedral and Fire Excluded Multistory. The vegetation criteria used to determine large tree habitat in HABSCAPES appears to be similar to the older forest structural stages (Mature Stem Exclusion, Cathedral, and Fire Excluded Multistory) used within the analysis area. Vegetation was assigned to various structural stages from Stand Initiation through Cathedral through Collapsing (see Appendix A and discussion under Vegetation in this chapter). The actual structural stages used to determine habitat suitability were based on known occupancy of such habitat by late successional species.

Of the 18 terrestrial guilds listed, only three are closely tied to the large tree (late successional) habitat. A species of concern which is not well represented by these guild categories is the white-headed woodpecker. The white-headed woodpecker falls under a guild which can use any structural class. Habitat availability for this species, which is dependent on large ponderosa pine, is over predicted; therefore it will be addressed separately and as a representative of other species that may need the Open Intolerant Multistory-Old and Open Parklike stand structures.

Another set of species not well represented by HABSCAPES guilds are any that need interior forest habitat. Review of the analysis area shows that the TMMLT guild is a relatively close match of the amount of interior forest habitat available. However, the site specific map of the LSR locates the interior habitat more accurately. Therefore interior forest habitat is addressed separately and the TMMLT guild will be used to address interior habitat outside the LSR and connectivity issues.

Connectivity. We used the existing connectivity analysis conducted under White River LSR assessment to evaluate connectivity between Douglas Cabin LSR and all other LSRs (Figure 4.5). There are no 100 acre LSRs in the vicinity of Douglas Cabin. Badger Creek Wilderness was assumed to provide the primary connection between White River, Douglas Cabin, and Surveyors Ridge LSRs when the LSR network was created. However, 1995 aerial photos show that this expected connection either does not exist or is functioning poorly. Most of the closed canopy, large tree habitat within the wilderness has been lost above 3500 feet elevation due to prolonged drought, prolonged western spruce budworm outbreak, and root disease. Similar habitat is declining below 3500 feet for the same reasons. No such habitat exists on south aspects below 3500 due to harsh site conditions.

The primary connection between Douglas Cabin LSR and White River LSR is provided via the Threemile Creek riparian corridor within Matrix lands south of the Badger Creek Wilderness. The middle connectivity corridor in Figure 4.5 may no longer function due to the collapse of many stands on Gordon Butte and the western edge of Douglas Cabin LSR. The primary connection between Douglas Cabin LSR and Surveyors Ridge LSR is provided via the north aspects along Little Badger Creek to more continuous forest just east of Flag Point. However, large portions of this connectivity corridor are in poor condition due to western spruce budworm defoliation of grand fir and Douglas-fir, and mountain pine beetle caused mortality in lodgepole pine.

Late Successional Habitat. Late successional habitat conditions are best represented by the following three guilds:

- Terrestrial, Small home range, Patchy, Large Tree (TSPLT),
- Terrestrial, Medium home range, Mosaic, Large Tree (TMMLT), and
- Terrestrial, Large home range, Mosaic, Large Tree (TLMLT).

Species within all three guilds tend to depend on closed canopy forest to most or all their needs.

The **TSPLT** guild represents species such as the northern flying squirrel, shrew-mole, and red tree vole. Only the northern flying squirrel is a known resident of Douglas Cabin LSR. These species typically have their primary or secondary use in only one major structural category; or their primary use is in only one category and the secondary use is in only one other structural category. Home range size for this guild is 52 acres with at least 50% of the home range in large tree patches of at least 5 contiguous acres. In general, these species do not cross openings easily or other structural stages that do not meet the late successional criteria.

According to HABSCAPES analysis total availability of habitat for TSPLT species within the LSR is low and concentrated in the western portion. When using the structural stages identified as suitable habitat for eastside conditions total available habitat for TSPLT species is over 50% of the LSR and well distributed. This guild will use denser stands in dry areas until a fire or other event opens the stands, forcing the animals to move. Douglas Cabin LSR consists of drier plant associations, such as Douglas-fir and dry grand fir with a limited amount of ponderosa pine-Oregon white oak. Only the dry grand fir plant associations are capable of sustaining stand densities associated with the TSPLT guild through time, and then mostly on north aspects. Open Intolerant Multistory-Old and Open Parklike stand structures are probably the densest stand structures that the environment will allow over the long-term in much of the LSR.

Only the HABSCAPES model is available for analysis of the adjacent LSRs and reserved areas. However, it is expected to underestimate late successional habitat availability because of the conditions east of the Cascade crest. We used general knowledge of the adjacent reserved areas and the LSRs (and LSR assessments) to supplement HABSCAPES information. The Badger Creek Wilderness surrounds all but the east side of Douglas Cabin LSR. The wilderness might be expected to provide a connecting link and additional late successional habitat for the Douglas Cabin-White River-Surveyors Ridge LSR complex, which skirts the east side of Mt. Hood. However, the majority of the late successional habitat in Badger Creek Wilderness is found in the east half, which functions as a connecting link between Douglas Cabin and Surveyors Ridge LSRs. Recent photos (1995) and field observations (1997) show that most of this hbaitat has been severely degraded or lost above 3500 feet

elevation and is declining below 3500 feet. Douglas Cabin LSR, the east half of Badger Creek Wilderness, and the lower elevations of Surveyors Ridge LSR are relatively dry and more conducive to an open forested structure such as Open Intolerant Multistory or Open Parklike dominated by ponderosa pine-Douglas-fir or ponderosa pine-Oregon white oak plant communities. Much of the area has high densities of grand fir and Douglas-fir in the middle and understory layers, creating high competition for moisture, nutrients, and light and a high risk of catastrophic loss from fire or insect epidemic. Significant mortality is already beginning to occur. The most direct connecting link between Douglas Cabin and White River LSRs is the Threemile Creek riparian corridor within Matrix lands just south of Badger Creek Wilderness. This corridor was recognized and protected in the Three Conifer Salvage Sale planning effort conducted in 1996.

The habitat availabilty for TSPLT species in White River and Surveyors Ridge LSRs is relatively good, as is connectivity within the two LSRs. However, connectivity within the western half of Surveyors Ridge LSR is deteriorating rapidly from insect and root disease attack. Long term habitat capability for TSPLT species is good in White River LSR, but from ¼ to ½ of Douglas Cabin and Surveyors Ridge LSRs are probably not capable of maintaining the stand densities associated with this guild through time without frequent and intensive management and aggressive exclusion of fire. The best connecting link between Surveyors Ridge and White River LSRs for the TSPLT guild species (and virtually the only contiguous habitat) is via the Oregon Highway 35 corridor outside the west edge of Badger Creek Wilderness. This corridor does not involve Douglas Cabin LSR and is "potected" by a scenic viewshed corridor.

The **TMMLT** guild represents the black-backed woodpecker (known resident) and three-toed woodpecker (suspected resident). Woodpeckers are opportunistic as mortality occurs in a stand. The **TLMLT** guild represents the northern goshawk, pileated woodpecker, wolverine, pine marten, fisher, northern spotted owl, and barred owl, all of which are either known residents or suspected to occur with high likelihood of presence. These species typically use the same structural classes as the TSPLT guild but with larger home ranges. Typical home range size is 500-3000 acres with at least 50% of the home range in large tree patches of at least 20 or 40 contiguous acres. In general, these species cross openings or other habitats not meeting the late successional criteria. Some form of cover may be necessary to provide some security for species such as pine marten, fisher, and northern spotted owl.

According to HABSCAPES, total habitat availability for TMMLT and TLMLT guild species within the LSR is low to very low and located only in the western portion. Habitat availability is much better when using the eastside stand structure types. Late successional habitat currently represents 50% of the LSR (same habitat as for TSPLT guild species). Currently these patches generally exceed 40 acres in size and have good connectivity across the LSR. As with the TSPLT guild, active management or restoration of the characteristic fire regimes to reduce high stocking of understory grand fir or Douglas-fir will not produce stands suitable for members of the TMMLT and TLMLT guilds.

Active management or restoration of the characteristic fire regime to restore the more typical stand structures and species compositions would significantly reduce suitable habitat for these three guilds. However, such species as white-headed woodpecker would greatly benefit from such management. Providing thickets of 5-60 acres would maintain a satisfactory distribution of habitat for the TSPLT guild across the LSR with limited impact on the health of the area.

East of the LSR, habitat for the three guilds is essentially absent. Conditions are too dry to support stands with the tree sizes and crown closures needed to meet the needs of these guilds, with the exception of a few north aspects in or near riparian areas. South of the LSR, habitat is very fragmented. Riparian corridors and the Barlow Road corridor account for most of the available habitat; however, these corridors are often narrow and have small gaps. As far as we know, the riparian corridors are in relatively good condition and functioning as dispersal routes, but they are oriented east-west with significant breaks between corridors.

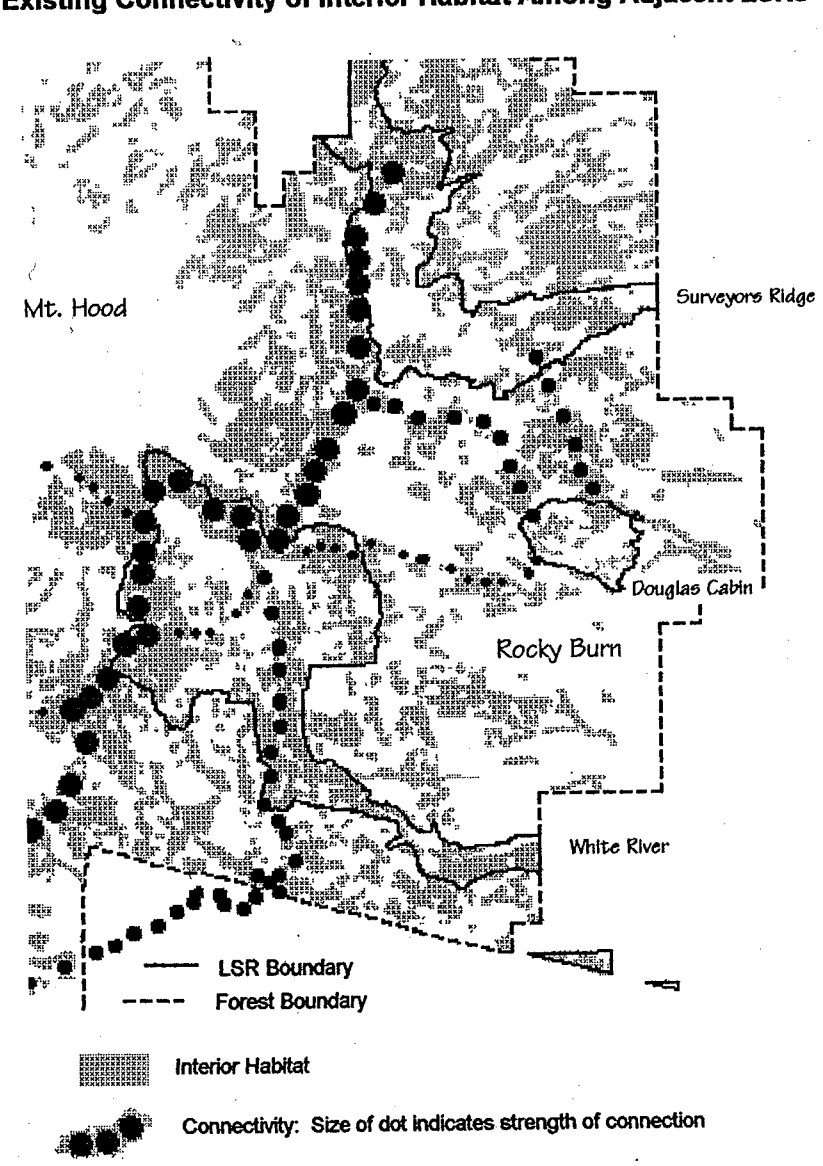


Figure 4.5. Eastside connectivity. The expected connectivity link through Badger Creek Wilderness is very weak and declining.

Directly west of the LSR, late successional habitat is virtually absent even though this area falls within Badger Creek Wilderness. A severe outbreak of spruce budworm in overstocked stands in the wilderness resulted in collapse of these stands. North of the LSR within Badger Creek Wilderness, the late successional habitat is in better condition. A significant portion of the habitat to the northwest has also collapsed, but a greater percentage of the habitat remains.

The relationship of Douglas Cabin LSR to the adjacent LSRs for the TMMLT and TLMLT guilds is virtually identical to that of the TSPLT guild with the following notable exceptions. By their very nature (mosaic guilds) the TMMLT and TLMLT guilds are better able to disperse across the landscape than the

more restricted patch guilds. In terms of potential dispersal habitat rather than fully suitable habitat, about 3000 acres (72%) of the LSR meets the definition of 11 inch or greater diameter trees with 40 percent or greater crown closure. Connectivity that runs north-south is patchy. Connectivity that runs east-west is more continuous and concentrated in the riparian corridors. Dispersal gaps and barriers for some species may exist between Douglas Cabin and White River LSRs.

Douglas Cabin LSR lies wholly within a portion of US Fish and Wildlife Service's Critical Habitat Unit (CHU) OR-1 for northern spotted owls. Critical Habitat Unit OR-1 is primarily located in the southern portion of Surveyors Ridge LSR and includes most of Marion, Eightmile Plateau, 15 North, and 15 South landscape units, and about ½ of Dog River landscape unit. The Surveyor's Ridge portion of the OR-1 CHU provides some late successional nesting, roosting, foraging (NRF) habitat, although fragmented with some areas starting to collapse. Connecting corridors of NRF and dispersal habitat exist north-south and east-west across the CHU. Sometime in the future, much of the existing NRF habitat will be lost within the 15 North and southwest side of 15 South LUs of the Surveyors Ridge LSR. It appears that much of this NRF habitat in the Surveyor's Ridge LSR can be maintained in at least marginal condition (less than 70% canopy closure). Canopy closures will be at about 50 to 60% for the next 20 years through selective thinning, while conditions improve at the more moist elevations where NRF habitat would naturally have occurred and can be more easily maintained. There is one northern spotted owl activity center within Douglas Cabin LSR and four activity centers outside the LSR but within 1.2 miles (Table 4.6).

Table 4.6. Northern spotted owl activity centers associated with Douglas Cabin LSR.

		Acres of NRF Habitat	
Activity Center	**General Location**	1.2 mile radius	0.7 mile radius
1030	Within LSR	1450 acres	
1119	Badger Creek Wilderness	1216 acres	373 acres
1218	Threemile Creek	811 acres	337 acres
1251	Badger Creek Wilderness	1183 acres	434 acres
1285	Badger Creek Wilderness	887 acres	284 acres

The **white-headed woodpecker, pygmy nuthatch,** and **flammulated owl** are examples of species that guild protocol in the HABSCAPES model may not properly address. White-headed woodpeckers and pygmy nuthatches forage and nest almost exclusively in ponderosa pine or Douglas-fir, while flammulated owls may utilize any cavity that is large enough within the drier habitats of the ponderosa pine zone. Within these drier habitats the relatively frequent occurrence of low intensity fires created open stands (Open Intolerant Multistory-Old and Open Parklike) of ponderosa pine, ponderosa pine/Oregon white oak, or ponderosa pine/Douglas-fir/Oregon white oak. The frequent fires prevent significant buildup of understory fuels within these open stands. Presently there are very few stands in this condition on the east side of the Mt. Hood National Forest and only a limited amount within Douglas Cabin LSR. The current dense understories within the remaining late successional habitat in this zone has created high moisture and nutrient stress related mortality within the few very large ponderosa pines and Douglas-firs that remain.

Although the present mix of large trees and understory trees generally meet the needs of such species as northern spotted owl, natural mortality is already killing many of the larger overstory trees. The end result with no intervention will likely be catastrophic loss of large areas from insects and fire, such as has already begun to occur in Douglas Cabin, with virtually no large trees remaining. In other words, a "hands off" approach will probably not result in maintenance or development of large trees or late successional habitat in this zone. Returning such stands to an Open Parklike or Open Intolerant Multistory-Old condition would protect the remaining large ponderosa pine and Douglas-fir, virtually eliminate the potential for catastrophic loss, and should enhance habitat for the white-headed woodpecker, pygmy nuthatch, and flammulated owl as well as improve deer and elk winter range thermal

cover. The cost, however, would be the loss of existing connectivity corridors for northern spotted owls before such connections were reestablished over Gordon Butte.

The present standard of 100% population potential for white-headed woodpecker for snags over 15 inches DBH (60 per 100 acres) will probably be difficult to achieve. Reaching this level of soft snags is dependent on the ability of a hard snag to achieve soft snag characteristics, then remain standing long enough to be used. The R6 snag simulator model indicates that unless the snag is at least 19 inches DBH it probably would not develop the soft snag character, and then could be expected to stand only about 10 years. Field reconnaissance and experience indicates the snag simulator predictions for decay of hard snags to soft snags and their longevity are reasonably accurate. In addition, the snag model indicates that starting in year 0 (today) almost 4 snags per acre greater than 19 inches DBH must be saved or created for the first 30 years to reach the 0.6 snags per acre (60 per 100 acres) needed for the 100% population potential. After the first 30 years, natural or other mortality would need to create about 0.6 snags per acre every decade to maintain the soft snag levels.

Ponderosa pine grown in this zone require about 150 years to reach 19-20 inches DBH. Over a 150 year period, up to 1120 snags per 100 acres (11.2 snags per acre) would have to be created. At an expected basal area of 80-120 square feet per acre (typical of healthy Open Parklike and Open Intolerant Multistory-Old stands) only 12-18 live 20 inch DBH trees would be present (1200-1800 per 100 acres). There would be fewer trees at larger diameters. Thus, to meet the 100% population potential, virtually every ponderosa pine would need to die upon reaching 20 inches DBH. Even if snag longevity were twice that predicted, the impacts of maintaining 60 soft snags per 100 acres does not appear to be within any expected range of natural variability at the landscape scale. Saving fewer hard snags but in much large diameter classes (30+ inches DBH) should greatly reduce the total number of snags needed since the longevity of larger soft snags is much greater than smaller soft snags. Whether such a strategy would be able to meet the 100% population potential while remaining within the range of natural variability has not been evaluated for this analysis. Further study of snag generation, use, decay and longevity rates, and viability standards for white-headed woodpecker appears to be in order.

Interior Habitat. Micro environmental conditions change between an edge along an opening and deeper into the stand. These changes in conditions are probably most important to various fungi, lichens, bryophytes, vascular plants, amphibians, mollusks, and arthropods, and least important to birds and mammals. Within the animal kingdom, the micro invertebrates and invertebrates are probably most closely tied to micro environmental conditions because of their limited mobility, with the exception of many flying insects. Very little is known about invertebrates in a forested environment--species present, needs, and function within the ecosystem.

The TLMLT guild most closely represents interior forest habitat. This guild does not represent interior habitat as well as desired for specific analyses, however. For general analyses of connectivity and relationships between LSRs, it appears to be accurate enough. Existing interior habitat within the LSR was mapped using a GIS program to create a 135 meter buffer around openings (Stand Initiation, Open Parklike, Understory Reinitiation, and Woodland structure types). Any late successional habitat (Mature Stem Exclusion and Fire Excluded Multistory structure types) that was further than 135 meters from an opening was considered interior habitat. No buffers were placed around intermediate structure types, such as Open Intolerant Multistory (both Young and Old), Stem Exclusion, and many Cathedral stands in the Doughty sale area since these types are dense enough to reduce wind velocity and raise or maintain relative humidity in the adjacent stands. These same structure types lack the large tree component, so were not included as interior habitat either.

There was no patch size and shape threshold to consider for interior habitat. Within the LSR, there are about 570 acres of interior forest habitat at this time (Figure 4.6). This is mostly found in three patches in the eastern portion of the LSR. Two patches, 75 acres and 122 acres, in the northeastern corner are most able to continue to function for the next 20 to 50 years. The 155 acre patch in the southeastern corner is in very dry Fire Excluded Multistory stands that are much more likely to be lost to insects or fire in the next 20 years.

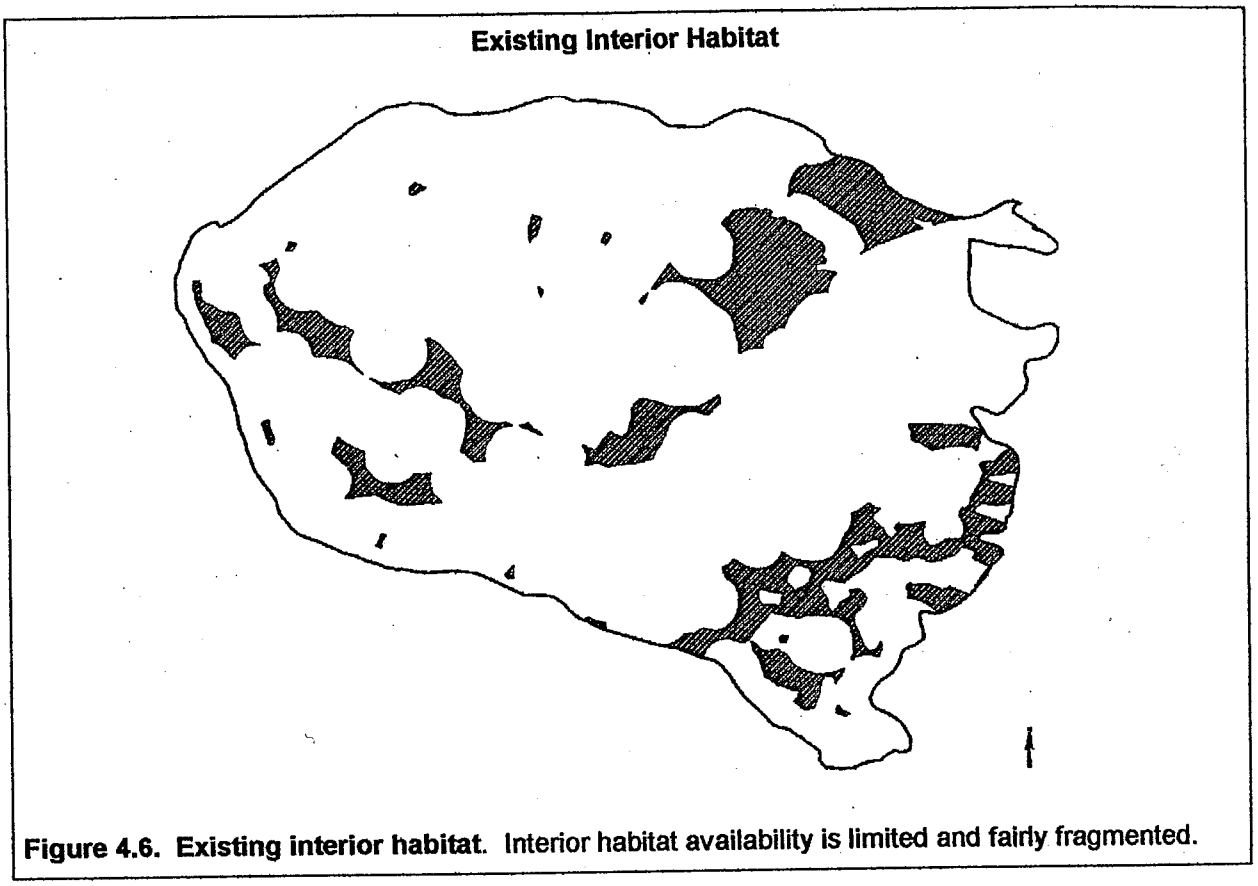


Figure 4.6. Existing interior habitat. Interior habitat availability is limited and fairly fragmented.

The predicted interior habitat in 100- 50 years is about 793 acres, primarily in a U-shaped patch in the Slopes area. The differences between the present and the future reflect loss of interior forest habitat in the lower elevation Fire Excluded Multistory stands, but increases in the higher elevation Cathedral stand structure more typically associated with late-successional species. We do not anticipate there will ever be much more interior habitat in this LSR, regardless of the time elapsed or the intentions of management.

Except for habitat within the White River and Surveyor's Ridge LSRs, probably none of the existing interior forest habitat blocks on the Barlow Ranger District are large enough to be considered refugia or to provide much recruitment for populating other areas except for the west edge of the Mill Creek LU. More site specific information for areas outside the analysis area is needed to accurately evaluate connectivity.

Summary. Douglas Cabin LSR probably does not function as a refuge for closed canopy, late successional dependent species, nor does it function as a center for recruitment of these species within the White River-Surveyors Ridge-Douglas Cabin LSR/Badger Creek Wilderness complex. The entire LSR could provide high quality "eastside" Cathedral, Open Intolerant Multistory, and Open Parklike fire climax habitat favorable for late successional species associated with open canopy, old forests, such as white-headed woodpecker. Sufficient habitat should remain in the short-term to provide for existing populations of closed canopy late successional dependent species. The current functioning of OR-1 CHU should remain intact but with a rearrangement of habitat conditions.

Disturbance Processes

Fire Regimes and History. The change in vegetation discussed above has resulted in a change in the expect type of fire, should one escape initial attack. Ladder fuels are well-distributed throughout the

LSR. Even though the recent harvests have fragmented the landscape, they are not large enough or distributed in a manner that would provide an effective fuel break. The characteristic fire is now mixed and high intensity over most of the LSR. Low intensity fire is still probable on the northernmost south aspect.

