TERRESTRIAL ECOSYSTEM NARRATIVE

Vegetative Characterization

The watershed of the Rogue River below Agness extends inland approximately nineteen air miles from the Pacific Ocean. The area analyzed for this watershed analysis is primarily the National Forest portion, which stretches from five to nineteen air miles inland. Because of this location, most of the analysis area is strongly influenced by the coastal climate. However, there are a variety of habitats in the watershed driven by diverse physiographic conditions. Vegetative types in the Rogue watershed vary because of the following factors: (1) the diversity of rock and soil types within the Klamath Province, including ultramafics; (2) the location of the watershed in a transition zone between the coastal face and the drier, inland Siskiyou habitats; and (3) the locally wide variation in aspect and elevation.

At least six plant series occur within the watershed analysis area on National Forest lands: tanoak/Douglas-fir, Douglas-fir, tanoak, western hemlock, Port-Orford-cedar, and Ponderosa pine. Tanoak/Douglas-fir and Douglas-fir plant series account for over 90 percent of the entire watershed analysis area. The tanoak series generally occurs below 4000 feet 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 (USDI & USFS, 1995). Douglas-fir and western hemlock are co-climax with tanoak on the drier and wetter sites, respectively (Atzet et al., 1996).

Ultramafic (serpentine) soils scattered throughout the Rogue watershed analysis area support a wide variety of other conifers, including Jeffrey pine, western white pine, and incense cedar on the drier slopes, and Port-Orford-cedar on more moist sites.

The entire area within the boundaries of the analysis area is generally timbered with saplings, young, mature and old growth Douglas-fir. Low elevation old growth Douglas-fir is fairly abundant in this watershed compared to other areas in the State. The Shrader Old Growth Trail provides an excellent example and interpretation of this type of old growth forest.

Table 1. Vegetation Types and Percent of Analysis Area.

Vegetation types	Acres	Percent of Analysis Area
Water	1,181	1
Rock	1,260	1
Grass *	7,455	9
Seedlings/saplings/poles	22,138	27
Young timber	27,032	33
Mature timber	13,819	17
Old growth timber	9,857	12

* *Grass vegetation type is composed of grass vegetation within the Forest Boundary and grass plus seedling vegetation outside the Forest Boundary.*

Hardwoods and moderate to high amounts of brush are found in the understory of most old growth Douglas-fir stands. Hardwood species found are tanoak, red alder, and Oregon myrtle. The largest patches of mature and old growth trees are located in the Quosatana and Bradford Creek drainages, and within one half mile of the Rogue River. Younger stands are found on private ground within National Forest boundaries and Forest Service managed lands where

seedlings, saplings and pole sized trees are prevalent. In many portions of the drainage at mid and upper elevations, stands of mid-seral Douglas-fir appear to have been heavily influenced by past fires.

Unique Interest and Botanical areas help characterize the diversity of vegetation within the analysis area. Portions of the Quosatana Butte and Signal Butte Unique Interest Management Areas as well as the Lobster Grove Botanical Area are included in this Rogue River Watershed Analysis Area.

Approximately 463 acres of the Lobster Grove Botanical Area lies within the Lower Rogue River watershed, the remaining 71 acres of the botanical area are in the Lobster Creek watershed. The value of the site lies not with rare plants, but with its old growth plant community. This is an area of very large Douglas-fir and Port-Orford-cedar; some individual trees approach 8 feet in diameter. The site is dominated by 10 to 15 large trees per acre, the heavily shaded understory is composed of sword fern, tanoak, madrone and Oregon-myrtle. The world's largest myrtle tree is located within the grove (USDA, 1989).

Private Land Within the National Forest Boundary

Inside the National Forest boundary there are considerable private land holdings. The old growth on these lands was heavily harvested during the 1950s and 60s, and the lands now support either mixed stands of sapling and pole sized conifer and hardwood trees, or have been left as grasslands for pasture. Some residential development has taken place along the Rogue River, generally within one half mile of the waterline.

Timber Harvesting History on National Forest Lands

On the National Forest lands, timber has been harvested from over 9,000 acres since the early 1950s, removing mostly old growth timber until recent years when emphasis has shifted to commercial thinning of large poles and mature timber. Most heavily harvested areas have been in the west side of the Quosatana Creek watershed along the 090 and 100 road systems, along the eastern side of the same watershed in the upper stretches along Wildhorse Ridge, and from the north side of the Wakeup Rilea Creek drainage northeast into the Nail Keg Creek area. Additional scattered harvest has taken place on the north side of the Rogue River in the upper reaches of Tom East, Bridge, Stonehouse, and Sundown Creek drainages (see Map 21, Regeneration Harvest and Roads).

Wildlife Habitat Characterization

The Rogue River watershed below Agness contains 19 percent of the larger Northwest Coast Late-Successional Reserve (LSR). This watershed analysis area is within the known range of the marbled murrelet. The late-successional habitat in the watershed provides important habitat for the American marten, pileated woodpecker and the threatened northern spotted owl, which are indicator species, meaning they represent other species that use similar habitat types. This version of the Rogue River Watershed Analysis Below Agness was analyzed using Pacific Meridian Resources (PMR) vegetation data for areas within the National Forest boundary and Western Oregon Digital Imagery Project (WODIP) vegetation data for areas outside the National Forest Boundary.

Early successional habitat (grass/shrub/seedling-sapling-pole) in the watershed is found in recent clearcut areas, meadows, pastures, open woodland areas and brushfield areas. Currently 36 percent (29,593 acres) of the watershed is in this condition. However, only a portion of this early successional habitat is in an open canopy condition, which will provide the pioneer habitat for species that require grass/forb, low shrub, open seedling-sapling-pole habitat for all or part of their life history. The majority of the existing clearcut areas that are currently open enough to provide this type of habitat will grow out of this condition within the next ten years. The meadow habitat is being encroached by trees. Pioneer successional habitat provides habitat for black-tailed deer, Roosevelt elk and other species that utilize grass/forb, shrub and open sapling-pole plant communities.

This watershed contains an estimated 1 percent or 1181 acres of water, and 1 percent or 1260 acres of rocky/sparsely vegetated areas. The remaining 33 percent of the watershed is in young successional habitats, which typically are smaller diameter trees with closed canopy.

Late-Successional Habitat

What is the historic and existing late-successional habitat in the watershed?

Historic levels of late-successional forest (pre-1850 to 1950) have fluctuated over time due to climatic changes and human influence (Atzet and Martin, 1991). The Regional Ecosystem Assessment Report (USDA, 1993) estimated historic levels of late-successional habitat between 45 and 75 percent for the Lower Rogue Basin. This portion of the Rogue Watershed (below Agness) is below this range.

