

**Southwest Oregon**  
**Late-Successional Reserve Assessment**

**10/95**

Medford District, Bureau of Land Management, Department of the Interior

And

Siskiyou National Forest, U.S. Forest Service, Department of Agriculture

Medford and Grants Pass, Oregon

## Table of Contents

	Page
I. Introduction	9
A. Goals and Objectives of LSR Assessment,	9
B. Context of Southwest Oregon LSR Assessment	9
II. Individual LSR Context	10
A. East IV/Williams-Deer LSR	10
1. Existing Conditions	11
2. Surrounding Ownerships	11
3. Connections	11
4. Geo-soils	12
B. Briggs LSR	12
1. Existing Conditions	12
2. Surrounding Ownerships	12
3. Connections	12
4. Geo-soils	12
C. Fish Hook/Galice LSR	13
1. Existing Conditions	13
2. Surrounding Ownerships	13
3. Connections	13
4. Climate	13
D. West IV LSR	15
1. Existing Conditions	15
2. Surrounding Ownerships	15
3. Connections	15
4. Geo-Soils	15
E. South Chetco LSR	15
1. Existing Conditions	15
2. Surrounding Ownerships	15
3. Connections	15
F. North Chetco LSR	15
1. Existing Conditions	15
2. Surrounding Ownerships	15
3. Connections	16
4. Geo-soils	16
G. Northwest Coast LSR	16
1. Existing Conditions	16
2. Surrounding Ownerships	16
3. Connections	16
4. Climate	16

	Page
H. Taylor LSR	16
1. Existing Conditions	16
2. Surrounding Ownerships	17
3. Connections	17
III. The Vegetation: Plant Series, Patch Sizes, and Amounts	18
A. Plant Series	18
1. The white-fir series	18
2. The red-fir series	18
3. The Port-Orford-cedar series	18
4. The tanoak series	18
5. The Jeffery pine series	18
6. The Douglas-fir series	18
7. The western hemlock series	18
8. The mountain hemlock series	18
B. Amount of Older Forest Habitat	19
C. Patch Sizes	24
IV. Species With Special Status and Unique Habitats	30
A. Plant Species with Special Status	30
1. Species Within LSR but Not Associated with Older Forest Habitat	31
B. Survey and Manage Plant Species	35
1. Vascular Species	35
2. Non-vascular Species	35
C. Wildlife Species with Special Status	37
1. Endangered and Threatened Wildlife Species	37
2. Sensitive Wildlife Species	39
3. Survey and Manage Wildlife Species	39
4. Late-Successional Wildlife Species listed in Appendix J2	40
5. Wildlife Management Indicator Species	40
D. Unique Habitats	48
1. Wildlife Areas	48
2. Meadows < 1 Acre	48
3. Meadows > 1 Acre	48
4. Black/White Oak Savannah	50
5. Lakes/Ponds	50
6. Swamps/Springs/Wet Areas	51
7. Rock	51
8. Band-tailed Pigeon	51
9. Tanoak	51
10. Hardwoods and Dispersed Habitat	51
V. Historical and Existing Conditions and Processes for the LSR's	53
A. Aquatic Elements and Processes	53
B. Forest Elements	68
1. General Elements	68
2. Older Forest Patches	70
C. Forest Processes	70
1. Agents of Disturbance	70
2. Fire Severity and Frequency	71
3. Results	71
4. Growth and Health Processes	75

VI. Trends for Elements and Processes	76
A. Trends by Plant Series	76
B. Forest Trends with Past Timber Harvest	77
1. Large Trees	77
2. Canopy and Understory Characteristics	77
3. Snags, Large Woody Material, and Fire	77
4. Patch Size	77
C. Forest Trends and Fire	77
VII. Management Implications	83
A. Desired Conditions	83
1. General Elements	83
2. Older Forest Patches	85
B. Priorities for Treatment	86
1. Amount of Older Forest	86
2. Owl Activity Centers and Patch Sizes	87
C. Possible Projects	89
VIII. Projects and Descriptions	92
1. Responsibility for line officers	92
2. Documentation	92
3. Air quality needs	92
4. Burn Intensity	93
5. Priority Areas for Treatment	93
B. Large Woody Material and Snags	93
1. Terrestrial	93
2. Aquatic	95
C. Silvicultural Activity	95
1. Thinning	95
2. Release	97
3. Underplanting	98
4. Limiting Understory	98
5. Creation of Snags and Large Woody Material	98
6. Reforestation	98
7. Fertilization	98
D. Phytophthora Control	98
E. Unique Habitat Restorations	99
F. Wild Fire	99
1. Spotted Owl	100
2. Marbled Murrelet	100
3. Peregrine Falcon/Bald Eagle	100
4. Salmonids Habitat Protection	100
5. Port Orford Root Disease	101
6. Areas Requiring Higher Protection	101

G. Other Nonsilvicultural Activities that Are Neutral to Late-Successional Habitat	102
1. Genetic Developments and Research	102
2. Special Forest Products	103
3. Recreation Developments	105
4. Grazing	105
5. Mining	105
6. Other Projects	106
IX. Monitoring Needs	106
A. Vegetation	106
B. Wildlife	106
C. Stream Flats	106
D. Conditions Which Require Reexamination	107

## List of Maps

		Page
Map 1.	Southwest Oregon Late Successional Reserve Areas	15
Map 2.	Southwest Oregon Draft Plant Series	29
Map 2a.	Draft Plant Series - Galice LSR	31
Map 2b.	Draft Plant Series - Williams LSR	33
Map 3.	Southwest Oregon Interior Patch Areas	47
Map 3a.	Interior Patch Areas - Galice LSR	49
Map 3b.	Interior Patch Areas - Williams LSR	51
Map 4.	Critical Habitat Units (CHU) in Late Successional Reserves (LSR)	65
Map 5.	Southwest Oregon Special Wildlife and Plant Sites	79
Map 6.	Southwest Oregon - Key Watersheds and Anadromous Fish Streams	89
Map 6a.	Key Watersheds and Anadromous Fish Streams - Galice LSR	91
Map 6b.	Key Watersheds and Anadromous Fish Streams - Williams LSR	93
Map 7a:	E. Fork Illinois River Watershed - Low Gradient Stream Reaches	95
Map 7b:	Sucker Creek Watershed - Low Gradient Stream Reaches	95
Map 7c:	Winchuck River Watershed - Low Gradient Stream Reaches	97
Map 7d:	Indigo Creek Watershed - Low Gradient Stream Reaches	97
Map 7e:	Lower Rogue Subbasin Watershed - Low Gradient Stream Reaches	99
Map 7f:	Briggs Creek Watershed - Low Gradient Stream Reaches	99
Map 7g:	Johnson Creek Watershed - Low Gradient Stream Reaches	101
Map 7h:	North Fork Smith River Watershed - Low Gradient Stream Reaches	103
Map 7i:	South Fork Coquille Watershed - Low Gradient Stream Reaches	103
Map 8:	Southwest Oregon Port Orford Cedar Status	109
Map 9:	Southwest Oregon - Risk of Decline in Tree Health in LSRs	111
Map 10:	Southwest Oregon 50th Percentile Flame Lengths	119
Map 10a:	Southwest Oregon 90th Percentile Flame Lengths	121
Map 11:	Southwest Oregon 50th Percentile Rate of Spread (Feet/Hour)	123
Map 11a:	Southwest Oregon 90th Percentile Rate of Spread (Feet/Hour)	125
Map 12:	Southwest Oregon - Candidates for Stand Treatment	133

## List of Figures

	Page
Figure 1: Plant Series by LSR	37
Figure 2: Percent Area Capable of Growing Older Forests	38
Figure 3: Total and Interior Older Forest Habitat	39
Figure 4: Owl Activity Centers	40
Figure 5: Older Forest Patch Size - TSHE Plant Series	42
Figure 6: Older Forest Patch Size - ABCO Plant Series	43
Figure 7: Older Forest Patch Size - LIDE3 Plant Series	44
Figure 8: Older Forest Patch Size - PSME Plant Series	45
Figure 9: Comparison of Pools and Large Wood Frequency in Selected Stream Reaches	87

## List of Tables

	Page
Table 1: LSR Characteristics	17
Table 2: Crude Densities Among SW Oregon Spotted Owl Density Studies	19
Table 3: Rare Plants Known Within the LSRs	57
Table 4: Botanical Land Allocations	61
Table 5: Endangered, Threatened, Sensitive, and Other Important Wildlife Species	68
Table 6: Habitat Acreage and Species Sites	74
Table 7: Data on Owl Activity Centers	76
Table 8: Spotted Owl Critical Habitat	77
Table 9: Unique Wildlife Sites	84
Table 10: Low Gradient Streams	88
Table 11: Current Conditions of Forest Elements	106
Table 12: Fire Disturbance Characteristics	113
Table 13: Existing Processes for Older Forest Stands	114
Table 14: Trends for Forest Processes and Elements	115
Table 15: Desired Conditions of Forest Elements	128
Table 16: Large Woody Material Amounts	129
Table 17: Priority Areas for Treatments	130
Table 18: Largest Blocks of Total and Interior Habitat	131
Table 19: Possible Projects in LSRs	135
Table 20: Large Woody Material and Criteria for Ecosystem Resilience	138
Table 21: Areas Requiring Higher Levels of Protection	145
Table 22: Special Forest Products	147

## Southwest Oregon Late-Successional Reserve Assessment

### I. Introduction

In 1994 the Pacific Northwest Forest Plan initiated a Regional "Late Seral" network to help maintain the viability of species associated with older forests. **Our objective is to assess how well the western portion of the southwest Oregon net is functioning.** Since the network was designed to function in harmony with existing land allocations, lands associated with the Siskiyou National Forest, the Grants Pass and Glendale Resource Areas of the Medford BLM District and Coos Bay District are considered. Like monitoring, assessment is a continuous process; this report is a first approximation; it will be revised as we learn and as conditions and needs change.

Although each Late Seral Reserve (LSR) is designed to include as much late seral forest as possible and provide for landscape scale connections, ecosystem analyses at the watershed scale provide specific information on provincial pathways, patterns, structure, and disturbance dynamics (including associated risks). Direct viability assessment (controversial, time consuming and expensive) is not used. Consistent with the Chief's instructions, this integrated, interagency team focuses on habitat quantity, quality, distribution ("coarse filters"), established needs of sensitive species ("fine filters") and the risk associated with maintaining late seral forests (disturbance dynamics).

Required by the Northwest Forest Plan, this midlevel assessment provides information, not decisions, for Forest and District plan amendments, site specific projects, and restoration and monitoring needs for management of the Late-Successional Reserve. It dovetails with current ecosystem analysis being conducted at the watershed scale. The scale of this analysis (over 1 million acres) is larger than the scale for watershed (ecosystem) analyses (generally less than 100,000 acres). These multiscaled midlevel analyses are iterative and are not independent from each other. The following completed watershed analyses have more specific information about their respective watershed: Kirby, Elk River, South Fork Coquille, Taylor, Silver, Sucker/Grayback, East Fork Illinois, North Fork Smith, the Winchuck, Quosatana, and Lawson watershed analyses. In addition, future watershed analyses will build upon the knowledge contained in this document.

### A. Goals and Objectives of LSR Assessment

Ecosystem management requires maintaining biological diversity including species viability (ROD, Ecological Principles for Management of Late-Successional Forests, pages B-1 to B-6). Forest and District goals and objectives are consistent with ROD requirements (Siskiyou National Forest Plan and Medford District BLM Plan).

Since species directly depend on habitat, a variety of habitats over time and space provide viability for a range of species including rare and sensitive species and those associated with late seral stages. Successional and disturbance processes have provided a varied seral stage mix and a functional landscape pattern. However, the effects of fire, the most influential process, have been altered and will continued to be modified well into the future.

Management will focus on the amount and distribution of interior habitat, number and size of trees both live and dead (standing and down), on the forest floor and in streams, and canopy density, continuity and layering. Over time we will determine the needs of indicator species. In the mean time we will maintain and create elements of older forests.

### B. Context of Southwest Oregon LSR Assessment - Landscape Assessment

**Regional Setting:** Southwest Oregon LSRs are part of a regional network designed in association with other land allocations (riparian reserves, National Parks, Wilderness, botanical areas, etc.) to provide functional late seral habitat, including long-term dispersal and migratory pathways.

The Cascade and Coast Ranges provide north-south mid to high elevation routes. Each has its own unique complement of species associated with the inland continental and coastal marine climates respectively. The Siskiyou backbone, joins the two parallel ranges like the crossbar of the letter "H" allowing species form four different directions to come together. In addition, the Columbia and Klamath Rivers, the only two major rivers to significantly breach the Cascades and Coast ranges, allow mixing of east-side and west-side species and genetic varieties.

**Provincial setting:** The Siskiyou, much older and more varied in climate and geology than either the Cascades or Coast Ranges, still provide a diversity of source material for the surrounding areas and act as a sink or refuge for species during climatic extremes. The ice ages and the xerothermic period are examples of these recent extremes. Today this area remains central to the continued health and development of the Pacific Northwest flora, like a busy intersection in the migratory crossroads.

## II. Individual LSR Context

Table 1 lists the vegetative status of each Late-Successional Reserve. Late seral habitat is a "coarse filter" which indicates how well the reserve is functioning. For example, a reserve with 80-100% of the capable acres in late-successional conditions would likely function well. Conversely less than 40% late-successional conditions would indicate a poorly functioning LSR. Of course, these ranges would vary over time and space.

Previous work documented in the Shasta Costa EIS suggest the functional range is between 45-70% late-successional conditions. Research in the future will provide better information.

**Table One: LSR Characteristics 1/**

LSR	Size	Percent of Area with Potential (acres) 2/	Percent Late Successional (acres) 3/	Percent Managed Stands 4/	Interior Late-Successional Habitat (acres) 5/
Briggs	53,980	60% (32,223)	50% (15,996)	7%	32%(10,334)
EastIV	62,809	93% (58,260)	36% (20,694)	35%	7% (4,120)
Williams	59,717	84% (50,333)	47% (23,766)	13%	12% (6,884)
Fish Hook	151,965	91% (137,877)	39% (54,407)	10%	15% (20,268)
Galice	82,895	94% (78,215)	60% 47,151	13%	8% (6,791)
North Chetco	26,199	83% (23,426)	29% (6,688)	22%	5% (1,068)
Northwest Coast	145,974	86% (125,542)	38% (47,973)	25%	12% (15,469)
South Chetco	71,382	95% (67,750)	36% (24,502)	24%	8% (5,759)
Taylor	8,934	99% (8,810)	46% (4,112)	28%	15% (1,314)
West IV	53,738	6% (3,389)	29% (996)	1%	54% (1,817)
<b>TOTAL</b>	<b>719,593</b>	<b>(585,825)</b>	<b>246,285</b>		<b>74,004</b>

1/ All habitat data was calculated using PMR pixel databases for National Forest lands and existing vegetation GIS layer for BLM stands.

2/ Acres that have the potential to produce older forest conditions.

3/ Areas that have Late Successional characteristics include Mid, Late, or Climax seral stages with > 40% canopy closure - trees are at least 21 inch DBH (these are almost entirely natural stands). This is expressed as a percentage of the area capable of growing older forests. > 40% canopy closure was used as the "lower end" for late-successional habitat, instead of > 70%, because most natural stands between 40% and 70% are actually close to 60%, and therefore do qualify as late-successional habitat (ecoplots data for the Siskiyou shows old-growth at 60% or more canopy closure). Natural stands < 40% are typically on serpentine-influenced soils and do not qualify as late-successional.

4/ Managed stands are generally young plantations established after a regeneration harvest (such as a clearcut). It also includes natural stands that have been commercially thinned.

5/ Areas calculated from PMR pixel data (25 by 25 meters) for National Forest lands, existing vegetation GIS layers for BLM lands. Interior habitat calculations used a buffer of 125 meters from the outside edge.

Regardless of percent of late seral habitat, other "fine filter" criteria (specific species requirements) also need assessment. For example, the abundance and distribution of specific habitat elements such as snags, down wood, etc. can be species specific.

Late-successional habitat, spotted owl habitat, old growth habitat, and older forests are not synonymous. This assessment focuses on appropriate habitat characterized by structure and elements associated with mature forests.

Additional characteristics and functions of each Late-Successional Reserve aid planning of activities within each LSR.

## A. East IV/Williams-Deer

The East IV/Williams-Deer LSR has a combination of National Forest and BLM lands. The white fir, tanoak, and Douglas-fir plant series occupy most of this LSR. Thirty-six percent of the capable lands are in older forest conditions.

The east side of the Illinois River Valley, the high elevations, the low elevations in the BLM ownership, and similar geology are defining features of this LSR.

**Existing Conditions:** With a high percentage of the land in managed stands (35%), the proportion of interior late-successional habitat is only 7 percent. Most of the existing late-successional habitat is located in the white fir and tanoak plant series. Several large patches of late-successional habitat exist in the white fir, tanoak, Jeffrey pine, and Douglas-fir plant series. Some large interior patches of late-successional habitat exist in the white fir and tanoak plant series.

**Species:** The Applegate watershed (Cheney, Williams, and Powell Creeks), Sucker Creek, and Grayback Creek in the East IV LSR support important anadromous fish runs of coho, chinook, and steelhead.

Many rare animal species occur in this LSR. It presently supports 42 activity centers for the northern spotted owl. 14 of these activity centers have less than 30 percent of their home range in suitable owl habitat. It is accepted that 40% or more of the home range (within 1.3 miles) should be in older forest, to adequately support a viable owl pair. Less than 30 percent of the home range in older forest habitat will generally not support a viable pair of owls over the long term. 22 of these 42 activity centers contain greater than 40% of their home range in suitable owl habitat. Other animal detections include wolverine, fisher, marten, big-eared bat, and goshawk, along with many other plant and animal species.

In 1990-1992, BLM established a spotted owl density study in this LSR. The purpose of the Williams Density Study Area was to establish base line population information, habitat quality information, and population dynamics for spotted owls in this 119 square mile area. In 1992, scientists calculated a relatively high density of 0.159 owls/km<sup>2</sup> (Table 2).

Sites located within the LSR which contain less than 40% of suitable owl habitat appear to be declining. This suggests the 1992 population was higher than what can be supported by existing habitat. Since 1992, the BLM has continued to monitor the majority of the spotted owl sites (22 of the 24 active sites located in 1992). Seven of these sites did not have responses in 1995. Five of those 7 sites are deficit in suitable owl habitat. Only 4 of the remaining 15 sites have enough suitable habitat within 1.3 miles to be considered viable over time. The ability of the remaining viable nesting pairs to contribute young to successfully repopulate vacated sites is not known. The uncertain future of the population is dependent upon avoiding future disturbances such as stand replacement fire, insects, and conversion of habitat by human activities.

**Table 2: Crude Densities in S.W. Oregon Spotted Owl Density Studies (Owls/km<sup>2</sup>)**

Year	Butte Falls	Evans Creek	Elk Creek	Cow Creek	Williams
1992	0.084	0.104	0.245	0.106	0.159

Several diverse habitats persist in the LSR. Thirty-six meadows covering 1,338 acres grow in the area and 10 ponds are present. Some distinctive high elevation meadows provide plant diversity. Rock habitat and hardwood sites including important oak savannas also provide some important habitat diversity.

**Surrounding Ownerships and Land Allocations:** The ownership characteristics surrounding the East IV/Williams-Deer LSR are a mix of private and federal lands. On the northern, eastern, and western sides of the LSR, a checkerboard ownership pattern of Bureau of Land Management and private lands exist. The southern boundary of the LSR is a solid block of lands of the Rogue, Siskiyou, and Klamath National Forests. National Forest lands immediately south of the LSR include Wildernesses and the Applegate Adaptive Management Area land allocations. The BLM lands immediately to the west of the LSR are also in the Illinois Basin and allocated to matrix lands. The Applegate Adaptive Management Area covers BLM lands to the north and east of the LSR.

Private lands adjacent to the LSR include residential homesites, small woodlots, and lands managed for agricultural uses. The community of Williams is approximately two miles east of the LSR and the community of Murphy is about two miles north of the northeastern LSR boundary. The town of Takilma is west and north of the LSR and the community of Cave Junction is several miles to the north of Takilma.

**Connections:** Other characteristics and functions of this LSR are the high elevation older forest connections between the eastern Illinois Valley mountains and the coastal part of the Siskiyou. Most of this high elevation connection occurs in the

white fir and red fir plant series. Parts of this LSR also connect the Rogue and Illinois River Valleys. Refer to Structural/Seral Stage Map and Existing Vegetation Map at the Siskiyou National Forest and Medford BLM for exact locations of these connections.

In addition, this LSR has an "elevator effect". It provides contiguous forest reserves from the lower elevations to the higher elevations. A good example is Grayback Creek which leaves the LSR at an elevation of 1,800 feet, and has its headwaters at over 5,000 feet. This elevator effect provides opportunities for species to "move" up and down in elevation during long warming or cooling periods.

This LSR connects with scattered older forest habitat on BLM lands to the north and east (part of the Applegate AMA) and larger blocks of older forest habitat in the Siskiyou and Red Buttes Wildernesses to the south and east (On Klamath and Rogue River NFs, respectively). The connections to the LSRs on the Klamath National Forest and Six Rivers National Forest are important considerations. However, this LSR assessment does not include these LSRs due to budget and time constraints. During implementation, these connections need to be considered if relevant.

There is a lack of older forest connections directly to the east and west. Consequently, the area to the south provide functioning connections. Land between the headwaters of the Illinois and Smith rivers south of O'Brien, Oregon connects private lands and federal ownerships within the Klamath, Siskiyou, and Six Rivers National Forests. U.S. Highway 199 south of O'Brien bisects this corridor, traversing the headwaters of the Illinois and Smith rivers. The highway is a permeation (Perry 1994) to this critical connection.

**Geo-soils:** In places, the potential of the land to grow older forests is limited by the serpentine geology. These serpentine lands also have their own late-successional conditions, but these conditions do not support many of the species normally associated with older forests (canopy closure of Forests on serpentine soils is usually less than 40%).

This serpentinite geology, ultra basic soils, and dry summer conditions lend this landscape a unusual tone and pleasant atmosphere. Low available soil moisture and low soil nutrients limit tree growth and provide smaller trees with less plant biomass than adjacent lands.

## **B. Briggs LSR**

The Briggs LSR has all National Forest lands. The tanoak and Douglas-fir plant series occupy the majority of this LSR. Only 60% of the LSR is capable of growing spotted owl habitat. Of these capable lands, 50% are older forests (the highest percentage of any LSR).

**Existing Conditions:** With a low percentage of the land in managed stands (7%), the proportion of interior late-successional habitat is 32%. Most of the existing older forest habitat is located in the Douglas-fir, Jeffrey Pine, tanoak, and white-fir plant series. Several large patches of older forest habitat exist in the all four plant series. Some large interior patches of late-successional habitat exist in the Douglas-fir and tanoak plant series.

Anadromous fish runs of coho, chinook, and steelhead use the Illinois River and several tributaries.

Many rare animal species occur in this LSR. It presently supports 8 activity centers for the northern spotted owl. All activity centers have greater than 30% of their home range as suitable owl habitat and 6 of these 8 centers have greater than 40% of their home range in suitable owl habitat. Other animal detections of interest include goshawk, among many other plant and animal species.

Several diverse habitats persist in the LSR. Five meadows covering 49 acres grow in the area and 3 ponds are present. Some talus and bluff habitat and hardwood sites (including tanoak) also provide some important habitat diversity.

**Surrounding Ownerships and Land Allocations:** The ownership characteristics surrounding the Briggs LSR are a mix of National Forest lands. The Kalmiopsis Wilderness (180,000 acres) exists on the western sides of the LSR. The South Kalmiopsis roadless area and the West IV LSR are located on the southeastern boundary. The northern and eastern boundaries are matrix lands intersected by riparian reserves.

**Connections:** Important characteristics of this LSR are the Illinois River connection between the Illinois Valley and the Rogue River. In addition, the older forest habitat in the Briggs LSR connects to the Kalmiopsis Wilderness and to the Taylor Creek LSR.

**Geo-soils:** In places, the potential of the land to grow late-successional forests is limited by the serpentine geology, though not as limited as in the West IV LSR.

## C. Fish Hook/Galice LSR

The Fish Hook/Galice LSR is a mixture of BLM and National Forest lands. The tanoak and Douglas-fir plant series occupy the majority of this LSR, with a major component of white fir. Thirty-nine percent of the capable lands are in older forest conditions.

**Existing Conditions:** With a low percentage of the land in managed stands (10%), the proportion of interior late-successional habitat is 15%. Most of the existing late-successional habitat is located in the Douglas-fir, tanoak, and white-fir plant series. Several large patches (total patches and interior patches) of late-successional habitat exist in the all three plant series.

Alaska yellow-cedar and a few associated uncommon plants occur in several high elevation north slope locations. Such plants are thought to be "refugia" species; they became isolated from large populations during the cool Pleistocene geologic time period.