Since 1961, 16 wildfires have started within the LSR boundaries. Lightning started nine fires and abandoned campfires started six fires; the cause of one fire is not known, but is probably human-caused based on the time of year. The lightning fires started in June, July and August, with most starts in August. The human-caused fires started in October and November, which corresponds with general deer and elk hunting seasons. None of these fires burned many acres; most burned less than ¼ acre.

Insects. During the 1980s and early 1990s, only the lack of large diameter ponderosa pine prevented an outbreak of western pine beetle. Regardless, western pine beetle appears to kill a relatively constant number of the few large ponderosa pine remaining each year, particularly in the northeast portion of the LSR, adjacent to Badger Creek Wilderness. Mountain pine beetle has been somewhat active, attacking smaller diameter ponderosa pine. At present, however, pines of suitable size are still relatively uncommon and scattered throughout the stands. Activity levels of Douglas-fir bark beetle have shown some recent increase, but levels of mortality remain low.

The two pests that have been most active are western spruce budworm and fir engraver beetle (Table 4.7). As mentioned under Vegetation, a major outbreak of western spruce budworm occurred in the western portion of the LSR. This pest has been active throughout the LSR, with top-killing common in both Douglas-fir and grand fir. Fir engraver beetle activity levels seem to be linked to spruce budworm activity levels. Usually fir engraver beetle is considered a secondary pest that primarily top-kills trees. During the recent drought, fir engraver beetle was a primary cause of tree death elsewhere on the district. Defoliation increases tree stress, leaving them more vulnerable to successful attack by other insect pests and diseases. No recent evaluations of fir engraver activity levels have been conducted in the LSR. However, it seems reasonable that if fir engraver beetle was a primary cause of tree death in similar situations elsewhere, it could be a similar problem in the LSR.

Insect pest activity is operating more at an epidemic level than an endemic level. Populations of specific pests may be at endemic levels, but this is primarily due to the low populations of host tree species. When low numbers of host species are present and the host tree species or sizes are desirable, even small annual losses become significant.

Table 4.7. Insect activity levels in Douglas Cabin LSR 1980-1996.

Year	Insect(s)	Acres Affected
1980	Douglas-fir bark beetle	33
	fir engraver beetle	
1983	western spruce budworm	4,235
1984	western spruce budworm	4,235
1985	western spruce budworm	4,235
1986	western spruce budworm	4,201
1987	western spruce budworm	3,830
1988*	western spruce budworm	2,724
1989	western spruce budworm	26
1990	western spruce budworm	413
	western pine beetle	103
	fir engraver beetle	2
1991	western spruce budworm	1,695
1992	western spruce budworm	2,396
	western pine beetle	42
1993	fir engraver beetle	31
	western pine beetle	4
1994	fir engraver beetle	1
1995	fir engraver beetle	1
1996	Douglas-fir bark beetle	4
* Western spruce budworm sprayed with Bt in spring		

Diseases. Changes in disease levels are based on circumstantial evidence, rather than direct evidence. Old photos indicate stands were much more open than present. The differences in stand density between 1939 and now suggest that the area can support more trees than it did before 1900. In turn, this suggests that past stands were open enough that most individual trees were under relatively little stress, even during droughts. Since root disease activity levels are directly related to tree stress, we concluded that root disease activity levels were quite low. Currently, root disease activity is moderate to high in the western half of the LSR (Slopes) and low in the eastern half (Flats). The lower activity levels in the Flats are partly due to the drier conditions, which are not as favorable for root disease.

Infection levels of dwarf mistletoe are related to both the density of host species and proximity of individual host trees to each other. Further, studies suggest that population levels of dwarf mistletoe of all species are lower in areas subjected to frequent fire since small infected trees and infected lower branches are often burned (Hawksworth and Wiens 1996). In addition, dwarf mistletoe seed germination is reduced when exposed to smoke for 60 minutes or longer (Hawksworth and Wiens 1996). Moderate to high levels of infection in a large number of Douglas-firs are not uncommon, especially in the eastern half of the LSR (Flats area). Based on this information, we believe that the level of dwarf mistletoe infection in Douglas-fir has increased significantly. Both the number of trees infected (due to increased numbers of Douglas-fir) and the level of infection on individual trees (due to dense multistoried stands and the lack of fire) are much higher now than in the past.

Wind. The incidence of blowdown has increased somewhat over past levels, primarily due to clearcutting. Tree flagging by westerly winds is evident along the western edge and the prominent ridges in the Slopes area. Extensive blowdown occurred in several Cabin shelterwoods and thinnings in the northwest quarter of the LSR during late winter 1991. Most blowdown on the District seems to occur in late winter and early spring, when soils are saturated and strong westerly winds associated with a marine push occur.

Many of the current trees are less windfirm than in the past. Trees in denser stands tend to be thinner in diameter than trees of the same height and age grown under more open conditions. The trees in the denser stands "rely" on support from adjacent trees to provide support from wind. When such stands are

thinned, this support is reduced or removed and the trees left are more easily blown over. Experience with other thinnings and shelterwoods elsewhere on the District have shown that it is very difficult to rebuild windfirmness in the remaining stand before many of the trees blow over.

Floods. It is difficult to evaluate how flooding may have changed. Since all streams in the LSR are intermittent, high flows normally occur under high intensity rainstorms and rain-on-snow events. As a result, the streams are considered to have very flashy flow regimes.

Several factors can alter both erosion rates and flow regimes. Erosion tends to become more concentrated in clearcuts and compacted areas, leading to more rill erosion rather than sheet erosion. Some clearcuts reach to the stream channels, allowing "straight shots" for water and sediment leaving the clearcuts. In turn, this could result in higher energy in the flow which potentially allows for more streambed and bank scouring and more sediment input into the streams. In the adjacent uncut stands, the increased stand density serves to reduce erosion and also to reduce the amount of water reaching the streams. Water reductions can come directly through precipitation interception by the tree crowns and indirectly by increased evapo-transpiration demands on the ground water. How much these factors are influencing flow regimes in Douglas Cabin is not known.

Important conclusions reached:

- Tree species composition within most of the LSR has changed from a dominance of fire tolerant, shade intolerant species (relative to site) to a dominance of fire intolerant, shade tolerant species. Whereas the LSR was dominated by ponderosa pine, Douglas-fir, and Oregon white oak circa 1900, it is now dominated by Douglas-fir and grand fir. Oregon white oak has become a minor species and may have been lost in portions of the LSR.
- Understory species composition has changed from a dominance of grasses and brush to a dominance of litter and duff.
- Characteristic old growth structure types have become very rare due to a combination of harvesting large diameter trees and fire exclusion.
- Insect pest activity has changed from primarily endemic levels to primarily epidemic levels.
- Dwarf mistletoe levels have probably increased with more trees infected and more trees with high levels of infection (Hawksworth ratings of 3 or high).
- The numbers of large diameter ponderosa pine are at historic lows and continuing to decline.
- Clearcutting has fragmented the best available connectivity corridors on north aspects in the Slopes area.
- The characteristic fire regime has changed from primarily low intensity underburning with little damage or loss of tree cover expected to primarily high intensity crown fire with high levels of damage and loss of tree cover.
- Approximately 19% of the LSR is either unsuitable or marginally suitable for the growth of closed canopy forest.
- Approximately 109 acres in the western edge has collapsed. This area is connected to a much larger collapsing area within Badger Creek Wilderness in Badger and Little Badger Creeks.

Human Uses

Current human uses within the LSR consist of recreation and cattle grazing. Planned timber harvesting essentially ended in the LSR shortly after the Mt. Hood Forest Plan was released. The Mt. Hood Forest Plan designated most of the LSR as C1--Timber Emphasis, with B4--Pine-Oak Habitat along the eastern edge. However, once the northern spotted owl was proposed for listing as a threatened species, the present LSR area was set aside, first as a Habitat Conservation Area (HCA), then as a Critical Habitat Unit (CHU).

Recreational Uses. Recreational uses within the LSR are limited in both type and duration. The most intensive use comes during spring hunting season for turkey and fall hunting seasons for deer and elk. There are usually 3-5 major dispersed camps within the LSR during these hunting seasons. Some hunters camp at Bonney Crossing Campground or Little Badger dispersed site and hunt within the LSR. Roads 2711-120, -011, -140, and -150 have CFR closures from August 1 to April 15 each year to provide for increased deer and elk security during hunting seasons.

A limited amount of snowmobile use and All Terrain Vehicle (ATV) use occurs in winter and summer. Snowmobile use is limited by inconsistent snowpack in the Flats area coupled with deep snow accumulation where the access road crosses Little Badger and Badger Creeks. A limited amount of morel mushroom gathering occurs in spring.

Two wilderness trailheads (Douglas Cabin and Gordon Butte) are located along the 2711-120 road (Figure 4.7), but both trailheads receive only limited use due to steep road access, seasonal road closure, limited signing, and lack of a destination point. The Douglas Cabin Trailhead sign has fallen, the portion of the trail within the LSR is difficult to locate due to Cabin cutting units, and the stands along the trail have collapsed. Badger Rim Trail is a proposed trail that weaves in and out of the wilderness and is intended to connect Bonney Crossing Campground, Douglas Cabin Trail, and Gordon Butte Trail. This Rim Trail has been flagged and surveyed, but no funds have been allocated for construction. All trails are for foot and horse traffic only.

Grazing. Grazing is probably the most dominant use, currently. Two permittees use the Badger Allotment, with a total of 80 cow-calf pairs allowed. Grazing levels within the allotment varies from year-to-year, depending on whether either or both permittees use their full grazing permit and whether the pasture that includes Douglas Cabin LSR is being rested from grazing. The current grazing season is June 1 to September 30. Heaviest use within the LSR appears to occur shortly after cattle are turned onto the allotment, before the intermittent streams completely dry up and if the cattle are turned out near the LSR. Cattle use in the middle and latter part of the grazing season is probably concentrated outside the LSR near perennial water.

The fences around the two stock ponds are in very poor repair. Both ponds leak, although Redtail Pond holds water much better than Eagle Pond. Wildlife have ready access to any water in both ponds.

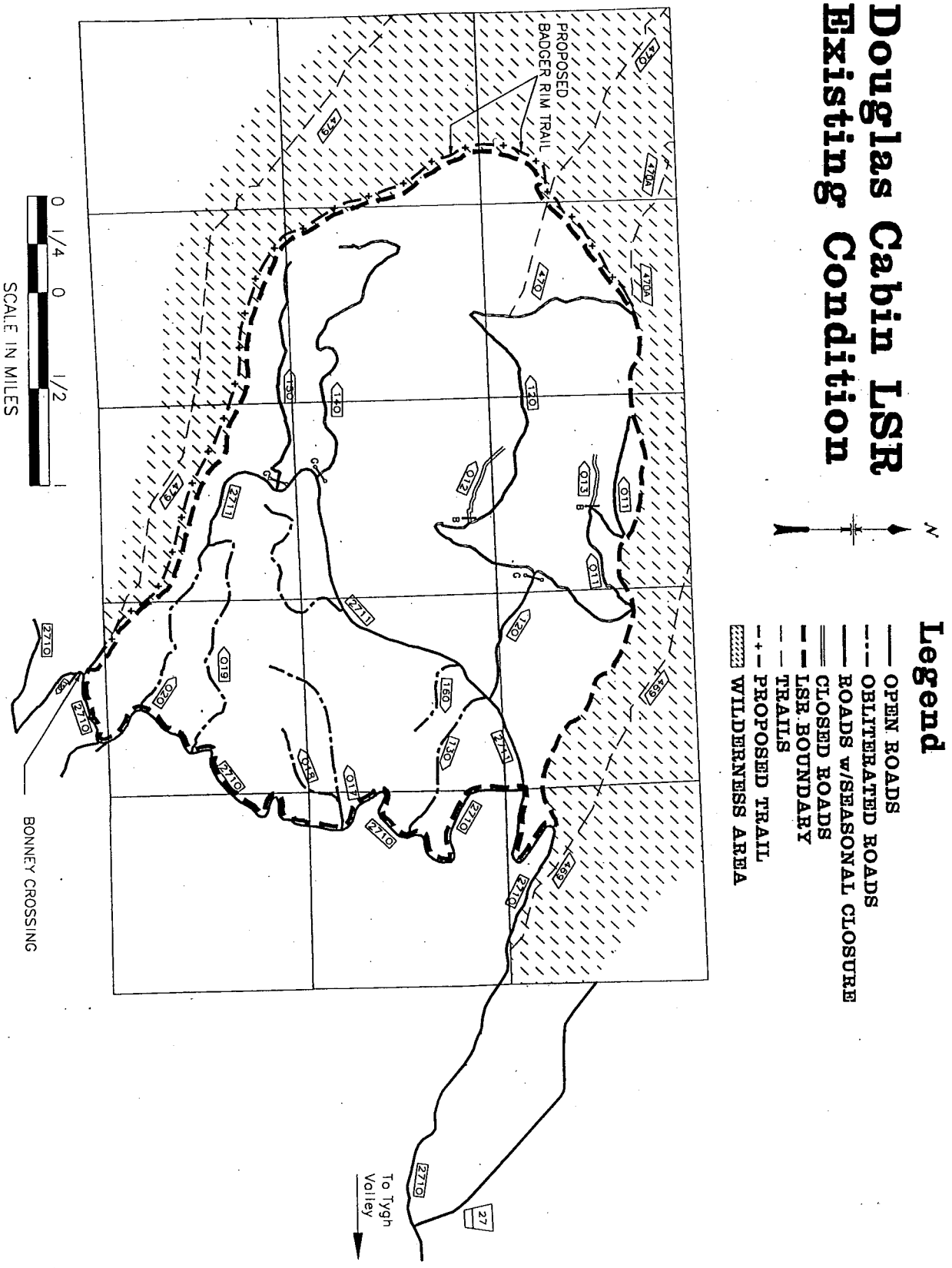


Figure 4.7. Existing transportation system. Three CFR closures limit acccess west of the gates from August 1 to April 15.

Chapter V Desired Future Conditions

Introduction

Late Successional Reserves are to be managed to protect and enhance conditions for late successional and old growth related and dependent species. Meeting a specified set of goals and objectives requires:

- Knowledge of applicable laws, regulations, and policies (Management Direction).
- Knowledge of where objectives could potentially be met with reasonable success (Range of Natural Conditions).
- Knowledge of where objectives are currently being met or not being met.
- Whether any movement can be can be made towards those goals and objectives.

Using the Range of Natural Conditions (RNC), management direction, and present conditions to develop the Desired Future Conditions (DFC) reveals important "red flag" differences. Some of the differences between RNC and DFC reflect tradeoffs for current needs verses future possibilities. Some differences reflect conflicts between stated goals and objectives (Management Direction) and site capability. Some changes from RNC will probably be more-or-less permanent because of changes in the environment and modern social demands.

Specific Considerations

The primary emphasis in discussions with members of the Regional Ecosystem Office and written direction in the Record of Decision for the Northwest Forest Plan and the FEMAT Report has been late successional species associated with closed canopy stands. In some discussions, we have been advised to manage at stand densities greater than RNC in order to provide habitat for species associated with late successional closed canopy forest. In attempting to describe the desired conditions for Douglas Cabin LSR, we evaluated the ability of the area to provide and sustain late successional closed canopy forest. In particular, we focused on climate, soils, the needs of late successional species associated with open canopy forest, and late successional stand longevity. Available water, or growth moisture, to support the stand densities needed to both develop and hold late successional closed canopy forest is a major concern in Douglas Cabin.

Climate. As discussed in the previous sections, the climate in Douglas Cabin is considered warm and dry. We examined the precipitation records for three nearby National Weather Service (NWS) Observer Stations (Table 5.1). Dufur, Oregon lies well below lower timberline; trees grow only in association with perennial and large intermittent streams without irrigation. Friend, Oregon lies in an area that previously supported pine-oak woodland and open forest (currently it is all farmed). Pine Grove, Oregon lies at the bottom edge of pine-oak-incense-cedar forest. According to the PRISM (Parameter-elevation Regressions on Independent Slopes Model) map available from the Oregon Climate Service (www.ocs.ats.orst.edu), the east edge of Douglas Cabin LSR falls into the 16-22 inch annual precipitation band and the west edge in the 28-34 inch band. As a rule of thumb, at least 20 inches of annual precipitation is considered necessary to support forest and at least 30 inches to support relatively dense forest. Open coniferous forest grows in Oregon with annual precipitation lower than 20 inches in some locations.

In order to place this information in perspective, we went to the home page of the Oregon Climate Service and looked at the annual precipitation of other stations around the Mt. Hood National Forest and around the Deschutes National Forest (Table 5.2).

Table 5.1. Locations and precipitation at three NWS Observer stations.

Station	Elevation	Legal Location	Distance from LSR	Period of Record	Annual Precipitation (inches)				
					Average	Maximum	Year	Minimum	Year
Dufur	1330 ft	T1S R13 E Sec. 25,26	12.5 miles NE	1910, 1915-1996	12.27	21.73	1996	5.12	1935
Friend	2400 ft	T2S R12E Sec. 32	9 miles ENE	1924-1976	15.14	22.97	1942	8.70	1935
Pine Grove	2220 ft	T5S R11E Sec. 25	11 miles S	1969-1994	18.43	27.62	1983	11.75	1985
Note: Douglas Cabin LSR lies in T3S R11E, SE quarter									

Table 5.2. Average annual precipitation for other NWS Observer stations.

Station	Elevation	Period of Record	Annual Precipitation (inches)				
			Average*	Maximum	Year	Minimum	Year
Hood River	500 ft	1911-1996	31.05	53.75	1996	15.76	1944
Parkdale	1700 ft	1913-1996	38.63	62.09	1948	21.80	1985
Estacada	410 ft	1913-1996	58.93	90.03	1996	35.67	1952
Bend	3650 ft	1911-1996	11.70	21.89	1948	5.42	1994
Sisters	3180 ft	1958-1996	13.85	22.20	1996	7.58	1985
Crater Lake NPS HQ	6480 ft	1930-1996	65.82	101.10	1996	47.26	1935
* Period of record used is 1961-1990, except for Parkdale							

Soils. In addition to annual precipitation, the soils present in an area can greatly influence the effectiveness of the moisture received. Coarser soils and shallow soils hold less moisture than finer soils and deeper soils. Even in areas that receive abundant precipitation, the inability of the soil to hold that moisture can dramatically reduce site capability. For example, soils on the Slopes are generally very gravely loams, capable of holding about 0.05 inches of water per inch of soil. That is only a 0.5 inches of available water per 10 inches of soil depth and only 1.5 inches of available water if we could find a soil on the Slopes that was 30 inches deep (especially on a south aspect). North aspects on the Slopes can hold more water than south slopes because the soils are more developed, deeper, and have accumulated more organic matter. The Flats area is characterized by finer-textured, and generally deep loamy soils that can hold about 0.20 inches of water per inch of soil, which calculates to about 2.0 inches of available water per 10 inches of soil *and 10 inches of available water in a soil only 50 inches deep.* Although the Slopes area receives more annual precipitation than the Flats, there is less water available due to the nature of the soils.

Needs of Open Canopy Species. In addition to habitat loss for closed canopy late successional species, there has been considerable habitat loss for open canopy late successional species. This latter group includes such wildlife species as flammulated owl, white-headed woodpecker, and pygmy owl and such plant species as Idaho fescue, bluebunch wheatgrass, and needlegrass. In general, habitat for the closed canopy late successional species was created through fire exclusion at the expense of habitat for open canopy late successional species. Now the combination of overstocking, drought, insects, disease, timber harvest, and weed infestation has resulted in loss of habitat for both groups of late successional species.

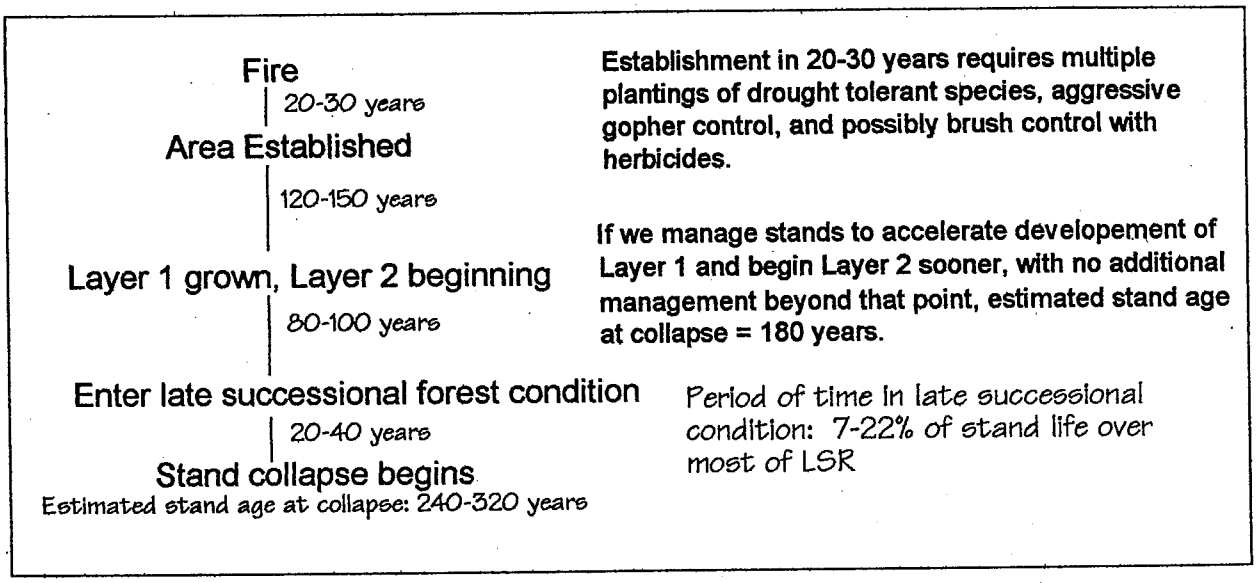
Late Successional Stand Longevity. We evaluated the likely longevity of both open and closed canopy late successional stands within Douglas Cabin LSR. As revealed in previous Sections, open canopy late successional forest was more common than closed canopy late successional forest and the existing closed canopy late successional forest is either collapsing or in poor health. The existing forest essentially entered it's current stand structure classes in the 1970s.

If we manage within RNC, it would mean emphasizing open canopy late successional forests, such as Open Intolerant Multistory, Open Parklike, and some areas of semi-open Cathedral stand structures. As best we understand the ecology of the area and the silivics of the primary species, and assuming we applied the proper intensity of disturbance at suitable times, there is no known reason why 60-70% of the LSR could not be in an open canopy late successional condition 100% of the time. This type of forest condition would emphasize the habitat needs of species associated with open canopy late successional

forest over the needs of those associated with closed canopy forest. The area would provide habitat for the latter group of species, but at lower levels than currently exists.

If we manage the LSR outside of RNC (more dense than typical) it would mean emphasizing more closed canopy late successional forest, such as semi-closed to closed canopy Cathedral structures and the Fire Excluded Multistory stand structure. Some more open stand structures would exist in the unsuitable lands. As discussed in previous sections, the Fire Excluded Multistory structure type is not a "natural" structure and is a high risk structure type under the conditions found in Douglas Cabin. *A single large scale disturbance, especially a fire, would likely adversely affect most or all of the LSR, not just a portion.* Under current conditions, a wildfire originating between Badger Creek and Flag Point, escaping initial attack, and burning under marine push wind conditions has a very high probability of burning the entire LSR and seriously threatening the community of Pine Hollow east of the Forest boundary.

A likely scenario is this:



Simply stated, the tradeoff between managing within RNC and managing beyond RNC appears to be:

Scenario	Area in Late Successional Condition	Time in Late Successional Condition
Within RNC	60-70% of LSR	100%
Above RNC	~90-95% of LSR	7-22%

We believe that managing to provide functioning late successional closed canopy forest for only 7-22% of the time does not really meet the objectives of Late Successional Reserves. It seems more logical to manage within RNC in order to provide more late successional forest, albeit more open forest than envisioned in the Northwest Forest Plan, over a much longer period of time. In addition, managing within RNC would also provide habitat for an "underserved" group of late successional species.

The DFC described in this section represents our best attempt to reconcile stated goals and objectives with land capability. As such, it is heavily oriented towards managing within RNC. The discussion follows a similar format as the previous two sections. Climate and geologic processes are not discussed since we have no influence over them. All discussions of abiotic factors refer to the limited areas where our management can influence outcomes of events beyond our control, such as flooding, where management activities may affect future site capability, such as soil compaction, or where past management activities and policies have greatly affected the frequency, severity, and timing of events, such as fire. The main discussion focuses on biotic factors, such as vegetation and wildlife habitat.

Soils

Site capability is maintained at its highest potential. Disturbances, such as fire, erosion, and so forth, occur at the "typical" intensity, severity, and frequencies. Sites are not overstocked with trees. Soil compaction levels meet to exceed Mt. Hood Forest Plan standards (15% or less of the area detrimentally compacted).