Approximately 29 percent of the portion of the Rogue River, below Agness, watershed is presently in late-successional forest (see Map 14, 1995 Seral Stages). Historical vegetation mapping shows 67 percent of the Rogue River Watershed Below Agness provided late-successional habitat in the 1940s, prior to any timber harvest (see Map 13, 1940 Seral Stages). Burning by Native Americans and early Euro-American settlers probably reduced what could have been late-successional habitat in 1940 to lower levels. The exact percentage or level cannot be determined.

Late-successional forests are one facet of overall biological diversity. However, late-successional forests require special consideration because their integrity as functioning ecosystems and their ability to provide habitat to species associated with the forest interior may be strongly influenced by stand size (Rosenburg and Raphael, 1986). Logging in the Pacific Northwest has reduced the size of late-successional forests, resulting in regionwide changes in wildlife species composition (Rosenberg and Raphael, 1986). On the Siskiyou National Forest much of the timber harvested has been on productive lower elevation sites. The amount of late-successional habitat on the Forest has been reduced nearly 26 percent since 1940 (USDA, 1989, Forest Plan FEIS, Chapter III-Affected Environment, page III-115).

Stands of late-successional forests are becoming isolated as harvest, fire and other activities disrupt connections between large, contiguous blocks of this habitat. This fragmentation threatens the ecological value of the remaining late-successional forests, including their value as habitat for forest interior plants and animals. The full impact of fragmentation of late-successional forests is not completely understood, but the populations and numbers of species

associated with mature and late-successional forests can decrease if fragmentation, isolation, and reduction in stand size continues.

Interior forest habitat includes those portions of the late-successional forest areas that are not influenced by "edge effect." Edge effect is the result of changes in microclimate and species composition, which are caused by an increased exposure to sun and wind. Edge effect penetrates a forest edge for approximately two tree lengths or about 400 feet into the forest interior, which is a guideline for the Pacific Northwest (Harris, 1984; Franklin and Forman, 1987). The preliminary results of current research (Spies et al., 1990) generally support this approximate distance.

Interior late-successional habitat was analyzed using GIS seral stages from stand level data. Interior habitat was determined by buffering in from openings in the forest. Buffering distances used were 400 feet from clearcuts or natural openings less than 40 years old. Because stands on ultramafic soils are largely open, and do not contain the same microclimates typical of closed canopy late-successional stands, these stands were not included as interior late-successional habitat. A 400-foot buffer from these stands was not applied. Some of these stands may provide typical microclimates associated with closed canopies, but an analysis of each stand was not feasible. See Maps 15, 16, and 17: 1940, 1995, and 2040 Interior Late-Successional Habitat.

Table 2. Distribution of Interior Late-Successional Forest Blocks within the Rogue River, below Agness, watershed.

	Historic (1940)		Current Condition		Future (2040)	
Block Size in Acres	**Number of Blocks**	**Total Acres**	**Number of Blocks**	**Total Acres**	**Number of Blocks**	**Total Acres**
1-25	25	173	84	544	87	560
26-50	8	310	12	422	10	351
51-100	3	236	5	316	9	585
101-300	7	1,431	6	1,195	12	2,219
301-500	0	0	2	802	0	0
501-700	2	1,190	1	641	1	501
701-900	3	2,371	0	0	3	2,486
>900	5	31,031	1	1,370	1	1,627
Total Interior Acres		**36,742***		**5,290***		**8,329***

* Historic interior old growth acres are based on broad scale timber typing from 1940 aerial photos. Current condition interior old growth acres are based on analysis of 30-meter pixel data from satellite imagery (PMR data). The difference in detail between the two sources accounts for some of the difference in interior old growth acres between these two dates. Increases in future interior old growth acres are based on projected growth of large stands of young conifers in the watershed. These stands originated during extensive stand replacement fires prior to the era of fire suppression that began in the early 1900s.

The National Forest Management Act (36 CFR 219.19) requires the maintenance of viable populations of vertebrate species well distributed throughout their current geographic range. Late-Successional Reserves have been designated to accomplish this direction for species that use this habitat type (USDA and USDI, 1994). Thirty-four percent of the watershed has been designated Late-Successional Reserve and another 12 percent of the watershed will be managed

towards a late-successional habitat condition through other land allocations. Forty-six percent of the watershed is in private ownership.

The above tables show that there are currently lesser amounts of late-successional habitat in the Rogue River Watershed, below Agness, than there were in 1940. Future projections indicate that the amount of late-successional habitat is expected to increase on federal lands, but remain low on private lands. This increase in late-successional habitat is consistent with the ROD (USDA and USDI, 1994, for federal lands.

The ROD (USDA and USDI, 1994) further indicates that thinning or other silvicultural treatments may occur inside these Late-Successional Reserves if the treatments are beneficial to the creation and maintenance of late-successional forest conditions.

Management Opportunities: Development of late-successional structure can be accelerated through treatment of managed and natural stands in LSR and other allocations not programmed for timber harvest. Approximately 9,650 acres of managed stands in the watershed could be treated to improve habitat for the northern spotted owl and other species that use late-successional habitat. The opportunity exists to prioritize which of these stands would benefit late-successional species the most (i.e. stands within home range of owls or within potential habitat connections).

The highest priority for commercial stand treatment to improve late-successional habitat are those stands that have mid-seral habitat adjacent to existing large late-successional habitat blocks (see Map 14, 1995 Seral Stages). Treatment in these stands would result in the achievement of late-successional characteristics at an earlier time than if allowed to progress at a natural rate.

Bear Damage

During the analysis of the watershed it was discovered that bear damage is occurring in much of the area south of the Rogue River. For the last 3 to 4 years bears have been stripping and peeling bark from conifer trees in plantations with advanced reproduction. Dominant and co-dominant conifers between 10 to 16 inches diameter are generally the damaged trees. Typically, a bear will sit on the ground and scoot around the bole, peeling and eating the inner bark of trees within the plantation, or in the case of younger bears, may climb the trees and peel off bark at some point above ground level. There is evidence that this is learned behavior passed on from sow to cubs. There is also some indication that fertilized plantations are among those hardest and most frequently hit by the bears.

Low elevation aerial photographs were flown in September of 1999. These special flight color photos show trees girdled in the spring of 1998. Dead conifers from the spring of 1997 are also evident by close analysis of the aerial photos. Approximately 1300 to 1700 acres in the Lower Rogue watershed analysis area have received moderate to heavy damage in the last 3 to 4 years (see Map 22, Bear Damage). Some plantations, including the Baxter Progeny Test Site, are experiencing up to 100 percent tree losses due to bears. Other plantations have received less damage, with the average being 60 percent. However, with no bear control measures in place at present, bear populations are probably expanding with corresponding tree damage area expansion. Without some control over the bear populations and damage, the development of late-successional habitat is being moderately to severely inhibited on approximately 1,700 acres within the watershed analysis area.

Management Opportunities: A Bear Damage Abatement Plan needs to be developed in collaboration with the Oregon Fish and Wildlife Service providing a damage risk assessment and reasonable control of bear populations.

Special and Unique Habitats

What are the special and unique habitats in the watershed and how are they changing?