Several key watersheds (Big Windy, Howard, Rogue River, Mule Creek, Kelsey Creek, Whiskey Creek, Silver, Indigo, Shasta Costa, and Lawson) support valuable runs of coho, chinook, and steelhead anadromous fish.

The Fish Hook (NF)/Galice (BLM) LSR supports active elk herds, especially in the Fish Hook Peak Peavine Mountain areas. In cooperation with the Oregon Department of Fish and Wildlife, the BLM employs many different habitat and population management to enhance elk numbers in the Peavine area.

Many rare animal species occur in this LSR. It presently supports 53 activity centers for the northern spotted owl. Forty-one activity centers have greater than 30% of their home range as suitable owl habitat and 45 of these 51 home ranges contain greater than 40% suitable owl habitat. Two spotted owl activity centers have less than 30% suitable owl habitat. BLM has excellent quality site-monitoring data available for this area. Other animal detections of interest include peregrine falcons, martens, Pacific western big-eared bats, and goshawks, among many other plant and animal species.

Several diverse habitats exist in the LSR, including the Fish Hook Wildlife Area. Fifty-nine meadows covering 2,335 acres grow in the area and 8 ponds are present. Eighty-eight different sites provide talus and bluff habitat, plus 15 hardwood sites, also provide important habitat diversity.

**Surrounding Ownerships and Land Allocations:** The eastern boundary is a checkerboard ownership pattern of BLM and privately owned lands. A solid block of federal ownership on the other three sides dominates the Fish Hook/Galice Block LSR.

The Wild and Scenic Rogue River corridor splits the northeastern portion of the LSR. This Congressional designation takes precedence over the LSR allocation. Consequently the River corridor is not part of the LSR.

The Northwest Coast LSR borders this area to the west, the Kalmiopsis Wilderness to the south, and the Wild Rogue Wilderness to the northeast. Private lands adjacent to the eastern boundary of the LSR in the Galice Creek drainage include active mining claims. Private commercial forest lands, private residences, and Indian Mary Park (a Josephine County facility) are located to the east and southeast of this LSR.

**Connections:** This is the central LSR on the Siskiyou National Forest and consequently provides many connections. It provides a corridor of older forest habitat between the Kalmiopsis and Wild Rogue Wildernesses. It has a connection of existing older forest habitat through Lawson Creek and the Illinois River to the Northwest Coast LSR. Another connection is the Foster Creek drainage where older forest habitat connects to the Northwest Coast LSR. In addition, the areas not harvested in Silver, Shasta Costa, and Indigo watersheds provide unfragmented habitat. The east/west older forest link helps connect the coastal mountains east across the valley to the Rogue-Umpqua divide.

In the middle of this LSR, there is a patch of Matrix land around Fish Hook peak. These matrix lands have been fragmented by past harvests and by natural meadows. Consequently, it was excluded from this LSR.

**Climate:** The climate differentiates this LSR from the Northwest LSR. It has little summer fog, compared to the cooler and more moist NW Coast LSR.

## D. West IV

National Forest lands dominate within the West IV LSR along with a small amount of BLM land. It has a large component of Jeffrey pine plant series and Douglas-fir/tanoak plant series. Only 6 percent of the LSR has the potential to grow large trees and older forests suitable for the northern spotted owl. Fifty-four percent of these capable lands are in late-successional conditions.

**Existing Conditions:** A low percentage of the land is in managed stands (1%). Consequently, the amount of interior late-successional habitat is 29 percent. Most of the existing older forest habitat is located in the Jeffrey pine and tanoak plant series. Several large patches of late-successional habitat and interior patches exist in the tanoak plant series.

This LSR has many sensitive plant species. Many of these species are associated with the serpentine habitat. For some sensitive plant species, their entire range is located almost entirely with this LSR. In addition, a high number of species (including sensitive and non-sensitive), occur only in this northwest California and southwest Oregon serpentine habitat.

The North Fork Smith key watershed supports valuable runs of sea-run cutthroat, chinook, coho, and steelhead anadromous fish.

Many rare animal species occur in this LSR. It presently supports 3 known activity centers for the northern spotted owl. One of these centers has less than 30 percent of its home range in suitable owl habitat. One of the centers has greater than 40 percent of its home range in suitable owl habitat. Other animal detections have been limited.

Several diverse habitats persist in the LSR. Only 1 meadow covering 6 acres is in this LSR and no ponds are known. Rock habitat sites provide some important habitat diversity. Darlingtonia bogs are common in this LSR, compared to the other LSRs.

**Surrounding Ownerships and Land Allocations:** The Kalmiopsis Wilderness and the Briggs LSR border to the north and west. To the east are matrix federal lands and a botanical area. To the south is the Six Rivers National Forest.

The northern segment of the West IV LSR is disjointed from the southern portion and shares a common boundary with the Briggs LSR. This northern segment is still classed as part of the West IV LSR due to the serpentine geology and associated plant communities, also found in the southern portion. The South Kalmiopsis Administrative Study Area, splits this LSR, but acts as a connection between the northern and southern segments, and contains similar geology and landscape patterns.

**Connections:** This LSR connects Briggs, S. Chetco and E IV LSRs. It connects an administrative study area in the Siskiyou National Forest, the North Fork Smith Recreation area to the south (Six Rivers National Forest), and the Kalmiopsis Wilderness to the north. Important areas for older forest connections are the Illinois River corridor and the BLM lands which connect to the Sucker-Grayback drainage. Only limited connections of older forests are available to the east, west, and south due to private land, geology, and past management practices.

**Geo-soils:** Serpentinite and peridotite rocks (ultra-basic soils), and low summer rainfall define the landscape character. Other contributors to the wide-open space of the "serpentine" landscape include numerous uncommon and endemic plants, a 25-year wildfire return-frequency and rugged mountains. Diorite rock and the associated soils of the upper Baldface Creek area support a diverse plant community with old-growth Port-Orford-cedar, western hemlock, and Douglas-fir. Such plants, including the hemlock, are thought to be refugia species isolated from larger populations during the cool Pleistocene.

## E. South Chetco

The South Chetco LSR is located west of the Smith River and West IV LSR. Thirty-six percent of the capable lands are older forests. Most of the area is National Forest. A small amount of BLM land (Coos Bay District) exists between the National Forest and the Pacific Ocean.

**Existing Conditions:** With a moderate percentage of the land in managed stands (24%) and interspersed tanoak stands, the amount of interior late-successional habitat is 8 percent. Most of the existing older forest habitat is located in the TSHE and LIDE3 with several large patches of late-successional habitat. Some large interior patches of late-successional habitat exist in the LIDE3 plant series. Stands of tanoak dominate much of this LSR.

This LSR supports the northern most population of coastal redwood, and many productive streams of anadromous fish. Being close to the ocean, many streams such as Emily Creek, the Chetco River, the Winchuck River, and Wheeler Creek provide easy access for sea going birds and fish. The Winchuck and Emily are designated key watersheds for anadromous fish (chinook, steelhead, and Coho).

People have detected many rare animal species in this LSR. Occupied behaviors by marbled murrelets have been detected on 20 occasions in this LSR; presence has been detected on an additional 52 occasions. The LSR presently supports 20 activity centers for the northern spotted owl. For twelve of the 20 northern spotted owl activity centers, less than 30 percent of their home range is suitable owl habitat. Only one of these 20 home ranges encompass more than 40 percent suitable owl habitat. Other animal detections include fisher, marten, and goshawks, along with many other plant and animal species.

Several diverse habitats persist in the LSR. Ten meadows covering 113 acres are in the area and no ponds are present. Talus, bluffs, and hardwood sites including important tanoak stands also provide some important habitat diversity.

**Surrounding Ownerships:** The Kalmiopsis Wilderness is directly east of this LSR. To the south lies the Six Rivers National Forest with the Smith River Recreation Area. Forest Service Matrix lands are located along the northern boundary while private ownership abuts the western boundary. A small Coos Bay BLM parcel to the west outside the Siskiyou National Forest boundary is also part of this LSR.

**Connections:** The areas of older forest habitat which connect to other areas are along the rivers. The north slopes along these streams support large trees and form stringers to connect older forests. For example, the Wild and Scenic Chetco River has older forest habitat which links this LSR to the Kalmiopsis Wilderness. In addition, older forest connections also link this LSR to the Six Rivers National Forest to the south.

## F. North Chetco

The North Chetco LSR (all National Forest land) is a continuation of the South Chetco LSR, with many similar coastal elements (salmonids, murrelets, etc.). The hardwood component is not as dominant, although the tanoak plant series covers much of this LSR. Twenty-nine percent of the capable lands are in older forests (a low percentage compared to the other LSRs).

**Existing Conditions:** With a moderate percentage of the land in managed stands (22%), the amount of interior late-successional habitat is the lowest of any LSR (5%). The fragmentation by harvest units and past fires has probably reduced the amount of interior habitat. Most of the existing older forest habitat, large patches, and amount of interior habitat are in the tanoak plant series.

The Chetco Wild and Scenic River supports large runs of anadromous fish, including chinook, steelhead, and coho. However, no key watersheds are designated within this LSR.

Detected animal species in the LSR include four activity centers for the northern spotted owl. One of these owl home ranges has less than 30% suitable owl habitat. Another home range has greater than 40% suitable owl habitat. Occupied behaviors by marbled murrelet have been detected on four occasions in this LSR; presence has been detected on an additional 14 occasions. Other animal detections include American marten and goshawk, along with many other plant and animal species.

Several diverse habitats persist in the LSR. 18 meadows covering 438 acres are located in the area and three ponds are present. Two botanical sites, one talus bluff, and many hardwood sites provide some important habitat diversity.

**Surrounding Ownerships and Land Allocations:** The Kalmiopsis Wilderness is the eastern boundary of this LSR. National Forest Matrix lands and Riparian Reserves are the northern and southern boundaries. The western boundary is a

combination of private lands, matrix lands, and riparian reserves. This LSR surrounds part of the Wild and Scenic Chetco River.

**Connections:** North-facing slopes close to the riparian areas contain extremely large trees. These older forest areas connect to the Fish Hook/Galice LSR through the riparian zones of Lawson Creek downstream to the Illinois River.

**Geo-soils:** The land is deeply dissected, primarily due to heavy precipitation and recent tectonic activity. Soils are deep and fertile, associated with the metasedimentary rocks of the area.

## **G. Northwest Coast LSR**

The majority of the large Northwest Coast LSR is within the tanoak and hemlock plant series. Thirty-eight percent of the capable lands are in older forests. Most of the area is National Forest land except for small BLM areas on the west, north, and northeast borders.

**Existing Conditions:** Twenty-five percent of the land area is in managed stands and the proportions of interior late-successional habitat is 12%. Most of the existing older forests are located in the western hemlock and tanoak plant series. Several large patches of late-successional habitat is found in these two series.

Several key watersheds (Elk River, South Fork Coquille, and Quosatana) support valuable runs of sea-run cutthroat, coho, chinook, and steelhead.

Many rare animal species occur in this LSR. It presently supports 37 known activity centers for the northern spotted owl. Fourteen of these home ranges contain less than 30% suitable owl habitat. Nineteen of the 37 home ranges contain more than 40% suitable owl habitat. Occupied behavior by marbled murrelets have been detected on 70 occasions in this LSR; presence has been detected on an additional 150 occasions. The boundary between the Northwest Coast and Fish Hook/Galice LSRs defines the known inland extent for the range of the marbled murrelet. Other animal detections include fisher, great gray owl, marten, and goshawk, along with many other plant and animal species.

Several diverse habitats persist in the LSR. Fifty meadows covering 2,138 acres grow in the area and 11 ponds are present. Seven swamps, many talus/bluff habitats, and hardwood sites including important oak savannas along the Rogue River near Agness, also provide important habitat diversity.

**Surrounding Ownerships and Land Allocations:** The Northwest Coast LSR borders private lands on the west and north. The Grassy Knob and Wild Rogue Wildernesses are adjacent. In addition, some National Forest Matrix lands are inclusions. The Fishhook/Galice LSR lies to the south. The village of Agness and some surrounding private lands lie in the middle of the LSR.

**Connections:** This coastal LSR is large (146,000 acres), with many linkages of older forest habitat. A large older forest links the Rogue River/Agness area to Agness Pass via the late-successional habitat in Foster Creek. A relatively large area of older forest habitat exists in the Elk River drainage, including the Grassy Knob Wilderness. The older vegetation along the Coquille River corridor links with Agness Pass and Elk River. Hall Creek in the Coquille drainage supports a relatively large unfragmented block of habitat with numerous Port-Orford-cedar stands containing many large trees, murrelets, and spotted owls. The boundary between Fish Hook LSR and the Northwest Coast LSR, and the North/South Chetco LSRs and the Kalmiopsis Wilderness is a 3,000' or greater ridge. Protocol surveys have not detected murrelets inland from this ridge (except for three sightings just east of the line). The summer fog and western hemlock plant series also do not cross the ridge.

**Climate:** The Northwest Coast LSR has a different climate than the Fishhook LSR. It has more fog and consequently more areas with the hemlock plant series. The tanoak plant series is also abundant, especially on the southern aspects.

## **H. Taylor LSR**

The Taylor Creek LSR is a small area, mainly designated for its critical anadromous fish habitat and stair step (low elevation to high elevation) characteristics. Douglas-fir plant series is the major ecological classification. Forty-six percent of the capable lands are in older forests (the highest of all LSRs). This LSR is completely on National Forest lands.

**Existing Conditions:** A high percentage of the land is in managed stands (28%) and the proportion of interior late-successional habitat is only 15%. The existing older forest habitat is all located in the Douglas-fir plant series. Several large patches of late-successional habitat and interior habitat exist.

This LSR supports a large canyon live oak plant community along the canyon walls in Taylor Creek.

Taylor Creek is a key watershed due to its highly valued steelhead, coho, and chinook anadromous fish.

Rare animal species occur in this LSR. It presently supports two known activity centers for the northern spotted owl. One home range contain less than 30% suitable owl habitat; the other contains between 30% and 40% suitable owl habitat. Other animal detections include goshawk.

Several diverse habitats persist in the LSR. Two meadows covering 117 acres are present in the area. No ponds are known. Talus slopes and rocky bluffs also provide important habitat diversity.

**Surrounding Ownerships and Land Allocations:** Taylor Creek LSR is surrounded on three sides by National Forest Matrix land. The other, or downstream side consists of BLM Matrix and Riparian reserves, and some privately owned lands.

**Connections:** Stringers of older forest habitat in the northeast and west link BLM lands to the Fish Hook/Galice LSR. Habitat corridors along riparian reserves also connect Taylor LSR to the southwest.

### III. The Vegetation: Plant Series, Patch Sizes, and Amounts

#### A. Plant Series

Plant series is a major stratification in this document. As an expression of site potential, series provide the basis to determine if the desired future is possible to achieve. Series are named after the dominant climax plant species (sometimes codominants are named). For example, the hemlock plant series will grow to be dominated by large hemlock if undisturbed by fire, floods, slides etc. Moreover, each series is characterized by a distinct disturbance regime (table 12) and its associated "patch dynamics" (figures 4-7). Series also provides information on the risk of maintaining specific structures or species composition (see the discussion on the application of fire).

Forests of the Klamath Province are comprised of at least 16 series. The most common are the White-fir, Red-fir, Port-Orford-cedar, Tanoak, Jeffrey Pine, Douglas-fir, Western Hemlock, and Mountain Hemlock (Atzet and Wheeler, 1984; Sawyer and Thornburgh, 1977a,b).

The network of LSRs in Southwest Oregon includes mapped areas of the following plant series (Maps 2, 2a, and 2b): White Fir (about 35% of the area), Shasta Red Fir, Port-Orford-cedar, Tanoak, Douglas-fir (about 25% of the area), Jeffrey Pine, Ponderosa Pine, Western Hemlock, Tanoak - Douglas-fir, Douglas-fir - Tanoak, Western Hemlock - Tanoak, and Tanoak - Douglas-fir - Jeffrey pine. Series with tanoak in the name include about 15% of the total area.

White fir is the most environmentally variable series. The Douglas-fir series occurs at lower elevations than the white fir series on shallow soils. The tanoak series dominates warm, wet coastal sites and inland areas with deep soils and low evapotranspirational demand (Atzet et al, 1983). The Shasta red fir series tends to occur on warmer, high elevation, south facing basaltic sites. Port-Orford-cedar is confined to drainages in the southern part of the forest and is scattered more liberally in the north. The Jeffrey pine series is confined to ultrabasic soils, which occur throughout the Province. The western hemlock series is very productive and occurs in moist temperate environments at low elevations near the coast. Mountain hemlock occurs at high elevations, sometimes delimiting timberline, where soil and air temperatures are extremely cold (Atzet et al., 1984; Sawyer and Thornburgh 1977a).

**The white fir series:** The white fir series occurs on a wide range of elevations, but is centered slightly above the average elevation of the Province. It occurs on all aspects, and is rare on ultrabasic serpentinite and peridotite parent rock. Granitic rocks on south aspects accompany the drier plant associations of the series. Douglas-fir trees usually dominate white fir stands in the overstory until late in succession. Thus, litter production is high, biomass production is high, and fuels dry quickly.

Fire is the dominant agent of disturbance to the white fir series, followed by humans, wind, and disease. It is the only series in which insects were observed to be the last major disturbance, albeit a small percentage of the sampled stands. Wind disturbance has a moderate influence in the series.

**The red fir series:** The red fir series occurs at high elevations in a narrow band between the mountain hemlock series and the white fir series. It is often on wind-prone topography, but usually on deep fertile soils. It has a slight tendency to occur on warmer, drier south aspects, and biomass production can be high.

Fire is most frequently the last major disturbance to the red fir series, followed by humans, wind, disease, and ice and snow. The effects of wind are among the highest for the series, and ice and snow are second only to the mountain hemlock series, which occurs at the higher elevations. Stands are relatively young. The mean disturbance interval of 40 years is moderate for the province.

**The Port-Orford-cedar series:** The Port-Orford-cedar series occurs at mid to low elevations and tends to follow drainages, especially in the southern half of the province. It is normally the most productive series. However in many stands, ultrabasic soils lower productivity and are associated with the common serpentine flora.

Fire is most frequently the last major disturbance to the series. Fire, humans and disease were the only agents observed. Port-Orford-cedar root disease influences stands along roads and streams by killing some Port-Orford-cedar trees. The series, associated with riparian environments, has a mean interval between disturbances of 150 years. The time since the last disturbance (usually fire, occasionally disease) is the longest (129 years) of any plant series.

**The tanoak series:** The tanoak series has the lowest average elevation in the province. It generally occurs below 4000 ft. and west of the coastal crest where the marine influence is high. Tanoak is an indicator of deep fertile soils or low atmospheric moisture demand.

Fires and humans are the most important disturbance agents; wind, disease, and erosion are minor in comparison. Ladder fuels build quickly, and a high proportion (>25%) of the area burned may be high intensity stand

replacement fire. The series has the highest occurrence of fire as the last major disturbance, but is moderate among the series in disturbance characteristics. The mean interval between disturbances is estimated to be 90 years.

**The Jeffery pine series:** The Jeffery pine series grows only on ultrabasic soils within the province, but occurs on a wide range of elevations. It is characterized by low biomass production, low stand densities and an unusual complement of rare or endemic plant species. It often occurs on south aspects with soil depths usually less than 20 in. Grass build-up is common.

Although fire occurrence is high, human disturbance is low. Since stands are sparse and low in biomass production, they are rarely harvested. Wind is a more important agent than humans. Stands are open and trees are shallow-rooted, a good combination for windthrow. The series is also notable for showing the least degree of disturbance, regardless of agent.

**The Douglas-fir series:** The Douglas-fir series occurs on a wide range of elevations and occurs slightly more often on south aspects than north. Stands occur on warmer, drier sites with moderately shallow soils, but biomass and litter productions are high. Open canopies allow tree regeneration and shrubs to form fuel ladders.

The mean interval between fires (30 years) is short: only that of white fir series is shorter. Controlling fire has increased the mean interval. The average stand in the series has been undisturbed for 76 years, over twice the mean return interval. Continued fire suppression may cause "unnatural" build up of fuels, resulting in a greater proportion of high-intensity fire when the area finally burns.

**The western hemlock series:** The western hemlock series generally grows on lower elevations and northerly aspects at higher elevations. It is not associated with any specific parent rock and is highly productive. Self-pruning and mortality rates are low even through mid-seral stages and older forests. Litter accumulation is low until late successional stages. The series has the highest occurrence of human disturbance, although fire is still the most frequently observed event. Wind is a frequent disturbance agent. The series is close to the coast, where cyclonic winter winds are common when soils are saturated. Western hemlock also has shallow roots, making it susceptible to windthrow. The average fire interval is estimated at 65 years.

**The mountain hemlock series:** The mountain hemlock series occurs at high elevations. It is similar to the western hemlock series with respect to litter production, but biomass production is low. It has a tendency to occur on cold, northerly aspects. On southerly aspects, it is often replaced by the red fir series.

Fire occurrence is lowest for all the series. Sites are cold, flat, and moistened from summer thunderstorms. Ice and snow are major disturbance factors; over 20% of the stands were damaged by ice or snow as the last major disturbance event. Disease, especially root disease, is common in older mountain hemlock stands and in some areas controls stand dynamics. The mean disturbance interval is the longest (115 yr) for all the series.

**Summary:** The four major plant series that cover the most area in the LSRs are white fir (ABCO), tanoak (LIDE3), Douglas-fir (PSME), and western hemlock (TSHE) (Figure 1). The East IV/Williams LSR is unique due to the large area of white fir plant series. Taylor LSR has only the Douglas-fir plant series. The western hemlock plant series covers the largest area of the Northwest LSR. All the other LSRs have tanoak plant series as the largest component. Finer details about plant series are found in the appendices.

## **B. Amount of Older Forest Habitat**

The percentage of capable and older forest habitat varies by LSR (figures 2 and 3). Total area of late-successional habitat was evaluated by plant series for the LSRs (Appendix A). Estimates vary as to the amount of older habitat needed, but a range of 45-75% has been estimated for Southwestern Oregon (REAP, 1994) and 40-70% for the Shasta Costa analysis. These estimates, however, are for the total landscape, not LSRs per se. LSRs, in combination with other land allocations with no programmed harvest, are expected to contain the majority of late-successional habitat. At least 75% of older forest habitat is needed to maintain a well functioning late-successional ecosystem on federal lands in the assessment area. None of the LSRs are presently in this condition. Although the focus of LSRs is older forest habitat, other habitat conditions within these land allocations are also important to sustaining ecosystem health.

When the data for spotted owl activity centers and late-successional habitat is examined, a strong relationship between the number of centers and the total available habitat appears to exist (figure 3). This indicates the importance of sustaining late-successional forest conditions for these species.

Many authors emphasize the important of large patches of habitat for the viability of species (Harris, 1984; Wilderness Society, 1986; Hunter, 1990; Perry, 1994; Noss, 1995). A solid relationship between interior older forest habitat and known spotted owl activity centers is not apparent. The presence of adjacent tanoak and other hardwood stands may account for this weak relationship. In addition, the analysis of patch size by plant series may obscure larger patches located in adjacent plant series.

*Figure 4: Owl Activity Centers as a Function of Late-Successional Habitat*

### **C. Patch Sizes**

Existing patch sizes for the older forests in each LSR (figures 5-8) generally average less than 200 acres. This figure includes the stratification of each LSR by plant series. Consequently, this estimate underestimates the average patch size where a patch of older forest covers more than one plant series.

Existing patch sizes contained in the Silver fire area (the geographical center of the Siskiyou National Forest) are an example of how recent natural processes (fire) interact with the older forest patch sizes. The Silver fire covered approximately 100,000 acres in 1987. Ignited by lightning, this fire area represents a natural disturbance pattern. The fire frequency in this area had not been altered significantly by previous fire suppression (fire frequency of approximately 50 years).

Silver fire may not be an appropriate model for all areas but it is a good first approximation. Other possible sources of data are the historic timber type map (Siskiyou National Forest GIS files) and working backwards from existing vegetation.

As illustrated in figures five through eight, the patch size distribution in Silver is not statistically different than the distributions in each LSR. These data suggest management of the LSRs has not fragmented the older forest habitat beyond the extremes of a natural disturbance (Silver fire). However, patch size distribution is extremely variable (has a high standard deviation).

Several LSRs do have a smaller average patch size than Silver, indicating a potential need to grow larger patches of older forest, particularly when interior patch sizes are considered. In particular, these LSRs are: North Chetco, South Chetco, and West IV for the PSME plant series; West IV for the ABCO plant series; Northwest Coast and Galice LSR for the LIDE3 plant series; and the Northwest Coast and Galice LSRs for the TSHE plant series. In addition, larger patch sizes are lacking in several LSRs. In particular, the LIDE3 plant series in the Williams, West IV, Galice, South Chetco, and Northwest Coast LSRs are lacking larger patch sizes which are found in the Silver complex. The existing interior older forest patches in each LSR are small in number and important as habitat due to their limited extent. Their locations are in maps 3, 3a, and 3b.