Hydrology

Stream channel stability is within the range of natural variability (although we do not know at present what that is) and function properly during high flow events. The timing of peak flows is within the range of natural variability. Riparian plant species and stocking levels are characteristic of the area for intermittent streams and springs. There is minimal channelization or directed flow; natural drainage patterns dominate. Roads have a minimal effect on the natural drainage patterns. Streams flow for a longer period into the year than at present. The channels contain sufficient large and small logs to trap sediment, reduce downcutting, and result in some meandering. Culverts are of the proper size to pass 100 year flood events and their associated debris.

Vegetation (see Addendum)

Desired conditions for vegetation are presented as a series of bullet statements and tables. These statements and tables are intended to be self explanatory, so little or no additional text is provided. Many of these statements and tables directly tie to the next section: Part IV Triggers for Management Activities.

For the most part, the forest structure types are oriented towards more open canopies. Canopy closure is expected to vary both across individual stands and across the landscape. Even the more open stands should contain areas normally considered as overstocked, called thickets. Thickets of denser trees provide the primary method of replacing larger trees in the general overstory, cover for a variety of species, and as a substrate for lichens and certain mosses. These thickets are usually of a size that is either unmappable or difficult to map and comprise a critical element in the old growth structure types. Individual thickets are fairly transient in nature, but collectively comprise a fairly stable percentage of the vegetation structure over the entire stand and landscape.

The typical old growth structures within the entire LSR will need to be maintained over time through a combination of thinning and prescribed burning. Some of the prescribed burns may be unplanned ignitions from lightning; however, the majority of the burning will be planned ignitions. [Funding realities may never allow full development of these types. The historic fire regime may never be fully restored.]

- Based on the stand structure categories described in Part II and Appendix A and site capability, manage the areas indicated in Figure 5.1 for its potential old growth structure type.

Old Growth Structure Type	Acres	Percent of Area
Cathedral	1,779	42%
Open Intolerant Multistory	1,680	40%
Open Parklike	731	17%
Woodland	45	1%
	4,235	

Notes: Old growth structure type mapped represents high end of site capacity. Cathedral has inclusions of Open Intolerant Multistory and Open Parklike. Open Intolerant Multistory has inclusions of Open Parklike. Open Parklike may have inclusions of Woodland

- Within the areas targeted for a particular old growth structure, the following levels of each old growth structure type should be present at any one time. All old growth stands contain a forest

matrix than meets the general description as well as thicketts of denser trees and more open areas.

Open Parklike/Woodland
80% Open Parklike/Woodland
64% Open Parklike/Woodland
16% umappable 1/8-1 acre thickets
20% Mappable Other structures (SI, SE, OIM-Y, OIM-O, WOOD, CAT)
Open Intolerant Multistory-Old
75% Open Intolerant Multistory-Old
45% Open Intolerant Multistory-Old
30% unmappable 1/8-2 acre thickets and openings
25% Mappable Other structures (SI, SE, OP, WOOD, OIM-Y, CAT, MSE, UR)
Cathedral
75% Cathedral
56% Cathedral
19% unmappable 1/4-2 acre thickets and <1 acre openings
25% Mappable Other (SI, SE, MSE, UR, OIM-Y, OIM-O, OP)

see Addendum

see Addendum

Target Old Growth Structures

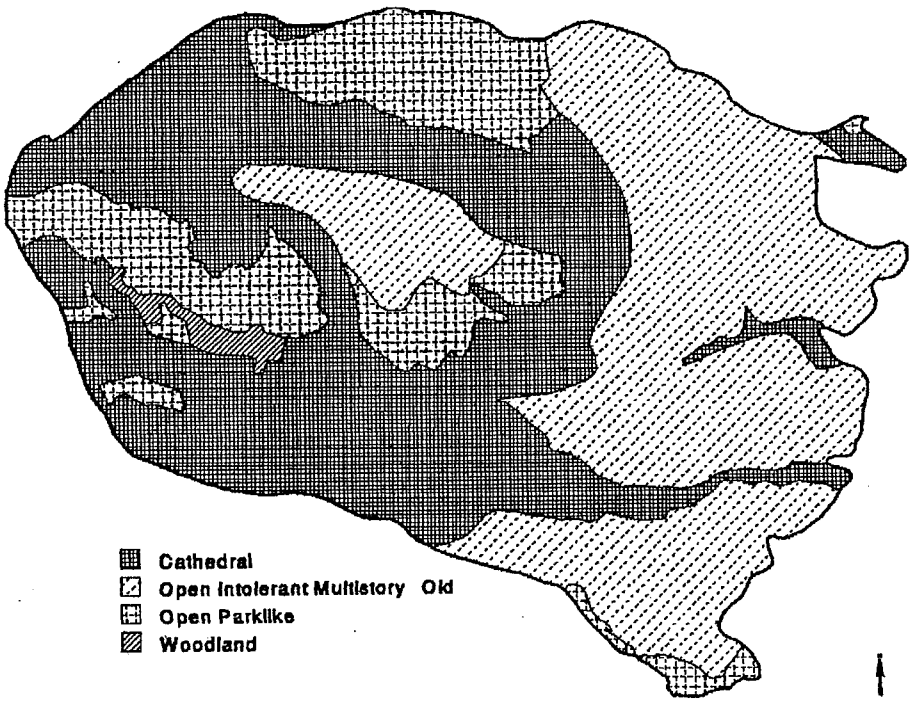


Figure 5.1. Target old growth structures. Together, Cathedral and Open Intolerant Multistory-Old potentially could occur on 82% of the LSR.

Each area actually mapped in a given old growth structure type consists of a general forest matrix that fully meets the description in Appendix A and areas within this matrix that technically meet the definition of another structure type. However, these inclusions of other structure types are of small enough size that they are difficult to map at the 1:24,000 scale. Collectively, the entire area is considered to be part of the old growth structure type. One key difference is that these unmappable patches within an old

growth area also contain some trees larger than 20 inches DBH whereas a mappable patches distinctly separate from the old growth area generally do not, unless they are another old growth structure type.

Within the table above, the first and last percentages represent the entire target area. For example, within the area targeted for Cathedral old growth structure, 75% of that area should be mapped as Cathedral while 25% may be mapped as some other structure type. The 2nd and 3rd percentages represent a further breakdown of the old growth structure type into the general matrix and unmappable inclusions of other structure types. Any structure type not listed in the Mappable Other category is considered an undesirable structure type, such as Collapsing and Fire Excluded Multistory. These generally undesirable structure types are permitted to occur as part of the unmappable areas within the old growth areas. Detailed descriptions for each old growth structure type are listed below.

Open Parklike		
General Stand Matrix	*Canopy Closure*	20-50% (expected to be variable and average 35% across the stand and landscape
	Area Coverage	80%
	Basal Area and Layers	
	Total	50-140 ft^2/ac (~25-60 trees per acre)
	Layer 0 >30" DBH	30%
	Layer 1 21-30" DBH	40%
	Layer 2 12-20" DBH	10%
	Layer 3 <12" DBH	20%
	Live Crown Ratio	40%+
	Understory	grass, needles, leaves, forbs, shrubs
	Other Notes	At least 50% of crown is well exposed to light
Thickets	*Canopy Closure*	50%+
	Area Coverage	20%
	Typical DBH Range	2-12" DBH
	Tree Size	approx. 20 ft tall
	Patch Size	1/8 - 1 acre
	Live Crown Ratio	50%+ on edge trees
	Understory	needles, leaves, scattered grass and forbs
	Other	branches (live or dead) within 3 ft of the ground and supporting lichens and mosses
Openings	*Area Coverage*	N/A
	Patch Size	N/A

Open Intolerant Multistory-Old		
General Stand Matrix	*Canopy Closure*	30-60% (expected to be variable and patchy, and average 45% across the stand and landscape)
	Area Coverage	60%
	Basal Area and Layers	
	Total	80-180 ft^2/ac (~40-75 trees per acres)
	Layer 0 >30" DBH	25%
	Layer 1 21-30" DBH	25%
	Layer 2 12-20" DBH	20%
	Layer 3 <12" DBH	30%
	Live Crown Ratio	40%+
	Understory	grass, needles, leaves, forbs, shrubs; litter and duff as approach 60% canopy closure
	Other Notes	At least 50% of crown is well exposed to light
Thickets	*Canopy Closure*	60%+
	Area Coverage	30%
	Typical DBH Range	2-20" DBH
	Tree Size	approx. 20 ft tall
	Patch Size	1/8 - 2 acre
	Live Crown Ratio	50%+ on edge trees
	Understory	litter and duff
	Other	branches (live or dead) within 3 ft of the ground and supporting lichens and mosses
Openings	*Area Coverage*	10%
	Patch Size	1/8 - 2 acres

Cathedral		
General Stand Matrix	*Canopy Closure*	50-90% (expected to be somewhat variable and average 70% across the stand and landscape
	Area Coverage	75%
	Basal Area and Layers	
	Total	160-220 ft^2/ac (~50-90 trees per acre)
	Layer 0 >30" DBH	30%
	Layer 1 21-30" DBH	50%
	Layer 2 12-20" DBH	5%
	Layer 3 <12" DBH	15%
	Live Crown Ratio	35%+
	Understory	litter, duff, scattered brush and grass
	Other Notes	
Thickets and Canopy Gaps	*Canopy Closure*	60%+
	Area Coverage	25%
	Typical DBH Range	2-20" DBH
	Tree Size	approx. 20 ft tall
	Patch Size	1/4 - 2 acre (thickets) or usually <1 acre (openings)
	Live Crown Ratio	50%+ on edge trees
	Understory	litter and duff
	Other	Thickets and canopy gaps help create a coarse texture to the stand as seen in aerial photos.

In all the old growth structures listed above, the goal is to minimize the area in early seral structures and maximize the area in older structures. Thus, the percentages for a given old growth structure represent a minimum and the percentages of Mappable Other represent a maximum. Given that a minimum

specified percentage of each old growth target area should contain that structure type, then we can estimate the minimum acres that should contain large trees (>20" DBH).

Old Growth Structure Type	Plant Series	Acres in LSR
Open Parklike[1]	Douglas-fir	621
Open Intolerant Multistory-Old	Douglas-fir, dry grand fir	1,008
Cathedral	dry grand fir	1,334
Total Acres		2,963
Percent of LSR		70%
[1] Includes Woodlands		

- Within each old growth area, the following species should be present or dominant:

Old Growth Area	Overstory	Understory
Open Parklike	ponderosa pine, Oregon white oak, occasional Douglas-fir or western juniper	prairie junegrass, bluebunch wheatgrass, Idaho fescue, antelope bitterbrush, deerbrush ceanothus, native forbs
Open Intolerant Multistory-Old	ponderosa pine, Douglas-fir, Oregon white oak, occasional grand fir	western fescue, wildrye, prairie junegrass, bluebunch wheatgrass, Idaho fescue, Oregongrape, ceanothus spp., baldhip rose
Cathedral	ponderosa pine, Douglas-fir, occasional grand fir, western larch, or western white pine	western fescue, snowberry, arnica, wildrye, Oregongrape, ceanothus spp., baldhip rose

- Most Oregon white oaks are single or double-stemmed with large spreading crowns that are free of conifer competition on at least 2 sides.

Snags and Downed Wood. The primary emphasis in snag and downed wood desired conditions are providing for the needs of wildlife and long-term site productivity. Some balancing is needed, however, based on site capability and fuels management. The goal is to provide the highest levels of snags and downed wood possible within site capability and without placing the area into a high risk situation.

Snags. Manage for 100% biological potential in all areas, with the possible exception of white-headed woodpecker. As documented in Part IV, the best information available indicates that meeting the 100% biological potential for this species is not feasible under current definitions of suitable habitat (60 soft snags per 100 acres, 15"+ DBH snags). One goal in vegetation is to manage for 30"+ DBH trees. Managing for these larger diameter trees and, by default, snags may serve to meet the 100% biological potential for white-headed woodpeckers due to the much greater longevity of these very large snags.

Downed Wood. Coarse woody debris, or downed wood, is a very important component of any ecosystem. The Northwest Forest Plan states that province-level plans will establish appropriate levels of downed wood and decay rates. The recommended levels will be "typical" and not require retention of all material where it is highly concentrated or too small to contribute to the downed wood functions over long periods of time. Douglas Cabin falls into the Deschutes Province; there is no province level plan.

Establishing appropriate levels of downed woody material is more difficult than establishing snag levels. There is plenty of research in dry ecosystems to guide us in setting appropriate levels to meet long-term site productivity needs (for example, see Graham et al. 1994). However, there is no such research and guidance for wildlife east of the Cascade crest. The recommendations listed below are an attempt to balance the needs of long-term site productivity and wildlife against site capability and wildfire hazard management.

Location	Target Old Growth Structure Type	Amounts of Downed Wood[1]
Recent Harvest Units	Open Parklike[2]	3-13 tons per acre, at least 1 tree-length log[3] per acre (120+ lineal feet)
	Open Intolerant Multistory-Old	5-15 tons per acre, at least 2 tree-length logs per acre (240+ lineal feet)
	Cathedral	10-20 tons per acre, at least 3 tree-length logs per acre (360+ lineal feet)
Unharvested Areas	Open Parklike Open Intolerant Multistory-Old Cathedral	No less than low end of loading shown in recently harvested units. Smaller diameter tree-length logs are acceptable in younger structure types (SI, SE, young OIM-Y), but larger diameter logs are preferred.
	Woodland	Whatever loading natural events provide

[1] Loading shown is total downed woody loading, weight of tree-length logs included in total loading. Loading should be concentrated in large logs.

[2] Open Parklike target area found primarily on lands unsuitable or marginally suitable for timber production.

[3] Tree-length log assumed to be at least 20" DBH and at least 120 ft long from butt end or root wad.

The intent of these recommendations is to provide a mosaic of downed woody loadings, not to provide only the minimum levels. In harvested units, large logs should be more-or-less evenly distributed across the unit, although the recommendation is for an average across the unit. At least 75% of the loading should be in material larger than three inches in diameter as measured using Brown's downed woody inventory method. In the Flats at the low end of the range, all loading should be in logs larger than twelve inches in diameter at the large end.

Within the Cathedral target area, no more than 15% of the harvested acres should fall below 15 tons per acre. Within the Open Parklike and Open Intolerant Multistory-Old target areas, no more than 10% of the harvested acres within the forested area should fall below 5 tons per acre. Woody material left after harvesting and fuels treatment should be more-or-less evenly distributed across the unit.

Wildlife

- At least 70% of the area that is capable of providing interior habitat is actually functioning as such (Figure 5.2).

- Maintain at least 1200 acres of suitable NRF habitat within 1.2 miles of the known activity center within the LSR until suitable habitat is reestablished on the north and east aspects of the Slopes area.

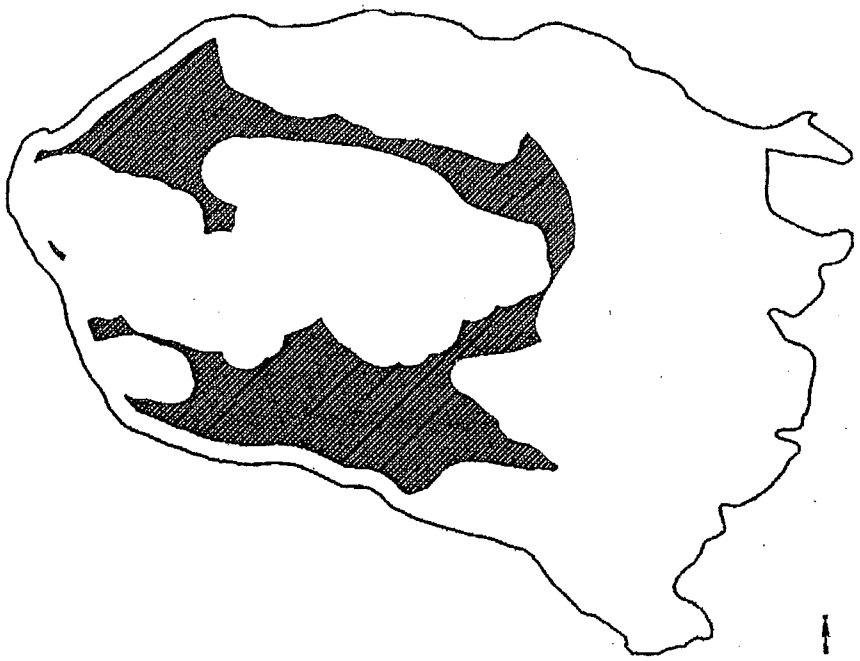


Figure 5.2. Target interior habitat areas. Most of the interior habitat would occur within the Cathedral area on north aspects. Interior habitat is expected to extend to the LSR boundary on the west and south edges.

Connectivity

Next 20-40 Years. Due to the collapse of stands in the upper Badger Creek Wilderness, connections between this LSR, White River LSR, and Surveyors Ridge LSR for closed canopy associated species has become almost totally dependent on one corridor (Figure 5.3). The main connecting corridor primarily consists of lands incapable of sustaining high levels of canopy closure. Over the short-term, it will be necessary to manage this corridor at higher than desirable canopy closures. This corridor connects to White River LSR by crossing Badger Creek just west of Bonney Crossing and following Threemile Creek to White River LSR. It connects to Surveyors Ridge LSR by crossing into Little Badger Creek drainage in Township 3 North, Range 11 East, section 23. This connection then heads west up Little Badger and then north below Flag Point and into Fifteenmile Creek. Both connections are somewhat tenuous, particularly if the connection to the north continues to unravel due to insect and disease attack.

- Maintain the connecting corridor with a canopy closure of 50% or greater.

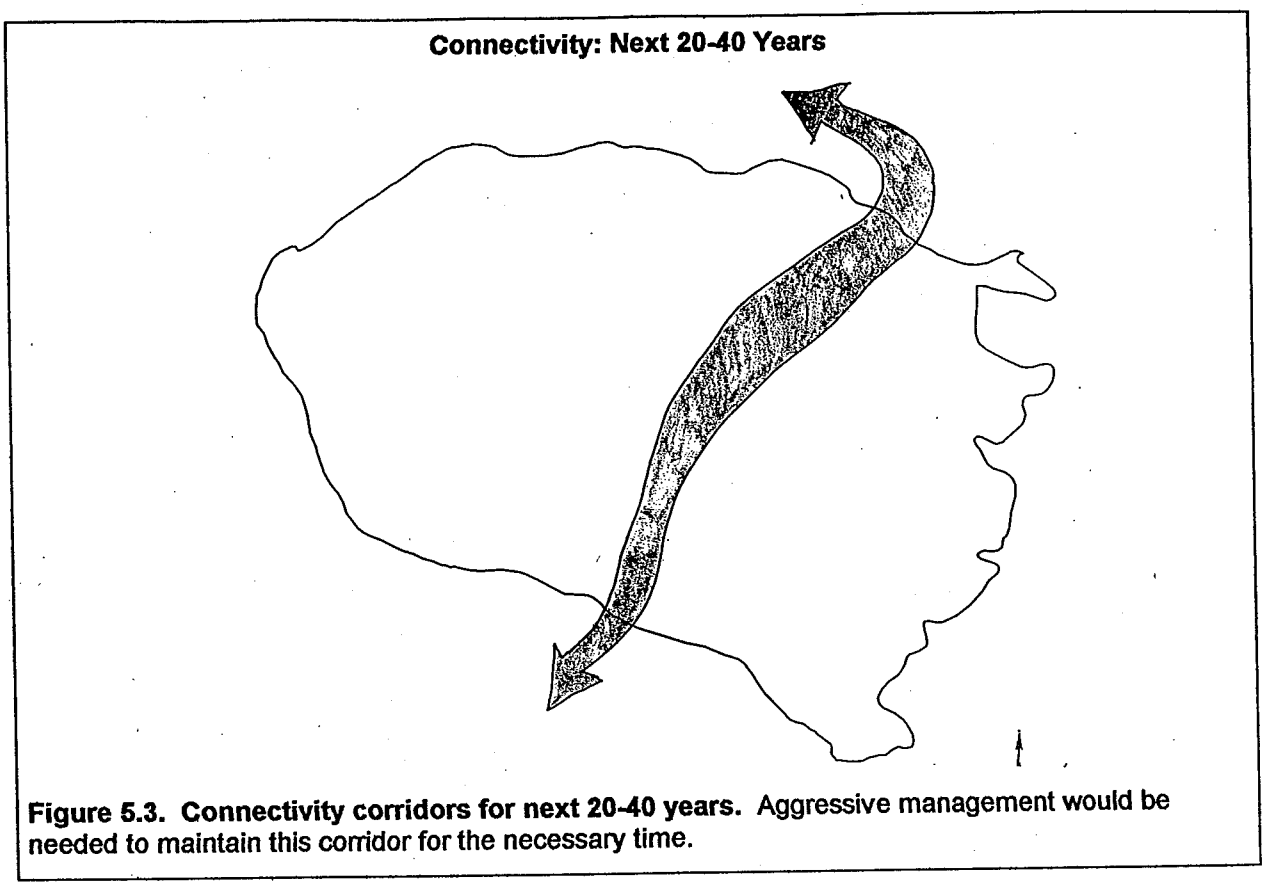


Figure 5.3. Connectivity corridors for next 20-40 years. Aggressive management would be needed to maintain this corridor for the necessary time.

Long-term. Eventually, the primary connection for closed canopy associated species between White River LSR, Douglas Cabin LSR, and Surveyors Ridge LSR will operate over Gordon Butte and Little Badger Creek from the west end of Douglas Cabin LSR. This is the primary connection that likely existed before 1900s. Since the connection exists through Cathedral stands, some connection must be retained at all times on at least one north aspect. Connectivity corridors should also be maintained along the north aspects of major intermittent streams into lower elevations for small home range species associated with closed canopy forests. Figure 5.4 displays the probable connecting corridors for closed canopy associated species.

Elsewhere in the LSR, sufficient canopy closure in large enough blocks should maintain connectivity for the more mobile closed canopy associated species, such as northern spotted owls. Connections should exist to the northeast, east, and southeast for open canopy, large tree associated species, such as white-headed woodpecker and pygmy owl.

Disturbance Processes

Fire. Fire planning for the use of both prescribed natural fire and management ignited prescribed fire should occur in conjunction with fire planning for the Badger Creek Wilderness. All characteristic old growth structures within this LSR are disturbance dependent and particularly dependent on fire as a primary agent of disturbance. The Fire Plan is found in Part VIII.

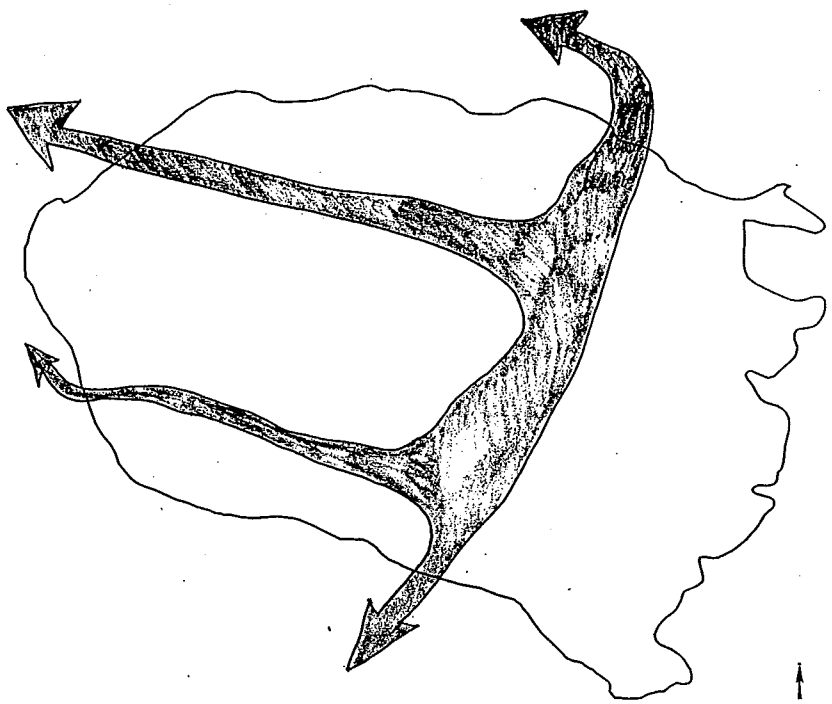


Figure 5.4. Connectivity corridors over the long-term. The north-south corridor would consist of more open stands than the east-west corridors.

Insects and Disease. Insects and disease are a part of the ecosystem. They produce small canopy openings, snags, downed logs, and habitat for other species. They thin stands threatened by long-term droughts and can pave the way for stand-replacing fires. Stand-replacing fires become problematic in an altered landscape where certain late successional species are dependent on "uncharacteristic" stand structures and static conditions in a highly dynamic landscape. The desired condition is to maintain, as much as possible, stands which exhibit levels of insects and disease that contribute to LSR functioning but do not endanger its continued existence:

- Mortality levels from insect and disease attacks should not exceed 15% of the trees per acre or basal area per acre on patches of more than 10 acres.

Human Uses.