The Siskiyou National Forest Plan designated 463 acres of Botanical areas (Management Area 4) within the Rogue River watershed below Agness. This includes a portion of the Lobster Grove Botanical Area. Appendix F of the Siskiyou LRMP EIS (USDA, 1989) provides a description of this Botanical Area on pages 138-139.

During the past ten years a number of important but relatively small Special Wildlife Sites (Management Area 9) on the Forest have been identified as unique wildlife habitats and small botanical sites (Siskiyou LRMP, USDA 1989, page IV-113). A total of 4249 acres have been designated in the Rogue River, below Agness, Watershed (see Map 18, Special Wildlife Sites). These sites constitute important components of overall wildlife habitat diversity and botanical values within the watershed.

Table 3. Special Habitat Sites (Management Area 9)

Type of Site	Number of Sites	Acres
Dispersed Late-Successional	11	395
Lakes and Ponds	6	30
Meadows and Meadow Buffers	44	2,041
Rock Bluffs/Talus	22	230
Wildlife Areas	11	1553
Total		**4249**

Meadows, Open White/Black Oak Savannas and Open Jeffrey Pine Meadows

Meadows, sometimes referred to locally as prairies, are decreasing in size. Historically Native Americans maintained meadows and open oak savannas by augmenting natural wildfires with burning, and early settlers reduced conifer encroachment rates on these open areas with heavy grazing and/or burning. Natural fires may have also opened many ridgetop environments to meadow, or meadow-like conditions. Early encroachment of meadow habitat is evident on the 1940 aerial photos. The encroachment visible on the 1940 photos around Potato Patch meadow was determined to be 20 years old when the photo was taken. Currently this encroachment is 80 years old. Meadows and open oak savannas have increasingly become overgrown with conifer tree species, primarily Douglas-fir, since 1920. Meadows and open oak savannas are projected to continue to decrease in size due to vegetative encroachment and lack of high intensity fire events, unless encroachment is reduced through manual methods (girdling and cutting trees) and through burning.

Oregon white oak, *Quercus garryana*, and California black oak, *Quercus kellogii*, are found only in a few locations in the Rogue River, below Agness, Watershed where they are associated with meadow communities (Meadows #280, 606, 66, 613 & 614). These oaks are valuable for their function in providing landscape diversity. Several components of oak woodlands are especially valuable to wildlife, including mast-producing trees, cavity trees, and perches. They often occur as ecotones - interfaces between coniferous forests and prairies or other habitat (Ryan and Carey, 1995).

Open oak savanna communities often depend on fires for their maintenance. In the absence of fire, many Oregon white oak stands are invaded and eventually overtopped by Douglas-fir. Without disturbance, black oak is eventually crowded out of the best sites and remains only as scattered remnants in mixed-conifer forests (Burns and Honkala, 1990). The savannas within the watershed are decreasing in size, as apparent from historical photos, from anecdotal reports by long-time residents, and from field examination of young Douglas-fir stands that are overtopping remnant oaks. This is part of a trend throughout the California to British Columbia range of the white oak, and the California to Oregon range of the black oak (Burns and Honkala, 1990; Niemic et al, 1995; Ryan and Carey, 1995).

The Pebble Hill and Pine Grove Meadow complexes are examples of large open Jeffrey Pine trees with a grass ground cover. However, this open pine/grass habitat is being lost to encroaching Douglas fir, incense cedar, and numerous small pine seedlings.

The Southwest Oregon LSR Assessment (USDI and USDA, 1995, page 143) identified meadow and oak savanna habitat within the Late-Successional Reserves as important elements of 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".

Other Special Wildlife Sites

Existing lakes, ponds, springs, talus areas, and rock outcrops with associated caves and cliffs are not expected to have changed very much from historic (1940) conditions. Wildlife associated with these habitats include red-legged frog, southern torrent salamander and western toad (lakes, ponds, springs), Del Norte salamander (talus habitat), peregrine falcon, common raven, golden eagle, cliff swallow (cliff habitat), western fence lizard, sagebrush lizard, ringtail, porcupine, marten (rock outcrops), bats, bear, bobcat, cougar, and woodrat (cave habitat). Rock quarry development has slightly reduced the amount of talus and rock outcrop habitat in the watershed.

Information Needs: Inventories of the meadows and oak savanna areas need to be completed to determine species composition, amount of encroachment, the best methods to restore the meadow/savanna habitat, and the best methods to improve or restore native grasses and other species. Potential special and unique sites need to be surveyed to determine if they meet Management Area 9 (Special Wildlife Site) criteria.

Management Opportunities: There is an opportunity to return meadows, oak savannas and pine savannas to historic conditions on National Forest lands. Some specific projects on National Forest land include: Adams Prairie, Skookumhouse Prairie, Potato Patch Meadow, Woodruff Meadow and Pine Grove Meadow. There is an opportunity to reduce and eventually eliminate noxious weed invader species such as Scotch broom, Canada thistle, meadow knapweed and tansy ragwort.

Proposed endangered, threatened and sensitive (PETS) species

What is the relative abundance and distribution of the species of concern in the watershed (e.g., threatened or endangered species, special status species, species emphasized in other plans)? What is the distribution and character of their habitats?

The Siskiyou National Forest has three species listed as *endangered* or *threatened* under the Endangered Species Act: the (1) bald eagle, (2) northern spotted owl, and (3) marbled murrelet. Bald eagles, which are classified as threatened, are known to nest near the Rogue River within this watershed analysis area. Marbled murrelets, also classified as threatened, are known to nest in this watershed analysis area. The Rogue River (below Agness) watershed contains 10 northern spotted owl activity centers and a portion of the median home range (1.3 mile radius around a nest or activity center) of an additional 6 spotted owl pairs.

Peregrine falcons were removed from the list of Endangered and Threatened wildlife on August 25, 1999 (USDI, 1999). They were subsequently listed as a sensitive species by the Forest Service (USDA, 1999). There is one known nest of peregrine falcons in the watershed, out of only six on the Siskiyou National Forest.

The late-successional habitat in Rogue River watershed, below Agness, contains the activity centers of the 9 owl pairs in the watershed. Five activity centers are located in Late-Successional Reserve (Management Area 8) and four activity centers are located in Supplemental Resources (Management Area 7). The viability of owls within the watershed should remain stable. See indicator species section below.

This watershed will continue to contribute to the viability of bald eagles and peregrine falcons.

Sensitive Species

Plants: The watershed has numerous occurrences of several sensitive plant species. *Arctostaphylos hispidula* (Howell's manzanita), *Carex gigas* (Siskiyou sedge), *Erigeron cervinus* (Siskiyou Daisy), *Illiamna latibracteata* (California globemallow), *Monardella purpurea* (Siskiyou monardella, *Salix delnortensis* (Del Norte Willow), *Triteleia hendersonii* variety *leachiae* (Leach's Brodiaea) and *Trillium kurybayashii* (Kurybayash's Trillium).