***Figure 5: Older Forest Patch Size - TSHE Plant Series***

***Figure 6: Older Forest Patch Size - TSHE Plant Series***

***Figure 7: Older Forest Patch Size - TSHE Plant Series***

***Figure 8: Older Forest Patch Size - TSHE Plant Series***

***Map 3b: Interior Patch Areas - Williams LSR***

#### IV. Species With Special Status and Unique Habitats (Fine Filters)

Standards and Guidelines concerning important plants and wildlife, including components of their habitats, are identified 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 (Attachment C of the ROD).

ROD Standards and Guidelines important to maintenance of species viability and ecosystem health address various topics:

Late successional habitat in upland and riparian areas; large dead woody material (both standing and down) in all successional conditions; large green trees in all successional conditions; soil and litter; and unique habitats such as caves, mines, abandoned buildings and wooden bridges, also in all successional conditions.

Habitat components identified in the Siskiyou National Forest Land and Resource Management Plan (USDA FS 1989) as important for maintenance of species viability and biological diversity are:

Habitat corridors along major rivers; old growth forests; mature forests; early successional forests; special and unique habitats, i.e., meadows, swamps/springs/wet sites/ and lakes/ponds, tanoak and hardwood sites, elk travel corridors and calving areas, band-tailed pigeon sites, raptor nest sites, rock sites (cliffs, caves, talus), and botanical sites; and wildlife trees for snags.

Three important topics synthesized from the paragraphs above are discussed in this section. Plant and Wildlife species with special status are summarized, as well as unique habitats/components.

##### A. Plant Species with Special Status (and Habitat)

Maintaining a variety of habitats required by rare species will be important to maintaining associated rare species and overall biological diversity. The amount of these habitats within LSR is small (see wildlife habitat section, Table 3). Historically, wildfires have been the major ecological process that have created varied habitats; in many areas fire can be an important tool for providing these habitats in the future. As noted below, monitoring will be critical to determining specific effects on individual rare species.

Known populations of rare plant species occur in each LSR. Within the Siskiyou NF, some have a high proportion within LSR or other lands with no timber harvest (Table 3). These rare species include Region 6 Sensitive Species (Forest Service), Special Status Species (Bureau of Land Management), and List 1 and 2 Species (Oregon Natural Heritage Program and California Native Plant Society).

About half of the rare species occur in relation to unique serpentinite geology (28 species out of the 55 listed). The West IV and the East IV/Williams LSR's have large amounts of serpentinite, and the highest number of rare plant species. The West IV LSR contains habitat for some of the rarest species (federal candidates) including a number of species whose entire range is within the Josephine ultramafic sheet of the Illinois Valley (*Hastingsia bracteosa*, *Hastingsia atropurpurea*, *Senecio hesperius*, *Microseris howellii*, *Calochortus howellii*) or whose range is almost entirely within the area (*Epilobium oregonum* and *Viola primulifolia* var. *occidentalis*). A Conservation Agreement is currently being developed between the U.S.D.I. Fish and Wildlife Service, Forest Service, Bureau of Land Management, State of Oregon, and The Nature Conservancy for federal candidate species associated with serpentine bogs and wetlands (*Hastingsia bracteosa*, *Hastingsia atropurpurea*, *Gentian setigera*, *Epilobium oregonum* and *Viola primulifolia* var. *occidentalis*). In addition, other important and regional endemic species will be covered (*Lilium volmeri*, *Cypripedium californicum*, *Darlingtonia californica*, and *Castilleja miniata* ssp. *elata*). These unique bog habitats should be considered for botanical sites designation (Forest Plan MA 9's) with future Forest Plan Amendments. Protection or enhancement of the water source is an important management consideration.

Some species such as *Cypripedium fasciculatum* and *Ribes marshallii* are associated with the late successional habitat to be maintained in LSR's. However, for this assessment, special consideration will focus on a few species more commonly associated with other habitats or specific microsite needs. For example *Frasera umpquaensis*, *Pedicularis howellii*, and *Triteleia hendersonii* var. *leachiae* are found within meadows, edge habitat or small openings within late successional forest stands. *Arctostaphylos hispidula* and *Haplopappus arborescens* occur most frequently in chaparral. *Lupinus tracyi* and *Sophora leachiana* show an increase in reproduction at disturbed sites.

Wildfires are also a part of the Jeffrey Pine plant association (Table 3). Again, fire effects on these specific rare plants are not known. Observation data is currently being collected on some of these species after a 1994 wildfire burned upper Josephine Creek, and additional monitoring will be conducted in a prescribed burn in lower Josephine Creek.

Unique botanical habitats exist in each LSR as designated Botanical Areas, Botanical Sites (smaller sites with outstanding botanical values) or Research Natural Areas (acreage is shown within each LSR in Table 4).

Risk to late seral habitat from off road vehicle use, noxious weeds and fire should be evaluated when individual area management plans are completed.

## Species and Habitats Within LSR but Not Associated with the Late Successional Habitat:

*Arctostaphylos hispidula*. Occurs on poor, rocky and shallow soils, often serpentine, and open and sunny sites, usually free from overstory tree competition. The Draft Species Management Guide for this plant recommends control burning a small population to determine species response to fire. Monitoring could assess whether setting back the successional stage of the community is beneficial to the species. It has been noted the species can be killed by fire. However, regeneration from seed after fire, tolerable intensity of fire, and other important questions have not been addressed to date (Bouldin 1992).

*Astragalus umbraticus*. Found in open woods, transition zones, often in disturbed sites. Thought to be declining because of fire suppression. Oregon Natural Heritage Program is considering dropping the status of this species, as numerous populations are now documented (personal comm. Kagan).

*Bensoniella oregana*. Occupies a restricted range in the coastal portions of the Siskiyou Mountains (southern Douglas, western Josephine and Curry counties) in Oregon. There are also two disjunct sites known from Humboldt County, California. Approximately 85% of the known Oregon locations are with LSR's. *Bensoniella oregana* grows in meadow edge and stream edge habitat, with only a few populations within forest habitat. Soils are derived from ancient sedimentary rock and often occurs in colluvial slopes materials common on steep north slopes and in moist meadows. Soil depth, soil moisture (not too wet) and climate (such as summer fog) seem to be critical habitat factors (Copeland 1980, Lang 1988).

Fire is not mentioned specifically in the Draft Species Management Guide (Lang 1988). This may be because many of the meadows where this species grows may have been created from slumping, high water table or frost packets. With the lack of fire effects addressed, it is recommended that the habitat where *Bensoniella* grows is first monitored to see if encroachment is occurring (use field visits and historic and current aerial photos). Results of cutting encroaching tree and shrub vegetation could be tested on a small area. A small prescribed fire test could also be initiated, however, this would be a lower priority compared to other species noted in this section.

*Haplopappus arborescens* (*Ericameria arborescens*). Although this species has a wide range in California, only 3 populations are known in Oregon and those do not appear to be reproducing. In Oregon, this species is found in chaparral, chaparral edge, and brushy clearcuts, at elevations of 1,200 to 2,650 feet. One of the three Oregon populations is within a LSR (South Coast). The Draft Species Management Guide (Zika 1993) recommends prescribed burning be considered as part of a study of the species reproductive biology.

*Frasera umpquaensis*. This species is found at mid to high elevations as an understory herb in open forested stands or as a principle component in herb dominated meadows (Vander Schaaf 1987). The Conservation Strategy states it is rarely found in closed canopy situations. Intense fire and succession are listed as potential hazards to the species. It states that succession, most notably the encroachment of trees into meadows and the gradual closure of the canopy, is a slow process but may be a long-term concern. Interspecific competition probably limits seedling establishment at some sites. However once the plant is established with its hardy rootstock, localized forbs and grasses do not seem to encroach. The plant does not established itself in areas already covered with dense vegetation.

Fire suppression has likely resulted in increased succession. Wildfires are thought to be important for maintaining meadows and forest edge habitat. A case study is currently proposed to look at the effects of prescribed burning on the Willamette National Forest (Cripps 1993).

*Lupinus tracyi*. Seven of the eight known Oregon populations are within LSR's on the Siskiyou NF; in addition there are 16 known California populations. In the Draft Species Management Guide (Kagan 1990), fire suppression and related succession is listed as the most serious threat for the Oregon populations. In areas of stable, forest habitat, the plants persist as isolated individuals in small habitat pockets and produced very few flowers and fruit. However, in the disturbed roadside and salvage-logged areas, density of plants is higher and almost all individuals flowered and produced higher numbers of flowers. Without disturbance, forest and shrub habitat on rocky ridges will slowly close in. It is not known how this species responds to fire; other *Lupinus* species are known to respond favorably. Burning is recommended for part of the habitat to determine effect on shallow-rooted individual plants and on the seed bank.

*Mimulus douglasii*. Habitat is moist and dry meadows, often gravelly, bare soils. Rare in Oregon, this species is more common species in California. The Oregon Natural Heritage Program has dropped this to a List 4 species; it will be dropped as a sensitive species with the next update. BLM manages this species as a tracking species. Although this species is of less concern, the habitat is important component for other species. *Sophora leachiana*. The entire range is the Taylor, Briggs and Galice Creek drainages between the Rogue River and the Illinois River, in an area about 20 miles by 6 miles, occurring in openings of mixed conifer forest at low elevation. The openings include natural habitat, such as river terraces, open ridges, open rocky slopes, or meadow edges, and human-created openings such as roadsides and bare soil within clearcuts. *Sophora* acts as a primary colonizer, is dependent on disturbances to create the open sites, and possibly fire for seed scarification. The combination of having large seed, indehiscent pods, and limited seed production is extremely unusual for a pioneer species. When the tree canopy becomes re-established, *Sophora* may persist vegetatively as rhizomes and aerial shoots, but it ceases to flower.

Mature fruit has been rarely been found anywhere; the sites where seed has been observed are areas disturbed between 3-5 years prior (Crowder 1978, Kagan 1991).

Wildfire suppression is listed as one of three main factors impacting *Sophora* populations in the Draft Species Management Guide. "Selected populations" should be managed with prescribed fire to maintain the required open habitat. Likewise, prescribed fire or manual clearing is suggested for populations that are found to be declining within specific populations areas (Kagan 1991). Two of three selected populations are within the Briggs and Taylor Creek LSR's and five "temporarily selected populations" are also within these two LSR's.

*Pedicularis howellii*. This species is found in the Siskiyou Mountains of southwest Oregon and northwest California within forest openings (light gaps) or at the edge of forests and other habitats. It is found primarily on northern exposures at elevations ranging from 4,200 - 6,300 feet. All Siskiyou NF populations are within LSRs, or other protected areas, as is approximately 95% of the total population. *Pedicularis howellii* does not appear to be limited to a particular habitat or seral stage but does seem dependant upon a specific suitable soil moisture regime and the apparent need for hemiparasitic root attachments to adjacent host plants. Natural forest processes such as fire, windthrow, high water table, pockets of frost or disease may maintain habitat for *Pedicularis howellii*. However, it is recommended that a monitoring plan be developed that can evaluate the impacts of fire and fire suppression (Williams 1995).

**Table 3 - Rare Plants Known within the LSR's - number of sites by LSR**

Rare Plant Species	South Chetco	North Chetco	Northwest Coast	Fish Hook/ Galice (FS/BLM)	Taylor	Briggs	West IV	East IV/ Williams	Total LSR and Other Lands With No Programmed Harvest	In Matrix (FS/BLM)
Allium bolanderi var. bolanderi and var. mirabile		2	50	1	1	1	4	9	68/2	57
Allium campanulatum								1		
Arabis aculeolata(CALIF)								3	3	-/1
Arabis mcdonaldiana (C2)	1						1	1	2	
Arabis modesta									2/2	3
Arabis serpentinicola (CALIF)							1		1	
Arctostaphylos hispidula	5	1	18	10			1		37	2
Astragalus umbraticus					3			1	6	
Bensoniella oregana (C2)		6	3	88/8					97/8	15
Calochortus howellii (C2)							11		14/25	-/28
Cardamine nuttallii var. gemmata (C2)	8	2				4	8		36	1/11
Carex gigas		4	3	1		3	5	2	23	-/1
Carex livida							3		5/2	
Cypripedium fasciculatum				4/1	7	1		2	15/1	13/68
Draba howellii		1				2	1	1	5	1
Encalypta brevicollis ssp. crumiana					1				1	
Epilobium oreganum (C2)							2	1	9/6	4
Epilobium rigidum	2					2	6	2	28	2/7
Erigeron bloomeri var. nudatus (CALIF)								3	3	
Erigeron cervinus		1	2	3	2	3		1	26	1
Erigeron petrophilus							1	1		
Eriogonum diclinum							3	3		
Eriogonum lobbii				6				8/2		
Erythronium howellii							1	10	11	7/17
Frasera umpquaensis (C2)				7/6				7/6		
Fritillaria glauca				4		10	3	-/1	21/1	17/48
Gentiana setigera (C2)	5						6		21/10	8/7
Gentiana plurisetosa.,							2	2		
Haplopappus arborescens	1							1	1	
Haplopappus whitneyi var. discoideus				27	1			5	33	
Hastingsia bracteosa (C1) and H. atropurpurea (C2)							7		19/13	2/16
Hiercium bolanderi	9	9	5	5		6	7	1	54/2	9/33
Iliamna latibracteata			2	5				2	10	8
Lewisia cotyledon var. purdyi (C2)									8	
Lewisia leana								9	9	12
Lewisia oppositifolia (CALIF)								1	1	
Lilium kelloggii	1								1?	
Lomatium engelmannii									4	5
Lupinus tracyi						2	5		8	
Microseris howellii (C2)						2	6	1/1	9/31	4/101
Mimulus douglasii	1		3	6		2	7		21/2	1/2
Monardella purpurea	7			2			6		18/9	1/4
Pedicularis howellii								20	22	
Poa piperi	3	3	8				2		22	3/3
Ribes marshallii								44	46	4
Salix delnortensis	4	5	1			1	1		18	5

Rare Plant Species	South Chetco	North Chetco	Northwest Coast	Fish Hook/ Galice (FS/BLM)	Taylor	Briggs	West IV	East IV/ Williams	Total LSR and Other Lands With No Programmed Harvest	In Matrix (FS/BLM)
<i>Sanicula peckiana</i>	4						7	1	14	
<i>Scirpus subterminalis</i> (CALIF)								1	1	
<i>Sedum moranii</i> (C2),,,,,,				-/4	2				2/4	-/2
<i>Senecio hesperius</i> (C2)						6	10		29/28	3/73
<i>Sidalcea malvaeflora</i> ssp. <i>patula</i>			1						1	
<i>Sophora leachiana</i> (C2)				-/4	83	18			103/4	14/6
<i>Streptanthus howellii</i>	15	1					2		28	-/1
<i>Triteleia hendersonii</i> var. <i>leachiae</i>			5	44					52	2
<i>Viola primulifolia</i> ssp. <i>occidentalis</i> (C2)	3							7	10/6	-/1

RARE PLANT SPECIES included in the above table are Region 6 Sensitive Species (Forest Service) Species of Concern (Bureau of Land Management), List 1 and 2 Species (Oregon Natural Heritage Program and California Native Plant Society). Species that are rare only in California have (CALIF) following their scientific name; only locations in California are noted.

\* BLM matrix lands included are within the Glendale and Grants Pass Resource Management Areas.

### B. Survey and Manage Plant Species - Northwest Forest Plan

The following plant species are associated with late-successional forests (ROD, pages C-60,61) within the range of the northern spotted owl and occur within the LSR's:

Vascular Species:

*Allotropa virgata* Sugarstick

*Cypripedium fasciculatum* Clustered lady-slipper orchid

*Cypripedium montanum* Mountain lady-slipper orchid

*Pedicularis howellii* Howell's lousewort

*Cypripedium fasciculatum* and *Pedicularis howellii* occurrences by LSR are listed above (Table 3). *Allotropa's* distribution and abundance is not well documented, as it has not previously been considered a rare plant; there are 10 known sites within the LSR's. Although *Cypripedium montanum* has been considered a watch species, its distribution and abundance has not been well documented; there is only one known site within the LSR's.

Non-vascular Species:

Many mosses, liverworts, lichens, and fungi listed in ROD Table 3-C are potentially present within LSRs within the analysis area. There is a lack of information on most of these non-vascular species. Initial work on defining the range for most of these species will not be complete until late 1995 or 1996. Field surveys will result in numerous locations, as demonstrated by the sampling completed in the Long Term Ecosystem Productivity Study on the Chetco Ranger District. Surveys of the 60 study acres resulted in 9 out of 15 of the known locations of non-vascular Survey and Manage Species on the Siskiyou National Forest. The only known location of *Encalypta brevicolla* ssp. *crumiana* anywhere occurs in the Fish Hook/Galice LSR.

**Table 4 - Botanical Land Allocations, in acres (Forest Service inless otherwise noted).**

<b>Botanical Allocations</b>	<b>South Chetco</b>	<b>North Chetco</b>	<b>Northwest Coast</b>	<b>Fish Hook/ Galice</b>	<b>Taylor</b>	<b>Briggs</b>	<b>West IV</b>	<b>East IV/ Williams/Deer</b>
Botanical Sites - MA-9's		273 (2 sites)		30 (2 sites)				143 (4 sites)
Botanical Areas	Redwood Groves 51 Snake Tooth, 21 Snake Tooth, 21 Vulcan, 133	Big Craggies, 859 Snow Camp, 1,041 Snow Camp, 1,041	Big Tree, 127 Iron Mountain, 1,866 Lobster Grove, 534 Red Flat, 53	Bear Camp, 5,927 Sourgame, 571 Sourgame, 571			Babyfoot Lake, 208 Days Gulch, 1,252 Days Gulch, 1,252 Eight Dollar Mtn., 2,623 Oregon Mtn., 2,623	Bigelow Lakes, 971 Bolan Lake, 466 Bolan Lake, 466 Page Mtn. Grove, 68 Grayback Mtn., 197
Proposed Research Natural Areas	Lemingsworth Gulch, 966					Hoover Gulch, 1,292		Craggy Peak, 100
Existing Research Natural Areas	Wheeler Creek, 336		Coquille River Falls, 501  Port-Orford-cedar, 1,120		N Fork Silver Crk BLM, 600		Eight Dollar Mtn BLM, 1,240	Brewer Spruce BLM, 1,594
Area of Critical Concern							Eight Dollar Mtn .1,240	

## C. Wildlife Species with Special Status

Proposed, Endangered, Threatened, and other selected species are described below. Federal lands in the assessment area are home to a variety of wildlife species. A number of these species are dependent on late-successional forest. Late-Successional Reserves were designed to insure maintenance of viable populations for spotted owls and other "Late-Successional and Old-growth Related Species Within the Range of the Northern Spotted Owl." Table 5 provides (1) a list of late-successional associated species known or suspected to exist within the Late Successional Reserves and (2) information on their locations (some species listed below are not Late Successional, but are listed because they are Sensitive, Management Indicator Species (MIS), etc.).

Wildlife species are grouped in six categories in Table 5.

1. Endangered, Threatened, or Proposed (per Endangered Species Act)
2. Sensitive (Forest Service designation - FSM 2670)
3. Survey and Manage/Protection Buffers (Northwest Forest Plan)
4. Late Successional species listed in Appendix J2 (Northwest Forest Plan, Final EIS)
5. Management Indicator Species (Forest Service)
6. Special Status Species (Bureau of Land Management) Manual 6840

Most of the data in Table 5 was gathered from Forest Service and BLM files and data bases. Extensive surveys have been made for spotted owl, marbled murrelet, bald eagle, and osprey; for most other species, data gathering was either opportunistic or associated with specific activities (such as timber sales). Even though sighting data for some species is sparse and/or opportunistic (random information, and not gleaned from statistically sound scientific studies, Table 5 shows that LSRs and other land allocations in the assessment area with no programmed timber harvest contain the majority of known locations for these species.

Detailed population data on animal species is difficult to gather, and always will be; information on habitats is typically more extensive than actual population data. The ebb and flow of habitat acres over time can act as a surrogate in lieu of actual population data on individual species. An assumption has to be made that the unique structures and composition inherent in various habitats harbor unique processes, which affect animal populations. Thus, the main focus of this entire assessment is vegetation, or habitat. However, one animal species inhabiting the assessment area is available for use as a "fine filter", to provide a gauge on how the Northwest Forest Plan "is working." Over the entire assessment area, we have the most data on spotted owl. Existing data and data we continue to collect on this species serves as this "fine filter," to help us judge how well the LSRs in the assessment area are performing their function as "habitat for late-successional and old-growth forest related species within the range of the northern spotted owl".

**Endangered and Threatened Wildlife Species:** Four species listed as Endangered or Threatened are found on federal lands in the assessment area: American peregrine falcon (E), bald eagle (T), marbled murrelet (T), and northern spotted owl (T). Any activities near nest sites which "may affect" individuals or their habitat must be brought to the USDI Fish and Wildlife Service for consultation (per Endangered Species Act).

*Peregrine Falcon.* Cliffs with suitable ledges provide nesting habitat for peregrine falcons. Four nests are known on the Siskiyou and one more is suspected; four of the sites are in LSR or other land allocations with no programmed timber harvest. One nest is known from adjacent BLM LSRs, and an additional seven potential nest sites exist. Peregrine habitat on federal lands in the assessment area is managed in accordance with the Recovery plan for American Peregrine Falcon (USDI Fish and Wildlife Service 1982). In addition, Standard and Guideline 4-5 of the Land and Resource Management Plan for the Siskiyou National Forest (1989) applies, as well as direction contained in the Medford District Record of Decision and Resource Management Plan (1995). Management plans have been or may be developed for one or more nest sites.

*Bald Eagle.* On the federal lands in the assessment area, major rivers provide the best habitat for bald eagles. Bald eagle habitat on federal lands in the assessment area are managed in accordance with the Pacific Bald Eagle Recovery Plan (USDI Fish and Wildlife Service 1986), and Working Implementation Plan for Bald Eagle Recovery in Oregon and Washington (Washington Dept. Wildlife 1989). In addition, Standards and Guidelines 4-3/4-4 of the Land and Resource Management Plan for the Siskiyou National Forest (1989) applies, as well as direction contained in the Medford District Record of Decision and Resource Management Plan (1995). Management plans may be developed for one or more nest sites.

The Siskiyou's single known nest occurs along the Rogue River (in the Wild Rogue Wilderness), but eagles are occasionally sighted along the Chetco and Illinois Rivers. LSRs provide some habitat for Bald Eagle, but the best habitat is within the Rogue River Wild and Scenic River corridor.

*Marbled Murrelet.* Accounts of the taxonomy, ecology, and reproductive characteristics of the marbled murrelet are found in the 1988 Status Review (Marshall 1988); the final rule designating the species as threatened (USDI 1992);

the proposed rule designating critical habitat for the species (USDI 1994); and the Service's biological opinion for Alternative 9 (USDI 1994b) of the FSEIS (USDA/USDI 1994a) for the Northwest Forest Plan. The document "Ecology and Conservation of the Marbled Murrelet" (Ralph et al. 1995) provides an up-to-date summary of the species. Marbled murrelet habitat will be managed according to the standards and guidelines in the ROD for the Northwest Forest Plan (USDA/USDI 1994).

All federal lands in the assessment area lie within survey Zones 1 and 2 for the marbled murrelet (USDA/USDI 1994). Zone 1 covers the area from the ocean shore to 35 miles inland; Zone II covers the area from 35 to 50 miles inland (ROD page C-10, plus Alternative 9 Map included with the Final EIS). The East IV, Williams, West IV, Briggs, Taylor, Galice, and Fish Hook LSRs are all well beyond the area where murrelets have been previously detected in SW Oregon (Dillingham, Miller, and Webb 1995, in press).

Survey visits have been conducted on approximately 25 percent of the potential habitat for marbled murrelet (Zones 1 and 2) on the Siskiyou National Forest and Medford District BLM. In Southwest Oregon, the climate is markedly different in coastal areas than at inland sites. Dillingham, Miller, and Webb (1995, in press) analyzed "Marbled Murrelet Distribution in the Siskiyou National Forest of Southwestern Oregon" (also included surveys done on the Medford District BLM). Their data base contains information on 2,479 survey visits. Presence/absence surveys were conducted between 1988 and 1994 at a variety of locations on the Siskiyou National Forest and Medford District BLM. Marbled murrelets were detected on 449 survey visits; 130 of these visits resulted in the detection of occupied behaviors (Table 6).

Murrelets were found in old-growth Douglas-fir or coastal redwood stands which occur on the western part of the Siskiyou National Forest. This is Franklin and Dyrness' (1973) western hemlock (*Tsuga heterophylla*) vegetation zone (Tom Atzet, Ecologist for the Siskiyou National Forest, notes that much of this general "zone" is actually climax to tanoak [*Lithocarpus densiflorus*]). Do not confuse "Tanoak Zone" with the various plant series containing "tanoak" (LIDE3) in their titles. "Tanoak Zone" refers to a much more general classification which describes the coast side of the assessment area, where summer fogs are common (Atzet and Wheeler 1982). Murrelets were not detected east of this vegetation zone. Beginning near the California and Oregon border and bearing north, this vegetation zone runs 20-28 km (13-18 mi) inland parallel to the Pacific Ocean, until it reaches the Elk and Coquille river drainages, where it extends up to 60 km (37 miles) inland. Several hundred more survey visits have been conducted so far in FY95; although the data from these visits has not yet been entered into our Observations data base, and therefore are not included in the figures given above, no murrelets were discovered further inland than previously known. Table 6 displays the number of acres of capable and suitable habitat for marbled murrelet contained within the federal lands in the assessment area.