Dispersed recreational uses should continue as the primary recreational activities while meeting the ROS class of semi-primitive motorized. No developed recreational sites should be considered. Only roads needed to provide access into the area and to trailheads should remain open. All other roads should be closed or obliterated (Table 5.3 and Figure 5.5). Long-term open road density should not exceed 1.5 miles per square mile, although short-term increases will occur during vegetation management activities. Vegetation management should strive to meet a VQO of Partial Retention in all distance zones.

Table 5.3. Road management objectives for Douglas Cabin LSR

Road	Maintenance Level	Surface	Closure	Type of Closure
2710	3	gravel	No	N/A
2711	2	gravel	No	N/A
2711-011	2/1*	gravel	Yes	Pull culverts and shape drainage crossing, obliterate/disguise entrance
2711-120	2	gravel	No	N/A
2711-140	2/1*	gravel	Yes	Pull culverts and shape drainage crossing, obliterate/disguise entrance, leave area for dispersed camping
2711-150	2/1*	gravel	Yes	
2711-012	1	native	Yes	Berms and water bars
2711-013	1	native	Yes	Berms and water bars
* Maintenance level 2 while open, maintenance level 1 when closed				

The Northwest Forest Plan directs that all human uses should be neutral or beneficial to the biological function of the LSR. We used the Northwest Forest Plan as a guide to judge site specific social uses either happening now or possible in the future.

Compatible Uses:

- Most dispersed recreation uses
- Maintenance of existing stock ponds to improve/retain water holding capacity
- New water developments that do not impact streams or springs.
- Commercial sales of posts, poles, shakes, rails, and firewood, **only in conjunction with an approved silvicultural project designed to meet LSR objectives.**
- Personal use collection of root species associated with open stands.
- Native plant seed collection (commercial and personal use).

Neutral Uses:

- American Indian treaty rights uses
- Badger Rim Trail construction and use
- Existing grazing in Badger Allotment
- Seed cone collections
- Personal use collection of mushroom species associated with open stands
- Personal use Christmas trees
- Upland-oriented outfitter/guide services using Badger Rim Trail from Bonney Crossing Campground (trailhead outside the LSR)
- Personal use collection of posts, poles, shakes, and rails **only in conjunction with an approved silvicultural project designed to meet LSR objectives.**
- Personal use firewood collection along roads

Incompatible Uses:

- New rock pits
- Collection of native plants involving bare root or root ball transplanting

- Commercial collection of Christmas trees, mushrooms, most other special forest products
- Commercial collection of vertebrate or invertebrate species
- Collection of roots or fungi species associated with closed canopy stands
- Gathering of hardwood branches, mosses, lichens, or ferns in Riparian Reserves
- New dispersed campsites in Riparian Reserves

Incompatible Uses Requiring Further Analysis of Possible Overriding Social Value:

- New roads
- Road realignments
- Reopening rock pit along road 2710
- Visual rehabilitation of existing clearcuts involving removal of additional trees
- Off-road motorized travel for non-emergency purposes
- Construction of new livestock corrals, drift fences, and boundary fences
- Reintroduction of Rio Grande race of wild turkey
- Introduction of other nonnative game species and native or nonnative biocontrol species

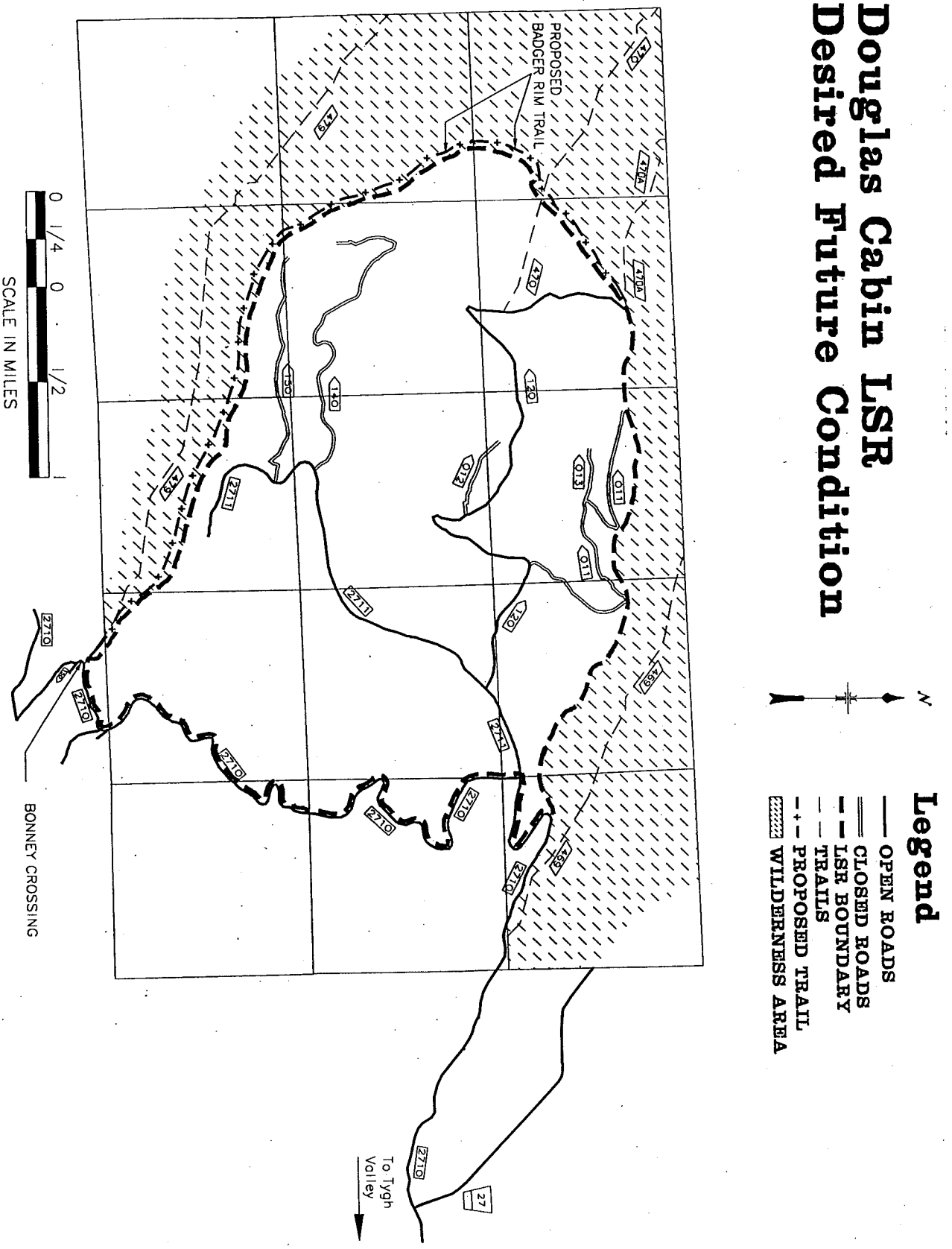


Figure 5.5. Desired transportation system. Additional year-round road closures would eliminate the need for the CFR closures and the gates currently present.

Chapter VI Triggers for Management Activities

In order to decide whether silvicultural treatments are needed to manage high risk conditions, we need some decision method, or triggers and constraints, to help determine which stands are potential candidates for treatment. We examined several factors to develop these triggers and constraints:

- Species composition (overstory and understory),
- Tree architecture,
- Canopy closure,
- Downed woody loadings,
- Extent of ladder fuels,
- Percent mortality,
- Interior habitat,
- Connectivity corridors,
- Winter range thermal cover condition, and
- Spotted owl habitat condition.

These factors are based on protecting older forest from stand replacing events, promoting faster growth in younger stands, and maintaining certain habitat conditions. Reaching a trigger does not necessarily mean that a management action will be taken. Rather, it indicates a need for further analysis to determine if the problem is significant and what types of treatments may be appropriate.

Species Composition

Certain wildlife species of concern are strongly associated with particular tree species. For example, several of the bat species on the C-3 list roost in the sloughing bark of dead trees. Thicker barked trees, such as ponderosa pine and Douglas-fir, provide better roosting sites than thinner barked trees, such as grand fir. Additionally, the species found in the understory can affect forage quality and quantity, long term site productivity, and species diversity. Of particular concern is when nonnative species more-or-less permanently displace native species. Management action may be needed when one or more of the following triggers are reached:

Location	Overstory	Understory
Douglas-fir plant associations	Douglas-fir comprises 50% or more of the stand Oregon white oak comprises 10% or less of the stand	Native bunchgrasses declining in cover Target[1] weeds found anywhere in any stand Knapweeds or thistles expanding beyond road edges Annual grasses occupy 25% or more of the understory and appear to be expanding
grand fir plant associations	grand fir comprises 50% or more of the stand	Native grasses declining below levels expected in a given stand structure type Target weeds found anywhere in any stand

[1] Target weeds are priority noxious weeds designated by the State Weed Board

Tree Architecture

Large crowned trees are more desirable than small crowned trees. More acorns are likely to be produced from oaks with only single or double stems and whose crowns are free generally of competition on at least two sides. Early treatment often prevents the development of undesirable tree architecture. Once live crown ratios fall below a certain point, improving live crown ratio becomes very difficult.

- Live crown ratio of conifers <30% and falling over 25% or more of the stand.
- Live crown diameter (in feet) of all species ≥tree diameter (in inches) in 50% or more of the stand in the more open stand structures (OP, OIM-O, OIM-Y, SI, SE, SE-PO).
- 50% or more of oaks in the stand have more than 3 stems per root collar/stump.
- 50% or more of oaks in the stand have conifers encroaching on at least 2 sides of the tree

Canopy Closure

The range of canopy closures in the target old growth structures described in Part V represent both a trigger and a constraint. As a trigger, management action may be justified when canopy closure equals or exceeds:

- 50% in Open Parklike areas on more than 20% of the area
- 60% in Open Intolerant Multistory-Old areas on more than 30% of the area
- 90% in Cathedral areas on more than 25% of the area

Stands with the above canopy closures are considered overstocked and at high risk of large scale, stand replacing events, such as an insect outbreak or wildfire. The higher canopy closures are acceptable in thickets intended to provide structural diversity.

As a constraint, canopy closure should not drop below:

- 20% in Open Parklike areas
- 30% in Open Intolerant Multistory-Old areas on more than 10% of the area
- 50% in Cathedral areas on more than 25% of the area

The constraints in particular are meant to apply to areas that are actually classified as a particular old growth structure and not in younger structural stages. An area limitation is not listed for Open Parklike areas since at 20% canopy closure, lower canopy closures are very difficult to detect as discrete areas. If stand collapse is deemed eminent in any old growth structure type, then these constraints do not apply. The goal would then be to treat the stand in a way that minimizes the area of collapse and maximizes retention of large trees and snags.

Downed Wood

A constraint is needed in order to assure adequate numbers of large logs remain in the intermittent streambeds. Since no studies or surveys have been conducted on intermittent streams there are no guidelines to use. After much discussion over what might be appropriate, we concluded that developing a constraint will need to wait until we conduct surveys of intermittent streams within and near the LSR.

Too much downed wood places the area and LSR at high risk of a stand-replacing fire. The point at which a stand or area moves into a high risk condition varies by vegetation series. Drier sites move into a high risk situation at a lower loading than moister sites due to differences in fuel drying and stand structures and fuel drying. Nonetheless, fuel loadings that increase fire hazard also provide wildlife habitat. Due to the decay rates considered typical of Douglas Cabin, fuel loadings that increase fire hazard do not necessarily increase site potential or long-term site productivity. Downed wood loadings

are considered excessive at the following levels, which represent a 25% increase of the upper limit specified as desired in recently harvested units in Part V:

Target Old Growth Structure	Total Loading
Open Parklike	16 tons per acre over at least 75 more-or-less contiguous acres
Open Intolerant Multistory-Old	19 tons per acre over at least 100 more-or-less contiguous acres
Cathedral	25 tons per acre over at least 200 more-or-less contiguous acres

The maximum allowable area coverage by excessive loadings is relatively small due to the small size of the LSR and the presence of the Badger Creek Wilderness on three sides. We have much less latitude to manage fuel loadings in the wilderness than elsewhere.

In both uplands and riparian areas, the arrangement of downed woody material can be just as important as the amount. Therefore, we selected several photos from fuel loading photo series to indicate unacceptable arrangements of downed woody material (Table 6.1).

Table 6.1. References to photos illustrating unacceptable fuel arrangements outside of thickets.

Target Old Growth Structure	Source	Forest Type
Open Parklike and	GTR[1] PNW-105 pg. 160	ponderosa pine
	GTR PNW-105 pg. 184	ponderosa pine
	GTR PNW-105 pg. 188	ponderosa pine
Open Intolerant Multistory-Old	GTR INT-97 pg. 108	Douglas-fir
	GTR INT-97 pg. 120	Douglas-fir
	GTR INT-97 pg. 122	Douglas-fir
Cathedral	GTR INT-96 pg. 14	grand fir-larch- Douglas-fir
	GTR INT-96 pg. 16	grand fir-larch- Douglas-fir
	GTR PSW-56 pg. 100	white fir

[1] GTR = General Technical Report

Ladder Fuels

Denser thickets have two important roles--providing cover and forage for species such as deer and providing a fuel ladder into the crowns of the overstory trees. Therefore, we need to find some balance between providing thickets while striving to protect older forests from crown fire development. Cover needs are particularly important along roads during hunting season and in winter range. The main characteristics to consider for ladder fuels are patch sizes, amounts, and distribution.

Patch sizes and amounts were discussed under the desired conditions for the target old growth stand structures. The intent in these descriptions is the thickets are well distributed across the landscape, of random size, and of random distribution. Thickets should not be clustered or concentrated into only part of the stand. In discussing this problem, we could not decide how to describe what is needed or how to insure it occurs. We will need to try several methods first in order to develop descriptions that everyone can understand and mentally picture. As an interim trigger:

- No more than 3 thickets should be within 200 feet of each other.

Mortality

Some level of tree mortality is desirable in order to provide snags and downed wood. At some point, the level of mortality results in large openings within the stand and it begins to lose its old growth or late successional characteristics. Management action may be justified when:

ee Addendum)

- Stand mortality equals or exceeds 15% of either basal area or trees per acre. Trees per acre is critical if most of the trees affected are small, resulting in a rapid increase in downed woody fuel in the smaller size classes. Basal area per acre is critical if most of the trees affected are large,

resulting in a rapid decrease in canopy closure and potentially a rapid increase in downed logs, depending on the species affected.

We believe that setting the trigger at 15% still allows for a sufficient number of snags to provide for 100% biological potential. There are no models to help guide us in developing this criterion, so we relied on professional judgment. In addition to just mortality, we need to examine the cause of death and whether the area affected is increasing rapidly (i.e. growing noticeably each year). For example, a high level of mortality caused by a single windstorm may not adversely affect meeting LSR objectives, whereas a spreading Douglas-fir bark beetle outbreak may.

Interior Habitat

Old growth and late successional associated species usually require some level of interior habitat, at least in closed canopy forests. However, we are unsure what would serve as the minimum level, since larger species need more habitat, while smaller species need less. We assumed that interior habitat for animals with large home ranges was more critical and that a larger patch would also provide habitat for several individuals or pairs of species with smaller home ranges and for old growth and late successional associated plants, fungi, mollusks, and arthropods. The interior habitat size we selected was based on what little information we could find about species dependent on closed canopy forest dominated by larger trees and professional judgment.

The Open Parklike and Open Intolerant Multistory-Old structure types have no interior habitat in the typical sense. Stands are simply too open. Interior habitat is possible only in the area targeted for Cathedral stands. Of the possible stand structures, only Mature Stem Exclusion, Cathedral, and Fire Excluded Multistory provide interior habitat, with Fire Excluded Multistory acceptable only for short periods of time.

- Natural events or human activities drop the amount of interior habitat below 70% of the maximum potential interior habitat.

Connectivity Corridors

- Natural events or human activities reduce a connectivity corridor by 25% or more at any point along its length. This includes openings that run parallel to the corridor "flow" was well as openings perpendicular to the "flow".

The intent of this trigger is to maintain a corridor's function. Corridors cannot function effectively if they are too narrow or if one or more openings sever the corridor. Cable corridors are allowed for logging. However, the logging system may need adjusting to reduce the number of corridors or to reduce corridor width.

Northern Spotted Owl Habitat

Most of Douglas Cabin is not capable of providing high quality nesting/roosting/foraging (NRF) habitat for northern spotted owls over the long-term. It can provide low quality NRF habitat over the short-term (next 20-40 years) and currently provides an important north-south connection corridor between White River LSR and Surveyor's Ridge LSR. Douglas Cabin LSR is capable of providing high quality dispersal habitat across most of the LSR and at least medium quality NRF habitat on north aspects in the Slopes area. Triggers associated with connectivity corridors and interior habitat should provide for near maximum levels of northern spotted owl habitat this LSR is capable of providing. As constraints:

- The amount of available NRF habitat drops below 1200 acres within 1.2 miles of any activity centers located within the LSR or located in adjacent non-matrix lands.

- No management activity can reduce existing NRF habitat unless the area is called to protocol to determine the presence of absence of northern spotted owls within 1.2 miles of the activity area. Calling should cover NRF habitat within the LSR and adjacent non-matrix lands.

Chapter VII Recommended Projects and Monitoring

Introduction (see Addendum)

This section describes and lists recommended projects to begin moving the LSR towards the desired conditions. The projects are based on a comparison between the existing and desired conditions. The information is presented in the form of a table that includes a brief description of the problem(s), one or more projects designed to address the problem(s), project monitoring needs, and considerations to include in specific project design.

It also lists the general monitoring needs. These monitoring needs apply to most vegetation management projects and are the standard methods for tracking changes in vegetation health and structure, and species compositions.

Recommended Projects

This project list is not tied to a particular timeline. High priority projects are indicated by italics. The high priority vegetation management projects are areas that have either collapsed or are in imminent danger of collapsing. Certain projects, such as precommercial thinning and plantation establishment, are expected to be more-or-less on-going.

Problem(s)	Project(s)	Monitor Needs	Considerations
Open road density exceeds desired level of 1.5 miles per square mile	Close roads 2711-140, 2711-150, and 2711-011 by pulling culverts, shaping drainage crossings, and obliterating/ disguising entrances	Check drainage patterns to insure water is not routed down roadbeds or through fillslopes	Leave road prism intact for use in later projects. Where feasible, leave enough of road entrance intact on 2711-140 and 2711-150 to provide for dispersed camping
Cutslopes along 2710 bare and eroding, in extreme cases undercutting bank	Seed or plant native grasses or shrubs	Survey 1 & 3 years after planting to ensure banks are revegetating	
Roads within LSR not designed to be self maintaining, require active maintenance to avoid erosion damage	Reconstruct 2710, 2711, 2711-120 to change drainage patterns and reduce annual maintenance needs	Survey every 3-5 years for maintenance needs after reconstruction completed	
Condition of intermittent streams unknown, including presence or absence of plant species dependent on perennial water	*Survey intermittent streams for large wood, channel stability, perennial pockets, cottonwood, aspen, etc.* *Survey for springs*		

Problem(s)	Project(s)	Monitor Needs	Considerations
Lack of perennial water limits potential use of LSR by some C-3 birds and mammals	Construct 5-6 small guzzlers on dry ridges in Slopes area to trap snowmelt and rainwater Construct 1-2 large guzzlers in Flats area to trap snowmelt and rainwater	Monitor for use by target species 1, 3, & 5 years after installation; then at 2 yr. intervals for maintenance needs	Guzzlers should not impair hydrologic functioning or alter natural drainage patterns
Loss of large diameter ponderosa pine has reduced potential bat roosting habitat	Place bat boxes in existing Open Parklike area and around Cabin 18	Monitor for use by target species 1, 3, & 5 years after installation; then at 2 yr. intervals for maintenance needs	Place boxes on south or southwest side of tree
Connectivity corridor associated with Gordon Butte has collapsed, connectivity through LSR and Badger Creek Wilderness now dependent on a single route; are at high risk of large wildfire	*Salvage collapsing stand area and plant mix of tree species to accelerate regeneration*	*Stocking surveys at 1, 3, & 5 years; animal damage control needs prior to harvest and planting*	*Retain all large diameter shade intolerant conifers, either living or dead to provide seed sources and large snags*
Very little of LSR comprised of desired old growth structures	*Thin and underburn FEM stands to begin moving towards Cathedral, Open Intolerant Multistory-Old, and Open Parklike structures*	*Survey for numbers, sizes, and, where possible, species of snags and downed logs prior to management activity and within 5 years after harvest.*	*Retain existing connectivity corridor functioning in vicinity of road 2711* *Retain as many large diameter shade intolerant conifers, either living or dead, to provide large trees and snags and seed sources* *To maximum extent possible, following thinning guidelines in REO memo dated July 9, 1996 (Appendix D)*
Live crown ratios in most younger stands <35% and tree crown diameter (ft) is less than tree DBH (inches)	Thin SE and UR stands to maintain or promote deep, wide crowns		To maximum extent possible, following thinning guidelines in REO memos dated April 20, 1995, and July 9, 1996 (Appendix D)

Problem(s)	Project(s)	Monitor Needs	Considerations
Crowding by conifers has reduced live crown area of most oaks	Thin around larger crowned oaks to improve crown spread and reduce competition and produce large diameter oaks for cavity sites Thin oak clumps to favor most vigorous 2-3 sprouts		Retain large diameter ponderosa pine and Douglas-fir, either living or dead, to provide large trees and snags
Condition of native plant communities unknown in existing open stands	Survey for Detection weeds, native bunchgrasses, and shrubs that bear large seeds or fruits (i.e. chinkapin, rose, etc.)		
Condition of existing closed roads unknown following intense storm and snowmelt events in 1996 and 1997	Survey 2711-012 and 2711-013 for roadbed, cutbank, and fillslope stability, culvert condition		
Stock ponds do not fill to capacity, existing fences in poor repair with barbed wire and posts down	Reseal existing stock ponds to improve water holding capacity Remove existing fences. Exclude ~1/2 of each pond from direct access to develop riparian plant community, plant native willows and cottonwood (if appropriate)	Monitor for water holding capability 1, 3, and 5 years after project completion, then every 5 years for maintenance needs	Use of cottonwood should depend on results of cottonwood survey to determine if native to the local area
Douglas Cabin trailhead sign has fallen, trail difficult to locate in existing Cabin units, no parking at designated trailhead	Move Douglas Cabin trailhead up to Gordon Butte trailhead location, construct portion of Badger Rim Trail between Gordon Butte trailhead and Douglas Cabin trail		
Little or no roosting habitat available for bat species that depend on caves anywhere on Barlow Ranger District	Investigate feasibility of burying old culverts into steep slopes to provide bat habitat as well as denning habitat for other mammals		Modify culverts to provide "grippable" surface for bats

Problem(s)	Project(s)	Monitor Needs	Considerations
Water diverted from intermittent stream channel to ripped roadbed	*Rechannel water back into natural channel*	*Check after high run-off episodes and flash floods for 3 years after project completion to determine if stream remains in natural channel*	*Scatter slash along old roadbed to catch sediment and assist in revegetating roadbed*
Culverts undersized for passage of 100 year event with associated debris	Replace culverts on 2710 and 2711 to meet 100 year flood requirements	Check after flash floods and high run-off episodes for culvert blockage	
Nonsystem road build under Douglas Cabin timber sale (1959) is generally unvegetated. Water from at least 2 springs runs down the road for a short distance	*Obliterate roadbed, plant trees and other native vegetation, place streams back into natural channels*	*Survey 1, 3, and 5 years after project completion to assure roadbed is revegetating and the streams remain in natural channels*	*Minimize disturbance of springs and outflow areas during road obliteration*
Open old growth structure types need frequent manipulation (harvest, underburning, or both) in order to maintain stand replacing fire risk below "high" rating	Prescribe burn Open Parklike target old growth areas every 10-15 years Prescribe burn Open Intolerant Multistory-Old target areas every 15-20 years	Survey prior to burning and 1 and 3 years after burning to assess fire-caused tree mortality, response of understory vegetation and regeneration, and changes in snag and downed log numbers	Burning prescriptions should emphasize retention of large trees and snags, protection measures may be needed to protect desired large logs
Locations of northern spotted owls unknown in or near LSR	Survey for northern spotted owls using standard protocols at least every 20 years		

General Monitoring Needs

The following monitoring tools should be used on a 10 year basis to track changes in stand structures and species compositions:

- Type 10 Stand Exams (or the equivalent)
- True color aerial photos
- Infrared aerial photos

Before trying extensive vegetation management within the LSR, we need to evaluate the ability of possible silvicultural prescriptions to achieve results by monitoring similar prescriptions outside the LSR. All or part of the following timber sales outside the LSR use prescriptions that we are likely to attempt inside the LSR:

- Haze
- Hazlet
- Con 1
- Con 2
- Con 3
- Con 4
- Con 5
- Owl Quarry
- Fivemile

Of these sales, only Fivemile has not been offered for sale. Harvest has begun on Haze and Owl Quarry and is expected to begin in spring 1997 on the Con sales. Monitoring of units within these sales should provide some predictors on the ability of the prescriptions to move towards or provide particular stand structures, species compositions, snags, and downed logs. Monitoring should also help point out modifications needed, in the spirit of adaptive management, in order to better meet LSR objectives.