Also occurring in the watershed are: *Allium bolanderi* (Bolander's Onion) and *Poa piperi* (Piper's Bluegrass). These two species were removed from the Sensitive Species list in May 1999 and are still on the Oregon Natural Heritage Program List 4 (taxa which are of conservation concern but are not currently threatened or endangered). A third member of this list within the watershed is *Arabis aculeolata* (Waldo Rockcress). Another species, *Downingia yini* (Dwarf Downingia), although not on any special status lists, occurs as an isolated population in the watershed.

Leach's brodiaea

The watershed is particularly important for Siskiyou Daisy and Leach's brodiaea. Siskiyou daisy is restricted to the Siskiyou Mountains of Oregon and California. This watershed, the northwestern extent of the species range, contains two populations. These daisies live in crevices in solid rock, or in rocky areas. Leach's brodiaea, although locally common to the east of this watershed, has a very limited range with the bulk of the world's population on the Gold Beach Ranger District. The Species Management Guide for *Triteleia hendersonii* var. *leachiae* (Titus, 1995) lists the 10 most significant populations. One of these populations, adjacent to the 3318300 road, is in this watershed. It occurs on the edge of old growth forest at the southwest edge of the range of Leach's brodiaea. The species management guide lists fire suppression and related successional events, logging, and road construction as important threats to the species. It also lists meadow management as critical for the continued survival of this taxon. The guide states the species is expected to be very fire hardy.

Waldo rockcress occurs on rocky peridotite and serpentine soils (Greenleaf, 1979). It is found on the western side of the Illinois Valley in Josephine County and one isolated site on serpentine soils in this watershed. It occurs on the southern side of Copper Canyon. Because this plant is listed with the Oregon Natural Heritage Program and is known from only one population on the west side of the Siskiyou National Forest, it should be protected from future management activities (Maria Ulloa personal communication).

Dwarf Downingia occurs in boggy sites near ponds and lakes in the Klamath and Cascade Ranges (Hickman, 1993). This watershed has one location of this species near the Lower Rogue River Trailhead. The plant was originally collected there approximately 40 years ago, and collected again recently (Veva Stansell, personal communication). It is the only known Curry County site for this species.

Amphibians, Mammals and Reptiles: Del Norte salamanders (73 sites), Red-legged Frogs (38 sites), Townsend's big-eared bats (2 sites), Northwestern pond turtles (5 sites), and California mountain kingsnakes (7 sites) are documented in the watershed. Riparian areas in the watershed provide potential habitat for white-footed voles. Wolverine have not been sighted in the area and none have been detected on snow track surveys. Common kingsnakes have not been found in the watershed area.

Neotropical Migratory Birds: The few large, relatively unfragmented blocks of habitat remaining within the watershed provide good nesting sites for birds, such as the willow flycatcher, pacific-slope flycatcher and hermit warbler. These birds are vulnerable to parasitism by brown-headed cowbirds. Cowbirds, edge specialists, are particularly attracted to human habitation and cattle, both of which are present in Agness at the upper end of this watershed. This site acts as a reservoir for brown-headed cowbirds. Current numbers of cowbirds have been as high as 40 birds at Agness. The species is not commonly sighted in the watershed outside of Agness.

Willow flycatchers, a species of special concern, nest along the river corridor. They are known only in the riparian areas of the Rogue River and Chetco River on the west side of the Siskiyou National Forest.

Another species of special concern, Vaux's swift, nests in large, hollow dead trees or structures that provide similar habitat such as chimneys. Large hollow trees are uncommon, and rarely found except in old-growth forests. They are frequently seen foraging over the Rogue River in this watershed. They nest as single pairs, or often in small groups. When in migration, they form large congregations and sometimes over 100 birds roost in single sites. Two large migratory roosts are known in the lower portion of this watershed at Jerry's Flat and it is likely that some large roosts also occur in the National Forest portion of the watershed as Vaux's swifts are frequently seen.

Indicator Species

Seven forest wildlife species, and one group, have been selected as management indicator species. An indicator species represents all other wildlife that utilizes the same habitat type. Indicator species act as barometers for the health of various habitats (Siskiyou LRMP IV-10, USDA, 1989).

Bald Eagle and Osprey

Bald eagle and osprey utilize habitat corridors along major rivers, sometimes nesting up to one mile (occasionally further) from rivers in large green trees or dead trees. The Lower Rogue River watershed is important to the viability of bald eagles and osprey. Bald eagles are known to nest here and are regularly seen foraging along the Rogue River within the analysis area.

Osprey nests have been closely monitored from 1992 to 1999 (1992 to 1996 data published in Blithe and Dillingham 1997; 1997 to 1999 data unpublished). Nest trees fall down, nests blow out of trees, and osprey seem to regularly build new nests in different parts of the river. However, during the eight years of monitoring, there has been a stable population of thirteen pairs nesting along the Rogue River from Agness to Lobster Creek. The stable population in this vicinity contrasts with the area from Lobster Creek to the Rogue River mouth where the

population has approximately doubled in the same eight-year monitoring period. If we use older survey data (Lee Webb unpublished data) we see the population has indeed increased from the eight pair found in 1976 between Agness and Lobster Creek. Six of the nest trees used during the 1992 nesting season were still active during the 1999 nesting season. Of the thirteen active nests in 1999 (see Map 23, Osprey Sites), nests had been present in the same tree an average of five years. The Siskiyou LMRP (USDA, 1989) has Standards and Guidelines (4-4 and 4-9) for maintaining potential nesting habitat.

Spotted Owl, Pileated Woodpecker, and American (Pine) Marten

The northern spotted owl represents over 150 other wildlife species, which use late-successional forest habitat for all or part of their life cycles (Guenther and Kucera, 1978, Brown, 1985). Spotted owls are strongly associated with dense mature and old-growth Douglas-fir forests. These habitats provide the structural characteristics required by the owls for food, cover, nest sites, and protection from weather and predation. Pileated woodpeckers and pine marten represent the composite needs of over 160 wildlife species that utilize mature forest (Guenther and Kucera, 1978, Brown, 1985). The Siskiyou LRMP (USDA, 1989) had designated areas for the pileated woodpecker and pine marten within the Rogue Watershed (Management Area 8, Forest Plan, Chapter IV-Forest Management Direction, page IV-105). However, the ROD (USDA and USDI, 1994) amended MA-8, and created Late-Successional Reserves that account for these species and the species they represent.

Existing sighting data from the Wildlife Observation (WILDOBS) database was analyzed. The geographical information system (GIS) was used to analyze stand level vegetation data to calculate historical, existing, and future levels of habitat for these species (Table 12). Mature and old-growth seral stages were used for pileated woodpecker, marten and spotted owl habitat (see 1940 and 1995 Seral Stages, Maps 13 and 14).