Proposed critical habitat for marbled murrelet is present on the Siskiyou National Forest and adjacent BLM lands. Proposed critical habitat constitutes all LSRs described in the draft NW Forest Plan within 35 miles of the ocean. Consequently, LSRs in this 35 mile zone added between the draft and final NW Forest Plan are NOT proposed critical habitat for murrelet (ie. most of the Shasta Costa, Indigo, Silver, and "Canyon" drainages are NOT proposed critical habitat).

Portions of the existing South Chetco, North Chetco, and Northwest Coast LSRs owe their existence to the presence of existing Occupied Marbled Murrelet Sites (ROD, page C-10). The ROD also provides direction to protect all contiguous existing and recruitment habitat within 0.5 miles of any newly discovered occupied site (a circle of 0.5 mile radius contains 500 acres). These protected areas then become "new" LSRs. Several new 0.5 mile LSRs for murrelets will be installed at the end of the FY95 field season. Other LSR sites will undoubtedly be added in coming years. Management of these LSRs may be modified by the Final Marbled Murrelet Recovery Plan (not expected until FY96 or later). If the average 0.5 mile circle contains 200 acres of existing and recruitment habitat in "Matrix" for marbled murrelet, and an additional 50 separate occupied sites are discovered in the next 10 years (not an unreasonable supposition), then as much as 10,000 acres of late successional stage habitat may ultimately be withdrawn from present Matrix lands.

*Spotted Owl.* A detailed account of the taxonomy, ecology, and reproductive characteristics of the spotted owl is found in the 1987 and 1990 Fish and Wildlife Service Status Reviews (USDI 1987, 1990a); the 1989 Status Review Supplement (USDI 1989); the ISC Report (Thomas et al. 1990), and the final rule designating the spotted owl as a threatened species (USDI 1990b). Spotted owl habitat will be managed according to the standards and guidelines in the ROD for the Northwest Forest Plan (USDA/USDI 1994).

The draft recovery plan for the spotted owl (USDI FWS 1992) indicates that large clusters of viable owl pairs interconnected across the range of the species is necessary for the conservation of the species. Most (estimated 80%) of the federal lands in the assessment area has been surveyed for spotted owls in the last decade (Table 5). LSRs and other land allocations with no programmed timber harvest (such as wilderness) provide a foundation of habitat connections for the spotted owl; clusters of owl activity centers are well distributed across areas with no programmed harvest on the Siskiyou and adjacent BLM LSRs. In general, future timber harvest in Matrix is not expected to preclude the LSRs and other "no programmed harvest" land allocations within the federal lands in the assessment area from maintaining or attaining viable clusters of spotted owls, as intended by the Northwest Forest Plan (USDA/USDI 1994) (Table 6 shows acres with no programmed harvest).

As displayed in Tables 6 and 7, approximately 208 spotted owl activity centers are located on the federal lands in the assessment area. LSR acres on the assessment area equal 719,593 (58 % of this land area) (Table 7). Of the approximately 1,304,000 acres in the entire area, approximately 1,137,000 acres (92%) are protected under various land allocations within the Northwest Forest Plan (LSR, Riparian Reserves, etc.), or within congressionally reserved/administratively withdrawn lands; these lands with no programmed harvest support approximately 178 (89%) activity centers (pairs or resident singles).

Table 7 shows how many acres of capable and suitable habitat for spotted owl are contained within the federal lands in the assessment area. Most (59%) of the owl home ranges in LSRs and other areas with no programmed timber harvest contain 40 percent or more late successional forest (1,360 or more acres) (% suitable habitat from 1993 Fish and Wildlife Service analysis, plus other site-specific BLM and Forest Service data). For 16 percent of the home ranges, the proportion of suitable habitat is between 30 and 39 percent; only 25 percent of these sites contain less than 30 percent suitable habitat within the home range (contain less than 1,020 acres). The Fish and Wildlife Service (USDI 1990a) notes that various studies suggest a marked decrease in site occupancy and reproductive success occurs when suitable habitat for spotted owl pairs is reduced to less than 40 percent. In their review, FWS found that any harvest which dropped suitable habitat to less than 40 percent of a home range radii would likely result in the disruption of essential breeding, feeding, and sheltering behaviors. Those home ranges with less than 30 percent suitable habitat are high priority areas for habitat manipulation projects designed to rapidly increase the amount of available late successional forest. Second priority areas are those which presently contain between 30 and 40 percent suitable habitat. A project which causes the amount of suitable habitat to drop below the 40 percent threshold results in "Take" of that pair.

Thirty (30) Known Spotted Owl Activity Centers were established in land areas which would otherwise be at least partially in Matrix. These 100 acre LSRs (Activity Centers) were established per the ROD direction on page C-10. These reserves were established for owl activity centers discovered prior to January 1, 1994). These sites are NOT shown on the LSR map attached to this assessment. For each of the 30 pairs listed in Table 6 as within "Matrix" (actually within LSRs termed Known Spotted Owl Activity Centers), Riparian Reserves actually constitute approximately 35 to 40 percent of the home range for each pair (average amount of the land base in streams which receive the protection buffers, as outlined in the Aquatic Conservation Strategy of the Northwest Forest Plan - USDA FS/USDI BLM 1994). In general, these Known Spotted owl Activity Centers do not contain interior late-successional forest.

Critical Habitat for the northern spotted owl was designated on January 15, 1992. All or part of nine Critical Habitat Units (CHU) for spotted owl are located on the Siskiyou and adjacent BLM LSRs. Within the Siskiyou and adjacent BLM LSRs, CHUs cover 300,611 acres (table 8). When LSR allocations were applied to the federal lands in the assessment area as a result of the Northwest Forest Plan (USDA/USDI 1994), all but 17 percent (60,874 acres) of the CHUs acres were found to be overlain by LSRs. In other words, the constituent elements (FWS term) of habitat for spotted owls will be protected or enhanced on the 83 percent of the designated Critical Habitat within LSRs. Map xx shows that the CHU area not covered by LSR is scattered throughout federal lands in the assessment area, and is mainly on the edges of LSRs. If a project (such as a thinning) occurs within CHU, and is determined to "may affect" Critical Habitat, consultation must be initiated with the USDI Fish and Wildlife Service; in general no net loss of suitable habitat for spotted owl should occur in CHUs, as a result of planned projects.

**Sensitive Wildlife Species:** For most sensitive species, sighting data are limited (Table 5). There are several exceptions. We have 71 American marten sighting locations on the federal lands within the analysis area;

82 percent of the locations were in LSR or other land allocations with no programmed harvest. We have 77 locations for goshawk, 78 percent in areas with no programmed harvest. Del Norte salamanders are known from 178 sites, 81 percent of which are in LSR, Wilderness, Administratively Withdrawn sites, and other areas with no programmed harvest. The other 34 Del Norte sites (19%) are nominally within Matrix, but are protected as Managed Late-Successional Areas (ROD page C-28).

**Survey and Manage Wildlife Species/Protection Buffers (for additional species):** Ten species are included in this category (three of these species [Del Norte and Siskiyou Mountain salamanders, great gray owl] are classified as sensitive). These species are listed in table 3-C of the ROD; see also ROD pages C-21, C-28, C-43 [provide additional protection - bats], C-45. Aside from the Del Norte salamander, we have few records for these species. Extensive surveys for bats have not occurred on the Siskiyou, but some or all of these species are likely to be present; the BLM has monitoring sites for bats in LSRs under their jurisdiction (see data in Table 6). Red tree voles are likely to be present in most suitable habitat, but very few surveys have been conducted for this species (BLM has data from specific owl sites where red tree vole skulls were found in owl pellets).

**Late-Successional wildlife species listed in Appendix J2:** In addition to the Survey and Manage species listed in table 3-C of the ROD, a number of additional species were analyzed for the Final SEIS (for the Northwest Forest Plan). Information was generated on the impacts of activities on non-federal lands and other sources of cumulative effects. Appendix J2 of the Final SEIS provides specifications of mitigation measures that could be employed to benefit the species. Six wildlife species listed in Appendix J2 are present on the federal lands in the assessment area (Table 5). Sighting data is limited for these species; collectively, however, 86 sightings of these six species are in our Observations data base, and 90 percent occurred in land allocations with no programmed timber harvest. Even

though sighting data for these species is not extensive, data in Table 5 indicates LSRs and other land allocations with no programmed timber harvest likely provide an important habitat base for these species.

**Wildlife Management Indicator Species (FS):** Eight Management Indicator Species were used to gauge the effectiveness of the 1989 Land and Resource Management Plan for the Siskiyou National Forest. Three of these animals are Threatened or Sensitive species. Several of the others (listed in Table 5) are dependent on Late Successional Forest, such as osprey and pileated woodpecker. Ninety-six percent of the osprey sightings (most representing nesting birds) in our data base were located in land allocations with no programmed timber harvest. Recorded sightings of pileated woodpecker occurred 79 percent of the time in areas with no programmed timber harvest. Even Roosevelt elk, which rely on a combination of late and early successional stages, were recorded 81 percent of the time in areas with no programmed timber harvest (see below for discussion of Elk Areas, under Unique Habitats); in the future, pioneer vegetation will be in short supply in these areas. Data for blacktail deer are displayed in Table 5 in terms of early successional stage vegetation which is currently present. Pioneer vegetation in LSRs will be at much lower levels in the future than at present; this will also affect habitat capability for elk, as well as other species which depend on early successional stage vegetation for at least part of their life cycle. The welfare of woodpeckers is expressed in terms of percent habitat capability.

**Wildlife Special Status Species (BLM):** These Special Status Species (SSS) animals are recognized by federal or state government as needing particular consideration in the planning process, due to low populations (natural and human-caused), restricted range, threats to habitat and for a variety of other reasons. The list includes species officially listed, or proposed or candidates for listing under ESA by the USDI Fish and Wildlife Service. State Listed Species are those identified as endangered, threatened, pursuant to ORS 496.004, ORS 498.026, or ORS 546.040. Also included are Bureau Assessment Species which are animal species found on List 2 of the Oregon Natural Heritage Data Base and those species on the Oregon List of Sensitive Wildlife Species (ORS 635-100-040) and are identified in BLM Instruction Memo No. OR-91-57. Bureau Sensitive species are those eligible for federal listed, federal candidate, state listed, or on List 1 in the Oregon Natural Heritage Data Base, or approved by the BLM state director. Surveys have not been conducted for most species; incidental observations have been recorded for some species.

Table 5. Endangered, Threatened, Sensitive, and Other Important Wildlife Species. Groups explained in text above. Some species are in more than one group; they are listed only in the first group they are part of, and abbreviations next to the name show which additional groups they belong to. Where data is listed by "detections," this indicates the number of separate observation records in our data bases; a single observation may include one or many individuals of a species.

Wildlife Species	Estimated % Habitat on BLM/FS Surveyed	South Chetco	North Chetco	North West Coast	Fish Hook / Galice	Taylor	Briggs	West IV	East IV/ Williams/ Deer	Total All LSRs	Non-Matrix Other than LSR, No Program Harvest	In Matrix	Total
Endangered Threatened or Proposed													
Peregrine Nest Sites (SSS) 1/	50% NF 60% BLM	0 -	0 -	0 -	1 1k+3p	0 -	0 -	0 -	0 4p	1 8	2 -	1 -	4 8
# *Bald Eagle Nest Sites (MIS) (SSS)	90% FS 80% BLM	0 -	0 -	0 -	0 3p	0 -	0 -	0 -	0 0	1 -	-	0 -	1 0
#*Spotted Owl Activity Centers	80% FS 50-85% BLM	19 1	4 -	33 4	22 29	2 -	8 -	3 -	19 23	110 57	11 -	30 (2/) -	151 57
# of surveys w/ *Marbled Murrelet Presence (SSS) 4/	30% FS-coast 15% FS-inland 2% BLM	52 0 0	14 0 -	150 0 0	0 3 (3/) 0	0 0 0	0 0 0	0 0- 0	0 0 0	216 3 0	68 1 -	32 0 -	316 3 0
# of surveys w/ *Marbled Murrelet Occupancy 5/	30% FS-coast 15% FS-inland	20 0	4 0	70 0	0 1 (3/)	0 0	0 0	0 0	0 0	94 1	19 0	16 (4/) 0	129 1
Sensitive # Detection Sites													
California Wolverine (SSS)	5%/NF	0	0	0	0	0	0	0	2	2	2	1	5
*Fisher (J2) (SSS)	5%/NF	1	0	3	0	0	0	0	2	6	4	2	12
*American Marten (MIS) (J2) (SSS)	15%/NF	2	4	14	16	0	0	0	1	37	21	13	71
*Pacific Western Big-eared bat (S&M) (SSS) (Provide Add'l Protection)	<5%/NF 85% BLM	0 -	0 -	0 -	1 0	0 -	0 -	0 -	0 3	1 3	3 -	30 -	4 3
White-footed vole (SSS) 6/	<1%/NF	0	0	0	0	0	0	0	0	0	0	0	0
*Northern Goshawk (SSS)	5%/NF 2-5% BLM	4 -	3 -	7 -	8 2	1 3	6 -	0 -	9 2	38 7	22 -	17 -	77 7
*Great Gray Owl (S&M) 7/ (Protection Buffers) (SSS)	No Surveys	0	0	1	1	0	0	0	0	1	0	0	2
Willow Flycatcher	<2%/NF <1%/BLM	0 -	0 -	1 -	2 2	0 -	0 -	0 -	2 1	5 3	9 -	2 -	16 3
Northwestern Pond Turtle (SSS) 7/	50% FS 50% BLM	1 -	0 -	3 -	2 10	0 -	1 -	0 -	2 3	9 13	42 -	1 -	52 13
California Mountain Kingsnake (SSS)	<5% FS <5% BLM	0 -	0 -	2 -	10 1	5 -	1 -	0 -	0 0	18 1	31 -	1 -	50 1
Common Kingsnake (SSS)	<5% FS <5% BLM	0 -	0 -	0 -	3 1	0 -	1 -	0 -	0 0	4 1	7 -	0 -	11 1
Red-legged frog (SSS)	20% FS 2% BLM	44 -	1 -	24 -	0 0	0 -	0 -	0 -	0 0	29 0	14 -	3 -	46 0
*Del-Norte Salamander (S&M) (SSS) (Protection Buffers)	10% FS 5% BLM	14 -	10 -	31 -	17 1	0 -	6 -	6 -	5 15	89 16	39 -	34 -	162 18
*Siskiyou Mtn Salamander (S&M) (Protection Buffers) 9/	10% FS 3% BLM								Potential Potential				
Burnell's False Penny Beetle (SSS) 10/	<1% FS <1% BLM	- -	- -	1 0	- -	- -	- -	- -	- -	1 0	- -	- -	1 1
Obrien Rhyacophilan 10/ (SSS)	<1% FS <1% BLM	- -	- -	- -	- -	- -	- -	1 0	- -	1 0	- -	- -	1 1
Survey and Manage/ Protection Buffers # Detection Sites													
*White-headed woodpecker (Protection Buffers) (SSS)	<10% FS 10% BLM	0 -	0 -	0 -	0 0	0 -	0 -	0 -	5 0	5 0	0 -	3 -	8
*Red Tree Vole (S&M) (SSS)	<1% FS <5% BLM	0 -	0 -	0 -	0 1	0 -	0 -	0 -	0 1	0 2	1 -	2 -	3 2
*Fringed Myotis (S&M) (SSS) (Provide Add'l Protection)	<1% FS <10% BLM	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 2	0 3	1 -	0 -	1 3



Wildlife Species	Estimated % Habitat on BLM/FS Surveyed	South Chetco	North Chetco	North West Coast	Fish Hook / Galice	Taylor	Briggs	West IV	East IV/ Williams/ Deer	Total All LSRs	Non-Matrix Other than LSR, No Program Harvest	In Matrix	Total
Shuh's Homoplectran Caddisfly	<1% FS <1%BLM	0 -	0 -	0 -	0 0	0 -	0 -	0 -	0 0	0 0	0 -	0 -	0 0
Siskiyou Caddisfly	<1% FS <1%BLM	0 -	0 -	0 -	0 0	0 -	0 -	0 -	0 0	0 0	0 -	0 -	0 0
Alsea Ochrotichian Micro Caddisfly	<1% FS <1%BLM	0 -	0 -	0 -	0 0	0 -	0 -	0 -	0 0	0 0	0 -	0 -	0 0
Franklins Bumblebee	<1% FS <1%BLM	0 -	0 -	0 -	0 0	0 -	0 -	0 -	0 0	0 0	0 -	0 -	0 0
Oregon Pearl Mussel	<1% FS <1%BLM	0 -	0 -	0 -	0 0	0 -	0 -	0 -	0 0	0 0	0 -	0 -	0 0

\* = Species dependent on Late-Successional Forest

1/ Peregrine. k = Known Site; p = Potential or Suspected.

2/ These spotted owl activity centers are not actually in Matrix; they are LSRs termed "Known Spotted Owl Activity Centers" (ROD page C-10) and surrounded by Matrix.

3/ Marbled murrelet detections in Fishhook LSR are located on the border with the Northwest Coast LSR.

4/ Marbled murrelet Presence indicates detections of "flyby" behavior.

5/ Marbled murrelet Occupancy indicates behavior(s) detected which indicate nesting.

6/ White-footed Vole. We have no sightings for this species, which is thought to depend on alder riparian zones. Wildlife Biologists look for habitat, rather than individual voles.

7/ Great Gray Owl. This species is thought to be only "accidental" in the area covered by this LSR analysis.

8/ NW Pond Turtle. Our only native turtle is found along rivers, especially in the various Wild and Scenic Rivers in the area.

9/ Siskiyou Mountain Salamander. The divide between the Rogue River National Forest (Applegate drainage) and the Siskiyou National Forest (Illinois River drainage) appears to also be the dividing line between the ranges of the Siskiyou Mountain salamander (east) and Del Norte salamander (west).

10/ These insect species are known only from their initial collection areas.

11/ These are the species identified for "additional analysis," based on the screening process described on pages J2-2 and J2-3 of Appendix J2 of the Northwest Forest Plan (Results of Additional Species Analysis).

12/ The black-backed woodpecker is "rare" in the Oregon Klamath Mountains. May even be "accidental".

13/ From J2: The common merganser is a widely distributed, common waterfowl species not closely associated with streams and rivers on federal forest lands for breeding or wintering. No mitigation is possible or should be necessary. FEMAT rating 100-0-0-0.

14/ Osprey sightings represent nesting birds, and the Forest Service data base contains multiple data points for many nesting birds, often over a period of years. Most of the osprey activity is concentrated along the Forest's Wild and Scenic Rivers. In any given year, some 50 nests may be active on the Siskiyou National Forest and adjacent BLM lands. On lands managed by BLM and dealt with in this LSR analysis, 75 percent of the habitat has been surveyed; much of the osprey activity takes place just outside of the Galice LSR, along the Rogue Wild and Scenic River.

15/ Woodpeckers - Average habitat capability for woodpeckers is shown; snag data from Ecoplots.

16/ Roosevelt Elk. Although sightings area opportunistic, figures illustrate most observations have occurred in areas with no programmed timber harvest. In the future, pioneer vegetation will be in short supply in these areas.

Table 6. Habitat acreage and species sites within the federal lands in the assessment area. Relative condition of habitat for the spotted owl and marbled murrelet is described. "No Programmed Timber Harvest" includes Congressionally Reserved, LSR, Riparian Reserves, and Administratively Withdrawn (Management Areas 1 through 11).

	<b>Grand Total</b>	<b>Areas With No Programmed Timber Harvest (%)</b>	<b>Areas With Programmed (Matrix) Timber Harvest (%)</b>
1-Total Acreage w/in Boundary of Assessment Area	1,304,000	1,137,000 (87)	167,000 (13)
2-Acreage Federal Land w/in Boundary of Assessment Area	1,235,000	1,137,000 (92)	98,000 (8)
3-Total Spotted Owl Habitat Capable Acres <u>1/</u>	797,896	653,678 (86)	104,218 (14)
4-Total Suitable SpottedOwl Habitat <u>2/</u>	383,000	340,000 (89)	43,000 (11)
5-Spotted Owl Sites <u>3/</u>	208	178 (86)	30 (14)
6-Spotted Owl Sites (>40%) <u>4/</u>		104	
7-Spotted Owl Sites (30-40%)		28	
8-Spotted Owl Sites (<30%)		46	
9-Total Marbled Murrelet-Capable Acres <u>1/</u>	797,896	653,678 (86)	104,218 (14)
10-Total Marbled Murrelet Suitable Habitat <u>2/</u>	383,000	340,000 (89)	43,000 (11)
11-Total Occupied Marbled Murrelet Sites <u>5/</u>	130	114	16
12-Total Documented Presence of Marbled Murrelets (not inclu Occupied Sites) <u>5/</u>	319	287	32

1/Based on PMR data (all land is "capable" unless classified as water, rock, snow, grass, shrub, or serpentine [the latter type might be late or climax, but actually less than 40% canopy closure]). Assume capable acres for marbled murrelet same as for spotted owl (actually is less, but how much less is unknown).

2/Based on PMR data (Mid, Late, and Climax seral stages, at >40% canopy closure). > 40% canopy closure was used as the "lower end" for late-successional habitat, instead of > 70%, because most natural stands between 40% and 70% are actually are close to 60%, and therefore do qualify as late-successional habitat (ecoplot data for the Siskiyou shows old-growth at 60% or more canopy closure). Natural stands < 40% are typically on serpentine-influenced soils and do not qualify as late-successional. We assumed suitable acres for marbled murrelet same as for spotted owl (actually is less, but how much less is unknown). Although murrelets are not known to occur inland beyond the Hemlock/Tanoak zone (15 to 32 miles from the ocean), the entire Forest is within 50 miles of the ocean; this area must be surveyed for marbled murrelet, and is deemed potential habitat.

3/40%+suit = Spotted owl home ranges which contain at least 40 percent of their area in late successional forest (at least 1,360 acres out of 3,400 acres). Any action which reduces the late successional habitat in a home range to less than 1,360 acres results in "incidental take". Does not include 5 owl activity centers from Coos Bay District BLM situated in LSR just beyond the boundary of the Siskiyou NF see table 5)

4/Based on data through 1993. The 24 owl sites listed as in the Matrix are all protected by 100 acre LSRs ("Known Spotted Owl Activity Centers" - ROD page C-10).

5/Based on data through 1994. "Sites" equal "presence" or "occupancy" results of individual survey visits. Some "sites" are close together (less than one mile apart). The 16 occupied sites in Matrix will be mapped as LSRs in fall of 1996.

Table 7. Late Successional Reserves on the Siskiyou National Forest (plus 140,000 acres Bureau of Land Management LSR adjacent to East IV and Fish Hook, and small areas north of Northwest Coast and west of South Chetco). Map 1 shows locations of individual LSRs. Data on Owl Activity Centers up through 1993. 40%+suit = Spotted owl home ranges which contain at least 40 percent of the area in late successional forest (at least 1,360 acres out of 3,400 acres); any action which reduces the late successional habitat in a home range to less than 1,360 acres results in "incidental take". For home ranges below 40 percent, vegetation manipulation projects designed to increase the amount of successional habitat are high priority (the lower the percent, the higher the priority). Does not include information on 5 owl activity centers from Coos Bay District BLM situated in LSR just beyond the boundary of the Siskiyou NF (see Table 5).

				# Spotted Owl pairs on Federal land (FS, BLM)			
LSR Name	BLM/FS Acres in LSR	Areas with Potential Ac (%) 1/	Existing Late-Successional Acres (%) 2/	40% + suit	30-40% suit	<30 % suit	TOTAL Owl Pairs
S. Chetco	71,382	67,750(95)	24,502 (36)	1	7	11FS +1BLM	20
N. Chetco	28,199	23,426 (83)	6,688(29)	1	2	1	4
NW Coast	145,974	125,542 (86)	47,973 (38)	19	3	11FS+4BL-M	37
Fish Hook	151,965	137,877 (91)	54,407 (39)	17	3	2	22
Galice BLM	82,895	78,215 (94)	47,151 (60%)	26	3	0	29
Taylor	8,934	8,810 (99)	4,112 (46)	1	1	0	2
Briggs	53,980	32,223 (60)	15,996 (50)	6	2	0	8
West IV	53,738	3,389 (6)	996 (29)	1	1	1	3
East IV	62,809	58,260 (93) (% 's incl BLM)	20,694 (36)	12	1	6	19
Wllms BLM	59717	50,333 (84)	23,766 (47)	10	5	8	23
TOTAL	719593	585,825 (81)	246,285 (42)	94	28	45	167
Owls Protected in other Land Allocations with no Program Harvest				10	0	1	11
Known Spotted Owl Activity Centers (100 acre LSRs from "Matrix")							30
GRAND TOTAL							208

1/Area left after serpentine, meadows, rock, water, and grass have been removed.