If a "new" prescription is to be used in the LSR, it should first be attempted on a small area (i.e. 40 acres or less in size) either inside the LSR or outside the LSR in a similar habitat. The purpose of the small area trial would be to "experiment" with the prescription before applying it to a larger area. Monitoring should occur immediately after harvest, immediately after fuels treatment, and 1 and 3 years after fuels treatment. If the results are promising after 3 years, then the treatment could be applied to a larger area.

In addition to monitoring prescriptions outside the LSR, there is opportunity to monitor prescriptions inside the LSR. For example, the Doughty thinnings and shelterwoods in the Flats area show promising signs that those prescriptions are suitable to achieve the desired stand structures, based on a limited number of random samples in 2-3 units. More intensive monitoring should occur in the Doughty units to verify the initial impressions. Along the same lines, three underburns have occurred inside the LSR (1989, 1990, and 1991). Stand exams from 1989 (preburn for 1990 and 1991) could be compared with stand exams from 1997, to help determine what impacts burning has had on stand structures and species compositions, and somewhat on snags and downed logs. Direct comparisons for snags and downed logs will not be possible since sampling methods have changed.

Chapter VIII Fire Management Plan

Introduction

The fire regimes and fire history of Douglas Cabin LSR were discussed in Parts II and III (Past Conditions and Existing Conditions, respectively). This section describes the existing fire risk, emphasizing stand replacing fire risk; proposed fire management strategy; and fire suppression guidelines. It includes brief discussions of the applicability of both management ignited prescribed fire and prescribed natural fire.

Existing Fire Risk

Rating the existing risk for large stand-replacing fires involves two separate elements. In fire management, the term "risk" specifically refers to the probability that a fire will start and spread. Risk is often expressed as an occurrence rate, or the average number of fires per 1000 acres per year. An area of low risk means the area typically experiences few starts during the declared fire season (June 15 through October 15). Gordon Butte and the dry ridges in the Slopes is an area of somewhat concentrated lightning occurrence, although not as concentrated as higher points within the Wilderness. Nonetheless, lightning has started more fires than human carelessness within this LSR, with most starts associated with the ridges and Gordon Butte.

The term "hazard" specifically refers to the available fuel loading. Due to curing and seasonal drought, the hazard rating of a given area changes throughout the declared fire season. An area of high hazard means the area has a large amount of available fuel at the time of the rating. The hazard ratings, as listed under the section on fuel loading, are for the hottest and driest part of the fire season, typically ranging from mid-July through September in this LSR. Due to its position in the landscape, soils, and lack of perennial water, the entire LSR moves into a high hazard category by August of most years. Of particular concern is the 109 acres of collapsed stands in the western portion of the LSR which abuts similar stands within Badger Creek Wilderness.

Fire Occurrence Rates. Fire occurrence rates are low for the entire area, generally 0.25 fires per 1000 acres per year, based on data from 1961-1996. No areas of highly concentrated starts occur within the LSR. Fires rarely occur in multiple starts (busts). Arson has not been a problem. Storms that form on the north side of Mt. Jefferson or over the Bonney Butte and Badger Butte area typically result in lightning in Douglas Cabin. Lightning busts are possible, but rare. The last major lightning bust on record was in 1961. A similar event today would likely result in at least one escaped fire due to the reduction in both initial attack personnel and reinforcements within all wildland fire fighting agencies in the area. Most human caused fires have remained small.

Fuel Loadings. We did not use the existing downed woody inventories to estimate natural fuel loadings. Three prescribed underburns within the LSR and the spruce budworm outbreak on the west edge since fuels were inventoried have resulted in significant changes in the fuel loadings. This discussion is based on observations of current conditions and is qualitative. Due to the lack of complete data, areas of low, moderate, and high fuel loading have not been mapped. The discussion is by Fire Group. Fine fuels are woody material less than 3 inches in diameter, ponderosa pine needles, and grass.

Loadings in Fire Group One are generally low since this group is limited in extent and occurs in very rocky areas. Loadings in Group Two are generally moderate to borderline high in terms of downed woody material. Ladder fuels are extensive and probably outside the range of natural conditions, particularly along intermittent streams and areas not recently harvested. In areas that have been recently underburned, jackpots created by falling dead trees and brush are common. Fire Group Two would normally carry a moderate loading in the form of cured grass by late June or early July. Due to increased tree density, the grass load has declined in unburned areas.

Loadings in Fire Group Three are high to extreme along north aspects and in collapsed stand area and moderate to high elsewhere. Ladder fuels are very extensive and likely outside the range of natural conditions. Dwarf mistletoe is a significant factor in increasing both downed woody loadings and ladder fuels. Since fuel accumulation rates far exceed decay rates, fine fuel loadings are starting to become a concern.

Expected Fire Intensity and Severity. Fire intensity in this discussion refers to flame lengths. Fire severity refers to loss of canopy and duff consumption. Before 1855, both fire intensity and severity were low in Fire Groups One, Two, and much of Three. These areas mostly underburned with low flame lengths. Fires were generally frequent enough to limit duff buildup and downed log numbers. Frequent fire was a main factor in creating and maintaining the characteristic old growth structures in these areas--Open Parklike Fire Groups One and Two, Open Intolerant Multistory-Old in Fire Groups Two and Three, and Cathedral in Fire Group Three. Since the average fire return interval was more variable in Group Three, occasionally the fuel complex would support moderate and high intensity fires and moderate severity fires. Fire return was probably frequent enough to limit high severity fire to very small spots that are insignificant even at the stand level.

Current conditions will support high intensity and severity fires in Fire Groups Two and Three. Such fires would eliminate any existing late successional and old growth stands and the potential to move existing stands towards the characteristic old growth structure quickly. On steeper slopes such a burn would be much more susceptible to erosion due to the near total loss of protective cover. A high intensity rainstorm before a new vegetative cover established might result in a change in site capability, under worst case conditions. In addition, since the various organisms typical of these Fire Groups are not adapted to high intensity or severity fires, we could see significant reductions in soil arthropods and fungi, particularly mychorrhizal fungi.

Large Stand Replacement Fire Risk. The risk rating in this section attempts to integrate the specific meaning of risk (probability of a fire) with the hazard (available fuel) for the area under discussion. It also attempts to integrate any changes in expected fire intensity and behavior brought on by nearly 100 years of fire exclusion and the various timber management practices. Lastly, the risk ratings reflect a subjective judgment on the impacts of a large stand-replacing fire on LSR objectives, available late successional and old growth habitat, the potential to provide such habitat over the next 20 years, and the potential impacts on site quality.

Slopes. Overall stand-replacing fire risk is high to extreme, particularly in the collapsed stand area. Clearcuts and shelterwoods break fuel continuity. However, in-growth of shade tolerant species and widespread insect and disease related mortality in the surrounding stands has increased fuel loadings and ladder fuels. Some units were hand piled and burned. Hand piling slash does not reduce the fine fuel loading as well as broadcast burning, such that some units still contain the potential to contribute to fire spread and intensity.

Douglas Cabin is partially exposed to strong west winds that are funneled down Badger Creek canyon and across Gordon Butte. These topographic features often cause winds to accelerate as they funneled down drainages oriented in the same direction as the prevailing summer winds. Windthrow and snapping can be a problem along the western edge of the LSR, but appears to be less of a problem in the central and eastern portions.

Access into the Slopes area is slow by ground due to the lack of roads and the steepness of roads 2711-011 and 2711-120. An escaped fire would depend on the combination of dry conditions, high winds, and either an overwhelming number of starts at the same time (a fire bust) or a lack of firefighting personnel due to the fire load elsewhere in the region or nation. Since the Slopes can burn nearly every year, the probability that an individual start could transition into a major fire increases when initial attack is delayed.

Lethal underburning is a strong possibility in the Slopes, particularly in areas where ponderosa pine is still a major stand component and the area has not burned for several decades. Ponderosa pine sheds a

large number of bark plates each year. Through time, deep pedestals of bark plates and needles have built up around the bases of these trees. The pedestals can be over 4 inches deep around the larger trees. Fire can smolder for many hours to days in these pedestals, killing the cambium even through the thick bark present on the living boles. In addition, smaller diameter grand fir and Douglas-fir are common species in these stands. Grand fir is not very fire resistant and small diameter Douglas-fir is fire sensitive such that even a fire that does not crown can kill the cambium of these thin-barked trees.

The Slopes area receives low to moderate recreation use. There are two trailheads into the Badger Wilderness along the top end of road 2711-120. Use of both trailheads is limited for a variety of reasons. Use may increase if Badger Rim Trail were to be constructed. Most use occurs during the fall hunting seasons for deer and elk.

Flats. Stand-replacing fire is a moderate risk in the Flats. Much of this area has been harvested (thinnings and shelterwoods) and underburned. The untreated areas of Fire Group Two are relatively susceptible due to in-growth of fire sensitive species, ladder fuels, and higher than typical fuel loadings. Most roads have been closed in Flats, but the flat topography allows people to travel cross-country using all wheel drive vehicles. Most use occurs during spring and fall hunting seasons.

As the landscape moves towards the Desired Future Conditions identified in the Watershed Analysis, the risk of stand-replacing fire should decrease throughout the LSR. However, the area of collapsing stands will likely prove difficult to deal with over the short term due to steep slopes, low value species and logs, and the difficulty in controlling both wildfires and prescribed fires in the heavy fuel loadings currently present.

Proposed Management of Identified Fire Risks

Prescribed Natural Fire. The LSR standards and guidelines permit the use of prescribed natural fire (PNF) to meet LSR objectives. Based on LSR size and shape, location on the larger landscape, and surrounding land uses, Douglas Cabin is an excellent candidate for PNF. Since this LSR also abuts the Badger Wilderness, detailed planning effort for prescribed natural fire occur in conjunction with fire planning for the wilderness. Due to the poor stand conditions, the prescription should limit PNF candidate fires to those starts which will produce only low or moderate intensity fires, at least for the next 10 years; or PNF should wait until fuel loadings and ladder fuels have been reduced to the level that will support a more characteristic fire type (non-lethal underburns).

The prescription parameters should consider:

1. Drought conditions[1],
2. Large fuel dryness[1],
3. Current and expected wind speed and direction,
4. Proximity to existing late successional and old growth stands, and
5. Probability of burning into and reducing late successional and old growth stands.

Restoring fire to Douglas Cabin LSR will also help maintain the disturbance dependent old growth structures (Cathedral, Open Intolerant Multistory-Old, and Open Parklike).

Management Ignited Prescribed Fire. The LSR standards and guidelines also permit the use of management ignited prescribed fire to meet LSR objectives. Due to the current stand conditions and fuel loadings, particularly in the western third of the LSR, we recommend using management ignited prescribed fire first before allowing PNF. Some mechanical vegetation manipulation to reduce the risk of high intensity fires and escaped fires may be appropriate. Such manipulations would reduce the presence of ladder fuels and of fire sensitive species.

Prescribed burns should occur on about the same return interval as estimated for pre-1855 conditions. More detailed fire history studies using fire scarred trees would help better establish an appropriate return interval, assuming a sufficient number of living trees or stumps of known date-of-origin remain in or adjacent to the LSRs.

Initially, we expect such management ignited prescribed fires to be conducted in spring in order to better control fire effects. Of particular concern is the buildup of needles and bark flakes around large diameter ponderosa pine. Raking these accumulations well away from the boles is an acceptable alternative to spring burning provided such raking occurs at least one year before the planned burn. Studies in other areas have found that many fine roots have migrated into this pedestal of needles and bark flakes in order for the tree to capture scarce moisture. Raking reduces expected fire intensity and severity around the bole, but damages and destroys many of the fine roots. Raking at least one year in advance of the burn should allow the tree to replace the lost and damaged roots. These roots should regrow deep enough in the soil profile to adequately protect them from low severity fire.

Site specific burn plans will identify objectives and monitoring needs for each burn, as required by Forest Service Manual direction and the FEIS for managing competing and unwanted vegetation. The Barlow Ranger District integrated resource analysis for burning natural fuels also contains a potentially useful monitoring plan.

Management ignited prescribed burning should meet the following goals for managing LSRs:

1. Protecting or enhancing stand conditions for old growth associated species, and
2. Reducing the risk of large scale, stand-replacing disturbances.

Fire Suppression Guidelines

Appropriate Suppression Response. Three suppression responses to wildfires are allowed--confine, contain, and control. The Mt. Hood National Forest uses a centralized dispatch system on single starts and a district dispatch system on multiple starts. All fires handled by Mt. Hood Dispatch start with a control strategy. Since district dispatch is not employed until multiple starts occur, burning conditions are such that only a control strategy is used. Confine and contain strategies are almost never used.

The wildfire management goal in LSRs is to keep all stand-replacing events as small as possible. In general, few wildfires have the potential to become stand-replacing events. Wildfires with the lowest probability of this type of burning are those that occur outside the main fire season (before June 15 and after October 15) in most years. In wet years, such as 1995, even fires starting within the main fire season have a very low probability of transitioning into a stand-replacing event. In dry years, such as 1994 fires starting outside the main season have a moderate to high probability of transitioning to a large, stand-replacing event.

Until a PNF Plan is prepared and approved, all fire starts are declared wildfires. Even after approval of a PNF plan, regional policy is that all human-caused starts are declared wildfires. A given start that is a good candidate for a prescribed natural fire under the physical and ecological guidelines of the PNF plan may still be declared a wildfire due to social considerations or the regional or national fire load at the time of the start.

We recommend greater use of confine and contain strategies within Douglas Cabin LSR on declared wildfires to improve the cost effectiveness of wildfire suppression and to use the available fire fighting forces more efficiently. We did not have time to fully develop guidelines for use of confine and contain strategies. Appropriate indicators for use of either strategy would be time of year, current levels in selected fire danger indices, current trend in indices, fire location, and fire potential. A matrix could be developed that uses time of year and one or more fire danger index, such as Energy Release Component (ERC). Table 8.1 displays an example of such a matrix. A copy of the running trend of the selected indices that includes the historical average, a dry year or years, and a wet year or years would

assist in the decision-making process for use of alternative suppression strategies. Separate matrices may be needed for the Slopes area and the Flats area.

Table 8.1. Example of a decision matrix for the appropriate suppression response.

Fuel Model G--Douglas Cabin LSR

Time of Year	0-30th Percentile ERC	30-50th Percentile ERC	+50th Percentile ERC
October 15-June 15	Confine	Contain	Contain or Control
June 15-July 15	Confine or Contain	Contain or Control	Control
July 15-September 15	Confine or Contain	Control	Control
Sept. 15-October 15	Confine	Contain or Control	Control

Once the 90th percentile of the selected fire danger index is reached, burning conditions are generally extreme and a control strategy is the only acceptable option. Experience has also shown that rapid initial attack is critical to successful initial attack under extreme burning conditions. Any delays are much more likely to result in an escaped fire and a stand-replacing event. Energy Release Component is a good indicator of seasonal and long-term drought since this value is influenced by 1000 hour fuel moisture. Throughout Douglas Cabin LSR, NFDRS fuel model G is currently the most suitable for evaluating fire danger and escaped fire risk.

Minimum Impact Fire Suppression. Safety of fire fighters and forest users is the highest priority in all suppression efforts. All fire suppression activities must follow guidelines developed in the Fireline Handbook and listed by the hazard abatement plan developed after the South Canyon Fire deaths. Late Successional Reserve standards and guidelines require use of the minimum impact suppression tactics ("light hand" tactics) designed to minimize the size of all wildfires while producing the least possible impact on late successional and old growth habitat. Elements of particular concern are late successional and old growth stands, snags, downed logs, and duff.

Moody and Mohr (1988) developed a guide for minimum impact suppression tactics, which we recommend for use on both wildfire suppression and for mop-up of prescribed burns within LSR and Riparian Reserve boundaries. Minimum impact tactics include such practices as:

- Allowing fires to burn to natural barriers.
- Minimizing constructed fireline and fireline width; use of fireline explosive (FLE), cold-trailing, and wet line to lessen impacts from constructed line.
- Minimizing bucking and felling of trees and snags in line construction.
- Removing only those limbs with potential to spread the fire beyond the fireline.
- Allowing trees and snags to burn out instead of felling them, provided they do not pose a significant safety risk to firefighters or pose a significant risk of spotting outside the fireline.
- Limiting use of bulldozers to slopes of less than 25%.
- Minimizing spading, or "potato patching" during mop-up; as much as possible using water or foam and stirring or allowing fuels to burn out naturally.
- Minimizing bucking during mop-up; instead attempting to roll logs to extinguish the fire.
- Extinguishing smoldering logs as soon as possible.

- Locating portable pumps to minimize the risk of fuel spills entering streams, ponds, or other areas containing water; keeping hazardous materials spill kits in close proximity to all portable pumps.

Post fire rehabilitation needs should be identified quickly and rehabilitation carried out both quickly and at ecologically appropriate times. For example, seeding should not occur at times when germination and subsequent survival are expected to be very low. Erosion control seeding should rely on native species or sterile nonnative species as much as possible.

Logistics. No suitable locations for incident base camps or spike camps exist within Douglas Cabin LSR (Table 8.2). Use of roads 2711-011 and 2711-120 to transport heavy equipment should be avoided if possible and minimized if essential. Adverse grades on these two roads makes travel by heavy equipment very slow. Turnarounds suitable for school buses are limited to the end of road 2711-120 and do not exist on other spur roads off of 2711. Off road vehicle travel should be limited only to the minimum essential to meet fire suppression objectives or to protect firefighter safety.

Table 8.2. Potential fire camp locations for wildfire suppression in Douglas Cabin LSR.

Type of Camp	Location	Comments
Incident Base Camp	Wasco County Fairgrounds Tygh Valley	Helibase also
Spike Camps/Day Sleeping[1]	Junction of roads 2700 and 2710	Need to survey for sensitive plants and archeological sites before using.
Helispots	Switchbacks on roads 2711-120 and 2711-011, end of road 2711-140 in clearcut	Light helicopters only
	Gordon Butte	Medium helicopters, inside Wilderness, last maintained in 1981

Air Operations. No natural openings with adequate access are available for use as a helibase or helispot within the LSR. Some road corners may suitable for use as helispots, but none can handle anything larger than a light helicopter and none have clear take-off and landing paths. Helispot construction should be minimized. If a spot is to be used only for cargo drops, use slings and longline in lieu of constructed helispots. No helibases should be constructed. Locate helicopter fueling areas outside Riparian Reserves whenever possible. If a helicopter fueling area is located in a Riparian Reserve, a hazardous materials spill kit large enough to handle the available fuel must be located no farther than 5 minutes away from the site.

As stated in the Northwest Forest Plan and the Mt. Hood Forest Plan, retardant drops should be directed to minimize entry of chemicals into streams, lakes, water courses, or other waterbodies. Uncolored or fugitive chemical suppressants and other water additives should be considered in Douglas Cabin. As soon as possible, switch to using helitankers and buckets near waterbodies. Helitankers and helicopters with buckets can make more precise drops than air tankers, lowering the probability of accidental drops into streams and wet areas.

Rehabilitation. Rehabilitation plans must be designed to restore or move the area towards the late successional or old growth conditions, prevent or stop sediment from reaching Riparian Reserves, and restore camp sites and similar areas to the pre-fire condition. Wildfire suppression and the logistical support to the effort will cause some significant damage regardless of how careful and conscientious

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1 Unless otherwise noted, camps are intended to serve up to six 20-person crews with parking for vehicles and outhouses; no kitchens, showers, or other amenities and services.

incident managers and firefighters are. Some rehabilitation work is anticipated on all fires larger than 5 acres. Rehabilitation work may be needed on fires 1-5 acres in size that occur in sensitive areas.

Rehabilitation guidelines include:

- Pick up and remove all flagging, garbage, litter, and equipment. Reduce the need for litter and garbage pickup by recycling as much material as possible.
- Discourage the conversion of constructed firelines to recreational trails, by covering the line with brush, limbs, and both sound and rotten logs. The preferred source of these materials is the material removed to construct the line.
- Fill in cup trenches and dug out areas and obliterate berms created during the suppression effort.
- Construct waterbars as needed to reduce erosion on steeper slopes. A soil scientist or hydrologist will provide guidance on the spacing needed.
- Consider subsoiling compacted areas in incident base camps, spike camps, and other high use areas. Scattered rocks and logs and/or transplant small trees and shrubs into the rehabilitated area.
- Erosion control seeding and other rehabilitation work involving planting should use native species or sterile nonnative species whenever possible.
- Flush cut and cover with soil all stumps in high use or visually sensitive areas, such as along roads 2710 and 2711, adjacent to wilderness trailheads, or adjacent to heavily used dispersed campsites.
- Reshape any constructed helispots in visually sensitive areas or designated viewshed to more closely resemble a natural opening. This rehabilitation effort will likely require falling more trees and potentially the loss of some late successional or old growth trees or habitat.

The incident resource advisor may require additional rehabilitation to meet LSR and Riparian Reserve objectives. A resource advisor will decide soon after a wildfire is reported whether rehabilitation might be needed. Rehabilitation planning and implementation should begin as soon as possible after firefighting efforts begin and must begin before the fire is declared contained.

Post Fire Monitoring and Evaluation. Post fire monitoring and evaluation will serve to identify areas of this plan or of the suppression effort that need improvement, formulate different strategies and tactics to add to the plan, and assist in adaptive management. Initial evaluation should occur before the firefighting effort ends on all extended attack and project fires. This evaluation should discuss the strategy and tactics used and success or failure of minimum impact tactics in meeting LSR and Riparian Reserve objectives, standards, and guidelines. It should also discuss whether firefighter safety was compromised and what changes might be made to better protect firefighters and still meet LSR and Riparian Reserve objectives. Lastly, the evaluation should rate the incident resource advisor and the Escaped Fire Situation Analysis in providing clear direction to the incident management team on meeting LSR and Riparian Reserve objectives. A copy of the evaluation should be filed with the incident management package and with the LSR Assessment.

Within one year of any fire exceeding 5 acres, an interdisciplinary team should revisit the burn area to ascertain the success or failure of rehabilitation in meeting LSR and Riparian Reserve objectives and standards and guidelines. This team should be comprised of resource specialists with expertise in the areas of concern on a given fire and a representative of the fire management organization. A team need not be very large if the concerns or items under evaluation considered minor or small-scale. A copy of the evaluation should be filed with the incident management package, line officer, and LSR Assessment.

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Appendix A

Stand Classification Scheme

Classification Scheme for Stands in Douglas Cabin LSR

Stand Initiation - created opening in a forest matrix with trees less than 5" DBH and canopy closure variable. An overstory may be present as long as the canopy closure is 30% or less in Douglas-fir and moister plant associations, or 15% or less in pine-oak associations. Includes clearcuts, seed tree cuts, and shelterwood cuts as well as openings created by insects, disease, fire, or other natural events. Grasses, forbs, or shrubs are common and may dominate. EARLY SERAL.

Stem Exclusion - young stands usually comprised of shade intolerant species with a canopy closure of 70-90%. Trees usually 5-9" DBH. Canopy is single-layered. Generally consists of plantations and "dog hair" stands of natural regeneration. EARLY SERAL. Two modifiers possible:

1. **Stagnating** - combination of stand density and species mix has resulted in the virtual cessation of tree growth. Canopy closure often near 100%. Some trees may be developing flat tops. Few or no understory grasses, forbs, or shrubs are present. Stand at high risk of epidemic levels of disease, defoliators, bark beetles, or some combination, and of stand-replacing fire. Disturbance is required for the stand to move to another structural stage. EARLY SERAL

2. **Pine-Oak** - one to two layered stands with Oregon white oak forming the second layer. Canopy closure may be quite open but harsh site conditions do not allow additional trees to establish. Scattered large diameter ponderosa pine may be present. Most ponderosa pine is generally less than 9" DBH with 40% or greater canopy closure. If present, Oregon white oak has small narrow crowns, except on the edges of openings, and tends to consist of multi-stemmed clumps. Understory of pine needles and scattered clumps of grass, forbs, or shrubs. Small pines may have ceased growing. Usually considered EARLY SERAL, but in some locations may be MID-SERAL.

Mature Stem Exclusion - older stands usually dominated by shade intolerant species but often with shade tolerant species present. Canopy closure of 70-90%; dominant and co-dominant trees usually 9-20" DBH. Shade intolerant species mostly in the dominant and co-dominant crown positions. Shade tolerant species mostly in the co-dominant and intermediate crown positions. Canopy generally single layered or somewhat two layered. Understory usually contains scattered patches of grasses, forbs, or shrubs. MID-SERAL. Additional modifier possible:

1. **Stagnating** - combination of stand density and either species mix or stand age has resulted in the virtual cessation of tree growth. Canopy closure often near 100%. Dominant trees becoming flat-topped. Few or no understory grasses, forbs, or shrubs present. Downed woody loadings may be high and are increasing. Stand at high risk of epidemic levels of disease, defoliators, bark beetles, or some combination, and of stand-replacing fire. Disturbance is needed to move the stand to another structural stage. MID-SERAL

Understory Reinitiation - semi-open to semi-closed stands of both shade intolerant and shade tolerant species. Stand is distinctly two layered with shade intolerant species dominating the overstory and a mix of shade intolerant and shade tolerant species in the understory. Overstory trees generally 12" DBH or larger with a canopy closure of 30-55%. Understory trees generally less than 5" DBH with a canopy closure of 2o% or more, and may be clumpy in distribution. Understory grasses, forbs, or shrubs are common. Usually occurs between the Stem Exclusion and Mature Stem Exclusion Stages and between the Mature Stem Exclusion and Late Seral Multistory stages. MID- to LATE SERAL. One modifier possible:

Collapsing - stand with high levels of mortality due to insect and/or disease attack. Canopy closure decreasing and grass, forb, shrub, and tree regeneration usually increasing. Downed woody fuel loadings may become extreme, approaching or exceeding 100 tons per acre, depending on initial tree size and stand density. Overstory not expected to survive, unlike in typical Understory Reinitiation stage. Area is moving into the Stand Initiation stage rather than a later successional stage. Usually MID-SERAL, occassionally LATE SERAL.