Table 4. Habitat Trends for Selected Indicator Species

	Pileated Woodpecker, Marten and Spotted Owl Habitat	
Year	**Acres**	**Percent Watershed**
1940	55,815	67
1993	23,677	29
2040	28,418	34

Spotted owls, pileated woodpeckers and marten have been documented in the Rogue River, below Agness, watershed (see PETS section for more details). Future projections indicate that the amount of late-successional habitat available for these indicator species is expected to increase on federal lands, but remain low on private lands.

Woodpeckers: The composite snag needs of woodpeckers represent all wildlife species that use cavities for nesting or denning (Siskiyou LRMP FEIS, pages III-104, III-105, USDA, 1989). On the Forest, and most likely in Rogue River, below Agness, watershed, there are over 75 species which use snag habitat (Guenther and Kucera, 1978, Brown, 1985). Siskiyou Forest Standard and Guideline 4-13a states that habitat capability of woodpeckers should be continually maintained at not less than 60 percent of potential population levels in areas managed for timber production.

Woodpeckers are dependent upon snags and down wood for roosting, nesting, and foraging habitat. High intensity fires killed large conifers and hardwoods. The variation in amounts left after fires is not known. There were areas shown on 1940 aerial photos, where large brushfields did not contain visible large snags. These were mainly found in areas that likely had frequent fires, i.e. placed high up on ridges on south facing slopes. Smaller snags were created in stand development where competition between densely spaced trees and brush caused mortality.

Deer and Elk: Elk and deer use all successional stages to meet their habitat needs for cover, forage, and reproduction. Natural or created openings provide the majority of the feeding habitat, which is assumed to be the most restrictive habitat component in this region (Forest Plan FEIS, Chapter III-Affected Environment pages III-106 through III-107). Elk and deer represent more than 180 wildlife species that need young successional stages to meet all or some of their requirements (Guenther and Kucera, 1978 and Brown, 1985).

The Rogue River, below Agness, watershed has large concentration of elk on private land and the adjacent Forest Service lands. A few scattered small elk herds utilize Forest Service lands near Wildhorse Ridge, Frog Lake, Button Prairie and Adams Prairie. The elk mostly use recent clearcuts, meadows and open pine savannas for forage.

Deer are found throughout the watershed, though an accurate estimate of their population is unavailable. Local residents report that populations are far smaller now than they were ten to twenty years ago. Deer use newly harvested areas and natural meadows for foraging. They also feed on acorns from oak trees throughout the area and use the riparian areas during fawning season and summer.

To estimate the amount of deer and elk habitat, the amount and quality of forage and cover was analyzed. GIS was used to analyze seral stages at the stand level. Tables 13 and 14 list the acres of each type of habitat estimated for the Rogue River, below Agness, watershed.

Table 5. Historic Elk Habitat Type (1940)

Habitat Type	Percent of Watershed
Optimal/Thermal Cover	76
Hiding Cover	7
Forage	12

Table 6. Current Elk Habitat Type (1995)

Habitat Type	Percent of Watershed
Optimal/Thermal Cover	61
Hiding Cover	16
Forage	20

Existing conditions for elk habitat were evaluated using a model developed for use in Western Oregon. The model was based on the interactions of four variables: (1) size and spacing of forage and cover, (2) road density, (3) cover quality, and (4) forage quality (Wisdom et. al., 1986). Optimal cover modifies ambient climate, allows escape from human harassment, and provides forage. Thermal cover functions similarly to optimal cover, but it does not provide forage. Hiding cover allows elk to escape human disturbances (Wisdom et. al., 1986). The quality of forage is as important as the amount of forage available. Human disturbance allowed by motor vehicle access reduces elk use of habitat adjacent to roads (Wisdom et. al., 1986).

Currently the amount of forage area in the entire Rogue River, below Agness, watershed watershed is within the LRMP 4-11 suggested 20 percent. However, only 13 percent of the area within the National Forest boundary is currently forage. As a requirement under NFMA, 219.19,

the Siskiyou National Forest, Forest Plan FEIS, p. III-102, designated elk and deer as indicator species in the Siskiyou National Forest, Forest Plan FEIS. Deer and elk were selected because they are commonly hunted and they represent other species that utilize early successional forest. There are more than 180 wildlife species that need young successional stages to meet all or some of their requirements (Brown, 1985). NFMA, 219.19 states, "In order to insure that viable populations will be maintained, habitat must be provided to support, at least a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." Because the percentage of forage acres on National Forest lands are projected to decline, populations of wildlife species that are associated with this habitat type are also projected to decline on National Forest lands.

The area outside the National Forest boundary, which is predominantly private land, currently has 31 percent in foraging habitat.

Information Needs: Pacific Meridian Research (PMR) and Western Oregon Digital Inventory Project 1993 (WODIP) vegetation data needs to be ground verified to ensure validity. The correlation between certain vegetation types, seral stages and wildlife use of those habitats needs to be verified. This can be accomplished by continuing to do surveys for presence of indicator and PETS species.

Management Opportunities: Forage seeding could be used where timber harvest occurs to enhance the forage value for elk. Encroaching trees in open meadows and oak savanna areas can be cut and removed or girdled (See Special Wildlife Site Section). Open meadows and pine savanna areas can be burned to remove encroachment and benefit native species. Areas of exposed soil can be seeded with native species. A potential specific project is to create some quality forage/early successional habitat within immature and mature stands by thinning to a wide spacing, creating 1 to 2 acre openings, underburning, and seeding with native species.

Exotic and Noxious Weeds

What are the locations and risk of spread for noxious weeds in the watershed?

Large numbers of exotic and noxious weeds have invaded the watershed and are increasing in numbers (see Map 19, Noxious Weed Sites). The species and their status can be found in Table 15. Their aggressive nature threatens to destroy native plant communities. Many colonies have been discovered and destroyed, but many of these sites are still active, because seeds left from mature plants germinate after the site has been treated. New colonies of these species are expected to continue to be found as seed is carried into the watershed from neighboring lands, especially upriver colonies of purple loosestrife and yellow star thistle along the Rogue River corridor. The proximity to high concentrations of loosestrife and yellow star thistle upriver in Josephine and Jackson Counties is one of the reasons why such a high number of weed sites occurs in this watershed.

ability on seeds and plant density elsewhere in Oregon (Coombs, 1999).

Poison hemlock is found in Quosatana Campground and along the Agness Road. The public should be aware that this plant is toxic to humans and livestock alike. Sheep eating as little as 4 to 8 ounces of green leaves or cattle eating 10 to 16 ounces may be fatally poisoned (Hawkes et al., 1985).

Tansy ragwort, St. Johnswort and bull thistle commonly occur on disturbed sites. Although they have long occupied many of the watershed's disturbed sites they pose a lesser threat to the area because insects keep their populations under control. These insects are also known as biological controls. Tansy flea beetle and the cinnabar moth have been introduced to reduce the number of tansy ragwort plants in the watershed. Monitoring efforts have shown that tansy ragwort populations and insect control are cyclic in nature. Years when there are higher numbers of tansy ragwort are followed by years when insect populations increase and reduce the ragwort infestation levels.