2/Areas with Late Successional characteristics which includes Late or Climax seral stages with 40% canopy closure - "Late" equals trees with at least 21 inch DBH (PMR satellite data). Percent figures in this column are "percent of the percent" in column 3.

3/Areas close to having Late Successional characteristics; includes the Mid, Late, and Climax seral stages with > 40% canopy closure (PMR satellite data). Figures in this column are "percent of the percent" in column 3, and include the area from column 4.

Table 8. Spotted owl Critical Habitat overlap with LSR for federal lands in the assessment area. Percent CHU covered by LSR is 83; other land allocations with no programmed timber harvest, such as Wild and Scenic River corridors, also act to insure that Critical Habitat will continue its vital role in maintenance of spotted owl populations. Taylor Creek LSR is not associated with any CHU acres, and is not listed in the table.

CHU NUMBER	FS or BLM Acres In CHU	LSR NAME	FS or BLM Acres In LSR	FS or BLM Acres CHU In LSR (%)	FS or BLM Acres CHU outside Of LSR (%)
OR-65 FS	3,552	Fish Hook	151,595	3,552 (100)	0 (0)
OR-65 BLM	73,080	Galice	82,895	47,480 (65)	25,600 (35)
OR-66 FS	7,812	NW Coast	145,974	7,667 (98)	145 (2)
OR-67 FS		NW Coast	145,974	[49,998]	
OR-67 FS		Fish Hook	151,965	[17,530]	
Summary OR-67	79,761			67,528 (85)	12,233 (15)
OR-68 FS	13,282	Fish Hook	151965	11544 (87)	1738 (13)
OR-69 FS	26616	Fish Hook	151965	24280 (91)	2336 (9)
OR-70 FS		Briggs	53980	[27,854]	
OR-70 FS		West IV	53738	[305]	
Summary OR-70	36,943			28,159 (76)	8,784 (24)
OR-71 FS	53,784	South Chetco	71,382	51,200 (95)	2584 (5)
OR-72 FS	10,092	East IV	6,280	94,393 (44)	5,699 (56)
OR-72 BLM	45,988	Williams	59,717	45,988 (100)	0 (0)
OR-73 FS	10,575	East IV	62,809	8,820 (83)	1,755 (17)
GRAND TOTAL	361,485	N/A	719,593	300,611 (83)	60,874 (17)

## D. Unique Habitats

Unique habitats existing in each LSR are described in Table 9 with locations in map 5. Most of the habitats listed in Table 9 are "Special Wildlife Sites," as described in the 1989 Land and Resource Management Plan for the Siskiyou National Forest. Meadows less than one acre and much of the White Oak/Black Oak Savannah were not mapped as MA-9 in the Siskiyou LRMP. Also, a few unique sites of various types have been found since 1989; these proposed sites will be added to the Management Area 9 allocation at a future date (Forest Plan Amendment). The discussion below applies to all Siskiyou unique habitats (existing MA-9 allocations and those sites to be added in the future). Acres for existing sites listed below do not match exactly with 1989 LRMP totals because LRMP acres were estimated from computer maps; these sites were later mapped more accurately in GIS). Botanical sites are also part of the MA-9 strategy, and are discussed in this document in the section A above (Special Status Plants).

The Medford District of the Bureau of Land Management does not have a similar land allocation, although many of these unique habitat sites are present on the LSRs they manage. As described below, maintenance of some unique habitats requires active management of vegetation; this vegetation would be other than late successional. Management techniques listed below for maintenance and enhancement of these habitats apply to LSRs managed by both the Forest Service and BLM. Together or separately, these unique habitat types add substantial diversity to the mix of wildlife habitats in the LSRs.

On page C-17 of the Northwest Forest Plan, mention is made that "habitat improvement projects designed to improve conditions for .. wildlife .. should be considered if .. their effect on late-successional species is negligible." Maintenance of Wildlife Areas, BLM Elk Areas, and existing meadows (including Oak Savannah), plus reclamation of lost meadows would reduce the amount of potential late-successional forest in LSRs. Approximately 19,000 acres of these Unique Habitats exist in LSRs, and would not actually be maintained as late-successional habitat (these sites would provide a modicum of early-successional habitat interspersed throughout the LSRs in the assessment area). Due to poor soil and other conditions, an estimated 50 percent or more of the 19,000 acres in these habitat types would never produce quality late-successional forest habitat. Thus, the potential "loss" (or "non-gain") of late-successional habitat in LSRs on federal lands in the assessment area is trivial and constitutes approximately 1.3 to 2.7 percent of the land base. Maintaining the viability of these habitat types has and would have little effect on late-successional species inhabiting LSRs on federal lands in the assessment area. Maintenance of these habitat types does have an important positive impact: perpetuation of these wildlife habitats (and their attendant significant contribution to biological diversity).

**Wildlife Areas.** These are high value sites with multiple values for wildlife (for example, a Wildlife Area may contain water, meadow, and hardwoods). Sites range from larger areas such as Horse Creek (Matrix), Pebble Hill (LSR), Morris Rogers (LSR and W&S River), and Fish Hook (mostly LSR with some Matrix), to smaller areas such as Pony Keg and Cedar Swamp (both LSR). Sixty-one percent of the acres in Wildlife Areas in the entire assessment area is contained within LSRs; total area of Wildlife Areas in LSR on National Forest is 3,398 acres (for the entire Siskiyou National Forest (including Matrix) total acres in this allocation are 5,542). Those Wildlife Areas in LSR on the federal lands in the assessment area should be managed to maintain or improve their value to wildlife; portions of some of these areas may be managed for other than late successional forest. Individual management plans may be developed for the more complex sites (such as Fish Hook).

**Meadows <1 Acre - Not Mapped.** For the federal lands in the assessment area, small openings of less than one acre were not mapped (not included as a land allocation in the Siskiyou's MA-9). For the Siskiyou, these sites were discussed as part of the Forest-wide Standards and Guidelines (Siskiyou LRMP S&Gs, pg IV-36). Small meadows and other small openings of less than one acre contribute to vegetative diversity, and are important to many wildlife species; they provide forage sites for deer and elk within optimal thermal cover and are especially important during severe weather (Brown 1985). Those meadows of less than one acre in LSR on the federal lands in the assessment area should be managed to maintain or improve their value to wildlife.

**Meadows >1 Acre - Forest Service, Mapped -- BLM, Unmapped.** This habitat type is an important integral component of overall habitat diversity on the federal lands in the assessment area. Meadows and meadow/forest edge areas provide hiding and thermal cover, nest and den trees, and food for many wildlife species. Perhaps the best known meadow complex in LSR is Adams Prairie, which provides excellent habitat for a variety of species, from torrent salamanders and water pipits to golden eagles and coyotes. Several important meadows are located on BLM lands; examples are the large meadows on the slopes northeast of Marial.

**Map 5: Southwest Oregon Special Wildlife and Plant Sites**

Fifty-seven percent of the meadow acres in the assessment area is contained within LSRs. LSRs contain 6,934 acres of meadow habitat (6,534 NF, 400 BLM) (for the entire Siskiyou National Forest, 11,462 acres are allocated to meadows). Those meadows in LSR on federal lands in the assessment area should be managed to maintain or improve their value to wildlife; except for buffer strips of meadow/forest edge habitat, meadows should be managed for other than late successional forest. Individual management plans may be developed for the more complex sites (such as Adams Prairie).

Meadow areas lost to encroachment should be restored to their former size. Aerial photographs were taken circa 1940 of most of the Siskiyou, and portions of adjacent BLM LSRs. These photographs provide a historical reference point -a guide to size and shape of meadow habitat in federal lands in the assessment area, before the advent of widespread fire suppression. In some cases, these 55 year old photos are a window to even earlier times (perhaps back to the World War I era); some of the photos show encroachment which had occurred in meadows during the previous several decades prior to 1940.

Although many of the meadows on federal lands in the assessment area could be planted to and would grow trees, doing so would severely reduce the acres devoted to this unique habitat type. Approximately nine-tenths of one percent of the acres in LSRs in the assessment area are presently devoted to meadow habitat. Perhaps 50% of these areas are not capable of growing late-successional forest. Even if meadow acres lost to encroachment are recovered (maximum estimate is equal to the number of existing acres -- 100 % increase), less than two percent of the acres in LSRs in the assessment area would be "allocated" to meadow. The Northwest Forest Plan mentions meadows directly or indirectly in several instances. One of the nine Aquatic Conservation Strategy Objectives on page B-11 of the ROD speaks to maintaining and restoring the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands; some of the meadows contained within federal lands in the assessment area are located in these situations. Under a discussion of Watershed Restoration (ROD, page B-31), acknowledgment is made that opportunities exist for meadow restoration projects.

**Black/White Oak Savannah.** Although Oak Savannah was not specifically mapped as a habitat type within land allocation MA-9 as part of the Siskiyou's 1989 LRMP, this important habitat type is an integral component of overall habitat diversity on federal lands in the assessment area. Most, but not all of the Oak Savannah sites were mapped as Meadows (see above); some sites were missed when mapping was done from aerial photographs, because slowly invading conifers had obscured the true origins of the sites. A maximum (estimated) 2,000 acres of Oak Savannah may have been missed during the MA-9 mapping efforts in the 1980s (not mapped as Meadow or Wildlife Area); most of these acres are in LSRs.

Oak Savannahs and savannah/forest edge areas provide hiding and thermal cover, nest and den trees, and food for many wildlife species, including deer, elk, wild turkeys, and a variety of songbirds. Perhaps the best known Oak Savannah complex is located on some of the south-facing slopes near the mouth of Shasta Costa Creek, in the Fish Hook/Galice LSR. Some of the Oak Savannah habitat sites in this area have been mapped as part of the Siskiyou's Meadow sites (see above). Oak Savannah sites in the lower Shasta Costa drainage mapped in GIS as existing meadows (MA-9) include sites 255, 252, 043, 3068, 251, 323, 324, and 322. Approximately 400 acres of Oak Savannah in this general area have NOT been mapped as existing MA-9 allocations (Sections 3, 4, 5 - T35S, R11W and Sections 32, 33 - T34S, R11W).

Within LSRs on the Siskiyou, other Oak Savannahs presently mapped as Meadows include Fall Creek 265 and 264, Oak Flat 053, Big Bend area (Rogue River near Illahe) 0032, 3068, 243, 031, 240; and Sapphire 3069. Several "pine" meadows (pine/oak savannah - serpentine-influenced soils) are presently being encroached by Douglas-fir, due to fire suppression. In their pine/oak condition, these sites provide excellent habitat for a variety of small and large animals, including many woodpeckers (Pine Grove 055, Pebble Hill 058, Sevenmile 57, Wildlife Area 277).

The fire suppression efforts which have endured over the last six or more decades should be ended; prescribed fire is needed to maintain these Oak and Pine/Oak Savannah areas (conifers which invaded 50 to 60 years ago need to be removed). Use of prescribed fire, besides maintaining an important habitat and plant community type, would also reduce long-term fire risk for the Agness community.

**Lakes/Ponds.** These high value habitat sites have been mapped in five of the eight LSRs discussed in this assessment. Sixty percent of the acres in Lakes/Ponds in the entire assessment area is contained within LSRs; total area of Lakes/Ponds in LSR on National Forest is 291 acres (for the entire Siskiyou National Forest total acres in this allocation are 481). Those Lakes/Ponds in LSR on the federal lands in the assessment area should be managed to maintain or improve their value to wildlife; although vegetation at these sites is generally best managed as late-successional habitat, there may be instances when vegetation at some of these areas may be more appropriately managed for other than late-successional forest.

**Swamps/Springs/Wet Areas.** These high value habitat sites have been mapped in two of the eight LSRs discussed in this assessment. Eighty-one percent of the acres in Swamps/Springs/Wet Areas in the entire assessment area is contained within LSRs; total area of Swamps/Springs/Wet Areas in LSR on National Forest is 104 acres (for the entire Siskiyou National Forest total acres in this allocation are 128). Those Swamps/Springs/Wet Areas in LSR on the federal lands in the assessment area should be managed to maintain or improve their value to wildlife; although vegetation at these sites is generally best managed as late-successional habitat, there may be instances when vegetation at some of these areas may be more appropriately managed for other than late-successional forest.

**Rock (talus/bluffs/etc.).** These high value habitat sites are scattered across the federal lands in the assessment area. Rock sites, including adjacent forested areas (edge) are important habitat for a number of species of special concern, both plant and animal, including the western big-eared bat and Del Norte salamander. Thirty-nine percent of the acres in Rock Sites in the entire assessment area is contained within LSRs; total area of Rock Sites in LSR on National Forest is 5,787 acres, or about eight-tenths of one percent of the LSR land base (for the entire Siskiyou National Forest total acres in this allocation are 14,784). Those Rock Sites in LSR on the federal lands in the assessment area should be managed to maintain or improve their value to wildlife. When vegetation is present at these sites, it is generally best managed as late-successional habitat; however, there may be instances when vegetation at some of these sites may be more appropriately managed for other than late-successional forest. Use Brown (1985) -- Chapter 9 - Cliffs, Caves, Talus -- as a guide in managing rock sites.

**Band-tailed Pigeon.** These uncommon but important habitat sites (key feeding, roosting, mineral springs, and "fly through" areas) are present in two of the LSRs in the assessment area; these sites receive concentrated use by band-tailed pigeons. Thirty percent of the acres in Band-tailed Pigeon Sites in the entire assessment area is contained within LSRs; total area of Band-tailed Pigeon Sites in LSR on National Forest is 234 acres (for the entire Siskiyou National Forest total acres in this allocation are 766). Those Band-tailed Pigeon Sites in LSR on the federal lands in the assessment area should be managed to maintain or improve their value to wildlife. To maintain its value to band-tailed pigeons, vegetation at these sites should be managed as "other than" late-successional habitat (generally managed in food-producing small tree or shrub-type vegetation).

**Tanoak.** On the Siskiyou National Forest, four Tanoak sites totaling 360 acres have been identified as important forage areas for wildlife, especially deer, bear, and elk. These mature tanoak stands produce outstanding acorn crops year after year. All four sites are located in the Northwest Coast and Fish Hook LSRs (no sites in non-LSR). These sites should be maintained in their present condition, and protected from stand-replacement fires.

**Hardwoods and Dispersed Habitat** (i.e., Dispersed Old-growth) are described in the Siskiyou LRMP (pgs IV-113, 114) as mostly mature and old-growth forest; they were designed as random "stepping stones" between habitat areas for pine marten, pileated woodpecker, and spotted owls. The habitat networks for these three species were superseded by the LSR land allocation in the Northwest Forest Plan. Many of these sites were located on lands unsuitable for timber harvest, because of geology or soils problems. It is appropriate to continue to manage Hardwoods and Dispersed Habitat as late-successional habitat. Acres within LSR for these two habitat sites are: Hardwoods 1,884; Dispersed Habitat 13,312.

**Elk Areas.** Elk make greater use of certain forest habitats during the course of their daily and seasonal activities. Special sites such as riparian zones, natural openings, calving areas and specific old-growth stands meet important elk habitat needs. On the Siskiyou National Forest in the Northwest Coast LSR, six Elk Areas totaling 615 acres have been identified as important travel corridors and calving areas.

Approximately 200 acres of important elk habitat areas also exist in the Galice portion of the Fish Hook/Galice LSR. Several marginal or low-productivity sites (in terms of tree production) on ridgetops in the Silver Creek-to-Peavine Mountain area are presently in the grass seral stage, but suffer from encroaching brush and some conifers. These sites range in size from several acres to as many as 20. One of the sites is actually the "easement" area surrounding the Peavine Lookout (trees which would obstruct the view must be removed at periodic intervals). None of these sites are currently in late-successional condition and invasion of brush and trees has only occurred since the advent of rigorous fire suppression. These sites maintain soil moisture into the summer season, and form an important habitat base for the well-known Peavine elk herd. These ridgetop sites should be maintained or enhanced for their forage values; they would never support quality late-successional forest. Maintenance and enhancement measures include prescribed fire and grass seeding.

Table 9 - Unique Wildlife Sites for each LSR, by acres (and sites). Last column is PERCENT ONLY, and shows proportion of sites in/out of National Forest LSR in terms of acres and total sites. Forest Service data mostly from the 1989 LRMP, MA-9. Most of these site types exist on BLM lands also; however, these habitats have not been mapped. Meadow and Elk Area acres for BLM have been estimated. Six Wildlife Areas straddle the boundary between both LSR and other land allocations.

Special Wildlife Sites	Total Acres (Sites) in LSR	South Chetco	North Chetco	Northwest Coast	Fish Hook/Galice	Taylor	Briggs	West IV	EastIV/-Williams-/Deer
Wildlife Areas NF	3396 (13)			1522 (7)	1876 (6)				
Meadows <1 ac NF	Not	Mapped	see SIS	LRMP	S&G's	pg IV-36			

Meadows>1 ac NF	6534 (186)	113 (10)	438 (18)	2138 (59)	2335 (59)	117 (2)	49 (5)	6 (1)	1338 (36)
Meadows >1 ac BLM	400 (N/A)				200ac				200ac
Black/White Oak Savannah	Est 2000				400ac				?
Swamps/Springs/Wet Areas NF	291 (35)		10 (3)	125 (11)	64 (8)		9 (3)		83 (10)
Rock (talus/bluff/etc) NF	104 (8)	3(1)		101 (7)					
Band-tailed Pigeon NF	5,787 (254)	101 (2)	63 (1)	338 (34)	1910 (88)	141 (3)	1594 (70)	383 (12)	1257 (44)
Tanoak NF	234 (4)				169 (2)				65 (2)
Hardwoods NF	360(4)			176 (3)	184 (1)				
Dispersed Habitat NF	1,884 (36)	544 (1)	552 (8)	116 (6)	412 (15)		19(1)		241(5)
Elk Areas NF	13,312 (242)	1163(17)	727 (7)	1875 (52)	4479 (55)		2453 (35)	972 (20)	1643(56)
Elk Areas BLM	615(6) 200(N/A)			615 (6)	200ac				0Ac

## **V. Historical and Existing Conditions and Processes for the LSRs**

Because terrain, climate, populations, associations, rates of processes, and social and economic needs are constantly changing, historical conditions cannot totally provide a reference for future management standards. Moreover, it is impossible to separate the human influence from "pre-european" historical conditions. Data is lacking and what is available is often unreliable. We can use the recent past, represented by measured data sets, to compare management actions and establish recent process rates. Such estimated baselines provide good data for reference and monitoring.

Describing our future is the most important part of the assessment. We quantify the desired conditions of the late-successional reserves. Then, we measure our progress to achieve these conditions with specific reference to recent conditions.

Consequently, existing conditions are part of our rationale for future prescriptions. If existing conditions are the same as our desired future, there is no reason to act. However, trends may indicate a risk associated with maintenance. If the risk is not high, again, there may be no reason to act. However, we need to assess any threats to the desired range of conditions.

### **A. Aquatic Elements and Processes**

Low gradient, highly productive stream reaches are important elements of older forests for stream environments. These "flats" have diversity in habitat and are heavily used by fish (Elk Wild and Scenic River Management Plan, DEIS, 1992).

The following tables, maps and graphics serve as a coarse filter for identifying low gradient stream reaches (approximately 50 stream reaches with a length of 100 miles) within or immediately downstream of late successional reserves. The Medford BLM District and the Siskiyou National Forest have stream survey information with information for approximately 400+ miles of streams with fish populations. Additional miles of stream survey information reside on individual databases or spreadsheets at the Ranger District and Area Management Unit level and were not employed for this analysis.

These attributes are common to most of these low gradient reaches:

1. Each reach, greater than one half mile in length, has an overall gradient of two percent or less. A few exceptions are Dunn Creek and Althouse Creek (3%) with higher gradients. These two streams are addressed due to the abundance of both salmon and steelhead.
2. All reaches have populations of resident and anadromous salmonids.
3. Most reaches have stream valleys greater than three bankfull widths or a valley index of 3 or greater. The reach is unconfined by adjacent hillslopes and exhibits lateral channel movement. Most stream reaches are within alluviated canyons or alluvial valleys with floodplains (Frissell, 1986).
4. Braiding and some side channel habitat are present.
5. Floodplains and terraces in these reaches often contain diverse hardwood and conifer forests. Forbs and grasses growing on flood deposits and hardwood litter provide rich photosynthetic materials directly to the aquatic environment.
6. These reaches are pool/riffle systems rather than step/pool or cascade systems. Pool habitat occurs at intervals varying from five (5) to nine (9) wetted widths of the channel. Many pools are lateral scour pools.
7. These reaches are usually depositional rather than erosional or transportational and have finer substrate materials e.g. sand, gravel, cobble and contain accumulations of large wood.
8. These stream reaches have the potential of containing sub-reach stream segments of high aquatic productivity or "flats".

Flats of rich aquatic diversity and productivity also exist within stream reaches of steeper gradients. In addition, high gradient areas with boulders and pocket pools are very productive rearing areas for juvenile steelhead. These flats have not been identified at this scale of analysis.

The enclosed Table 10 contains information on each of these low gradient reaches. Flats with high aquatic production potential are shorter stream segments or sub-reaches of the reaches shown. Figure 7 depicts examples of the amount of large wood and pools per mile in these reaches. The expected range of 25 to 80 pieces of large wood per mile is derived from data analysis of more than 100 stream reaches in the Siskiyou Mountains.

The large wood in existing pools are compared with the desired frequency of pools every seven (7) wetted channel widths. Many of the gradient reaches listed here have valley bottom roads for easy access and have had some

stream cleanout activities. This is not sufficient explanation for the low number of large wood pieces in some isolated stream reaches.

Maps 6 and 7 depict the general location of these low gradient stream reaches on federal lands in the analysis area. A subset of these stream reaches with plan view maps and a stream profile adds more information. Many of these biologically important areas have not been located specifically. The watershed analysis work now being undertaken as directed by the Northwest Forest Plan will locate these shorter stream segments more accurately.

***Figure 7: Comparison of Pools and Large Wood in Selected Streams***

***Map 6: Southwest Oregon - Key Watersheds and Anadromous Fish Streams***

***Map 6a: Key Watersheds and Anadromous Fish Streams - Galice LSR***

***Map 6b: Key Watersheds and Anadromous Fish Streams - Williams LSR***

***Map 7a: East Fork Illinois River Watershed - Low Gradient Stream Reaches***

***Map 7b: Sucker Creek Watershed - Low Gradient Stream Reaches***

***Map 7c: Winchuck River Watershed - Low Gradient Stream Reaches***

***Map 7d: Indigo Creek Watershed - Low Gradient Stream Reaches***

***Map 7e: Lower Rogue Subbasin Watershed - Low Gradient Stream Reaches***

***Map 7f: Briggs Creek Watershed - Low Gradient Stream Reaches***

***Map 7g: Johnson Creek Watershed - Low Gradient Stream Reaches***

***Map 7h: North Fork Smith River Watershed - Low Gradient Stream Reaches***

***Map 7i: South Fork Coquille River Watershed - Low Gradient Stream Reaches***

## B. Forest Elements

These measured forest elements provide a reference point to compare with the desired future range. Differences between the current condition and desired range give insight for appropriate projects.

Forest elements are those characteristics of the vegetation that are important for late-successional species. Examples of forest elements are interior late-successional habitat, large trees, snags, large woody material, multistoried canopies, understory trees, canopy gaps, and patchy understories.

**General Elements.** Table 11 "Current Conditions of Forest Elements" displays the first estimates of several elements associated with older forests. The estimates, developed from ecoplots are specific to the plant associations on the Siskiyou National Forest. An internal report by McCrimmon and Atzet (June 1992) for the Rogue River National Forest plant series provides the density estimates for snags and down wood. These estimates are specific to southern Oregon. Data from local Forest Service and BLM inventories needs to be added and blank spaces filled as the table is periodically revised in an iterative manner.

These estimates reflect post 1940 fire control. Before 1940 the average number of acres burned per year on the Siskiyou National Forest was 20,833 acres. After 1940 the average was reduced to 2,772. All older forest characteristics have been affected, yet it would be difficult to glean this human influence from the plot data.

PLANT SERIES	ABCO		ABMAS		CHLA		LIDE3		PIJE		PIPO		PSME	
	PSME	ABCO	ABMAS	ABCO	PSME	CHLA	PSME	LIDE3	PDE	CADE3	PSME	PIPO		
Two Major Tree Species <sup>1</sup>														
<b>BIG TREES</b>														
Biggest Tree Diameter (DBH - inches)	50"	37"					45"					38"	45"	38"
<b>#/ACRE</b>														
Average Tree Diameter (inches)	34	24	25	22	43	31	30/35	9	18	17	27	33	27	
Growth Rate Last 10 years (20ths of an Inch)	15	15	17	18	10	10		N/A	5	5	11	10	12	
Average Age (Years)	185	135	144	129	307	262	189	N/A	194	185	177	164	177	
Live Crown Ratio (%)	47	52	43	58	41	49	45	N/A	45	56		38	48	
<b>SNAGS</b>														
Average Diameter (DBH - inches)	33	26	25	27	39	23	29	11	16	16	25		25	
Height (ft)			46	32	43	51			37	31				
Decay Class <sup>2</sup>	2	2	2	3	3	3	3	2	2	2	2		2	
#/Acre	5	5	5	5	1	1	2	2	2	2				
<b>DOWN WOOD</b>														
Average Decay Class <sup>2</sup>		3	4	4	3	4	2	4	3	3	3	4	4	
Diameter (in)	15	16	13	15	21	15	18	10	9	12	10		10	
Pieces/Acre	52	52	52	52					9	9	25	25	25	
Average Length per piece (ft)	33	33	32	32	30	30	31	29	16	39	26		26	

<sup>1</sup> Regeneration tree species are listed in the Siskiyou LSR Ecoplot Analysis planning records. Various plant series have over 20 different species which regenerate successfully on any given site.