Fire Excluded Multistory - two to three layered semiclosed to closed stands of ponderosa pine, Douglas-fir and grand fir. Overstory usually dominated by ponderosa pine or ponderosa pine and Douglas-fir. Lower layers usually dominated by either Douglas-fir or grand fir, depending on the site. Canopy closure 60-90%. Stand at high risk of total loss to stand-replacing fire in an area formerly characterized by underburning or mixed intensity burning and often at high risk of epidemic outbreak of insects and disease. MID-SERAL.

Open Intolerant Multistory - two ore more layered semi-open to semi-closed stands of ponderosa pine and Douglas-fir. Oregon white oak may be present, but is relatively uncommon. Stand is a mosaic of patches and individual trees of varying sizes and ages. Total tree canopy closure varies from 30-60%, averaging around 45% across the stand and landscape. Understory grasses, forbs, and shrubs may be quite extensive. Two conditions:

1. **Young** - lacks large diameter trees (21"+ DBH). Residual large tree canopy closure is generally less than 15%. Usually only two layered. MID-SERAL

2. **Old** - large diameter trees (21"+ DBH) present with an overstory canopy closure of 15-60%. Usually three layered. An OLD GROWTH structure on more productive sites in the Eastside Zone and in the Transition Zone. Depends on disturbance to persist. LATE SERAL

Open Parklike - one and two layered stands with a canopy closure of 20-50% (averaging 35% across the stand and landscape) and dominated by large diameter ponderosa pine. Oregon white oak is usually common. Stands tend to be clumpy. Oregon white oak crown shapes are variable, but often large and spreading. Some large, open-grown oaks are present. Little or no tree regeneration is present. Grasses, forbs, and/or shrubs dominate the understory. Depends on disturbance to persist. Usually found on very unproductive sites and sites with very frequent, low intensity fire. Typical OLD GROWTH structure on such sites. LATE SERAL

Cathedral - semi-open to semi-closed stands dominated by large, widely spaced trees. Overstory trees are mostly shade intolerant and fire tolerant species and 21" DBH or greater. Tree crowns nearly touching to just overlapping. Canopy closure is somewhat variable, ranges from 50-90%, and averages 70% across the stand and landscape. Canopy either single layered or weakly two layered. If tree regeneration is present, then comprised of a mix of shade intolerant and shade tolerant species generally less than 5" DBH and canopy closure of less than 25%. Understory, when present, generally dominated by grasses, forbs, or shrubs and usually evenly distributed. Depends on semi-frequent underburning to persist. An OLD GROWTH structure in the Transition and upper Eastside Zones. May be present in the Crest Zone. MID- to LATE SERAL.

Late Seral Multistory - two and three layered stands with a mix of shade tolerant and shade intolerant species. Total canopy closure ranges from 60-100%. Overstory usually consists of a mix of shade intolerant and shade tolerant species greater than 21" DBH with a canopy closure of 50-80%. Middle tree layer consists mostly of shade tolerant species 5-20" DBH with a canopy closure of 10-30%. The lower tree layer consists mostly of shade tolerant species less than 5" DBH with a canopy closure of 10-30%. Stand somewhat broken with small openings that support tree regeneration, shrubs, and forbs. Sun flecks common. Large downed woody loadings variable, but can be quite high with numerous large downed logs and trees. An OLD GROWTH structure in the Crest Zone, upper Transition Zone and along perennial streams in all climate zones. LATE SERAL.

Woodland - very open areas dominated by Oregon white oak. Some ponderosa pine may be present. Canopy closure usually less than 25% if ponderosa pine is present or up to 40% if only Oregon white oak is present. Sites often dominated by grasses or antelope bitterbrush. Such sites found mostly in areas of shallow rocky soils with low precipitation or very low soil moisture holding capacity and often at the lower limits of tree growth. LATE SERAL. One modifer may be present:

1. **Stagnating** - open to very open areas dominated by short, multi-stemmed oaks that resemble a brushfield. Pine stumps may be present. Oak sprout density such that tree growth has generally ceased. Disturbance is needed to move to another structural stage. EARLY to MID-SERAL.

Appendix B

Reforestation Data

Evaluation Of Reforestation and TSI Units
For Douglas Cabin LSR

Overview: The history of harvesting in the Douglas Cabin area goes back to the late 1950's and early 60's with extensive selective cuts such as Douglas Cabin which covered virtually the entire LSR area. However, this discussion and analysis will center around the more recent sales with discrete harvest units. Only five such sales are present in this LSR and none of them have overlapping sale area boundaries.

Lower eastern flats	Harvest Year
Little Badger	1962
Jumper	1977
Doughty	1985
Out	1986
Upper western slopes	
Cabin	1988

A unique feature of this area regarding harvest units is the average size of unit which is eight acres. This is less than half the district average of 18 acres. Much of any reforestation success in this area can be attributed to this fact owing to edge effect of natural seeding and shade, and less severe microclimates than in larger units. Also, many of the units are shelterwoods which helps regeneration survival.

Nonetheless, reforestation in this LSR is moderately difficult. Most of the units have had two plantings and the more troublesome units will have their third planting this year (1997). Fifty-eight percent of the units have a southerly aspect or are flat. (The average TPA for northerly or easterly aspects is 433 while for southerly and flat aspects it is 287.) Also, based on observations and data, alot of the reforestation problems are due to compacted soils. Stocking on cable ground averages nearly 100 TPA higher than on tractor ground, due in part to compaction. Of course, the units which were cable-logged tend to be higher elevation and further west than the tractor units and therefore have more rainfall. Also, many of the lower, flatter units were seeded with forage grasses in the late 1980's and to this day the grass is a severe competitor for moisture and nutrients. Gophers are a moderate to severe problem in this area and aggressive control efforts, mostly through baiting, have been taken since 1991 when the Gopher Control EA was signed.

Despite all this, only nine percent of the acres are below the Forest Plan stocking guideline of 125 trees per acre (FW361). Another twelve percent is marginal with 125 to 200 TPA. All of these units are scheduled for planting and gopher control in 1997.

Species diversity is relatively low, ranging from one tree species per unit to six. For this analysis, Oregon white oak was included as contributing to diversity since it is an important part of the units where it occurs. Ponderosa pine is found on every unit. Douglas-fir and grand fir are found on about three-quarters of the units, while western white pine, western larch, Engelmann spruce, lodgepole pine, mountain hemlock, Oregon white oak and bigleaf maple comprise a minor component of various units.

Outlook: Eighty percent of this area should need no further treatment including 11 percent of the area which is already established (Jumpers, Little Badgers and some Outs).

For the immediate future the emphasis for these units will be to monitor for thinning and regenerate poorly-stocked units. Special treatment such as shade cards or mulches and continued agrressive gopher control will be needed. There are a handful of units, especially TSI, which need updated stocking surveys.

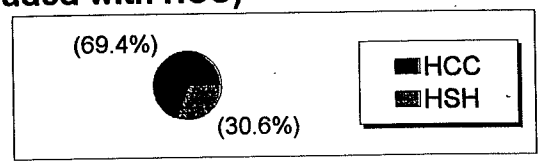
This LSR is virtually surrounded by Badger Creek wilderness which has a recent history of severe western spruce budworm outbreaks. The western reaches of this LSR are especially hard hit by the effects of this insect and will need to be carefully monitored, especially in the shelterwoods where the budworm drops down from the canopy to the seedlings. It will be desirable to consider resistant species such as pines when planning future management prescriptions in this area.

Status Based on Acres

	Acres	Units
Total:	585	72

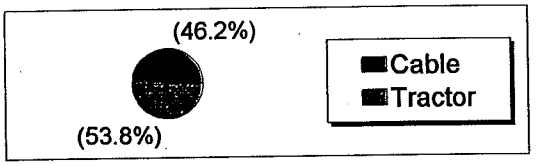
By harvest type: (HCR and HFR included with HCC)

HCC	406	56
HSH	179	16



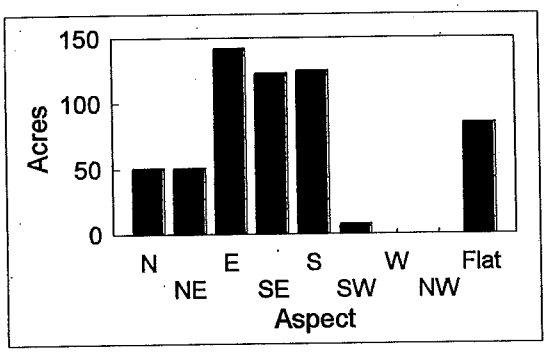
By harvest method:

Cable	270	24
Tractor	315	48



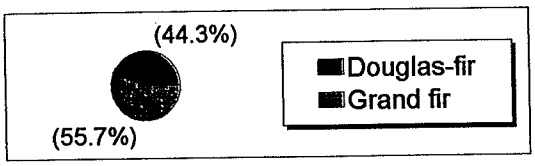
By aspect:

N	51	4
NE	51	4
E	142	21
SE	123	14
S	125	16
SW	8	2
W	0	0
NW	0	0
Flat	85	11



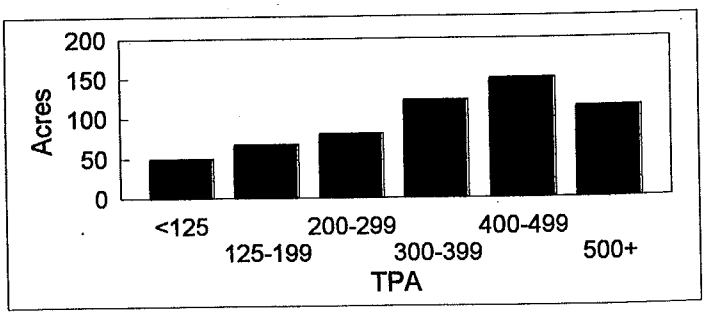
By Plant Series:

Douglas-fir	259	29
Grand fir	326	43



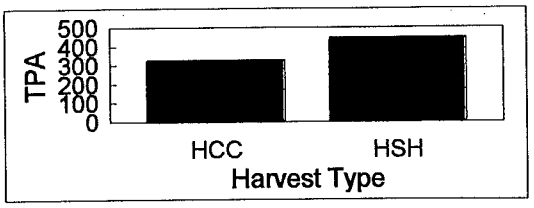
By TPA:

<125	50	12
125-199	67	10
200-299	81	11
300-399	123	13
400-499	150	10
500+	114	16

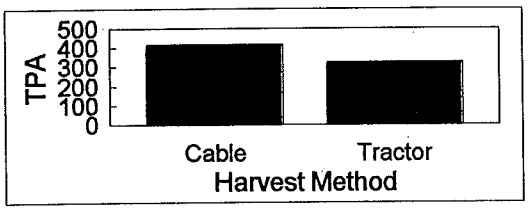


Status based on average TPA

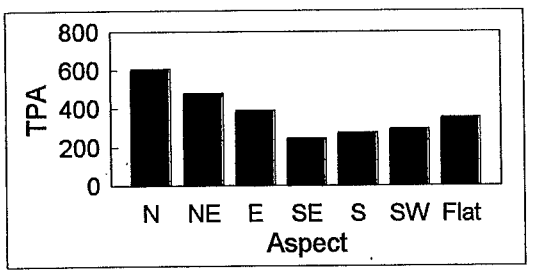
	Avg TPA	Units
Total:	354	72
By Harvest Type:		
HCC	327	56
HSH	446	16



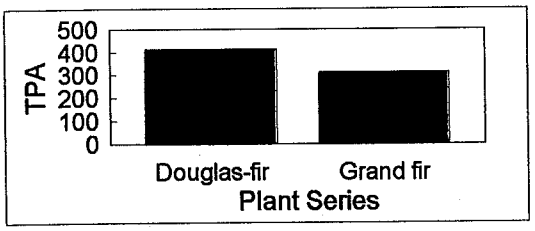
By Harvest Method:		
Cable	415	24
Tractor	323	48



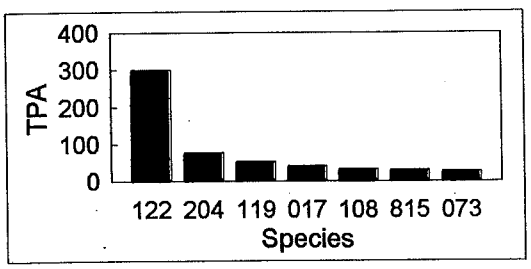
By Aspect:		
N	608	4
NE	481	4
E	391	21
SE	245	14
S	274	16
SW	295	2
Flat	356	11



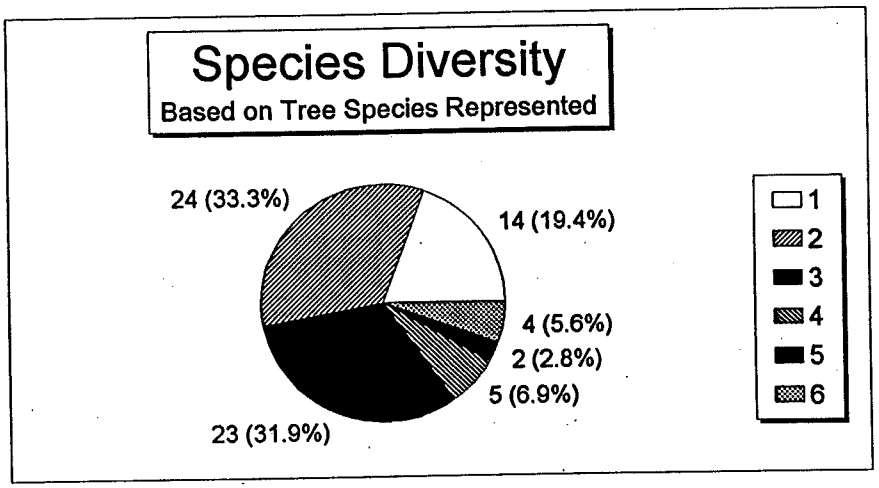
By Plant Series:	
Douglas-fir	414
Grand fir	312



By Species:		
122	301	72
204	78	51
119	53	5
017	41	35
108	33	8
815	31	4
073	28	6



* (only species represented on 5 or more units have been charted)
* Others (not charted) 093, 019, 264, bigleaf maple



e.g. 24 units or 33.3% of all units have 2 species represented

																Species list (values are TPA)										
Name	No	Ac	Type	Elev	Slope	Aspect	Lst Surv Yr	Lst Plant Yr	TPA	Height	Harv Rx	Harv meth	Harv year	PH1	PH2	122	204	17	119	73	108	815	264	93	312	19
cabin	1	9	ref	2700	10	S	96	94	211	2	HCC	T	88	91	94	211										
cabin	2	5	ref	2800	10	SE	96	97	110	3	HCC	T	88	91		100	10									
cabin	3	3	ref	3000	10	E	95	95	330	2	HCC	T	88	91	95	260		70								
cabin	4	7	ref	3100	5	E	96	97	107	2	HCC	T	88	91		107										
cabin	5	12	ref	3100	10	E	96	97	146	2	HCC	T	88	91		146										
cabin	6	7	ref	3300	15	E	96	91	300	3	HCC	T	88	91		264	7	7								
cabin	8	6	ref	2800	35	NE	95	93	400	1	HCC	T	88	91	93	220	160	20								
cabin	9	1	ref	2900	15	S	96	97	160	3	HCC	T	88	91	94	140		20								
cabin	10	4	ref	2900	20	S	96	94	210	2	HCC	T	88	91	94	200	10									
cabin	11	1	ref	3100	20	S	96	97	80	2	HCC	T	88	91	94	70	10									
cabin	12	8	ref	3300	30	E	96	94	238	1	HCC	S	88	91	94	231	6									
cabin	13	7	ref	3200	30	E	93	97	178	2	HCC	S	88	91		114	29	50								
cabin	14	2	ref	2900	10	SE	96	97	40	3	HCC	T	88	91	94	20		20								
cabin	15	3	ref	3000	10	SE	95	97	75	1.4	HCC	T	88	91		50						25				
cabin	16	11	ref	3100	35	SE	96	97	155	2	HCC	T	88	91	94	141	5	9								
cabin	17	6	ref	3000	20	E	95	95	342	2	HCC	T	87	91	95	300	17	42								
cabin	18	46	ref	3000	25	SE	96	94	400	3	HSH	S	88	91	94	265	119	16								
cabin	19	13	ref	3400	15	SE	96	94	265	3	HCC	T	88	91	94	262	4									
cabin	20	5	ref	3400	15	SE	96	97	170	3	HCC	T	88	91	94	170										
cabin	22	6	ref	3100	25	S	96	97	125	3	HCC	S	88	91	94	108	17									
cabin	23	5	ref	3400	35	SW	96	94	350	3	HCC	S	88	91	94	280	50	20								
cabin	24	7	ref	3200	40	E	95	95	479	1	HCC	S	88	91	95	357		121								
cabin	25	17	ref	3200	25	N	95	93	365	2	HCC	S	88	91	93	135	182	47								
cabin	26	3	ref	3500	15	SE	96	94	230	2	HCC	T	88	91	94	230										
cabin	27	12	ref	3400	45	N	96	94	529	3	HCC	S	88	91	94	321	46	138	4	17	4					
cabin	28	4	ref	3600	15	SE	96	94	280	3	HCC	T	88	91	94	270		10								
cabin	29	2	ref	3500	30	S	96	97	110	0.8	HCC	T	87	91	94	110										
cabin	30	16	ref	3600	40	N	95	95	613	2	HCC	S	88	91	95	278	31	216	34	50			3			
cabin	31	8	ref	3800	50	E	96	94	188	3	HCC	S	88	91	94	125	56	6								
cabin	32	7	ref	4100	30	E	95	95	393	2	HCC	T	88	91	95	300	21			50						21
cabin	33	6	ref	3900	20	SE	96	97	108	2	HCC	S	87	91	94	108										
cabin	35	3	ref	3900	25	S	96	97	140	2	HCC	T	87	91	994	140										
cabin	37	8	ref	3400	50	E	96	97	131	3	HCC	T	87	91	94	131										
cabin	38	8	ref	3600	50	S	96	94	338	2	HSH	S	87	91	94	338										
cabin	39	19	ref	4400	35	S	96	94	316	1	HSH	S	87	91	94	237	82	3								
cabin	41	3	ref	3500	40	S	96	94	470	2	HSH	S	87	91	94	422	50									
cabin	42	6	ref	4200	25	SE	96	97	125	1	HCC	T	87	91	94	92	17	25								
cabin	43	9	ref	3100	50	E	95	95	472	1	HCC	S	88	91	95	333	94			44						
cabin	44	4	ref	4200	55	E	96	94	640	2	HSH	S	88	91	94	230	170	80			60			100		
cabin	45	7	ref	4000	50	E	96	94	286	2	HCC	S	88	91	94	236	21	21		7						
cabin	47	9	ref	4400	25	E	95	91	533	1	HSH	T	87	92		367	6	6	106	11	44					
cabin	48	11	ref	4500	10	E	95	91	318	1	HSH	T	87	92		150	5	9	91	18	23					
cabin	49	8	ref	4400	25	SE	95	95	350	1	HCC	T	87	91	95	225	19	50	31	25						
cabin	50	3	ref	3300	15	E	95	91	400	1	HCC	T	87	91		190	130	110								
cabin	52	6	ref	3300	35	S	95	95	350	1	HCR	S	88	91	95	342	8									
cabin	53	8	ref	3700	50	S	96	97	106	3	HCR	S	88	91		94	13									
cabin	55	5	ref	4000	35	E	96	94	770	1	HCR	T	87	91	94	770										

Douglas Cabin LSR

																Species list (values are TPA)										
Name	No	Ac	Type	Elev	Slope	Aspect	Lst Surv Yr	Lst Plant Yr	TPA	Height	Harv Rx	Harv meth	Harv year	PH1	PH2	122	204	17	119	73	108	815	264	93	312	19
cabin	57	5	ref	4000	40	S	96	94	260	2	HCR	S	88	91	94	250		10								
cabin	59	5	ref	3500	45	S	96	91	730	3	HCC	S	89	91		680	10	40								
cabin	60	41	ref	3800	55	S	96	91	499	3	HSH	S	88	91		458	29	14								
doughty	2	5	ref	2700	10	V	96	91	670	2	HSH	T	85	91		660	10									
doughty	4	5	ref	2700	10	V	95	95	370	1	HSH	T	85	91	95	370	30									
doughty	5	5	ref	2700	10	V	96	91	630	2	HSH	T	85	91		470	138	30								
doughty	8	10	ref	2700	5	V	96	91	500	2	HSH	T	85	91		440	160									
doughty	10	3	ref	2700	10	V	96	91	430	2	HSH	T	85	91		400	30									
doughty	13	3	ref	2700	15	V	96	91	730	2	HSH	T	85	91		711	23									
doughty	16	4	ref	2700	40	NE	96	97	50	1	HSH	T	85	91		40	10									
doughty	19	3	ref	2700	10	SW	96	91	240	1	HSH	T	85	91		240										
doughty	29	4	ref	2700	5	S	90	89	280	0.5	HFR	T	85	89		280										
doughty	39	7	ref	2700	15	SE	94	89	614	0.7	HFR	T	85	89		464	79					71				
doughty	40	4	ref	2700	5	SE	96	91	510	1	HFR	T	85	89	91	510										
jumper	3	8	tsi	3080	5	E	89		664	15	HCC	T	77			395	224	45								
jumper	5	30	tsi	2920	20	NE	89		492	14	HCC	T	77			383	82	3				24				
little badger	3	2	tsi	2720	5	E	89				HCC	T				250	40	10								
little badger	4	4	tsi	2840	10	E	89		907	18	HCC	T				495	297	96							19	
out	6	6	ref	2500	45	N	94	89	925	1.8	HCC	S	86	89		783	183	17				8				
out	7	11	ref	2500	45	NE	94	89	982	1.4	HCC	S	86	89		555	363	64								
out	8	4	ref	2400	10	R	94	89	120	1.2	HCC	T	86	89		100	10					40				
out	9	2	tsi	2600	5	R			430	3.1	HCC	T	86	87		1710	180	30								
out	10	6	ref	2600	5	R	95	93	67	1	HCC	T	86	89	93	250	25									
out	11	21	tsi	2500	5	R			231	2.2	HCC	T	86	87		243	667					17				
out	12	21	ref	2400	10	R	96	92	362	3	HCC	T	86	89	92	352	36									

*PH1 and PH2 are the planting histories (dates of planting) for each unit

Appendix C

Wildlife Species Lists

Species	Common Name	Guild	LS/CLAS	J-2	C3	PROP C3	Veg. Structure	Presence
ACCCO	COOPER'S HAWK	TMGG					ANY	KR
ACGE	NORTHERN GOSHAWK	TLMLT	Y				MS CA LS OM FM	KR
ACST	SHARP-SHINNED HAWK	TMGG					ANY	KR
AEAC	NORTHERN SAW-WHET OWL	TMGG					ANY	SRM
AGPH	RED-WINGED BLACKBIRD	LKRVRO					LAKE/RIVER	SVL
AMGR	NORTHWESTERN SALAMANDER	TSGG	Y				ANY	SRM
AMMA	LONG-TOED SALAMANDER	TSGG					ANY	SRH
APCO	SCRUB JAY	TSMO					SI NF	KR
AQCH	GOLDEN EAGLE	TLC					ANY	KV, SRM
ARHE	GREAT BLUE HERON	LKRVARG					LAKE/RIVER	SVL
ASOT	LONG-EARED OWL	TMGG					ANY	SRH
BAWR	OREGON SLENDER SALAMANDE	TSGG	Y	Y			ANY	SRM
BOCE	CEDAR WAXWING	TSGG					ANY	KM
BOUM	RUFFED GROUSE	TSGG					ANY	KR
BUBO	WESTERN TOAD	TSGG					ANY	SRM
BUJA	RED-TAILED HAWK	TLC					ANY	KR
BULA	ROUGH-LEGGED HAWK	TLMO					SI NF W	KR
BUVI	GREAT HORNED OWL	TLC					ANY	KR
CACAL	CALIFORNIA QUAIL	TSMO					SI NF	SRL
CACAS	CASSIN'S FINCH	TSC					ANY	SRM
CAGU	HERMIT THRUSH	TSGG	Y				ANY	KR
CANLA	COYOTE	TLGG					ANY	KR
CANLU	WOLF	TLGG					ANY	SREXT
CARPI	PINE SISKIN	TSGG					ANY	KR
CARPU	PURPLE FINCH	TSGG					ANY	KR
CATAU	TURKEY VULTURE	TLC					ANY	KV, SRM
CATME	CANYON WREN	SPCL					NF	SRH
CATR	AMERICAN GOLDFINCH	TSMO					SI NF	SRM
CAUS	SWAINSON'S THRUSH	TSGG					ANY	SRL
CEAM	BROWN CREEPER	TSGSL	Y				MS CA LS OMO OP FM	SRM
CEEL	ELK	TLC					ANY	KR
CHBO	RUBBER BOA	TSGG					ANY	SRH
CHGR	LARK SPARROW	TSPO					SI NF	SMM
CHMI	COMMON NIGHTHAWK	TMGG					ANY	SRM
CHVA	VAUX'S SWIFT	TSGG	Y				ANY	KR
CICY	NORTHERN HARRIER	SPCL					NF Meadows	KR
CIPA	MARSH WREN	SPCL					Wet Meadow	SMVL
CLCA	WESTERN RED-BACKED VOLE	TSGL	Y				SE MS CA LS OM OP F	SRM
COAU	NORTHERN FLICKER	TMGG	Y				ANY	KR
COBO	OLIVE-SIDED FLYCATCHER	TSC					ANY	KR
COBR	AMERICAN CROW	TLGG					ANY	SRL
COFA	BAND-TAILED PIGEON	TSGG					ANY	SML
COLCO	RACER	TSPO					SI NF W	SRM