Silver nettle, also known as archangel, is not designated as a noxious weed by the Oregon Department of Agriculture. It is a cultivated ground cover, but has escaped at the end of the Road 3300120 and appears capable of growing under high canopy closure. It has grown over and killed existing native sword ferns and redwood sorrel at this site.

Information Needs: It will be necessary to survey disturbed areas to detect new populations of noxious weeds before they become well established.

Management Opportunities: It is especially important to control the brooms and gorse because they are just beginning to expand into the watershed and could potentially occupy much greater areas than they do now. It is also important to quickly treat any new colonies of new noxious weeds such as Yellow Star Thistle if they appear in the watershed, in order to prevent them from becoming well established. The silver nettle population should quickly be eliminated before it becomes established. Treatment of infected areas is needed to reduce, control and/or eliminate the further spread of noxious weeds in the watershed.

Treatment opportunities include cutting, pulling, or burning noxious weeds, introducing biological controls, closing roads, cleaning construction machinery before moving onto National Forest lands and before leaving infested sites, using only "clean" fill material, and using only certified weed-free hay. Seeding disturbed areas with native plant species will reduce opportunities for weeds to become established, and biological controls may be necessary to control widely distributed weed populations. Follow-up surveys of treated sites will be necessary to detect noxious weed population regeneration. Before ripping roads in contaminated areas, it should be determined if doing so would encourage noxious weeds to take over disturbed sites.

Role of Port-Orford-cedar in the watershed

What are the locations and risk of spread of Phytophthora lateralis (Port-Orford-cedar root disease) in the watershed?

Port-Orford-cedar (*Chamaecyparis lawsoniana*) is an important component in this watershed. Of the 44,674 acres of National Forest land within this watershed, 15,000 acres contain some Port-Orford-cedar. Approximately 19 percent of these 15,000 acres is infected with *Phytophthora lateral*is. The disease is extensive; most tributaries within the Quosatana Creek watershed are infected (see Map 20, Port-Orford-Cedar Distribution).

There are also large stands of POC further northeast along the south side of the Rogue River near the Illinois River. These stands, however, have only a scattering of root disease infection pockets at this time. *Phytophthora lateral*is is most prevalent where there is evidence of past human activities.

The natural range of Port-Orford-cedar is limited to northwestern California and southwestern Oregon but is found on many geologic zones and soil types, ranging from skeletal to productive soils. It is often the dominant tree in ultramafic riparian areas and frequently codominant with Douglas-fir in riparian areas of other geologic types. Crown closure by the species ranges from 0 to over 40 percent. Generally, however, throughout most of its range, it is restricted to areas with consistent water seepage within a meter of the soil surface. Port-Orford-cedar is valuable both ecologically and economically.

Port-Orford-cedar provides shade, large wood, and vegetative diversity on riparian and upland sites. It is fairly tolerant of shade and competition in natural stands, and can occur as a pioneer, late seral or climax species within the same stand. Growth is usually slower than Douglas-fir except in ultramafic substrates. Frequently, in mixed species stands, other species will grow taller and out compete them within 25 years of establishment. However, Port-Orford-cedar retains the ability to respond after dominants die.

In old stands, Port-Orford-cedar seems as tolerant of fire as Douglas-fir. Older trees develop thick bark and survive large, deep, fire scars. The wood has a high resistance to decay and insects. It can be especially valuable as large wood in riparian areas, remaining in streams longer than equal-sized logs of associated species. It can also have lesser value for cavity-nesters due to its decay resistance. If utilized, cavity-nesters seem to prefer dead Port-Orford-cedar over green.

Port-Orford-cedar timber brings higher prices than almost any other conifer in the United States due to log export to Japan. It is the only species than can be exported from federal lands within the Pacific Northwest. Its domestic price as lumber, however, is low to moderate when compared to the price of cedar species such as western red cedar or incense. Port-Orford-cedar boughs are used commercially for floral arrangements and have been collected along the road system in the watershed.

Effects of Port-Orford-cedar root disease (*Phytophthora lateralis*) on the watershed

Around 1952, an exotic root disease fungus or water mold, *Phytophthora lateralis*, was introduced into the Pacific Northwest from an unknown source. Both Port-Orford-cedar and Pacific yew (*Taxus brevifolia*) are susceptible to this disease, but yew are not readily killed.

This root disease lives within infected roots and wet wood and soils. It can be spread either by infectious “swimming” zoospores or thick-walled “resting” spores. These spores are spread by gravity, water, infected soil or woody debris. The disease can spread locally by root-to-root grafting. The infectious spore (zoospore) is only formed in water or when soils are saturated. They are capable of moving a few millimeters through water or saturated soils to reach a fine root

of a host tree by use of their small tail. This microscopic movement is directionally triggered by a chemical attraction to Port-Orford-cedar.

These zoospores attach to the live, fine roots (less than 1 mm in diameter) of Port-Orford-cedar that are normally abundant near the soil/water interface. After they are attached, they extend hyphae and grow throughout the root system and phloem up to the root collar of the tree. These hyphae give off enzymes that break down the cells of the cambium of the tree. Once introduced into the cambium of the tree, this disease will grow until the entire root system is colonized and the tree dies from desiccation generally in the spring or summer.

During adverse conditions such as dry weather, the fungus produces thick-walled spores (resting spores). These spores are the principal fungal forms in mud, and enable longevity of the fungus by providing a mechanism for surviving inhospitable conditions. Dry conditions reduce the danger of spread by spores but do not kill the fungus or its resting spores. Limited data indicates that infected soil can contain viable spores for approximately three years after the last host tree has died. Host tissue killed by this disease can also harbor thick-walled resting spores that can survive for up to approximately seven years while the Port-Orford-cedar host material decays. Under favorable conditions (saturated soils, cool soil temperatures, etc.) these resting spores produce the infectious zoospores.

A single introduction of the root disease into a waterway occupied by host trees can result in the spread of this disease to any adjacent, downstream, riparian area via water movement. However, the uphill distribution of this disease is slow because without an outside vector (carrier), this disease can only spread by root-to-root contact between infected and uninfected host trees. Discontinuity of host tree root systems is a barrier to its uphill spread.

Since 1952, this disease has been spreading throughout the range of Port-Orford-cedar primarily by the movement of infected plant materials or contaminated water or soil spread by gravity, equipment, vehicles, humans, or domestic and wild animals. The potential for loss of all Port-Orford-cedar stands to this root disease is low because of the existence of numerous protected populations representing both the environmental extremes and the middle of the species range. Currently, however, there is no identified genetic resistance or established chemical control for this disease. Prevention seems to be the most effective control strategy.