<sup>2</sup> Decay classes are defined in ecoclass inventory Siskiyou National Forest.

The number of large trees, snags, and large woody material varies by the plant series. The plant series that coexist with cooler, wetter climates have larger trees, more snags, and more large woody material. Consequently, the ABCO, ABMAS, CHLA, and TSHE plant series tend to have the larger trees and more dead wood.

The forest elements of interior habitat, canopy layers, understory trees, canopy gaps, and patchy understories are interrelated with each other. For example, a small patch of overstory trees are blown over, producing a canopy gap and subsequently a patchy understory. Eventually, some understory trees become established in the understory and produce a multilayered stand.

**Older Forest Patches.** Existing patch size and connectivity of late-successional forest habitat varies within each LSR. Large well-connected patches of older forest habitat are desired. Quantifying the desired amount of "large and well connected" is difficult. The Silver Fire of 1987 and the condition of the Grayback/Sucker watershed in 1949 provide historic examples of natural conditions prior to any timber harvest; in these areas fire suppression and other human activities had not affected natural patch sizes and connectivity. Appendix A provides a relative comparison of patch sizes and numbers for interior late-successional habitat existing in LSRs using the 25 by 25

meter resolution data and the baseline conditions in the Silver Fire and Grayback/Sucker areas. For Briggs and Fish Hook LSR, overall sizes and number of patches are similar to natural conditions. For the other LSRs, overall sizes and number of patches are lower than baseline conditions. These latter LSRs are high priority for treatment, to develop large patches of interior late-successional habitat. In addition certain plant series in each LSR have limited amounts of interior habitat for older forest species. Priorities for treatment are described in Tables 12 and 13. Potential projects include prescribed fire and thinning of younger stands adjacent to older forest patches to hasten development of late-successional habitat and reduce fuel loads.

### C. Forest Processes

Processes are forces of change. These processes change the distribution and abundance of forest elements. Examples of processes are fire, timber harvest, tree growth, nutrient recycling, and disease and insect epidemics (ROD, pages B2-4).

The condition of our future forests tie to the management of forest processes. Disturbance, the disruption of succession, can maintain ecosystems, biological diversity, and forest resilience. Disturbance regimes vary with the causative agent.

Many forest processes interact with each other. For example, forest disturbances recycle nutrients, kill trees, cause other trees to grow faster, and allow other trees to become established. Consequently, this discussion presents these processes as they relate to forest disturbance.

**Agents of Disturbance:** Forest disturbance is the result of physical or biological agents. Fires, floods, landslides, ice and snow, windstorms, and soil erosion are the most common physical agents. Insects, other animals, people, and pathogens are the most common biotic agents. The most common agent of change on the Siskiyou is fire and therefore the subject of this discussion.

However, some insects and disease disturbances are worthy of discussion. *Phytophthora lateralis*, a root fungus which kills Port-Orford-cedar (POC), is an exotic species whose spores are carried by mud and water. It is carried by animals, vehicles, people, and water along streams during wet weather. Although the pathogen is not threatening the species viability of POC, it has the potential to accelerate the death rate of large POC. The locations of phytophthora are on map 8.

Other introduced plant species adversely affect the LSRs. The major exotic species are gorse, scotch broom, and purple loosestrife. All three species crowd out native species and change conditions. Gorse grows in thickets and is a definite fire hazard due to its heavy fuels and flammability. Scotch broom has the same characteristics as gorse. The purple loosestrife is rapidly occupying riparian habitat along the Rogue River drainages, displacing cattails and other riparian vegetation.

Pine beetles and tree mortality are always present in the forest. However, with fire suppression increasing the number of stems per acre and subsequent increased moisture stress, the beetles have become epidemic during the past drought. In places, the overstocked understories have competed for moisture with the overstory component of Ponderosa or Sugar Pine. This drought and competition has left the overstory pine venerable to attack by pine beetles. 100 percent mortality of pines has occurred in these epidemic areas. Areas of extreme susceptibility are on map 9.

**Fire Severity (Intensity) and Frequency:** Fire severity is the degree to which vegetation and a site have been altered or disrupted by a fire. At present there is no well described meaning of the term. In general, it is a combination of the degree of crown scorch and consumption, bark char, mortality of the plants, organic matter consumption, and the degree of exposure, discoloration and changes in soils.

The federal lands in the assessment area have a low amount of fires, but a high percentage of large fires (1929, Elk River; 1938, Cedar Camp; 1970, Quail Creek; 1987, Silver, Longwood, and Galice; 1990, Chrome; 1994, Mendenhall). Damage, as measured by percent of crown consumed, has been less severe than anticipated (approximately 15% high intensity on the 100,000+ acre Silver Fire). Many fires exhibit extreme fire behavior on only the SE, S and SW aspects, with a backing fire occurring on the other aspects. East wind conditions, which occur primarily October through December, contribute to these large fires. Managed stands can also exhibit extreme fire behavior.

**Results:** In the Klamath Province, fire is the most important agent of disturbance (table 12). Ninety-eight percent of the older forest stands sampled for the ecology plot database (Siskiyou National Forest) had some evidence of disturbance. In most cases, several agents were responsible, but the effects of fire were most prevalent in 63%. The average age of the older stands was 237 years. The oldest was 800 years. The mean return interval was 42 years and the longest interval between disturbances was 150 years. Human activities, such as logging, are increasing, but were dominant in only 23% of the stands sampled. Harvested stands, however, were avoided in the sample. Disease, insects, ice, and landslides are common disturbance agents, but their effects usually are more subtle than fire.

**Map 8: Southwest Oregon Port Orford Cedar Status**

**Map 9: Southwest Oregon - Risk of Decline in Tree Health in LSRs**

Table 12: Fire Disturbance Characteristics 1/

SERIES	AVERAGE DISTURBANCE CHARACTERISTICS		
	Ave. Stand Age	Ave. Interval	Estimated Interval Range
ABCO	213	251	0-60
PSME	230	30	15-60
ABMAS	214	40	25-75
CHLA	419	50	40-130
PIJE	282	50	40-80
TSHE	281	65	50-150
LIDE	243	90	25-150
TSME	313	115	100-300

1/Source - Paradox database for ecology plots

For the fire regimes in the different plant series, several trends are noted. As the interval between fires increase, the severity of the fires increases. Conversely as the number of fires go up, the fire intensity tends to be lower.

**Growth and Health Processes:** Existing characteristics of the older forests in each major plant series are important references for both monitoring and future conditions (Table 13)

**Table 13: Existing Processes for Older Forest Stands**

Plant Series	AVERAGES of Overstory Tree and Stand Characteristics
ABCO	<p>Growth rate good at 15/20ths            Average stand age Doug-fir 185 yr; white fir 135 yr            Live crown ratio 50%            Down wood very high            Snags about 5/ac &gt;20 in dbh            Wildfire risk low</p>
ABMAS	<p>Growth rate high at 17/20ths            Average stand age 130 to 140 yr            Live crown ratio 50%            Down wood high,high in fines,low in coarse            Snags about 5/ac &gt;20 in dbh            Wildfire risk low            "Better shape" than ABCO regards fire risk</p>
CHLA	<p>Average stands tend to be older (250 to 300 yr.)            Growth rate low at 10/20ths            Live crown ratio 45%            Down wood to be computed            Per acre #s of trees, snags and down wood to be computed            Wildfire risk is low.</p>
LIDE3	<p>Doug-fir component of stands tend to be younger at &lt;200 yr            Growth rate low at 11/20ths            Per acre #s of trees snags and down wood to be computed            Wildfire risk is moderate to high.</p>
PIJE	<p>Average stand age 190 yr tending toward climax            Growth rate low at 5/20ths            Live Crown ratio 50%            Down wood low at 9/ac &gt; 20in dia            Wildfire risk is low.</p>
PIPO	<p>Average stand age 160 to 170 yr            Growth rate low at 10/20ths            Crown ratio 38 is relatively low.            Snags at 2.4/acre &gt;20 in dbh is low.            Down wood at 25/ac is high.            Somewhat decadent; PIPO species at risk to insects and disease            Wildfire risk is high.</p>
PSME	<p>Average stand age 170 yr            Growth rate low at 12/20ths.            Live crown ratio 45%            Down wood 25/ac high but tends toward small pieces            Wildfire risk is high.</p>
TSHE	<p>Average stand age Doug-fir 225 yr and w hemlock 120 yr            Growth rate Doug-fir 13/20ths and western hemlock 21/20ths            Snags and down wood to be computed            Wildfire risk is low.</p>

## VI. TRENDS FOR ELEMENTS AND PROCESSES

Though describing our future is the most important part of the assessment, we also need to assess trends to indicate risks associated with maintainance of older forests. If the risk is not high, there may be no reason to act. However, we need to assess any threats to the desired range of conditions. The trends and existing conditions then help us understand the condition of the LSRs and future possible actions.

The trends for forest elements such as large trees, snags, large woody material (on soil and in streams), multiple canopy layers, understory trees, and associated canopy gaps with a patchy understory provide understanding for maintaining future older forests. This chapter addresses elements such as the interior older forest habitat patches and unique habitats such as meadows and elk requirements. The general trends of growth rates, crown ratios, ages, wildfire, fuels, snags, down wood, insects, and disease conditions for the plant series are listed below.

### A. Trends by Plant Series

Table 14 presents different forest processes which can be addressed by plant series. Growth, mortality, risks of wildfire, and susceptibility to insects/diseases are discussed.

**Table 14: Trends for Forest Processes and Elements**

Plant Series	Trends for Older Forest Stands and Average Stand Conditions
All Plant Series	Insects and disease will continue to play an important role in providing disturbance. Without wildfire, prescribed fire, or thinning, forests within these plant series will be increasingly vulnerable on a large scale to insects and diseases. Potential for more severe wildfire will increase in all plant series as fine and coarse fuels increase and other disturbance events such as fire or thinning are absent from the landscape. This trend will manifest first in the ponderosa pine, Douglas-fir, and tanoak plant series, given other factors of tree density, aspect, soil moisture, etc. equal consideration.
ABCO	Growth rate will slow as stands age. Down wood and ladder fuels will increase without wildfire. Snags will increase without wildfire. Stand replacement wildfire potential increases as fuels increase.
ABMAS	Growth rate will slow as stands age. Down wood and fine fuels will increase without the presence of fire. The size and numbers of future snags will increase without the presence of fire. Stand replacement wildfire potential increases as fuels increase.
CHLA	Average stand age will remain older at 250 to 300 yr. Growth rates will continue to decrease as stands age. Wildfires will tend to be low and moderate intensity. Resistance to insects and diseases will decrease. Older and larger Port-Orford cedar and Doug-fir will survive fire.
LIDE3	Low growth rate of Doug-fir component will continue. Tanoak component will increase in # and dbh without wildfire. Wildfire potential, especially stand replacement fire, will increase with age and small fuel buildup. As fires occur, tanoak will be set back and Doug-fir will be enhanced.
PIJE	Average stand age will increase w/o wildfire; will remain constant with frequent, low intensity fire. Growth rate will remain low w/o fire; growth will increase w/fire. Down wood and snags have no change or slight increases with or without fire. Wildfire will tend to be low and moderate intensity.

Plant Series	Trends for Older Forest Stands and Average Stand Conditions
PIPO	Stand age will increase without disturbance events. Growth rate will remain low as stands age without disturbance. Crown ratio will stay constant or decrease slightly as trees age. The number of snags (average of 2.4/acre) will increase with and without fire. Down wood will increase without fire; decrease with fire. Insects and disease would increase without fire, decrease with fire.
PSME	Stand age of large trees (average of 170 yr) will increase. Growth rate 12/20ths will stay low without fire; increase with fire. Down wood will increase without fire; high fines will decrease with fire. Wildfire potential, especially high intensity fire, will increase.
TSHE	Average age of western hemlock component of stand will increase. Growth rate of Doug-fir will remain low; hemlock's growth rate will slow gradually. Doug-fir snags and down wood will increase; western hemlock snags and down wood will remain low until trees mature. Wildfire potential will remain relatively low without fire with increasing % of western hemlock; with fire, more Doug-fir and fewer hemlock will be present.

The forest processes and forest elements important for older forests have several trends that are or are not desirable for maintaining the viability of species associated with late-successional habitat. Most of these unhealthy trends are influenced by two major disturbance patterns: timber harvest and fire.

### B. Older Forest Trends Based on Past Timber Harvest

**Large Trees:** The trends in the amount and distribution of large trees has been greatly influenced by harvest activities. It can be assumed that harvest in the PIPO, ABCO, PSME, TSHE, and LIDE plant series combinations have reduced the number and acres of big trees and have fragmented the landscape with clearcuts. Not much commercial activity has occurred on the PIJE series and ABMAS series. The CHLA plant series mainly occurs in the riparian areas where previous management did not clearcut as much. This harvest effect is probably most noticed in the TSHE plant series.

**Canopy and Understory Characteristics:** On all plant series, the stand density of the resulting managed stands in many areas is too high, limiting the growth of trees. Upto 1,000 trees per acre are growing (Managed Stand Database, Siskiyou National Forest). These stand densities limit the development of big trees, has limited canopy gaps, and limit understory development. In addition, these stand densities are slow to develop multistoried canopies and patchy understories characteristic of late-successional forests.

On some stands, particularly in the tanoak plant series, plant competition limits tree establishment and growth. This trend can slow the development of late-successional characteristics.

**Snags, Large Woody Material, and Fire:** On all plant series, managed stands, especially the older harvest units, are lacking in the snag and large woody material components.

Despite this lack of dead wood, these stands tend to have a potentially high rate of spread and a high intensity level of fire due to the closed canopies and single-storied stands.

**Patch Size:** The patch sizes in LSRs have been fragmented by harvest units, though the fragmentation is not statistically different from the Silver fire. However, in the LIDE3 plant series, the Williams, West IV, Galice, South Chetco, and Northwest Coast LSRs are lacking the larger patch sizes found in the base line conditions represented by the Silver Fire area and respective plant series. Existing interior patches in each LSR are small in number and important for interior older forest habitat.

In addition, several LSRs have a smaller average patch size than Silver, also indicating a need to grow larger patches of older forest. In particular, these LSRs are: the the North Chetco, South Chetco, and West IV for the PSME plant series; West IV

for the ABCO plant series; Northwest Coast, and Galice LSR for the LIDE3 plant series; and the Northwest Coast and Galice LSRs for the TSHE plant series.

### C. Forest Trends and Fire

The suppression of fires since the 1930's has added to the trend of high rate of spread of fire and increased intensity of fire characteristic of managed stands and the forest in general (Maps 10 and 11). This effect is particularly found in the eastside LSRs (Williams, East IV, West IV, Briggs, Taylor, Galice, and Fish Hook). Fire suppression, especially in the lower elevations, has left overstocked stands, especially trees in the 0-60 age class.

On many sites, this increased stocking level and drought conditions have increased the water stress on the older overstory trees. In high risk areas where ponderosa pine and sugar pine comprise the overstory, these large trees are dying at an increased rate due to bark beetles. Douglas-fir has also been affected. These high risk areas are mapped in Map 9. The LSRs that have a coastal climatic influence (South Chetco, North Chetco, and Northwest Coast) have a lower risk than mapped in this figure.

These stocking levels have also increased fuels loading, especially in the plant series which, before fire suppression, had frequent low and moderate intensity fires. With the suppression of these fires, the fuel loading will now support large, intense fires rather than low intensity fires. This is especially evident in the Douglas-fir and Ponderosa Pine plant series. These higher levels of fuel loads put existing older forest habitat at a higher risk of stand replacement fire.

The Jeffrey pine plant series supports many sensitive and unusual plant species, some of which are adapted to fire. Little management and fire suppression have limited the disturbance on these areas. Consequently, the processes of nutrient cycling and implications for regeneration of some plant species are evident, where fire has not occurred.

In the LSRs, fire maintained the meadows and oak/pine savannas by killing invading trees. With the suppression of fire, these unique wildlife habitat sites are becoming smaller by upto 50% (figure 8). Other sensitive species, such as Frasera umpquensis, Pedicularis howellii, and Bensoniella oregana are found within meadows, edge habitat or small openings within a late successional stand. Maintaining this habitat will be important to maintaining these species.

Another species of concern is Sophora leachiana. Its entire range is between the Rogue River and the Illinois River growing in disturbed areas. It is dependent on fire disturbances to create the open sites and possible seed scarification it prefers. The lack of fire will decrease its population levels.

Percent of managed stands range from a low of 1% in West IV to a high of 35% in East IV LSR. Due to past management practices of increasing fuels by manual release and pre-commercial thinning, many stands now exhibit high rates of fire spread and intensity, which may result in total loss of stand.

Maps 10 and 11 depict average (50th Percentile) and average worst (90th Percentile) Wildfire Rates of Spread and Flame Length based on historical weather conditions from a representative weather station (Quail Prairie) and National Fire Danger Rating Fuel Model G.

Map 10: Southwest Oregon 50th Percentile Flame Lengths (ft.)

Map 10a: Southwest Oregon 90th Percentile Flame Lengths (ft.)

Map 11: Southwest Oregon 50th Percentile Rate of Spread (ft./hr)

Map 11a: Southwest Oregon 90th Percentile Rate o

## **VII. Management Implications - What and Where**

The desired conditions of the older forests, their priorities for treatment or no treatment, and project implications flow from the historical and existing conditions, and trends. This chapter presents the desired conditions (the most important part of the assessment) for the late-successional reserves. Then, we measure our progress to achieve these conditions with specific reference to recent conditions.

Consequently, the desired conditions set the course for targeting future management activity. If existing conditions are the same as our desired future, there is no reason to act. However, trends may indicate a risk associated with maintainance. If the risk is not high, again, there may be no reason to act. However, we need to assess any threats to the desired range of conditions.

### **A. Desired Conditions**

**General Elements.** It is important to know what the desired elements can be for conditions in older forests. Table 15 "Desired Ranges" provides an initial estimate of desired ranges by plant series, based upon current data, a "Supplement to Standards and Guidelines" 4-13a, 4-13b, 7-8 and 7-10: "Large woody material and wildlife reserve trees" (developed by Ed Gross, Linda Mullens, and Lee Webb of the Siskiyou National Forest as supplemental direction for the Forest Plan),and integration of information by the LSR assessment team.

Subitems of major tree species are listed so as more information is known, it can be added. All desired conditions are the best judgement of the LSR assessment team, based upon the relative productivity of each plant series, existing natural conditions in each plant series (ecology plot data), and observed growth rates and crown ratios of trees that survive.

Table 15: Desired Conditions Of Forest Elements

PLANT SERIES	ABCO		ABMAS		CHLA		LIDE3		PIJE		PIPO		PSME		TSHE	
	Psme	Abco	Abmas	Abco	Psme	Chla	Psme	Lide3	Abmas	Psme	Psme	Pipo	Psme	Pila	Psme	Tshe
Two Major Plant species <sup>1</sup>																
<b>Big Trees</b>																
#/Acre																
Diameter Average (inches DBH)																
Growth Rate Last 10 years (20ths of an inch)	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15
Average Age (Years)	>200	>200	>150	>150	>250	>250	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200
Crown Ratio (%)	>45	>45	>45	>45	>45	>45	>45	>45	>45	>45	>45	>45	>45	>45	>45	>45
<b>Snags</b>																
Average Diameter (inches)	>30"	>30"	>24"	>24"	>30"	>30"	>24"	>24"	>12"	>12"	>24"	>24"	>24"	>24"	>30"	>30"
Height (ft)	>45'	>>45'	>45'	>45'	>45'	>45'	>45'	>45'	>30'	>30'	>45'	>45'	>45'	>45'	>45'	>45'
Decay Class <sup>2</sup>	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3
#/Acre	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5
<b>Down Wood</b>																
Decay Class <sup>2</sup>	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
Minimum Average Diameter = 20 Inches																
#/Acre	12	12	12	12	12	12	15	15	10	10	10	10	15	15	12	12
Minimum average length per piece = 20 Feet.																

<sup>1</sup> Regeneration tree species are listed in the Siskiyou LSR Ecoplot Analysis planning records. Various plant series have over 20 different species which regenerate successfully on any given site.

<sup>2</sup> Decay classes as defined by ecosystem inventory Siskiyou National Forest.

Table 16. Large Woody Material Amounts (Pieces to Cubic Feet to Tons)

Pieces	Cu.Ft./Acre	Tons/Acre
10	430	9
12	516	11
15	645	14

Minimum Average Piece = 20 Inches (diameter) x 20 Feet (length)

Average Wood Density = 42 lbs/Cu.Ft.

**Older Forest Patches.** Development of large well connected patches of interior older forest habitat should be concentrated where stand replacement fires are less frequent, such as on north aspects and in plant series heavily influenced by moisture. Maps of the Silver Fire and historic Grayback/Sucker Creek areas support this expectation. Priority for developing large connected patches should be on north aspects and/or within plant series less prone to large stand replacement events. Existing patches could be protected where ever they exist, but especially where risk of stand replacement is high. See map 3 for location of existing patches; maps 10a and 11a displays those sites where stand replacement fires are most likely. In addition, some site-specific fire modeling will help predict those patches susceptible to intense fire.

Adopting strategies to develop and protect connections and large patches also meets the expectations of USDI Fish and Wildlife Service, as stated in the Northwest Forest Plan, Appendix G, page 19: "The Service believes dispersal questions ..... as well as the short term lack of habitat structure and other biological considerations, are built into the watershed analysis process and will be included in plans developed by local teams..." All land allocations within federal lands in the assessment area provide habitat connections which allow dispersal of wildlife and plant species across the landscape.

For various reasons, the function of late-successional habitat in Matrix is related to late-successional habitat in LSRs. Matrix lands are the areas where most timber harvest and other silvicultural activities are conducted. On the Siskiyou National Forest, 7% of the lands support the programmed timber harvest.

Programmed harvest in Matrix can help support the LSR strategy in several ways and not reduce the amount of planned timber harvest. Older forests in matrix function as some connections between the various Late-Successional Reserves and currently provide a small percentage of large patches of interior older forest habitat. Riparian Reserves are expected to be the primary connections between patches of older forest in Matrix. However, some areas within these Riparian Reserves currently do not harbor older forest habitat, and do not serve as adequate connections. Furthermore, a connection needs to be at least 1,000 feet wide to function as interior late-successional habitat.

Development and maintenance of large connected patches of interior habitat in Matrix and Riparian Reserves can help sustain the function of late-successional habitat in LSRs; This is especially important in the next several decades, as more of the land in LSRs begins to reach mid or later age. The following suggestions are offered:

**Matrix as Connections:** Possibly consider future connections at least 1000 feet wide through the Matrix land allocation by scheduling timber harvest so that connections of similar aged habitat will someday be continuous connections of suitable habitat for late-successional species. Riparian Reserves should make up most of the area in connections.

Possibly consider avoiding impacts to existing connections in Matrix, if compatible with Matrix objectives. Prevent stand replacement events such as intense fire; possibly consider delaying regeneration timber harvest in interior habitat or corridors, compatible with the needs for timber outputs.

In Matrix lands, if regeneration harvest avoids habitat which connect patches of interior late-successional forest in LSRs, the probability of maintaining population viability for older forest species increases. The probability of maintaining species viability is improved by simply scheduling harvest in Matrix while considering the importance of older forest habitat connections.

**Large Interior patches in Matrix:** Possibly consider maintaining large patches older forests in Matrix.

Possibly consider developing future large patches in Matrix by scheduling large areas of similar aged forest to develop into large patches of interior late-successional habitat. This can be accomplished by focusing harvest activities adjacent to existing sale units.

These considerations are not intended to reduce the programmed amount of timber harvest in the matrix.

## B. Priorities for Treatment

To progress from existing conditions to desired conditions, in many cases, no action is needed. This is especially true in the large blocks of interior habitat not at risk. In these areas, the best management will be no rehabilitation activities except prevention of stand replacement fires (see below). Activities neutral to LSR objectives may still occur.

**Amount of Older Forests:** In addition, the conditions of each LSR and within each LSR may influence the locations or priorities of projects. Focusing on the acceptable range of 45 to 70% (REAP, 1994) for late successional conditions, the LSRs have the following order of priority for treatment (ranked highest to lowest) (Table 17). Within each LSR, areas in different plant series also have different priorities, based upon existing proportions of older forests.