KEY

VEG. STRUCTURE=that occupied by the species..
OP = Open Parklike
CA = Cathdral
UR = Understory Reinitiation
SE = Stem Exclusion
SI = Stem Initiation
OM(Y or O) = Open Intolerant Multi-Story (Young or Old)
FM(Y or O) = Fire Excluded Multi-Story (Young or Old)
MS = Mature Stem Exclusion
LS = Late Seral Multi-Story
Any = Any Structural Stage
NF = Non-Forested
W = Woodland (Pine Oak)

****

PRESENCE.. = status of species in the LSR
KR = Known Resident
KV = Known Visitor (use is more than migration)
KM = Known Migrant (only)
SRVL = Suspected Resident very low likelyhood
SRL = Susp. Res. low likely
SRM = Susp. Res. mod. likely
SRH = Susp. Res. high likely
SML = Susp. Migrant low likely
SMM = Susp. Mig. mod. likely
SMH = Susp. Mig. high likely
? = likelyhood unknown
SREXT = Susp. Res. Extirpated
SV = Suspected Visitor at any season

****

Guild.. * = Categorization is estimated

Species	Common Name	Guild	LS/CLAS	J-2	C3	PROP C3	Veg. Structure	Presence	KEY
CONTE	SHARPTAIL SNAKE	TSGG					ANY	SRL	
CORCO	COMMON RAVEN	TLGG					ANY	KR	
COSO	WESTERN WOOD-PEWEE	TSGG					ANY	KR	
COVE	EVENING GROSBEAK	TSGG					ANY	KR	
CRVI	WESTERN RATTLESNAKE	TMGG					ANY	KR	
CYST	STELLER'S JAY	TSGG					ANY	KR	
DENCO	YELLOW-RUMPED WARBLER	TSGG					ANY	SMH	
DENI	BLACK-THROATED GRAY WARBL	TSGG					NF OP W	SRM	
DEOB	BLUE GROUSE	TSGG					ANY	KR	
DEOC	HERMIT WARBLER	TSGSL					SE MS CA LS OM OP F	KR	
DEPET	YELLOW WARBLER	TSGOS					SI NF SE MS UR	SRM	
DETO	TOWNSEND WARBLER	TSGSL	Y				SE MS CA LS OM OP F	KR	
DIPU	RINGNECK SNAKE	TSGG					ANY	SRH	
DIVI	VIRGINIA OPOSSUM	TMGG					ANY	SRH	
DRPI	PILEATED WOODPECKER	TLMLT	Y				MS CA LS OMO OP FM	KR	
ELCO	NORTHERN ALLIGATOR LIZARD	TSGG					ANY	SRH	
ELMU	SOUTHERN ALLIGATOR LIZARD	TSGG					ANY	SRL	
EMDI	PACIFIC SLOPE FLYCATCHER	TSPLT					MS CA LS OM OP FM	SRH	
EMHA	HAMMOND'S FLYCATCHER	TSGG	Y				ANY	KR	
EMOB	DUSKY FLYCATCHER	TSPO					SI NF	KR	
EMOC	CORDILLERAN FLYCATCHER	TSPLT					MS CA LS OM OP FM	SR	
EMTR	WILLOW FLYCATCHER	TSGOS					SI NF SE MS UR FM O	SRM	
ENES	ENSATINA	TSGG					ANY	SRM	
EPFU	BIG BROWN BAT	TMC	Y				ANY	SRM	
ERAL	HORNED LARK	TSPO					SI NF	SMM	
ERDO	PORCUPINE	TMGG					ANY	KR	
EUCY	BREWER'S BLACKBIRD	TSMO					SI NF	KM, SRM	
EUSK	WESTERN SKINK	TSGG					ANY	SRH	
FACO	MERLIN	TMMO					SI NF	KM	
FASP	AMERICAN KESTREL	TMC					ANY	KR	
FECA	LYNX	TLGSL*		N		Y	SE MS CA LS OM FM	SEXTR	
FECO	MOUNTAIN LION	TLGG					ANY	KR	
FERU	BOBCAT	TLGG					ANY	KR	
GLGN	NORTHERN PIGMY-OWL	TSGG	Y				ANY	KR	
GLSA	NORTHERN FLYING SQUIRREL	TSPLT	Y				MS CA LS OM FM	KR	
GUGU	WOLVERINE	TLMLT					MS CA LS OM OP FM	KV, SRH	
HALE	BALD EAGLE	LKRVARG	Y				LKE/RIV CA LS OM FM	SV	
HIPY	CLIFF SWALLOW	SPCL					NF	SRH	
HIRU	BARN SWALLOW	SPCL					NF OP W	SRL	
IXNA	VARIED THRUSH	TSGG					ANY	KR	
JUHY	DARK-EYED JUNCO	TSGG					ANY	KR	
LACI	HOARY BAT	TMGG	Y	Y			ANY	SRM	
LAEX	NORTHERN SHRIKE	TSMO					SI NF W	SRM	
LALU	LOGGERHEAD SHRIKE	TSMO					SI NF W	SRL	

Species	Common Name	Guild	LS/CLAS	J-2	C3	PROP C3	Veg. Structure	Presence	KEY
LANO	SILVER-HAIRED BAT	TMC	Y	Y		Y	ANY	SRM	
LEAM	SNOWSHOE HARE	TSGG					ANY	KR	
LEUAR	ROSY FINCH	TMPO					SI NF W	SRH	
LOXCU	RED CROSSBILL	TSGG	Y				ANY	KR	
MAAM	MARTEN	TLMLT	Y	Y			MS CA LS OM FM	KR	
MAFL	YELLOW-BELLIED MARMOT	TSPO					SI NF	SRM	
MAPE	FISHER	TLMLT	Y	Y			MS CA LS OM OP FM	KR	
MEFO	ACORN WOODPECKER	TSMST					OP W	SRL	
MEGA	WILD TURKEY	TMGG					ANY	KR	
MELE	LEWIS' WOODPECKER	TSC					ANY	SRH	
MELI	LINCOLN'S SPARROW	TSPO					SI NF W	SRL	
MELME	SONG SPARROW	TSGG					ANY	KR	
MEPME	STRIPED SKUNK	TMMO					SI NF W	KR	
MILO	LONG-TAILED VOLE	TSPO					SI NF	SR	
MIOR	CREEPING VOLE	TSGG					ANY	SR	
MITO	TOWNSEND'S VOLE	TSPO					SI NF	SR	
MOAT	BROWN-HEADED COWBIRD	TSGG					ANY	KR	
MUER	ERMINE	TSGG					ANY	KR	
MUFR	LONG-TAILED WEASEL	TMGG					ANY	KR	
MUMU	HOUSE MOUSE	SPCL					Buildings	KR	
MUVI	MINK	TMGG					ANY	KR	
MYEV	LONG-EARED MYOTIS	TMGG	Y	Y		Y	ANY	SRM	
MYOCA	CALIFORNIA MYOTIS	TMC	Y				ANY	SRM	
MYOCI	WESTERN SMALL-FOOTED MYO	SPCL	Y				NF	SRL	
MYTO	TOWNSEND'S SOLITAIRE	TSGG					ANY	KR	
MYVO	LONG-LEGGED MYOTIS	TMGG	Y	Y		Y	ANY	SRM	
MYYU	YUMA MYOTIS	TMGG	Y				ANY	SRM	
NECI	BUSHY-TAILED WOODRAT	SPCL					NF	KR	
NEGI	SHREW-MOLE	TSPLT	Y				MS CA LS OM OP FM	SRH	
NUCO	CLARK'S NUTCRACKER	TSGG					ANY	SRH	
OCPR	PIKA	SPCL					Rock outcrop	KR	
ODHE	BLACK-TAILED & MULE DEER	TMGG					ANY	KR	
OPTO	MACGILLIVRAY'S WARBLER	TSPO					SI NF	KR	
ORPI	MOUNTAIN QUAIL	TSMO					SI NF	SRL	
OTFL	FLAMMULATED OWL	TSC	Y				ANY	SRM	
OTKE	WESTERN SCREECH-OWL	TSGG					ANY	KR	
PAAT	BLACK-CAPPED CHICKADEE	TSGOS					SI NF SE UR MS FM O	KR	
PADO	HOUSE SPARROW	SPCL					Residences	KR	
PAIL	FOX SPARROW	TSGOS					SI NF SE UR MS OM F	SRM	
PARGA	MOUNTAIN CHICKADEE	TSGG					ANY	KR	
PARU	CHESTNUT-BACKED CHICKADEE	TSGG	Y				ANY	KR	
PASA	SAVANNAH SPARROW	TSPO					SI NF W	SRL	
PASAM	LAZULI BUNTING	TSPO					SI NF W	KR	
PECA	GRAY JAY	TMGG					ANY	KR	

Species	Common Name	Guild	LS/CLAS	J-2	C3	PROP C3	Veg. Structure	Presence	KEY
PEMA	DEER MOUSE	TSGG	Y				ANY	KR	
PEPA	GREAT BASIN POCKET MOUSE	TSGG					ANY	SRH	
PETRU	PINON MOUSE	TSPO					SI NF W	SRL	
PHCO	RING-NECKED PHEASANT	TSPO					SI NF W	SRL	
PHDO	SHORT-HORNED LIZARD	TSGG					ANY	SRH	
PHIN	HEATHER VOLE	TSPO					SI NF	SR?	
PHME	BLACK-HEADED GROSBEAK	TSGG					ANY	KR	
PHNU	COMMON POORWILL	TSMO					SI NF	SRL	
PIAL	WHITE-HEADED WOODPECKER	TMGG	Y				ANY	SRM	
PIAR	BLACK-BACKED WOODPECKER	TMMLT	Y	Y			MS CA LS OM FM	KR	
PICA	GOPHER SNAKE	TSPO					SI NF W	KR	
PICH	GREEN-TAILED TOWHEE	TSMO					SI NF W	KR	
PIEN	PINE GROSBEAK	TSGG					ANY	KR	
PIER	RUFOUS-SIDED TOWHEE	TSGG					ANY	KR	
PILU	WESTERN TANAGER	TSGG					ANY	KR	
PIPI	BLACK-BILLED MAGPIE	TMPO					SI NF W	KR	
PIPU	DOWNY WOODPECKER	TSGSL					MS CA LS OM OP FM	KR	
PITR	THREE-TOED WOODPECKER	TMMLT	Y				MS CA LS OM OP FM	SRH	
PIVI	HAIRY WOODPECKER	TSGG	Y				ANY	KR	
PLTO	TOWNSEND BIG-EARED BAT	SPCL					Caves Buildings	SRL	
POEGR	VESPER SPARROW	TSPO					SI NF	KR	
PRLO	RACCOON	TSGG					ANY	KR	
PSMI	BUSHTIT	TSMO					SI NF	SRL	
PSRE	PACIFIC TREEFROG	TSGG					ANY	KR	
RAAU	RED-LEGGED FROG	TSGG					ANY	KR	
RACAS	CASCADES FROG	TSGG					ANY	KR	
RECA	RUBY-CROWNED KINGLET	TSGG					ANY	SRH	
RESA	GOLDEN-CROWNED KINGLET	TSGG	Y				ANY	SRM	
SAOB	ROCK WREN	SPCL					NF	KR	
SATR	PACIFIC JUMPING MOUSE	TSGG					ANY	SR	
SAYSA	SAY'S PHOEBE	TSPO					SI NF	SRL	
SCEGR	SAGEBRUSH LIZARD	TSGG					ANY	SRH	
SCIGR	WESTERN GRAY SQUIRREL	TSGG					ANY	KR	
SCOC	WESTERN FENCE LIZARD	TSGG					ANY	KR	
SCOR	COAST MOLE	TSGG					ANY	SRL	
SELRU	RUFOUS HUMMINGBIRD	TSGG					ANY	KR	
SICAN	RED-BREASTED NUTHATCH	TSGG	Y				ANY	KR	
SICAR	WHITE-BREASTED NUTHATCH	TSGG	Y				ANY	KR	
SICU	MOUNTAIN BLUEBIRD	TSPO					SI NF	KR	
SIME	WESTERN BLUEBIRD	TSPO					SI NF	KR	
SIPY	PYGMY NUTHATCH	TSGG	Y				ANY	KR	
SOMO	DUSKY SHREW	TSGG					ANY	SR?	
SOTR	TROWBRIDGE'S SHREW	TSPLT					MS CA LS OM OP FM	SR?	
SOVA	VAGRANT SHREW	TSGG					ANY	KR	

Species	Common Name	Guild	LS/CLAS	J-2	C3	PROP C3	Veg. Structure	Presence	KEY
SPBEE	CALIFORNIA GROUND SQUIRREL	TSPO					SI NF	SRH	
SPGR	WESTERN SPOTTED SKUNK	TMMO					SI NF W	SRH	
SPHTH	WILLIAMSON'S SAPSUCKER	TSGSL	Y				SE MS CA LS OM OP F	KR	
SPLA	GOLDEN-MANTLED GROUND SQ	TSGG					ANY	KR	
SPNU	RED-NAPED SAPSUCKER (REL Y	TSGG					ANY	KR	
SPPAS	CHIPPING SPARROW	TSGG					ANY	KR	
SPRU	RED-BREASTED SAPSUCKER	TSGG	Y				ANY	KR	
STCAL	CALLIOPE HUMMINGBIRD	TSMO					SI NF	SRH	
STOCCA	NORTHERN SPOTTED OWL	TLMLT	Y				MS CA LS OM FM	KR	
STRNE	GREAT GRAY OWL	TLC	Y	N		Y	ANY	KV, SRH	
STUNE	WESTERN MEADOWLARK	TSPO					SI NF	KR	
STVA	BARRED OWL	TLMLT	Y				MS CA LS OM OP FM	KR	
STVU	EUROPEAN STARLING	TMC					ANY	KR	
SYBA	BRUSH RABBIT	TSGG					ANY	KR	
SYNU	MOUNTAIN (NUTTALL'S) COTTO	TMPO					SI NF W	KR	
TAAM	YELLOW-PINE CHIPMUNK	TSGG					ANY	SRH	
TABI	TREE SWALLOW	TSGG					ANY	KR	
TADO	DOUGLAS' SQUIRREL	TSGG	Y				ANY	KR	
TAGR	ROUGH-SKINNED NEWT	TSGG	Y				ANY	KR	
TATA	BADGER	TMMO					SI NF W	KR	
TATH	VIOLET-GREEN SWALLOW	TSGG					ANY	SRM	
TATO	TOWNSEND'S CHIPMUNK	TSGG	Y				ANY	KR	
THBE	BEWICK'S WREN	TSGOS					SI NF SE MS UR OM F	KR	
THEL	WESTERN TERRESTRIAL GARTE	TSPO					SI NF W	SRH	
THMA	WESTERN POCKET GOPHER	TSPO					SI NF	SRH	
THOR	NORTHWESTERN GARTER SNAK	TSPO					SI NF	SRL	
THSI	COMMON CARTER SNAKE	TSPO					SI NF	SRH	
THTA	NORTHERN POCKET GOPHER	TSPO					SI NF	KR	
TRAI	HOUSE WREN	TSGOS					SI NF SE MS UR OM F	KR	
TRTR	WINTER WREN	TSGG	Y				ANY	SRH	
TUMI	AMERICAN ROBIN	TSGG					ANY	KR	
TYAL	BARN OWL	TMC					ANY	SRM	
TYVE	WESTERN KINGBIRD	TSMO					SI NF W	KR	
URAM	BLACK BEAR	TLGG					ANY	KR	
URAR	GRIZZLY BEAR	TLGG*					ANY	SREXT	
URCI	GRAY FOX	TLGG					ANY	SRM	
VECE	ORANGE-CROWNED WARBLER	TSPO					SI NF	KR	
VERU	NASHVILLE WARBLER	TSGG					ANY	KR	
VIGI	WARBLING VIREO	TSGG	Y				ANY	KR	
VISO	SOLITARY VIREO	TSGG					ANY	KR	
VUVU	RED FOX	TSGG					ANY	SRH	
WIPU	WILSON'S WARBLER	TSGG	Y				ANY	KR	
ZAPR	WESTERN JUMPING MOUSE	TSPO					SI NF W	SRH	
ZEMA	MOURNING DOVE	TSGG					ANY	KR	

Species	Common Name	Guild	LS/CLAS	J-2	C3	PROP C3	Veg. Structure	Presence	KEY
ZOAT	GOLDEN-CROWNED SPARROW	TSPO					SI NF	SMH	
ZOLE	WHITE-CROWNED SPARROW	TSPO					SI NF	KM, SRH	

Late Successional Species: Known and Suspected

Species	Common Name	Guild	Veg. Structure	Presence
ACGE	Northern goshawk	TLMLT	MSE, CA, LS, OP	KR
AMGR	Northwestern salamander	TSGG	Any	SRM
BAWR	Oregon slender salamander	TSGG	Any	SRM
CAGU	Hermit thrush	TSGG	Any	KR
CEAM	Brown creeper	TSGSL	MSE, CA, LS, OM, OP	SRM
CHVA	Vaux's swift	TSGG	Any	KR
CLCA	Western red-backed vole	TSGL	SE, MSE, CA, LS, OM, OP	SRM
COAU	Northern flicker	TMGG	Any	KR
DETO	Townsend warbler	TSGSL	SE, MSE, CA, LS, OM, OP	KR
DRPI	Pileated woodpecker	TLMLT	MSE, CA, LS, OM, OP	KR
EMHA	Hammond's flycatcher	TSGG	Any	KR
EPFU	Big brown bat	TMC	Any	SRM
GLGN	Northern pygmy-owl	TSGG	Any	KR
GLSA	Northern flying squirrel	TSPLT	MSE, CA, LS, OM	KR
HALE	Bald eagle	LKRVARG	Lake/River	KV, KM
LACI	Hoary bat	TMGG	Any	SRM
LANO	Silver-haired bat	TMC	Any	SRM
LOXCU	Red crossbill	TSGG	Any	KR
MAAM	Marten	TLMLT	MSE, CA, LS, OM	KR
MAPE	Fisher	TLMLT	MSE, CA, LS, OM, OP	KR
MYEV	Long-eared myotis	TMGG	Any	SRM
MYOCA	California myotis	TMC	Any	SRM
MYOCI	Western small-footed myotis	SPCL	NF	SRL
MYVO	Long-legged myotis	TMGG	Any	SRM
MYYU	Yuma myotis	TMGG	Any	SRM
NEGI	Shrew-mole	TSPLT	MSE, CA, LS, OM, OP	SRH
OTFL	Flammulated owl	TSC	Any	SRM
PARU	Chestnut-backed chickadee	TSGG	Any	KR
PEMA	Deer mouse	TSGG	Any	KR
PIAL	White-headed woodpecker	TMGG	Any	SRM
PIAR	Black-backed woodpecker	TMMLT	MSE, CA, LS, OM	KR
PITR	Three-toed woodpecker	TMMLT	MSE, CA, LS, OM, OP	SRH
PIVI	Hairy woodpecker	TSGG	Any	KR
RESA	Golden-crowned kinglet	TSGG	Any	SRM
SICAN	Red-breasted nuthatch	TSGG	Any	KR
SICAR	White-breasted nuthatch	TSGG	Any	KR
SIPY	Pygmy nuthatch	TSGG	Any	KR
SPHTH	Williamson's sapsucker	TSGSL	SE, MSE, CA, LS, OM, OP	KR
SPRU	Red-breasted sapsucker	TSGG	Any	KR
STOCCA	Northern spotted owl	TLMLT	MSE, CA, LS, OM, OP	KR
STRNE	Great gray owl	TLC	Any	KV, SRH
STVA	Barred owl	TLMLT	MSE, CA, LS, OM, OP	KR
TADO	Douglas' squirrel	TSGG	Any	KR
TAGR	Rough-skinned newt	TSGG	Any	KR
TATO	Townsend's chipmunk	TSGG	Any	KR
TRTR	Winter wren	TSGG	Any	SRH
VIGI	Warbling vireo	TSGG	Any	KR
WIPU	Wilson's warbler	TSGG	Any	KR

Species of Management Concern

Species	Common Name	Guild	J-2	C3	Veg. Structure	Presence
BAWR	Oregon slender salamander	TSGG	Y	N	Any	SRM
FECA	Lynx	TLGSL*	N	N	SE, MSE, CA, LS, OM	SEXTR
LACI	Hoary bat	TMGG	Y	N	Any	SRM
LANO	Silver-haired bat	TMC	Y	N	Any	SRM
MAAM	Marten	TLMLT	Y	N	MSE, CA, LS, OM	KR
MAPE	Fisher	TLMLT	Y	N	MSE, CA, LS, OM, OP	KR
MYEV	Long-eared myotis	TMGG	Y	N	Any	SRM
MYVO	Long-legged myotis	TMGG	Y	N	Any	SRM
PIAR	Black-backed woodpecker	TMMLT	Y	N	MSE, CA, LS, OM	KR
STRNE	Great gray owl	TLC	N	N	Any	KV, SRH

Known Residents

Species	Common Name	Guild	Veg. Structure
ACGE	Northern goshawk	TLMLT	MSE, CA, LS, OP
CAGU	Hermit thrush	TSGG	Any
CHVA	Vaux's swift	TSGG	Any
COAU	Northern flicker	TMGG	Any
DETO	Townsend warbler	TSGSL	SE, MSE, CA, LS, OM, OP
DRPI	Pileated woodpecker	TLMLT	MSE, CA, LS, OM, OP
EMHA	Hammond's flycatcher	TSGG	Any
GLGN	Northern pygmy-owl	TSGG	Any
GLSA	Northern flying squirrel	TSPLT	MSE, CA, LS, OM
LOXCU	Red crossbill	TSGG	Any
MAAM	Marten	TLMLT	MSE, CA, LS, OM
MAPE	Fisher	TLMLT	MSE, CA, LS, OM, OP
PARU	Chestnut-backed chickadee	TSGG	Any
PEMA	Deer mouse	TSGG	Any
PIAR	Black-backed woodpecker	TMMLT	MSE, CA, LS, OM
PIVI	Hairy woodpecker	TSGG	Any
SICAN	Red-breasted nuthatch	TSGG	Any
SICAR	White-breasted nuthatch	TSGG	Any
SIPY	Pygmy nuthatch	TSGG	Any
SPHTH	Williamson's sapsucker	TSGSL	SE, MSE, CA, LS, OM, OP
SPRU	Red-breasted sapsucker	TSGG	Any
STOCCA	Northern spotted owl	TLMLT	MSE, CA, LS, OM, OP
STVA	Barred owl	TLMLT	MSE, CA, LS, OM, OP
TADO	Douglas' squirrel	TSGG	Any
TAGR	Rough-skinned newt	TSGG	Any
TATO	Townsend's chipmunk	TSGG	Any
VIGI	Warbling vireo	TSGG	Any
WIPU	Wilson's warbler	TSGG	Any

KEY

Veg. Structure

OP	Open Parklike
CA	Cathedral
UR	Understory Reinitiation
SE	Stem Exclusion
SI	Stand Intitiation
OM(Y or O)	Open Intolerant Multistory (Young or Old)
FM(Y or O)	Fire Excluded Multistory (Young or Old)
MSE	Mature Stem Exclusion
LS	Late Seral Multistory
NF	Non-forested
W	Woodland (pine-oak)
Any	Any structural stage

Presence - status of species in the LSR

KR	Known Resident
KV	Known Visitor (use is more than migration)
KM	Known Migrant (only)
SRVL	Suspected Resident Very Low Likelihood
SRL	Suspected Resident Low Likelihood
SRM	Suspected Resident Moderate Likelihood
SRH	Suspected Resident High Likelihood
SML	Suspected Migrant Low Likelihood
SMM	Suspected Migrant Moderate Likelihood
SMH	Suspected Resident High Likelihood
?	Likelihood Unknown
SREXT	Suspected Resident Extirpated
SV	Suspected Resident at any time

Guild * = categorization is estimated

KEY TO THE SPECIES GUILDS

Terrestrial Guilds	Patch Configuration	Home Range	Structural Stage
TSPO	Patch	Small	Open
TSPST	Patch	Small	Small Tree
TSPLT	Patch	Small	Large Tree
TSMO	Mosaic	Small	Open
TSMST	Mosaic	Small	Small Tree
TSGOS	Mosaic	Small	Open/Small Tree
TSGSL	Generalist	Small	Small/Large Tree
TSGG	Generalist	Small	All
TLC	Contrast	Large	Contrast
TMPO	Patch	Medium	Open
TMMO	Mosaic	Medium	Open
TMMLT	Mosaic	Medium	Large Tree
TMGG	Generalist	Medium	All
TLMO	Mosaic	Large	Open
TLMLT	Generalist	Large	Large Tree
TLGG	Contrast	Large	All
TSC	Contrast	Small	Contrast
TMC	Contrast	Mosaic	Contrast

Appendix D

REO Exemption Letters

United States Department of Agriculture | Forest Service | R-6/R-5

Reply to: 2470/1920

Date: May 9, 1995

Subject: Criteria to Exempt Specific Silvicultural Activities in LSRs and MLSAs from REO Review

To: Forest Supervisors, Owl Forests

Enclosed is a memorandum from the Regional Ecosystem Office (REO) exempting certain precommercial thinning, release, and reforestation activities within LSRs from REO review. I am pleased about this exemption and consider it a key step toward accomplishing ecosystem management objectives in a timely manner. However, since some readers will view the criteria as unnecessarily restrictive, I ask you to keep the following points in mind.