The primary vectors for spread of this root disease have been infected Port-Orford-cedar plant materials, waterflow, human transmission (such as root disease spores being introduced via the mud on vehicles, equipment, tools or boots), and animal transmission (such as hooves of horses, cattle or migrating wild animals such as elk). The greater the potential for one of these vectors to move from an infected area to an uninfected area with these spores, the greater the risk of infecting an uninfected area. The spread of this root disease, therefore, is a function of the number of vectors, the risk that the vector has picked up spores, the proximity of the infected area to an uninfected area, and the likelihood that a vector will move from an infected area into an uninfected area.

Spread of the disease in the future will most probably be associated with spore introduction via either unwashed heavy equipment or general vehicle traffic during the wet season. General traffic can spread this disease over long distances. Mud has been observed to stay on vehicles for trips over 30 miles, including trips of 15 miles on four-wheel drive roads (Forbes, 1993). Within riparian areas this disease will continue to spread to areas where water provides a vector for the spores. Additionally the disease will be spread through activities such as hiking, horseback or mountain bike riding, hunting, collecting special forest products such as mushrooms, beargrass,

Christmas trees, and animal migration. Many of these activities occur primarily during the fall wet-season when the risk of spread is high.

Sanitation treatments (i.e. killing or cutting Port-Orford-cedar trees) and seasonal or year-around road closure can be effective in maintaining uninfected Port-Orford-cedar populations or limiting the spread of this disease. Year-around road closures within infected or uninfected areas and sanitation of stands containing Port-Orford-cedar adjacent to roadsides have been implemented within this watershed. Dry season operations, aggregate surfacing of some roads, use of uninfected water and earth, and pre-operation washing of vehicles and equipment have also been implemented. These latter measures can be effective in preventing the spread of the root disease, and are the preferred project-level control measures.

Management opportunities: Continue with pre-operation washing of vehicles and equipment, use of uninfected water, soil or rock, sanitation of Port-Orford-cedar, and seasonal or year-around road closures as well as other reasonable control or prevention measures.

Role of Fire in the Watershed

What is the historic perspective of fire in the Lower Rogue watershed, and how can fire be beneficially employed in the future?

Fires have left evidence of their presence throughout the Klamath Mountains Geologic Province, including the analysis area. Fires with both natural and human causes have influenced the area for thousands of years.

The topography, vegetation, and weather of the area are typical of the inland canyon areas of southwestern Oregon. Slopes range from moderate (40 percent) to very steep (over 80 percent), with a very small amount of flatter ground located along the river benches. Mixed conifer stands, with a heavy hardwood shrub and tree component, dominate the landscape. Naturally occurring fuel loads are moderate, with relatively low rates of spread under average fire season conditions, but these fuels can burn much more severely under dryer late season conditions or in years of prolonged drought. Timber harvest changes fuel load patterns. Managed stands are distributed throughout the watershed on National Forest System lands. The majority of the private land in-holdings were mostly harvested by the mid-1970s (see Map 21, Regeneration Harvest and Roads).

The summertime climate of the watershed spans a wide range of conditions, from cooler and moister marine air which will generally invade the lower reaches of the watershed, to conditions dominated by the hotter and drier airmass which prevails over the inland areas. A distinct differential in afternoon temperatures can be found when traveling between Quosatana Creek and Bradford Creek, along the Agness road. The entire canyon along the length of the watershed (below the 1000 to 1500 foot level) can be filled with fog in the early morning hours, but will generally have burned off by 10:00 A.M. each day. Ridge winds are experienced at the higher elevations, and the lower points in the drainages feel the effects of the winds in the main canyons. The entire watershed is subject to the diurnal wind influence that is created by heating and cooling each day, generally blowing down slope (down canyon) during the early hours of the day, and upward during the afternoon and evening hours. During the late summer and into the fall, atmospheric conditions bring hot and dry east winds to the entire area. These winds generally overpower the local winds, move at unusually high velocities, while maintaining very high temperatures and low humidities for 24 hours a day. Lightning storms in the watershed are often accompanied by enough rainfall to extinguish fires or prevent them from growing before suppression action has been taken. During the past 80 to 90 years, (since record keeping began) human caused fires have accounted for at least three-quarters of the fire starts and the vast majority of acreage burned.

Range of Conditions and Trends: From prehistoric times through the early part of this century, fires were allowed to burn unchecked. Weather and natural terrain features were the only things that affected the spread of wildfire. Up until the 1930s and 1940s most fires were simply monitored, as effective fire suppression resources and tactics did not exist. Since then, fire detection and suppression resource delivery capabilities have become more effective and fire suppression policies have mandated that all fires would be controlled. Prior to 1940 the average number of acres burned per year on the Siskiyou National Forest was 20,833, after 1940 the average was reduced to 2,772 acres per year. Because of the low frequency of fire occurrence and the success of fire suppression, the majority of natural stands remaining throughout the

watershed have evolved without the opportunity for fire to play its natural role for more than a half-century.

Although there is limited historical evidence of naturally caused wildfire in the watershed, many stands reveal evidence of what can only be interpreted as prehistoric fire. Charring and fire scars on old-growth conifers can be found most anywhere in the watershed. Stand composition characteristics, particularly homogeneous stands of young conifers, mixed hardwoods, or brush fields would indicate that a stand resetting disturbance such as fire has occurred in many areas. Panoramic pictures taken from lookout sites and aerial photography, both taken between 1934 and 1940, depict these indications of fire across the watershed; indicating that our historic records show only a small portion of the effects of fire across the landscape through time.

It is known that Native Americans used fire during prehistoric times for many reasons including enhancing forage and habitat for game which they hunted, stimulating the growth of plant species used both for food and to make baskets, clearing travel paths, protecting valued habitats from unwanted fire, and for both defensive and offensive warfare against rival tribes and European settlers. It is likely that valley bottoms, open meadow areas, and oak stands of the watershed were manipulated in this manner.

Early settlers also used fire, but there intent was to create more uniformity in the landscape, rather than the diversity sought by the native inhabitants. Fire was used to create and maintain grazing land for their livestock, as well as clear vegetation for mineral exploration. These settlers were often irresponsible in their use of fire, causing fires to burn far outside of the desired areas; and in some cases, just to see fire burn. Various agricultural endeavors can be seen on the available photography of the prairies on the north side of the Rogue River. This photography shows evidence that fire was likely used to keep the areas clear, and that in some cases had previously burned far beyond the edges of these openings. Accounts have been passed on of pioneering families being able to ride horseback through many areas along the river corridor, citing that the ground cover and undergrowth was relatively sparse; quite a contrast to the conditions found today.

Historic Fire Activity

Historic fire information is drawn from copies of the Regional Fire Atlas and Record (1910 to 1959) and from individual fire reports from the 1960s to present. The records cover a total time span of 81 years, 64 years of which can be accounted for. There are 6 data gaps, totaling 17 years, for which no records can be located at this time. Fire statistics were collected for areas within the National Forest boundaries only.