Table 17: Priority of Treatments

LSR	Existing LS Habitat (% of Potential)	Priority Plant Series for Treatment (Existing LS Habitat (% of Potential))
North Chetco	29	LIDE3 - 29%
West IV	29	LIDE3/Psme/Pije - 41%
Williams/East IV	36	ABMAS - 24%
		ABCO - 37%
		LIDE3 - 39%
		LIDE3_PSME - 43%
		PSME - 43%
South Chetco	36	TSHE - 32%
		LIDE3 - 38%
Northwest Coast	38	LIDE3 - 33%
		LIDE3_PSME - 39%
Galice/Fish Hook	39	ABMAS - 37%
		ABCO - 39%
		PSME - 39%
		PSME_LIDE3 - 39%
		LIDE3_PSME - 46%
Taylor	46	PSME - 45%
		PSME_LIDE3 - 52%
Briggs	50	ABCO - 46%
		PSME_LIDE3 - 51%
		LIDE3_PSME - 56%

**Owl Activity Centers and Patch Sizes:** Priorities for developing late-successional conditions needs to include the finer screens of habitat needs around spotted owl activity centers in large LSRs and the need to increase the size of large blocks of habitat.

Home ranges for the northern spotted owl within the eight large LSRs are priority areas for accelerating development where the suitable habitat in any given activity circle is less than 40%, especially if less than 30 percent. Not included are the 100 acre Known Spotted Owl Activity Centers scattered throughout Matrix lands. The managed stands in these areas are a higher priority for treatment.

The agencies need to exercise caution when proposing projects within these activity centers. Stands may serve as foraging habitat, even though not suitable for nesting habitat. These stands should only be thinned if a short term loss of foraging habitat is acceptable. A focus on stands which the owls do not use would avoid these situations.

The large blocks of interior habitat need also would benefit from additions of habitat from the surrounding areas. Map 12 displays managed stands which can be treated to accelerate the characteristics of older forests, adjacent to the blocks of interior habitat. The existing largest blocks of habitat are listed below (Table 18):

**Table 18: Largest Blocks of Total and Interior Habitat**

<b>LSR</b>	<b>Plant Series</b>	<b>Existing Block Size (Acres)</b>	<b>Interior Habitat (Acres)</b>
Williams/East IV	ABCO	Up to 6,375	<900
	LIDE3	Upto 2,300	<400
	LIDE3_PSME	Upto 1,100	<500
	PSME	Up to 8,100	<2,590
West IV	LIDE3_PSME_PIJE	Upto 10,900	1,223
Briggs	ABCO	Up to 1579	<100
	LIDE3_PSME_PIJE	Up to 4100	<1,100
	PIJE	Upto 1,800	<100
	PSME/LIDE3	Up to 8100	<3,700
Galice/Fishhook	ABCO	Up to 2500	<600
	LIDE3	Up to 4300	<700
	LIDE3_PSME	Up to 21,600	<6,000
	PSME	Up to 3,800	<1,200
	PSME_LIDE3	Up to 20,740	<3,700
	TSHE	Upto 6,603	<300
S.Chetco	LIDE3	Up to 2,900	<579
	TSHE	Up to 4,200	<400
N.Chetco	LIDE3	Up to 7,100	<2,300
Northwest Coast	LIDE3/PSME	Up to 9,500	<1,900
	TSHE/LIDE3	Up to 14,800	<9,200
Taylor	PSME	Up to 2,000	<300
	PSME/LIDE3	Up to 2,100	<300

The large blocks of large interior habitat at risk for stand replacement events such as fire and insects are priority areas for further examination. Overlays of maps 3, 10a, 11a, and 9 will help identify these areas.

### C. Possible Projects

Using the trends listed above, several possible projects or activities could be feasible (table 19)

**Table 19: Possible Projects In LSR**

Plant Series	Element or Process	Trend	Desired Trend	Possible Projects	Locations
All Series	LARGE TREES	Lack of Big Trees Due to Harvest	Grow Big Trees. Have more mature and overmature trees	PCT CT Fertilization*, Other Stand Tending Measures	Managed Stands
All Series	LARGE TREES	Large Ponderosa Pine and Sugar Pine is at risk.	Keep PP & SP Healthy	Rx Fire Thinning From Below Density Mgt., Wildfire Mgt., Keep some areas unmanage dying PP.	Wherever PP & SP exist. 1. Less than 3500 feet elevation exposure within 1 mile of beetle activity with a canopy 2. Less than 3500 feet in elevation exposure within 1 mile of beetle activity with a canopy
TSHE CHLA LIDE	LARGE TREES	POC disease killing large POC trees	Reduce Disease Spread	Site Specific Rx including such considerations as road closure season of operation sanitation and PCT measures.	Areas where POC occurs and phytophthora occurs.
All Series	LARGE TREES and LARGE LIMBS	Increasing amount of Dense Stands, or Stands with Reduced Growth	Reduce density. Increase Growth. Increase Canopy Gaps. Provide Patchy Understory.	PCT , CT, RX Fire	Managed Stands or Natural Growth Rates (Stagnant)
All Series	Big Trees	High density stands at risk due to drought and fire.	Reduce Risk	Rx Fire. Single Story on Southern Slopes. Mult. Storied on N. Slopes	Areas with high rate of spruce fire potential.
All Series	SNAGS and LWM	Deficit in mgt. stands & in past salvage areas. Potential Salvage Areas due to Disease/Insects/Fire	Provide more snags and LWM as specified for each plant series. Provide LWM	Retain and Recruit LWM & Snags in PCT and CT. Prescribe fire. Follow Plant Series Guidelines for LWM.	Managed Stands and Young Where stand replacement density acres with < 40% crown closure
All Series	LWM In Streams	Deficit in critical areas.	Provide more LWM & restore processes in upstream areas	Remove barriers to LWM movement. Examine road management needs. Manage in riparian reserves to produce big trees. No harvest of big trees in riparian reserves. Place Large Structure in Streams. Plant conifers in riparian areas. Prescribe fire in riparian areas.	Focus on areas above fish habitat
All series	MULT CANOPY LAYERS	Lacking in younger stands	Provide for me conditions	PCT and CT Rx for MC on North Slopes. Consider Underplant in created canopy gaps.	Managed stands and natural
All Series	UNDERSTORY TREES	Lack of fire has left some understories overstocked.	Reduce Stocking	CT, PCT, or Rx Fire	High density stands
All series	CANOPY GAPS & PATCHY UNDERSTORY & CLOSING OF CANOPY GAPS	younger stands - do not have adequate canopy gaps.	Create Gaps	PCT, CT , or Rx Fire	Managed Stands and Young
All series	UNIQUE HABITAT	Trees are encroaching meadows reducing valuable habitat nich. Maintain habitat for species such as <i>Frasera utpquensis</i> <i>Pedicularis howellii</i> and <i>Bensoniella oregana</i> . Trees are encroaching foraging areas for elk and deer	Provide Disturbance in Meadows Maintain adequate foraging areas congruent with older forest species' needs. Maintain historically open ridgetop meadows.	Rx Fire Girdling Mechanical Treatment May include removal of encroaching tree and shrub species.Rx Fire, PCT,CT forage seeding on closed roads.	Meadows as existed in 1940 (of 1940 aerial photos).All L sites not capable of supporting

Plant Series	Element or Process	Trend	Desired Trend	Possible Projects	Locations
PSME	SOPHORA LEACHIANA	Lack of disturbance will decrease population levels	Provide disturbance	Rx Fire	Briggs and Taylor LSR
All Series	INTERIOR LS CONDITIONS CONNECTIONS & BUFFERING OF MICROCLIMATE-S	Patches and Connections are reduced in size leading to isolated reduced interior habitat.	Provide Increased Corridor & Patch Size Avoid stand replacement fires Increase corridor & patch size	Effective wildfire suppression and the appropriate suppression response.Rx Fire, PCT,CT& Fertilization	Large patches and corridors corridors Nonhabitat managed existing interior habitat. Fu corridors.
All Series	TREE GROWTH	Restricted in high density stands	Reduce Density	CT PCT Rx Fire and Release	Managed Stands High Risk
All Series	DISTURBANCES, including Wildfire and Prescribed Fire	less frequent/more severe	Keep fuel loading within historic variation by the use of fire	Rx Fire,Reduce fuel loading in high risk areas	High Risk AreasAreas that disturbance intervals.
All Series	TREE ESTABLISHMENT	mortality due to competition	Reduce Competition	PCT & Release	Managed Stands
LIDE3 and Oak Savanna Areas	FOOD FOR LS SPECIES	Hardwood stands invaded by conifers due to fire suppression	Maintain hardwood and savanna conditions	Rx Fire mechanical treatment	All LSRs especially around elevations on the East IV a
All Series	STORING CARBON	Large Woody Material lacking in streams and on the ground	Maintain and design needs for LWM per table 20.	Recruitment of Large Wood	Areas upstream from produ flats,managed stands,salvage
Jeffrey Pine Series	RECYCLING NUTRIENTS	Recycling From Fire is Absent	Reintroduce Fire	Wildfire Mgt. & Rx Fire	West IV and Briggs LSRs. Jeffrey Pine Series exists
All Series	SUCCESSION	Managed Stands have lack of some elements of succession	Reintroduce canopy gaps understory trees (more shade tolerant)	PCT CT	Managed Stands
All Series	PUBLIC SAFETY	Increased Fire Risk	Reduce Risk	CT PCT RX Fire	Near Human Communities Agness etc.) or Other High
All Series	Noxious Weeds and Nonnative Plants	Population is Increasing	Decreasing Population	Control and Eradication of these plants	Meadows and Unique Hab

## VIII. Projects and Descriptions

Projects consist of prescribed fire, large woody material and snag recruitment, silvicultural treatments, phytophthora control, unique habitat restorations, wildfire, maintenance of lookout seeing corridors and other nonsilvicultural activities.

### A. Prescribed Fire and Wildfire Hazard Reduction

A prescribed fire is a fire burning within an approved, pre-defined and planned prescription. It results from a planned or natural ignition. The use of prescribed fire restores processes that have been limited by effective fire exclusion.

One aspect of prescribed fire is wildfire hazard reduction. The goal of wildfire hazard reduction in all land allocations is to reduce the risk and scale of large-scale, high intensity wildfires which would prevent land managers from meeting resource management objectives. It is essential to seek a balance between reducing cost and reducing the risk of wildfire, while promoting management objectives (Appendix B8, Fire Management Standards and criteria).

Prescribed fire can reduce the risks of wildfire setting back the late-successional characteristics of the LSRs. In addition, it can produce elements such as canopy gaps, multistoried conditions, snags, and patchy understories needed for late-successional conditions.

The use of prescribed natural or management-ignited fire in LSRs is appropriate. Criteria for the use of prescribed fire are:

**Responsibility for line officers:** Forest Supervisors are responsible for considering the use of fire in the management strategy of all appropriate ecosystems, and especially those determined to be partially or totally fire dependent (FSM 5140.4, 5140.42). Prescribed burning may also be useful in the following land management activities:

- a. Site preparation.
- b. Control of undesirable understory including thinning.
- c. Reducing activity and natural fuels that require treatment.
- d. Vegetation management for range and wildlife habitat.
- e. Control of certain insects and diseases.
- f. Maintaining a certain successional stage.
- g. Managing nutrient reservoirs and cycles for site productivity.

**Documentation:** The criteria for documentation is listed below.

For management ignited burns, a prescribed fire burn plan must be prepared and approved in advance(FSM 5142.1).

The prescribed natural fire plan must be prepared and approved before the use of a natural ignition as a prescribed fire (FSM 5142.23).

**Air quality needs:** Consider these seven items if prescribed fire is planned:

- 1) Describe alternative fuel treatments and reasons why they are not selected over prescribed fire.

- 2) Quantify the fuels to be burned (acres, tons, types).
- 3) Describe the types of burns
- 4) Describe measures taken to reduce emissions.
- 5) Qualify the amount of emissions to be released.
- 6) Describe the regulatory/permit requirements for burning.
- 7) Describe the air quality impacts of burning activities, focusing on new or increased impacts on down wind communities, visibility impacts in Class I Wildernesses, etc.

**Burn Intensity:** Keep as many large trees as possible, ie. keep the percentage of the burned area below 15% in high intensity fire behavior and create snags, canopy gaps, and patchy understory for developing multiple canopy layers, large woody material, and future understory trees (use First Order Fire Effects Model, "FOFEM", to predict mortality rates and down wood material consumption).

**Priority Areas for Treatment:** Use prescribed fire in areas where the overstory is at risk due to an overstocked understory and in areas where the suppression of fires have lead to increased fuel loading and potentially extreme fire behavior or insect epidemics (high risk areas). Where these conditions exist adjacent to the valuable interior habitat areas in the LSR or those areas listed for protection under the wildfire section, use prescribe fire to achieve LSR objectives by reducing the risk of unacceptable wildfire behavior (would produce greater than 15% of the area burned in a stand replacement fire).

Prescribe fire on the Jeffrey pine plant series to simulate the historic fire frequency with which the plants evolved. In those areas, recycling of nutrients due to fire will provide historical conditions under which many of the rare plants evolved.

Prescribe fire on wildlife sites, especially meadows and oak/pine savannas, to maintain their habitat characteristics. Prescribed fire is an appropriate treatment of these small areas important for habitat diversity. Maintain the habitat for plant species, such as *Frasera umpquensis*, *Pedicularis howellii*, and *Bensoniella oregana*, which are dependent upon a meadow environment. Provide a low level of disturbance for the propagation of *Sophora leachiana* in the Taylor LSR.

## **B. Large Woody Material and Snags**

Large woody material and snags are important for both the aquatic and terrestrial environment.

**Terrestrial:** In projects where the amount of snags and large woody material can be affected, consider the following criteria (table 20). Recruitment of large woody material in managed stands via PCT and CT activities can provide future elements of the LSR habitat. In addition, any salvage projects in areas greater than 10 acres with a canopy closure less than 40% needs to implement the recruitment of snags and large woody material.

Site-specific prescriptions for large woody material (LWM) for areas need coordination with the needs of wildlife, soils, silviculture, and fire.

### **Table 20: Large Woody Material And Criteria For Ecosystem Resilience**

LWM numbers in the table are minimum levels and exceeding them will often benefit the ecosystem. We know of no upper limits for retention of LWM. BLM area plans and Siskiyou Forest Plan Standard and Guidelines 4-13a-b, 7-8 and 7-10 provide details on quality, quantity, and dimensions of LWM.

## MINIMUM NUMBERS OF LWM PER ACRE TO BE RETAINED ON SITE

<b>PRESCRIPTION</b>		
Plant Series <sup>2</sup>	Stand Relacement Events Such As Fire With Salvage <sup>1</sup>	Nonreplacement Events Such As Commercial Thinning
PIPO PIJE PIMO	10 Pieces LWM <sup>4</sup>  3.4 to 4.2 snags + All live trees where possible <sup>5</sup>	All Existing Down, Cull or Sound LWM, UP to 20 Pieces Per Acre <sup>3</sup> 8-10% Ground Cover All Existing Snags at Each Entry
LIDE3 PSME AB- MAS TSME	15 Pieces LWM <sup>4</sup>  3.4 to 4.2 snags + Keep all live trees where possible <sup>5</sup>	All Existing Down, Cull or Sound LWM, UP to 20 Pieces Per Acre <sup>3</sup> 8-10% Ground Cover All Existing Snags
ABCO TSHE CHLA LIDE3 SESE2	12 Pieces of LWM <sup>4</sup>  3.4 to 4.2 snags +	All Existing Down, Cull or Sound LWM, UP to 20 Pieces Per Acre <sup>3</sup> 8-10% Ground Cover All Existing Snags Keep all live trees where possible

1/These sites would be greater than 10 acres and less than 40 % canopy closure (Northwest Forest Plan ROD, page C-14).  
Keep all live trees where possible.

2/Plant series, a good indicator of site quality and the plant environment is a reflection of soil quality, aspect, available water, climate and fire history. Tanoak (LIDE3), because of its wide range of occurrence is included in both middle and bottom rows of the table. PIPO ponderosa pine; PIJE jeffrey pine; PIMO sugar pine; LIDE3 tanoak; PSME Douglas-fir; ABCO concolor fir; TSME mountain hemlock; ABMAS shasta red fir; TSHE western hemlock; CHLA Port-Orford-cedar; SESE2 redwood.

3/Thinning stands - Quantity and quality of LWM and WRT are usually low in second growth forests. For LWM leave all existing down, be it cull or sound, up to 20 pieces per acre. These minimum amounts of LWM may be achieved in more than one entry.

4/A piece is defined as an average diameter of 20 inches and average length of 20 feet. Some or all of the LWM may be left standing; to reduce on-ground fuels; to prevent log rolling on steep ground; to provide wildlife habitat; and for safety or economic reasons. While it may be upright for a few decades it will all come down eventually and contribute to site productivity in other ways.

At minimum, in all LSRs, the most common assemblage of woodpeckers on a given site is: Downy woodpecker, red-breasted sapsucker, hairy woodpecker, northern flicker, and pileated woodpecker. The 100 percent habitat capability level for this group of woodpeckers is 3.1 wildlife trees per acre (continual supply over time). When a 10% implementation factor is added for trees which will be inadvertently lost during harvest operations, or because of burning or blowdown, then total trees needed per acre is 3.4. For sites in portions of all LSRs, the acorn woodpecker is also present; in these areas, the 100 percent habitat capability level is 4.2 (including 10% factor). For portions of

the East IV LSR, the white-headed woodpecker is also present (but does not occur on the same sites as the acorn woodpecker); in these few areas, the 100 percent habitat capability level is 4.1 (including 10% factor).

*Distribution and Quantity:* Quantity of large woody material (LWM) recommended for each plant series group varies with our best estimate of site quality, the expected benefits to long-term site productivity and the estimated availability of LWM. A variety of decay classes (including class 1) and a variety of species reflecting site conditions are best left onsite.

Preferred distribution of LWM would be uniform over salvage areas or areas of consideration. Piece size should include some whole trees. Due to natural variability, availability, and topography, some areas will have more, some less than average.

Wildlife tree and snag densities must be provided within land areas generally no larger than 40 acres. Wherever possible, to provide for woodpecker territorial needs, dead trees should be left throughout the landscape; this provides the best opportunity to maintain LWM for long-term wildlife habitat and site productivity.

**Aquatic:** Large woody material is very important in streams, especially where the wood interacts with the low gradient streams with high fish diversity and production. Road management upstream of these low gradient "hotspots" needs to be examined for barriers to the movement of large woody material in the stream system. Upstream processes such as transportation of large woody material in streams also need to be restored. Much of the watershed restoration work targeted to improve water quality and spawning and rearing habitat for anadromous fish populations will be undertaken upstream of these low gradient stream reaches. Flats within these reaches will reflect the changes in watershed conditions e.g. fine sediment, large wood delivery, water temperature, pool quality.

These stream segments can serve as barometers of watershed health. Many of these segments are currently used by the Oregon Department of Fish and Wildlife or the Siskiyou National Forest as index areas for spawning salmon e.g. Quotsatana Creek, Lobster Creek, Emily Creek, Dunn Creek, Grayback Creek, Taylor Creek, Johnson Creek, Rock Creek. Monitoring of these important aquatic/riparian habitats will help measure the success of watershed restoration work.

*Criteria.* Criteria for this work includes:

Criteria for LWM and Projects:

1. Meet LWM guidelines for each plant series.
2. Hazard Tree Removal (ROD C-15)
  - a. Examine the area (120' circle) surrounding each hazard tree (or each small group of trees). Estimate the existing number of LWM pieces and compare to the minimum levels listed by plant series. Provide for the LWM needs on site (a distribution of amounts) that exceed the minimum LWM levels.
  - b. Where excess LWM exists, merchantable portions of the hazard tree may be removed from the site. If LWM does not exist in adequate quantity, hazard trees may be harvested if the felled tree is still a hazard, and cannot be routinely handled to provide LWM.

It may be that at a given hazard tree site, LWM minimum S&Gs are "almost" met before the addition of the hazard tree; in this case it may be appropriate to mark a portion of a hazard tree as commercially harvestable (example, 40'), and leave the rest of the tree on site. Adapt to changing circumstances as needed.

3. Upstream of critical stream reaches, remove artificial barriers to the movement of large woody material,
4. Examine road management needs in the watersheds above critical stream reaches,
5. Consider silviculture treatments in upstream riparian areas to accelerate the growth of large wood adjacent to streams.
6. Look at the amount of existing large wood in streams. Place instream structures where needed and where practical.

### **C. Silvicultural Activity**

Many silvicultural activities can help achieve LSR objectives. Such activities include thinning, release, underplanting, limiting the understory, creation of snags, planting, and possibly fertilization.

**Thinning:** Direction from the ROD explains that any silvicultural manipulations proposed for Late-Successional Reserves have two principal objectives: "(1) development of old-growth forest characteristics including snags, logs on the forest floor, large trees, and canopy gaps that enable establishment of multiple tree layers and diverse species composition; and (2) prevention of large-scale disturbances by fire, wind, insects, and diseases that would destroy or limit the ability of the reserves to sustain viable forest species populations." While prevention of large-scale disturbance is a general objective listed in the ROD for all of the range of the northern spotted owl, it is not always desirable in all ecosystems. Periodic large-scale disturbances have historically been a part of the ecosystems of the Siskiyou Mountains. Periodic large-scale disturbances often provide the diversity of habitat conditions that are necessary to maintain species viability.

Many acres inside the LSRs are young, managed stands created through past management practices. Silvicultural manipulation of these young forests can accelerate the development of some of the structural and compositional features of older forests. Direction in the ROD states that stand management inside of LSRs should focus on stands that have been regenerated following timber harvest.

The criteria for thinning inside of LSRs is developed to meet the above objectives and Forest Plan direction. The purpose of thinning projects is to reduce the stocking level within young plantations and managed stands, thereby improving species diversity within the stands and accelerating the development of late-successional forest characteristics.

Thinning treatments provide the following benefits to the LSRs:

a. Thinning reduces competition:

1. Trees grow larger and faster.
2. Stands become more vigorous and less susceptible to insect and disease risks.
3. Canopy conditions become more open and increase vertical variation by encouraging the establishment and growth of understory vegetation.

b. Thinning reduces uniformity and promote greater diversity:

1. Species selection favors minor, under-represented species, including hardwoods, consistent with natural conditions for that plant series.
2. Random spacing patterns, including unthinned clumps within each stand, promotes spatial diversity. Openings that naturally occurred on these sites prior to management, such as wet areas and grassy openings, are restored where feasible.
3. Wide spacing of Port-Orford-cedar (>40 feet), where feasible, will add diversity and eliminate the spread of phytophthera by root grafts.

Initial thinnings focus on high density, even-aged, single layered stands in LSRs that fit within priorities for treatment. Initial focus is also in areas that contain less than 40% suitable owl habitat in the home ranges around owl core areas. Priority areas also include stands at high risk for insect and disease attack, and high fire risk areas such as lightning activity centers. An example of a target stand is pre-commercial thinning size stands that exceed 350 trees per acre or commercial thinning size stands that have a relative density that exceeds sixty percent of the biological maximum density.

Analyze other opportunities for thinnings. Thinnings focus on both conifer and hardwood species to encourage the development of diverse stands. Consider riparian areas for thinning (especially upstream

of the productive "flats") if it meets the Aquatic Conservation Strategy. Analyze opportunities to reduce density through the use of prescribed fire.

An example thinning prescription for a pre-commercial sized plantation, generally between 10 and 20 years in age, reduces the density to approximately 175-225 trees per acre. Cut no trees over 8" dbh. Retain a hardwood component in the stand and thin hardwoods to promote their development. Leave an unthinned patch, approximately 1/4 acre in size, for every five acres treated to increase structural diversity.

Favor minor species for retention in the thinning to promote species diversity. Do not cut any Pacific yew or dogwood. Leave all snags and down woody material in place. Do not use skidders or harvesters and thin with chainsaws. Address the increased fire hazard created by the treatment and incorporate hazard reduction measures such as hand piling into the thinning prescriptions.

Thinned stands will require sufficient stocking to maintain future options and to ensure the sites attain desired vegetative objectives. Too much thinning may eliminate some future options, provide a site not fully occupied, and promote ingrowth of undesired vegetation.

Monitoring determines if additional entries are needed at a later date to achieve late-successional objectives. These entries include additional thinnings, underplanting of native tree and shrub species, and fertilization, if needed. Long-term management includes the development of snags, down woody material and defect to accelerate stand structure and complexity. Entries in LSRs are intended to be infrequent. Consequently, design initial entries to have long lasting effects to minimize the need for additional entries.

Commercially thin stands when they achieve a relative density of 60-70% or greater of the biological maximum density. Thin to stocking levels that promote the development of late-successional characteristics (canopy gaps, multistoried, some large limbs, etc.). Leave the most dominant trees along with the codominant and intermediate trees necessary for structural diversity. Maintain all species on site.