This is the first REO review exemption. It is based on proposals submitted to REO for review or upon proposals REO has discussed in the field. It is, of necessity, conservative. REO continues to express a desire to expand this exemption to other types of activities at the earliest possible time.

Before this memorandum was signed, all silvicultural activities were subject to REO review. Now most young stand thinning (including related sale), release, and reforestation proposals are not subject to review. This is a positive step, and there is little to be gained by discussing whether the criteria should have gone farther at this time. Since no commercial thinning proposals have ever been submitted to REO for review, for example, REO had little basis to expand these criteria at this time.

The criteria do not infer a right or wrong, or consistency or non-consistency with standards and guidelines. The criteria simply draws the line between those proposals no longer subject to REO review, and those that remain subject to review. Proposals not meeting the criteria should be submitted for review as in the past, and REO expects to continue to meet its committment to complete such reviews within 3 weeks, or less, of date received.

Note that the exemption for reforestation is in addition to the somewhat broader exemption already included in the standards and guidelines for reforestation activities required because of existing timber sales.

This exemption also applies to the Issue Resolution Team (IRT) since IRT review was only required in preparation for sending to REO. Specific questions about this exemption should be adressed to the President's Forest Plan coordinator on your unit.

/s/ John E. Lowe

JOHN LOWE
Regional Forester, R-6

/s/Steve Clauson (for)

LYNN SPRAGUE
Regional Forester, R-5

Enclosure

Regional Ecosystem Office
P.O. Box 3623
Portland, Oregon 97208
(503) 326-6265
FAX: (503) 326-6282

Memorandum

Date: April 20, 1995

To: Regional Interagency Executive Committee
(See Distribution List)

From: Donald R. Knowles, Executive Director /s/ Don Knowles

Subject: Criteria to Exempt Specific Silvicultural Activities in LSRs and MLSAs from REO Review

Pages C-12 and C-26 of the Record of Decision (ROD) for the Northwest Forest Plan state that "[t]he Regional Ecosystem Office may develop criteria that would exempt some activities from review." Enclosed are criteria that exempt certain young-stand thinning, release, and reforestation projects that are proposed in Late-Successional Reserves (LSRs) and Managed Late-Successional Areas (MLSAs) from review by the Regional Ecosystem Office (REO). These criteria were developed by an interagency work group and the REO based on the review of silvicultural projects, field visits, and discussions with agencies and technical specialists. The REO may expand the review exemption criteria as experience with additional forest management activities is gained. Please distribute the attached REO review exemption criteria to the field.

It is important to note that these criteria do not affect the kind of activities the ROD permits within LSRs and MLSAs. The criteria apply only to the requirement for REO review of silvicultural activities in LSRs and MLSAs and only to a specific subset of silvicultural treatments. It should also be noted that compliance with the ROD's standards and guidelines and other statutory and regulatory requirements is not affected by these exemption criteria. For example, requirements to do watershed analyses and Endangered Species Act consultation are not affected by the REO review exemption criteria.

Enclosure

cc:
IAC Members (See Distribution List)

362/ly

Distribution List Date: April 20, 1995

Subject: Criteria to Exempt Specific Silvicultural Activities in LSRs and MLSAs from REO Review

TO: **Regional Interagency Executive Committee**

Anita Frankel, Director, Forest and Salmon Group, Environmental Protection Agency
John Lowe, Regional Forester, USDA Forest Service, R-6
Stan Speaks, Area Director, Bureau of Indian Affairs
Michael Spear, Regional Director, U.S. Fish & Wildlife Service
William Stelle, Jr., Regional Director, National Marine Fisheries Service
William Walters, Acting Regional Director, National Park Service
Elaine Zielinski, State Director, Bureau of Land Management, OR/WA

cc: **Other Members of Intergovernmental Advisory Committee**

California
Francie Sullivan, Shasta County Supervisor
Terry Gorton, Assistant Secretary, Forestry and Rural Economic Dev., California Resource Agency

Oregon
Rocky McVay, Curry County Commissioner
Paula Burgess, Federal Forest and Resource Policy Advisor, Office of the Governor

Washington
Harvey Wolden, Skagit County Commissioner
Amy F. Bell, Deputy Supervisor for Community Relations, WA Dept. of Natural Resources
Bob Nichols, Senior Executive Policy Assistant, Governor's Office (Alternate)

Tribes
Greg Blomstrom, Planning Forester, CA Indian Forest & Fire Mgmt. Council
Mel Moon, Commissioner, NW Indian Fisheries Commission
Jim Anderson, Executive Director, NW Indian Fisheries Commission (Alternate)
Gary Morishima, Technical Advisor, Intertribal Timber Council
Guy McMinds, Executive Office Advisor, Quinault Indian Nation

Federal Agencies
Michael Collopy, Director, Forest and Rangeland Ecosystem Science Center, National Biological Service
Eugene Andreuccetti, Regional Conservationist, Natural Resources Conservation Service
Bob Graham, State Conservationist, Natural Resources Conservation Service (Alternate)
G. Lynn Sprague, Regional Forester, USDA Forest Service, R-5 (Alternate)
Thomas Murphy, Director, Environmental Research Laboratory, Environmental Protection Agency
Charles Philpot, Station Director, Forest Service, PNW
Tom Tuchmann, Director, Office of Forestry and Economic Development (Ex Officio)
Ed Hastey, State Director, Bureau of Land Management, CA (Alternate)

REO Review Exemption Criteria

Background

Standards and Guidelines (S&Gs) in the "Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl" (referred to as the ROD) provide that silvicultural activities within Late-Successional Reserves (LSRs) and Managed Late-Successional Areas (MLSAs) are subject to review by the Regional Ecosystem Office (REO). The S&Gs also state that "REO may develop criteria that would exempt some activities [within LSRs and MLSAs] from review."

Based upon proposals submitted to REO for review, field visits, discussions with the agencies and technical specialists, and our understanding of LSR objectives, REO is hereby exempting the following types of activities from the REO review requirement stated on pages C-12 and C-26 of the ROD. Silvicultural projects meeting the following criteria are exempted from REO review because such projects have a high likelihood of benefitting late-successional forest characteristics.

Activities must still comply with all S&Gs in the ROD (e.g., initial LSR assessments, watershed analysis, riparian reserves) and with other statutory and regulatory requirements (e.g., National Forest Management Act, Federal Land Management Policy Act, National Environmental Policy Act, Endangered Species Act, Clean Water Act). This exemption applies only to the REO review requirement found on pages C-12 and C-26 in the ROD. Silvicultural activities described in the S&Gs that do not meet the criteria listed below continue to be subject to REO review at this time.

Silvicultural treatments in LSRs and MLSAs are exempted from REO review (ROD, pages C-12 and C-26), where the agency proposing the treatments finds that the following criteria are met:

1. Young-Stand Thinning, commonly referred to as TSI or precommercial thinning, where:

   a. Young stands, or the young-stand component (understory) of two-storied stands, is overstocked. Overstocked means that reaching the management objective of late-successional conditions will be significantly delayed, or desirable components of the stand may be eliminated, because of stocking levels. The prescription should be supported by empirical information or modeling (for similar, but not necessarily these specific, sites) indicating the development of late-successional conditions will be accelerated or enhanced.

   b. Cut trees are less than 8" dbh, and any sale is incidental to the primary objective.

   c. Tracked, tired, or similar ground-based skidders or harvesters are not used.

   d. Treatments promote a natural species diversity appropriate to meet late-successional objectives; including hardwoods, shrubs, forbs, etc..

e. Treatments include substantially varied spacing in order to provide for some very large trees as quickly as possible, maintain areas of heavy canopy closure and decadence, and encourage the growth of a variety of species appropriate to the site and the late-successional objective.

f. Treatments minimize, to the extent practicable, the need for future entries.

g. Cutting is by hand tools, including chain saws.

2. Release, also commonly referred to as TSI, where:

a. There is undesirable vegetation (competition) which delays attainment of the management objective of late-successional conditions, or desirable components of the stand may be eliminated, because of such competition. The prescription should be supported by empirical information or modeling (for similar, but not necessarily these specific, sites) indicating the development of late-successional conditions will be accelerated or enhanced.

b. Cut material is less than 8" dbh, and any sale is incidental to the primary objective.

c. Tracked, tired, or similar ground-based skidders or harvesters are not used.

d. Treatments promote a natural species diversity appropriate to meet late-successional objectives, including hardwoods, shrubs, forbs, etc.

e. Cutting is by hand tools, including chain saws.

3. Reforestation and Revegetation, including incidental site preparation, release for survival, and animal damage control, where:

a. No site preparation is required other than hand scalping.

b. Reforestation is necessary to quickly reach late-successional conditions, protect site quality, or achieve other ROD objectives.

c. Treatments promote a natural species diversity appropriate to meet late-successional objectives, including hardwoods, shrubs, forbs, etc.

d. Treatments, either through spacing, planting area designation, or expected survival or growth patterns, result in substantially varied spacing in order to provide for some very large trees as quickly as possible, create areas of heavy canopy closure and decadence, and encourage the growth of a variety of species appropriate to the site and the late-successional objective.

e. Treatments minimize, to the extent practicable, the need for future entries.

United States Department of Agriculture | Forest Service | R-6/R-5

Reply to: 2470/1920

Date: July 26, 1996

Subject: Criteria to Exempt Specific Silvicultural Activities in LSR's and MLSA's from REO Review

To: Forest Supervisors, Deschutes, Gifford Pinchot, Olympic, Wenatchee, Mt. Baker-Snoqualmie, Mt. Hood, Rogue River, Siskiyou, Siuslaw, Willamette, Winema, Okanogan, Umpqua, Klamath, Six Rivers, Shasta-Trinity, Modoc, Mendocino, and Lassen NF's, and Area Manager, CRGNSA

Enclosed is a memorandum from the Regional Ecosystem Office (REO) exempting certain commercial thinning activities within LSR's and MLSA's from REO review. We are pleased about this exemption, and consider it a key step toward accomplishing ecosystem management objectives in a timely manner.

The criteria do not infer a right or wrong, or consistency or non-consistency with standards and guidelines. The criteria simply draw the line between those proposals no longer subject to REO review and those that remain subject to review. Proposals not meeting the criteria should be submitted for review as in the past, and REO expects to continue to meet its commitment to complete such reviews within 3 weeks or less, of date received.

Please direct any questions regarding these criteria to your forest silviculturist or Northwest Forest Plan coordinator. If you need assistance from the Issue Resolution Team, please call Joyce Casey at 503-326-5817 or Tom Hussey at 503-326-3589.

/S/ NANCY GRAYBEAL
FOR

ROBERT W. WILLIAMS
Regional Forester, R-6

STEVE CLAUSON
FOR

G. LYNN SPRAGUE
Regional Forester, R-5

Enclosure

cc:
TM-Forest Silv:R06C
NWFP Coods:R06A
IRT:Late Successional Reserve:FS Transmit CT Exemption
edit:p.jeffrey:265:07/22/96:07/23/96

Regional Ecosystem Office
333 SW 1st
P.O. Box 3623
Portland, Oregon 97208-3623
Phone: 503-326-6265 FAX: 503-326-6282

Memorandum

Date: July 9, 1996

To: **Regional Interagency Executive Committee (RIEC)**

Ken Feigner, Director, Forest & Salmon Group, Environmental Protection Agency
Robert W. Williams, Regional Forester, R-6, Forest Service
Stan M. Speaks, Area Director, Bureau of Indian Affairs
Michael J. Spear, Regional Director, U.S. Fish & Wildlife Service
William Stelle, Jr., Regional Director, National Marine Fisheries Service
William C. Walters, Deputy Field Director, National Park Service
Elaine Y. Zielinski, State Director, Oregon/Washington, Bureau of Land Management

From: Donald R. Knowles, Executive Director

Subject: Criteria to Exempt Specific Silvicultural Activities in Late-Successional Reserves and Managed Late-Successional Areas from Regional Ecosystem Office Review

Enclosed are criteria that exempt certain commercial thinning projects in Late-Successional Reserves (LSRs) and Managed Late-Successional Areas (MLSAs) from review by the Regional Ecosystem Office (REO), pursuant to pages C-12 and C-26 of the Northwest Forest Plan (NFP) Record of Decision (ROD). These criteria were developed by an interagency work group and the REO based on review of silvicultural projects, field visits, and comments from agencies, researchers, and technical specialists.

We believe we are ready for these exemptions. Several versions of these criteria have been distributed to your agencies and others for review over the last several months. The comments received have been used to help clarify and focus the criteria. Use of the criteria will expedite implementation of beneficial silvicultural treatments in LSRs and MLSAs. We suggest that you transmit them to your field units at your earliest convenience.

It is important to note that these criteria do not affect the kind of activities the ROD permits within LSRs and MLSAs. The criteria simply exempt a specific subset of silvicultural treatments from the requirement for project level REO review of silvicultural activities within LSRs and MLSAs. Please also note that compliance with the ROD's standards and guidelines and other statutory and regulatory requirements is not affected by these exemption criteria. For example, requirements to do watershed analyses and Endangered Species Act consultation are not affected by the REO review exemption criteria.

We expect implementation monitoring procedures of the Northwest Forest Plan to select enough silvicultural projects within LSRs and MLSAs, both exempted and

reviewed, to determine if actual projects meet standards and appropriate criteria. Obviously, if any of you have questions or comments about the attached, please call me directly at 503-326-6266, Dave Powers at 503-326-6271, or Gary S. Sims at 503-326-6274.

cc: IAC, RMC, LSR Workgroup

Enclosure

694/ly

Criteria Exempting
Certain Commercial Thinning Activities
From REO Review

Background

Standards and Guidelines (S&Gs) in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD) provide that silvicultural activities within Late-Successional Reserves (LSRs) and Managed Late-Successional Areas (MLSAs) are subject to review by the Regional Ecosystem Office (REO). The S&Gs also state that the REO may develop criteria that would exempt some activities (within LSRs and MLSAs) from review.

Based upon project proposals submitted to the REO for review, field visits, discussions with the agencies, researchers, and technical specialists, and our understanding of LSR objectives, the REO is hereby exempting certain commercial thinning activities (sometimes referred to as density management activities) from the REO review requirement (ROD, pages C-12 and C-26). Silvicultural projects meeting the criteria below are exempted from REO review because such projects have a high likelihood of benefiting late-successional forest conditions. Many of the commercial thinning proposals reviewed thus far by the REO have met these criteria.

In some cases the criteria refer to the prescription. All silvicultural treatments within LSRs will be conducted according to a silvicultural prescription fully meeting agency standards for such documents. A description of the desired future condition (DFC), and how the proposed treatment is needed to achieve the DFC, are key elements in this prescription. The description of desired future condition should typically include desired tree species, canopy layers, overstory tree size (e.g., diameter breast height), and structural components such as the range of coarse woody debris (CWD) and snags.

Some elements of these exemption criteria may seem prescriptive, and reviewers suggested several changes to accommodate specific forest priorities. While such suggestions may have been within the scope of the S&Gs, there are several reasons they are not included here:

These criteria are based on numerous submittals already reviewed by the REO and found to be consistent with the S&Gs. Other treatments, such as thinning with fire, may be equally appropriate. The REO simply has not had sufficient experience with such prescriptions within LSRs to write appropriate exemption criteria at this time. Agencies are encouraged to develop and submit such prescriptions for review. The REO will consider supplementing or modifying these criteria over time.

These criteria apply range wide. It may be more appropriate to seek exemption at the time of LSR assessment review where specific vegetation types, provincial issues, or objectives do not fit within these criteria or where silvicultural prescriptions are needed other than as described below.

These exemption criteria are not standards and guidelines, and projects meeting LSR objectives but not fitting these criteria should continue to be forwarded to the REO for review.

Four other key points about thinning are important to consider when developing thinning prescriptions:

1. We urge caution in the use of silvicultural treatments within LSRs. Silvicultural treatments within old habitat conservation areas (HCAs) and designated conservation areas (DCAs) were extremely limited, and many of the participants in the Forest Ecosystem Management Assessment Team/Supplemental Environmental Impact Statement (FEMAT/SEIS) process advanced good reasons for continuing such restrictions. Only high eastside risks and a case made that late-successional conditions could clearly be advanced by treatments in certain stand conditions led decision makers toward the current S&Gs. Note that the examples for the westside (S&Gs, page C-12) are for even-age stands and young single-species stands. Agencies must recognize when younger stands are developing adequately and are beginning to become valuable to late-successional species. Such stands should be left untreated unless they are at substantial risk to large-scale disturbance.

2. Thinning can easily remove structural components or impede natural processes such as decay, disease, or windthrow, reducing the stand s value to late-successional forest-related species. Thinning prescriptions that say leave the best, healthiest trees could eliminate structural components important to LSR objectives.

3. While historic stand conditions may be an indicator of a sustainable forest, they are not the de facto objectives. The S&Gs require an emphasis toward late-successional conditions to the extent sustainable.

4. Treatments need to take advantage of opportunities to improve habitat conditions beyond natural conditions. For example, exceeding natural levels of CWD within a 35-year-old stand can substantially improve the utility of these stands for late-successional forest-related species. Treatments must take advantage of opportunities to optimize habitat for late-successional forest-related species in the short term.

Relation to S&Gs and Other Exemption Criteria

Exempted thinnings must still comply with all pertinent S&Gs in the ROD (e.g., initial LSR assessments, watershed analyses, riparian reserves) and with other statutory and regulatory requirements (e.g., National Forest Management Act, Federal Land Management Policy Act, National Environmental Policy Act, Endangered Species Act, Clean Water Act). Interagency cooperation, monitoring, and adaptive management are key components of the ROD and were key assumptions underlying the development of these criteria. Additionally, field units are strongly encouraged to engage in intergovernmental consultation when developing projects. This exemption applies only to the REO review requirement (ROD, pages C-12 and C-26). Many treatments not meeting these exemption criteria may be appropriate within LSRs and MLSAs, and these treatments remain subject to REO review. These exemption criteria are in addition to criteria issued April 20, 1995, for Young Stand Thinning, Release, and Reforestation and Revegetation, and are in addition to exemption criteria adopted through the LSR assessment review process.

EXEMPTION CRITERIA

Silvicultural treatments in LSRs and MLSAs are exempted from REO review (ROD, pages C-12 and C-26) where the agency proposing the treatments finds that ALL of the following criteria are met:

Objectives

1. The objective or purpose of the treatment is to develop late-successional conditions or to reduce the risk of large-scale disturbance that would result in the loss of key late-successional structure. Further, the specific treatment would result in the long-term development of vertical and horizontal diversity, snags, CWD (logs), and other stand components benefiting late-successional forest-related species. The treatment will also, to the extent practicable, create components that will benefit late-successional forest-related species in the short term.

   Timber volume production is only incidental to these objectives and is not, in itself, one of the objectives of the treatment. Creation or retention of habitat for early successional forest-related species is not a treatment objective.

2. Negative short-term effects to late-successional forest-related species are outweighed by the long-term benefits to such species and will not lessen short-term functionality of the LSR as a whole.

3. The leave-tree criteria provide for such things as culturing individual trees specifically for large crowns and limbs and for the retention of certain characteristics that induce disease, damage, and other mortality or habitat, consistent with LSR objectives. Healthiest, best tree criteria typical of matrix prescriptions are modified to reflect LSR objectives.

4. Within the limits dictated by acceptable fire risk, CWD objectives should be based on research that shows optimum levels of habitat for late-successional forest-related species, and not be based simply on measurements within natural stands. For example, recent research by Carey and Johnson in young stands on the westside indicates owl prey base increases as CWD (over 4") within Douglas-fir forests increases, up to 8- to 10-percent groundcover south of the town of Drain, Oregon, and 15-percent groundcover north of Drain, increasing to 15 to 20 percent in the Olympic Peninsula and Western Washington Cascades. Other references that could help identify initial considerations involving natural ranges of variability in CWD include Spies and Franklin, for discussions on Washington Cascades, Oregon Cascades, and Coast Ranges; and Graham, et al., for east of the Cascades.

   If tree size, stocking, or other considerations preclude achievement of this objective at this time, the prescription includes a description of how and when it will be achieved in the future.

5. Agencies having an interest in LSR projects proposed under these criteria should continue to be given the opportunity to participate in project development.

Stand Attributes

1. The stand is currently not a complex, diverse stand that will soon meet and retain late-successional conditions without treatment.

2. West of the Cascades outside of the Oregon and California Klamath Provinces, the basal-area-weighted average age of the stand is less than 80 years. Individual trees exceeding 80 years in those provinces, or exceeding 20-inches dbh in any province, shall not be harvested except for the purpose of creating openings, providing other habitat structure such as downed logs, elimination of a hazard from a standing danger tree, or cutting minimal yarding corridors. Where older trees or trees larger than 20-inches dbh are cut, they will be left in place to contribute toward meeting the overall CWD objective. Thinning will be from below, except in individual circumstances where specific species retention objectives have a higher priority. Cutting older trees or trees exceeding 20-inches dbh for any purpose will be the exception, not the rule.

(see Addendum)

3. The stand is overstocked. Overstocked means that reaching late-successional conditions will be substantially delayed, or desirable components of the stand will likely be eliminated, because of stocking levels.

Treatment Standards

1. The treatment is primarily an intermediate treatment designed to increase tree size, crown development, or other desirable characteristics (S&Gs, page B-5, third paragraph); to maintain vigor for optimum late-successional development; to reduce large-scale loss of key late-successional structure; to increase diversity of stocking levels and size classes within the stand or landscape; or to provide various stand components beneficial to late-successional forest-related species.

2. The prescription is supported by empirical information or modeling (for similar, but not necessarily these specific sites) indicating that achievement of late-successional conditions would be accelerated.

3. The treatment is primarily an intermediate thinning, and harvest for the purpose of regenerating a second canopy layer in existing stands is no more than an associated, limited objective as described below under openings and heavily thinned patches.

4. The treatment will increase diversity within relatively uniform stands by including areas of variable spacing as follows:

   Ten percent or more of the resultant stand would be in unthinned patches to retain processes and conditions such as thermal and visual cover, natural suppression and mortality, small trees, natural size differentiation, and undisturbed debris.

   Three to 10 percent of the resultant stand would be in openings, roughly 1/4 to 1/2 acre in size to encourage the initiation of structural diversity.

Three to 10 percent of the resultant stand would be in heavily thinned patches (e.g., less than 50 trees per acre) to maximize individual tree development and encourage some understory vegetation development.

The treatment does not inappropriately simplify stands by removing layers or structural components, creating uniform stocking levels, or removing broken and diseased trees important for snag recruitment, nesting habitat, and retention of insects and diseases important to late-successional development and processes.

5. To the extent practicable for the diameter and age of the stand being treated, the treatment includes falling green trees or leaving snags and existing debris to meet or make substantial progress toward meeting an overall CWD objective.

6. Snag objectives are to be identified as part of the DFC. Prescriptions must be designed to make substantial progress toward the overall snag objective, including developing large trees for future snag recruitment and retaining agents of mortality or damage. To the extent practicable for the diameter and age of the stand being treated, each treatment includes retention and creation of snags to meet the DFC. Publications useful in identifying snag-related DFCs include but are not limited to Spies, et al.

   To the extent snag requirements for late-successional species are known, one objective is to attain 100 percent of potential populations for all snag-dependent species.

7. The project-related habitat improvements outweigh habitat losses due to road construction.

Cited References:

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