These records indicate a low frequency of natural fire occurrence. There were 14 lightning fires recorded, none grew to more than 5 acres in size, most fires were recorded as one acre or less. During this same period approximately 43 human caused fires have burned, with 25 of these fires growing to more than 5 acres in size, burning an estimated 14,500 acres. One large human caused fire in 1917 burned approximately 11,000 acres, approximately 8,500 was within the watershed; covering the north face of the Rogue river from Painted Rock Creek to the Forest boundary, and from the river to the ridge top between Lake-of the Woods and Sawtooth Rocks.

The majority of the large fires occurred prior to 1940, with 3 fires burning approximately 100 acres since that time. Nineteen other fires were reported since 1940, but all were controlled at less than 5 acres each.

Typical of fires west of the Cascade crest, the effects of burning appear to be more severe on the south and east aspects, and at higher elevations; then on the north and west aspects, and at the lower elevations. Aerial photographs (circa 1940) and the panoramic photographs taken from Lake of the Woods lookout point (circa 1934) reveal evidence of portions of fires which correlate well with fires documented in the known records. Several of these fires have the appearance of having been high severity, stand-resetting disturbances, particularly on the southern aspects and along the ridge tops. This same photography, covering areas of known historical fires, will often show little or no signs that a fire has passed through the northern and/or western aspects of an area, supporting the conclusions that a fire of lesser severity normally burns on these sites.

Present Day Fire Management

This watershed is allocated almost entirely to management areas where preplanned suppression strategies and acre objectives are set to control fires at a minimum size (Siskiyou LRMP, USDA, 1989). For Late-Success ional Reserves the ROD (USDA and USDI, 1994) has set standards and guidelines which emphasize the prevention of loss due to large scale fires, particularly stand resetting disturbances. Under the ROD and the South West Oregon LSR Assessment, fire may be used for its beneficial effects to the ecosystem, including hazard reduction to prevent or reduce the potential undesirable impacts of unwanted wildfire in the LSR, once a specific Fire Management Plan has been written for the area. Until then, rapid wildfire suppression will remain the operative plan for the majority of the watershed.

For the past decade funding for firefighting resources has been declining, leaving only limited resources available in the local area to respond for initial fire attack. Aerially delivered firefighting resources (rappelers) can respond to the area in approximately 35 to 45 minutes from their base in Merlin, when available. A cooperating agency, Coos Forest Protective Association, off-Zone agency personnel, contractors, and air tankers can be called upon when and if a fire situation exceeds the control capabilities of these initial attack resources. Private land holdings, within and adjacent to the watershed, are protected by Coos Forest Protective Association. Under a reciprocal mutual aid agreement, Forest Service firefighting resources share in protecting these lands; utilizing the closest forces concept.

Mutual risks exist with the Agness community, recreational river use running the full length of the watershed, and private lands surrounded by National Forest (NF) lands. A wildfire originating on NF lands could be a threat to the privately owned lands, under severe burning conditions, and similarly, a fire originating on the privately held lands could pose a threat to the surrounding NF lands under similar conditions.

Interpretation

It is difficult to determine what a natural range of variation for fire occurrence, extent, and intensity may have been prior to Euro-American settlement. Atzet and Martin indicate we do not have a clear picture of the natural range of conditions, as it pertains to the role of fire in the Klamath Province."...our temporal window is small. Disturbance regimes of the last 300 years hardly give the range our ecosystems have experienced." (Atzet and Martin, 1991) Since natural fire events are random and chaotic in nature, we can not model what the fire cycles were, or what the pre-historic "status-quo" was. Prior to 1850, information about climate, fire regime, and Native American activities is scarce. Conditions since 1850 poorly represent natural conditions due to the influence of early settlement. The study of historic fire records, depicting the human influence on the number and size of fires during the 1st half of the century, and the effects of active fire suppression during the 2nd half; supports this uncertainty in establishing the range of natural conditions. The evidence suggests that multiple, low intensity underburns were more prevalent than individual high severity stand re-setting fire events, throughout the Klamath Province. Studies within the Klamath Province found that evidence of fire was present in approximately 63 percent of the stands examined, and that it was the last and most important disturbance to occur.

Fire cycles west of the Cascade Mountains are estimated to be considerably longer than those found in east of the Cascades, particularly in Northeastern Oregon. This effect is even more pronounced along the westside of the Coast Range. While the coastal forest region is generally

thought to be of a wet climate, with few fires occurring at longer return intervals, the forests in the Klamath Province are dominated by a more Mediterranean type of climate, where fire has played a very active role. Referencing conditions in Northeastern Oregon, the forest health situation and the effects that fire exclusion has had on it; can be used to point to a similar path of events that may be occurring in Southwestern Oregon, on a much longer timescale. It is only in the past 60 to 75 years that human influence has attempted to alter this course through suppression policies and active intervention. Atzet and Martin suggest that this intervention has increased the mean interval between fires (approximately 50 years), in the Douglas-fir series. Continued suppression will lead to an "unnatural" build up of fuels, resulting in a greater proportion of high-severity fires when an area finally burns. This concept is being recognized throughout the western United States, as it relates to the issues of forest health and the increasingly catastrophic affects of wildfire on the landscape.

There is evidence that Douglas-fir stands in the area are at risk of imminent mortality due to over crowding. Under growth has begun to occupy the majority of the ground, and dead fuels are building to the point where fire severities could prove lethal to entire stands. Unique habitats such as meadows are being encroached upon by conifer species. Certain hardwood species, which naturally grow under mostly open conditions, have been over-topped and crowded out by these same conifers. Comparison of the 1938-40 aerial photographs to present day conditions would indicate an overall loss of landscape scale diversity. All of these are "indicators" that the disturbance process of low intensity fire has been absent from these sites for an inordinate period of time.

Fire will continue to occur and will continue to be suppressed within our limited capabilities, but not all fires will be contained at low acreages. If a fire occurs under moderate weather conditions, and in areas where fuel and weather conditions are such that the fire burns with a lower intensity, the forest in general could benefit and the values associated with Late Successional Reserves will remain intact and/or be enhanced. However, fires burning under hotter and dryer conditions can evolve into stand replacement disturbances, producing undesirable effects on a very broad scale. As time passes and the amount of fuel on the forest floor continues to increase, so will the severity of fire.

Management Opportunities: The Southwestern Oregon LSR Assessment allows fires to burn in the Late Successional Reserve (LSR) areas, under site-specific objectives. A Regional Ecosystem Office (REO) review of this assessment confirms this. The LSR assessment recognizes that fire can be used for the enhancement of fire dependent species and habitats and prevention of stand replacement fire events; as a part of allowing fire to return to the LSR. These objectives can be met using either naturally caused or management-ignited prescribed fire.

In the Lower Rogue watershed, prescribed fire can also be used to reduce the fire hazard of selected areas, where its use can be implemented in a safe and effective manner. Such an action would give the limited fire suppression resources of the area a more manageable situation for preventing wildfire from generating effects beyond those considered beneficial to the resource, as well as aid in protecting the interests of those living in the area surrounded by National Forest lands.