Other considerations: Develop thinning prescriptions by major plant series. For example, in tanoak series forests, aggressively thin tanoak more so than in the western hemlock series forests. Thin drier sites such as pine series forests to wider spacings than more moist sites such as white fir series forests.

Do not thin in owl habitat inside Known Spotted Owl Activity Centers (ROD page C-10), unless essential for the owls. These 100 acre LSRs constitute protective buffers for owl activity centers which would otherwise be located in Matrix. Use seasonal restrictions when projects are within one-quarter mile of a known nest tree or activity center. For spotted owl activity centers in the eight large LSRs, priority 1 are sites containing less than 30 percent suitable habitat within their home ranges. Priority 2 are those sites between 30-40 percent. Priority 3 are those sites at 40 percent or more.

Watershed analysis may indicate that certain levels of dense, single-layered stands are desirable landscape components to meet other resource objectives. Achieving this objective could alter the thinning prescription or result in some managed stands not being thinned.

Address Port-Orford-cedar root disease management objectives wherever Port-Orford-cedar is present. This could alter the thinning prescription for those sites.

Multi-layered stands provide ladder fuels that add to fire hazard. Consider developing or maintaining multi-layered canopies on northern aspects to achieve fire management objectives in high risk areas.

Manage southern aspects to incorporate disturbance considerations and favor predominately single layer stands.

Consider priority areas where existing size of interior habitat can be increased. Accelerate the development of managed stands inside or adjacent to these blocks to improve the quality of the interior habitat.

**Release:** Release of trees from the competition of surrounding vegetation can help establish trees and increase tree growth. The following criteria are important considerations for release:

- a. Treat managed stands where the conifer component may not survive due to competition from other vegetation.
- b. Treat managed stands where the vegetation will not develop without release.
- c. Apply the same criteria for retaining minor species, such as dogwood, as described for thinning prescriptions.

**Underplanting:** Underplanting can be important for creating multiple canopy layers, especially in managed stands. Underplanting as part of the thinning prescription of managed stands or stagnant stands accelerates the development of canopy layers. Criteria for underplanting include:

- a. Emphasize northern aspects with LIDE3 plant series or anywhere where TSHE, ABCO, ABMAS, or CHLA plant series exist.
- b. emphasize species mix normally found in the multiple canopy layers, such as hemlock, western red cedar, dogwood, etc. that is suitable for the appropriate plant series.

**Limiting understory:** Limit the amount of understory vegetation to prevent stagnant stands, or to protect stands at high risk of fire and/or insects/disease. Criteria for this treatment are:

- a. Emphasize density management of the understory where the overstory ponderosa pine, white pine, or sugar pine is at risk to active beetle attack.
- b. Emphasize management of the understory where fire suppression has left ladder fuels in areas of high fire risk (such as southern slopes).
- c. Treat areas of high value first (adjacent to large interior blocks of habitat, or other areas listed on table 21).
- d. Maintain natural hardwood distribution and abundance.

**Creation of snags and large woody material:** The creation of snags in managed stands provides a missing element of late-successional forests. The recruitment of large woody material, including snags, will be a part of every thinning prescription, where appropriate.

**Reforestation:** Reforest existing disturbances and future disturbances to accelerate the development of big trees and late successional habitat. Criteria for reforestation are:

- a. All managed stands will have adequate reforestation (125 trees per acre).
- b. Disturbance events of greater than 40 acres with less than 40 percent canopy closure will be reforested with a mix of indigenous species, appropriate to that plant series.

**Fertilization:** Fertilize to accelerate the growth of big trees and increase the size of interior habitat patches. Criteria for fertilization include:

- a. Avoid areas where rare species and the survey and manage species are known to grow,
- b. Emphasize managed stands where past vegetation treatment may have removed the nitrogen fixing species, such as alder and manzanita, or a hot fire has vaporized most of the nitrogen.
- c. Emphasize those plant series and sites where water is not as limiting as nitrogen for plant growth.

#### **D. POC Phytophthora Control**

The control of phytophthora keeps large POC trees from dying. Appropriate criteria for phytophthora control are:

1. Site specifically analyze options to lower the risk of infection.
2. Options can include road management (closures or limited access), sanitation, moisture conditions for operations, tree spacings, interplanting of POC, and any other appropriate measures.
3. Implement research results to prevent the spread of this disease. This may include chemicals to kill the fungal spores, development of genetically resistant planting stock, or other stand tending techniques.

#### **E. Unique Habitat Restorations**

Meadow and oak savanna habitat in the late-successional reserves are important elements for some rare plants and habitat diversity. Maintenance of these areas ensures this habitat continues to function and provide biological diversity. Though the maintenance of this habitat is contrary to late-successional conditions, the limited area, arrangement, and importance of this habitat niche does not adversely impact the objectives of the late-successional reserves, and does improve ecosystem resilience by increasing diversity. In all LSRs, these meadow habitats comprise less than 2% of the land area and often do not have the potential to grow late-successional forests.

Several criteria for oak savanna and meadow restoration and maintenance are:

1. Remove encroaching trees and undesirable exotic vegetation from meadows and savannas.
2. Leave or girdle large, live trees within savannas and meadow areas, depending on individual circumstances. Removal of tree excess to habitat needs may be necessary to meet objectives.
3. Restore savannas and meadow areas lost to encroachment to their former size. This restoration affects the removal of some vegetation that has encroached upon meadows.
4. Siskiyou National Forest 1940 aerial photographs provide a 55 year "look back" for meadows, for most of the LSRs (including some BLM portions). These photos provide a "picture" of how meadows fit the landscape at a time when fire suppression was beginning to take hold. Estimated acres of meadow would increase by 100 percent.
5. Reduce exotic species populations of gorse, scotch broom, and purple loosestrife.

Address elk habitat needs. As foraging areas grow into hiding and thermal cover, maintain existing forage areas. Criteria for these projects include:

1. Minimize effects on older forest habitat by maintaining forage for a longer period of time in managed stands by opening up canopy gaps.
2. Use prescribed fire in natural stands to maintain quality forage and micro openings in the forest canopy.
3. Seed high quality forage where needed on closed roads and other potential seed beds, such as marginal or low productivity sites on ridge tops (Silver Creek to Peavine Mountain area on Galice portion of Fish Hook/Galice LSR).

## **F. Wild Fire**

The Forest Service and BLM policy for fire suppression is to conduct fire suppression in a timely, effective and efficient manner with a high regard for public and firefighter safety. Respond to each wildfire ignition in a timely manner with appropriate forces, based upon established fire management direction as documented in approved Forest plans, Resource Management plans, and Fire Management Action Plans (FSM 5121). A wildfire is any wildland fire that does not meet management objectives, and, thus requires a appropriate suppression response. The appropriate suppression response (in terms of kind, amount and timing), on a wildfire most efficiently meets fire management direction under current and expected burning conditions. The response ranges from a strategy of prompt control at the smallest acreage possible to one of containment or confinement. Control human caused fires at least cost commensurate with the resource values at risk. Each fire that escapes initial attack, the responsible line officer conducts a fire situation analysis (FSA) evaluating initial suppression action on each uncontrolled wildfire following the first burning period. Review and daily validate the FSA prior to each subsequent burning period.

Wildfire can set back the elements for late-successional forests or can favorably influence the forest's resiliency, depending upon the fire's behavior. For example, a very intense fire burning in a high fuel area can burn up late-successional habitat. A low intensity fire in a low fuel area can accelerate such late-successional elements as canopy gaps, patchy understory, and a healthy overstory (use First Order Fire Effects Model-FOFEM, to determine mortality rates and down woody material consumption).

The following criteria provide a quick reference to the sensitive issues related to fire suppression and LSRs. These areas are associated with critical habitat, nesting seasons and other critical and sensitive issues.

### **Spotted Owl:**

Nesting Period; 3/1 - 9/30, Protect nesting site from noise disturbance within 1/4 mile. Limit repeated aircraft overflights of the area to minimum 1500' AGL

Habitat Protection; Low intensity fire is beneficial to habitat, except in the immediate nesting area. High intensity fire is damaging.

### **Marbled Murrelet:**

Nesting Period; 4/1 - 9/15 Protect nesting site from noise disturbance, within 1/4 mile. Limit repeated aircraft overflights of the area to minimum 1500' AGL. Limit fireline explosives within 1 air mile of nest sites during protection period.

Habitat Protection; Low intensity fire is beneficial to habitat, high intensity may be damaging.

### **Peregrine Falcon/Bald Eagle:**

Protection Period; 1/1 - 7/31 Protect nesting site from noise disturbance, 2 mile radius. Limit aircraft overflights of the area to minimum 1500' AGL. Limit fireline explosives within 3 air miles from nest sites during protection period. Locate camp and staging areas 1 mile from nest site.

Habitat Protection; Low intensity fire is beneficial to habitat, high intensity is damaging.

**Salmonid Habitat Protection;**

- Minimize use of heavy equipment in stream courses
  - Protect stream from fuel contamination by use of fuel barriers
  - Consider the use of wetlines near stream courses
- Minimize fireline construction near stream courses
- Use erosion control on constructed firelines over 20% slope
- minimize burnout in riparian zones
- Limit contamination of stream with retardant or foam

**Areas Requiring Higher Protection:** Several areas need protection from extreme wildfire behavior (stand replacement exceeding 15% of the area burned). In general, older forest patches and connections with interior habitat, spotted owl activity centers, murrelet activity centers, and riparian areas in watersheds with high anadromous fish populations need protection. Some specific areas are listed in table 21.

Table 21: Areas Requiring Higher Levels of Protection

Late-Successional Reserve	Items of Interest	Locations
BRIGGS	Older Forest Patches Spotted Owl Activity Centers	Illinois River Corridor
EAST IV/WILLIAMS	Older Forest Patches, Spotted Owl Activity Centers, Riparian Connections, Oregon Caves  Rural/Urban Interface	Sucker/Grayback Drainage  Williams and Takilma
FISH HOOK/GALICE	Alaska yellow cedar areas Habitat Connections  Recreation Sites & Views  Peregrine Falcon Area(s)	Elk Wallow Lawson Creek and the Illinois River to the Northwest Coast LSR; Foster Creek where it connects with NW Coast LSR; Silver, Shasta Costa and Indigo roadless areas; Matrix land around Fish Hook Pk.  Wild & Scenic Rogue River Corridor
WEST IV	Block of western hemlock  Habitat Connections	Granitic intrusion west of Oregon Mountain  Tunnel Area by Highway 199

Late-Successional Reserve	Items of Interest	Locations
SOUTH CHETCO	Coastal Redwoods  Murrelet Habitat  Recreation Values  Rural Interface	Emily Creek, Chetco River, Winchuck River, and Wheeler Creek  Northern aspects along streams with big trees  Wild and scenic Chetco River corridor  Winchuck River Winchuck and Chetco River Valleys
NORTH CHETCO	Habitat Connections  Recreation Values	Riparian Zones: Lawson Creek to the Illinois River.  Chetco River
NORTHWEST	Late Successional Habitat  Recreational Values  Peregrine Falcon Areas	Elk River drainage; Coquille River corridor; Hall Creek, Quosatana Creek  Scenic Rogue River, Coquille River, Elk River
TAYLOR	Critical anadromous fish habitat; stairstep characteristics; riparian reserves  Recreation Values	Taylor Creek to southwest.  Sites along Creek

\*\* Specifically look at protection for occupied murrelet habitat, known spotted owl activity centers, and connectivity corridors.

### G. Other Nonsilvicultural Activities in Late-Successional Habitat

The Northwest Plan specifically states that nonsilvicultural activities neutral or beneficial to the creation and maintenance of late-successional habitat are allowed. These projects are discussed below. **Genetic Developments and Research:** The "Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl" (S&G) page C-17 states: Existing developments in Late-Successional Reserves such as campgrounds, recreation residences, ski areas, utility corridors, and electronic sites are considered existing uses with respect to Late-Successional Reserve objectives, and may remain, consistent with other standards and guidelines. Routine maintenance of existing facilities is expected to have less effect on current old-growth conditions than development of new facilities.

Maintenance activities may include felling hazard trees along utility rights-of-way, trails, and other developed areas". On April 17, 1995 Ken Denton, Regional Office Issues Resolution Team, sent out direction which stated: "evaluation plantations are considered existing developments under S&G page C-17, not 'silvicultural' activities, and you should continue to maintain them per budget advice, ... continued maintenance of existing evaluation plantations - typically fenced, staked trees, historically maintained to evaluate the performance of different genetic parents, and so forth, should be treated as existing developments.

On Page C-18 and C-19 of S&G, research activities are addressed. It states: "A variety of wildlife and other research activities may be ongoing and proposed in late-successional habitat. These activities must be assessed to determine if they are consistent with Late-Successional Reserve objectives. Some activities (including those within experimental forests) not otherwise consistent with the objectives may be appropriate, particularly if the activities will test critical assumptions of these standards and guidelines, will produce results important for habitat development, or if the activities represent continuation of long-term research.

These activities should only be considered if there are no equivalent opportunities outside Late-Successional Reserves." It goes on to say: "Current, funded, agency-approved research that meets the above criteria is assumed to continue if analysis ensures that a significant risk to Aquatic Conservation Strategy objectives does not exist."

The Siskiyou National Forest has 67 evaluation plantations (E.P.s) to test the genetic potential of selected trees to transmit their growth and form characteristics to their progeny. Sixty-six of them are testing Douglas-fir, and one is testing sugar pine. Of these, 37 are located within LSRs. The Grants Pass and Glendale Resource Areas have 33 evaluation plantations. Ten are located in the LSRs. The size of each Douglas-fir plantation is about 10 acres, and all have been fenced to reduce wildlife damage. Some of the fences have been removed. The plantations range in age from 7 years to 18 years from seed. They were all planted at close spacing of 8' x 8' or 9' x 9', and all the planting was done on a grid. The trees in the older plantations are quite large (over 10 meters tall when measured at 15 years), and the crowns have grown together. The trees radial growth is being retarded by the intense competition. The sugar pine evaluation plantation is 4 acres in size, and is 12 years old. All of the evaluation plantations require much maintenance in the form of brush cutting to keep the test trees free from competing vegetation. As the E.P.s finish their measurement sequences, they are planned for thinning to prevent stagnation, and in some cases to retain some selected genetic individuals.

The Siskiyou National Forest has 12 seed orchard sites to produce frequent, abundant and easily harvested crops of seed from trees that exhibit improved growth and form characteristics. Of these, 11 are partially or totally within LSRs. The size of the seed orchards ranges from 7 acres to 12 acres. They range in age from 5 years to 13 years. The Medford BLM Area has two seed orchard sites, both are outside of LSRs.

Trees are still being planted in some of the orchards. Most of the orchards were planted at 20' x 20' grid. Three of the Douglas-fir and both of the sugar pine seed orchards have grafted trees at the grid locations. The remaining Douglas-fir orchards have clusters of 9 seedlings planted at each grid location. Many of the 9 tree clusters have not been thinned to the best individual at each grid location. Maintenance is routinely needed to keep unwanted vegetation, both grass and natural seeded trees, down in the orchards.

The Siskiyou National Forest has two sugar pine and one redwood common garden test sites to test the climatic adaptability and genotype-environment interaction of seed sources from the whole range of the species. These three sites are within LSRs. The size of the sugar pine sites is 6 acres, and the size of the redwood site is 4 acres. The sugar pine and redwood trees are 8 years old. The sugar pine trees were planted at 2.25 x 2.25 meters on a square grid and the redwood trees were planted on a 3 m x 3 m grid. These three test sites require much maintenance to control competing vegetation, and as the trees grow and fully occupy the site, precommercial thinning of selected individuals will be required.

The Siskiyou National Forest is in the process of preparing sites for two Port-Orford-cedar (POC) common garden test sites. The test sites will test the genetic potential of POC from its entire range, much like the sugar pine test. They are being located in two abandoned seed orchard sites, each about 7

acres in size. The seed orchards are not now needed due to the greatly reduced seed needs, and the common garden test required a uniform site which the seed orchard sites provide. They will be planted in the spring of 1996 as 1 year old seedlings from seed. Here again, much maintenance will be required to control competing vegetation, and to precommercial thin selected individuals not needed for the test.

Maintenance of the evaluation plantations, seed orchards, and genetic test sites will have no effect on current old-growth conditions, and will create no risk to Aquatic Conservation Strategy objectives. Given: 1) the small areas of the evaluation plantations, orchards, and test sites; and 2) that they will not contribute to late-successional characteristics of the LSRs until at least 50 years in the future. These activities will not impair the objectives of the LSRs.

**Special Forest Products:** The Standards and Guidelines for the Northwest Forest Plan page C-18 states: "Special Forest Products include but are not limited to posts, poles, rails, landscape transplants, yew bark, shakes, seed cones, Christmas trees, boughs, mushrooms, fruits, berries, hardwoods, forest greens (e.g., ferns, huckleberry, salal, beargrass, Oregon grape, and mosses), and medicinal forest products. In all cases, evaluate whether activities have adverse effects on Late-Successional Reserve objectives.

Sales will ensure the resource is sustainable and protection of other resource values occurs such as special status plant or animal species. Where these activities are extensive (e.g., collection of Pacific Yew bark or fungi), it will be appropriate to evaluate whether they have significant effects on late-successional habitat. Restrictions may be appropriate in some cases."

In 1994 the harvest of special forest products included the following products, amounts, and values on the Siskiyou National Forest (table 22). The quantity of these products removed in any given year will vary. For example, the amount of arrow wood may vary from 0 to 250 cords sold annually.

Table 22: Special Forest Products

Product	Quantity	\$ Value
Arrow wood	12 cords	180
Beargrass	12200 lbs	,1051
Boughs	48 tons	1,452
Burls	11400 lbs	1,160
Christmas trees	2481 each	12,405
Cones	20 bushels	10
Ferns	21400 lbs	1,070
Firewood commercial	345 cords	2,375
Firewood person	1139 cords	5,630
Misc. greens	17785 lbs	664
Mushrooms	1267 permits	49,100
Oregon grape	500 lbs	25
Other convertible	73 mbf	9,597
Other non-convert.	1293 lbs	204

Poles	7282 lineal ft.	364
Posts	420 each	310
Salal	36140 lbs	1,821
Sawtimber	3 mbf	356
Seedlings/transpl.	16,500 each	1,870
Total permits sold	21,372	89,645

The harvest of most of these products will have no effect on late-successional habitat. However, intensive harvest of mushrooms could have effects on habitat. Long term studies have not been done on mushroom harvest, but high harvest levels could affect their local population viability, food chains of small animals, and endangered or sensitive plant and animal species and their habitat.

The harvest of these products is consistent with LSR objectives where the resource is sustained and late-successional habitat is protected. All of the products except mushrooms are clearly visible and their harvest will not affect old-growth habitat.

Harvest of mushrooms may conflict with LSR objectives where local populations are limited compared to the number of permittees in the area. Mushroom harvest will also conflict with LSR objectives when food chains of special status species are disrupted, or when the habitat of these species is threatened. Mushroom harvest will be monitored to ensure populations remain viable, and some mushrooms may be listed on Table C-3 - Species to be protected through survey and management standards and guidelines.

In summary, the harvest of these products is consistent with LSR objectives where the existing elements and processes for late-successional conditions are not compromised. The following criteria should be considered to ensure LSR objectives are met:

1. Meet large woody material needs when cutting firewood, shakes, posts, poles, or bolts.
2. Harvest of material only where it is commonly found. Do not permit harvest on extreme ranges. This criteria applies to the following subjects or areas:
  - a. No harvest of any product on the isolated granitic block in West IV LSR.
  - b. No harvest of any sensitive or special status species.
  - c. No harvest in specific niches such as the RNAs, Wildernesses and Botanical Areas.
3. Port-Orford-Cedar root disease management objectives will be addressed wherever POC exists.

**Recreation Developments:** Recreation developments could hinder or enhance the conditions for late-successional forests. Given the low recreation use of the forest (FEIS, 1989) and the relatively large unroaded areas and late-successional conditions, all currently planned recreation projects can be compatible with the objectives of the LSRs. The criteria of the Northwest Plan apply: 1. Use adjustment measures such as education, use limitations, traffic control devices, or increased maintenance when dispersed and developed recreation practices retard or prevent attainment of Late-Successional Reserve objectives.

**Grazing:** Very little range resource is available on the LSRs. Most of the range resource is associated with pastures in natural openings along the Rogue River and other meadows. The Medford BLM Area Plan and the Siskiyou Land and Resource Management Plan state the maximum acceptable annual

utilization levels for the meadow sites. The Standards and Guidelines for Management of Habitat for the Northwest Forest Plan on page C-17 state: "Range Management - Range-related management that does not adversely affect late-successional habitat will be developed in coordination with wildlife and fisheries biologists.

Adjust or eliminate grazing practices that retard or prevent attainment of reserve objectives. Evaluate effects of existing and proposed livestock management and handling facilities in reserves to determine if reserve objectives are met. Where objectives cannot be met, relocate livestock management and/or handling facilities."

Since most of the very limited range activities on the Forest are associated with meadows, range resource utilization will not affect the late-successional habitat. Also, by following the direction in the Forest Plan, the unique habitats found in the meadows will be maintained.

**Mining:** Mining within the province has occurred since the late 1800s and continues today. Many names of geographic features reflect the history of early mining in Southwest Oregon. Most gold-bearing creeks and streams on federal lands have claims.

Presently, much of the mining is recreational mining. Most of this activity involves a floating suction dredge to filter through streambed material and obtain gold.

A number of commercial mining operations use larger mechanized equipment. The type of mining activity ranges from the weekend gold panner to the backhoe operator who may operate the entire season from June 15 through September 15.

The range of effects of suction dredges and other forms of mining vary in context and intensity. They need to be addressed on a site by site basis. NEPA provides the process for evaluating activities or impacts. Mining does not generally manipulate the habitat for late-successional species.

**Other Projects:** Most other projects such as easements, special use permits, bus tours, movies, waterlines, pow wows, sweat lodges, and passport-in-time efforts need evaluation at the project level. If potentially adverse effects on Late-Successional Reserve objectives could occur, these projects are subject to review by the Regional Ecosystem Office (ROD, page c-19).

## **IX. Monitoring Needs**

Monitoring needs are an important component of this assessment. They are developed from the coarse and fine filter elements that describe existing and future conditions. Monitoring should be a continuous process of evaluating the difference between desired pattern, structure, or composition and the current status of these elements. Information gathered cycles back to planning which becomes an adaptive process. Implementation monitoring is already done under the Forest Plan monitoring plan. No additional implementation monitoring needs to be addressed.

Vegetation and wildlife conditions need to be monitored to detect new information and trends on elements and processes important for late-successional conditions.

### **A. Vegetation**

Monitoring of the two most important elements of late-successional forests are the amount of large trees and the amount of interior late-successional habitat. As new inventories become available to replace the existing PMR database (National Forests) and existing GIS vegetation layer (BLM), these two elements should be reviewed again to determine changes in priority treatments or higher protection needs due to a

changed condition. This is part of the ecological monitoring element contained in the Siskiyou Forest Monitoring Plan.

Mushroom harvest monitoring will be needed to ensure populations are kept viable, especially for those mushrooms listed in Table C-3 (Species to be protected through survey and management standards and guidelines). Though these Table C-3 species will not be intentionally harvested, monitoring of their populations will minimize their impacts due to incidental harvest activity.

## **B. Wildlife**

Survey and Manage species already have a monitoring strategy. The agencies just need to follow the survey and manage guidelines and keep results over time.

As the agencies complete watershed analyzes, the results will describe trends in individual watersheds for important habitat elements such as snags, down wood, big trees, interior older forest patches, and unique habitat. These results are kept as reference and monitored to detect changes in the future.

A copy of the Wildobs database need to be queried at periodic intervals to monitor the known information of these species numbers and locations. Differences between time periods can then be assessed for population trends or inventory effectiveness.

## **C. Stream Flats**

Continue to cooperate with the monitoring efforts of the Oregon Department of Fish and Wildlife, the Siskiyou National Forest, and Medford BLM District.

The aquatic elements of stream flats need to be monitored over time. The following types of monitoring activities are recommended:

- cross sections at riffles and pools to detect channel changes.
- temperature monitoring.
- pebble counts or other method of quantifying substrate materials.
- photo points for referencing changes in stream and riparian conditions.
- specific habitat typing and mapping of fish habitat to note changes over time.
- population estimates of spawning adults and/or rearing juvenile salmonids.
- aquatic insect (macroinvertebrate) sampling.

## **D. Conditions Which Require Reexamination**

This assessment is an iterative document and will need to be kept up to date. Consequently, it will be kept in a three-ring binder so updates can be added as needed. The following items need to be considered for any updates:

1. For projects, is there sufficient information to make a reasonable prediction on the effect on Late-successional Reserves? The agency decisions need to be reasonable, not arbitrary, and not capricious. If more information is needed to make a management decision, this information will be gathered on a site-specific basis, or can be added to this LSR assessment.

2. Is there any new knowledge of species and habitat of late-successional conditions in southwestern Oregon which would change the agencies' management decisions? Examples of such new knowledge may include new inventories of habitat and new information on habitat requirements.
3. Fill in data gaps, as needed, for LSR management.