WILD ROGUE - SOUTH

WATERSHED ANALYSIS

REO Fifth Field Watershed #1710031004
Rogue River/Kelsey Creek
(Portion South of the Rogue River)

March 2000

U.S. Department of the Interior
Bureau of Land Management
Medford District
Grants Pass Resource Area

March 2000

Dear Reader:

The purpose of this watershed analysis is to identify the various ecosystem components in the Wild Rogue - South Watershed and their interactions at a landscape scale. The analysis looks at historical ecological components, current ecological components, and trends. It makes recommendations for future management actions that could be implemented to reach certain ecological conditions.

The watershed that is being analyzed in this document is the Wild Rogue - South. This watershed is the southern half (south of the Rogue River) of the Rogue Kelsey fifth field watershed (REO Watershed #1710031004). The northern half is analyzed in the Wild Rogue - North Watershed Analysis.

As you read this document, it is important to keep in mind that the watershed analysis process is an iterative process. As new information becomes available it will be included and periodic updating will occur. It is also important to keep in mind that **this analysis document is <u>not</u> a decision document**. The recommendations that are included are a point of departure for project-specific planning and evaluation work. Project planning then includes the preparation of environmental assessments and formal decision records as required by the National Environmental Policy Act (NEPA). Project planning and land management actions would also be designed to meet the objectives and directives of our Medford District Resource Management Plan (RMP).

This watershed analysis will thus be one of many tools in land management planning and project implementation within the Wild Rogue - South Watershed on Bureau of Land Management (BLM) administered lands. Although ecological information, discussions and recommendations are presented at the landscape scale irrespective of administrative ownership, please understand that the BLM will only be implementing management actions on the lands it administers.

Preparation of the watershed analysis follows the format outlined in the draft federal watershed analysis guidelines in the document entitled *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis* (Version 2.2, August 1995).

If you have additional resource or social information that would contribute to our better understanding the ecological and social processes within the watershed, we would appreciate hearing about them.

John Prendergast
Field Manager
Grants Pass Resource Area

TABLE OF CONTENTS

TABLES

APPENDICES

MAPS

INTRODUCTION

Preparation of watershed analyses is a key part of the implementation of the 1994 Northwest Forest Plan (NFP). It is conducted at a fifth field watershed scale and is a procedure with the purpose of developing and documenting a scientifically-based understanding of the ecological structure, functions, processes and interactions occurring within a watershed. It is one of the principal analyses used to meet the ecosystem management objectives of the NFP's Standards and Guidelines. It is an analytical process, not a decision-making process. A watershed analysis serves, in part, as a basis for developing project-specific proposals and identifying the monitoring and restoration needs of a watershed. The watershed analysis process is designed to be a systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives.

This watershed analysis will thus document the past and current conditions of the Wild Rogue - South Watershed, both physically and biologically. It will interpret the data, determine trends, and make recommendations on managing this watershed to achieve the desired future condition.

The first part of this analysis will address the core physical, biological, and human factors that characterize the watershed and their important ecological functions. Regulatory constraints that influence resource management in the watershed will also be identified. From these, key issues will be identified that will focus the analysis on the important functions of the ecosystem that are most relevant to the management questions, human values, or resource conditions affecting the watershed.

Next, current and reference conditions of these important ecosystem functions will be described. An attempt to explain how and why ecological conditions and processes have changed over time will be discussed during the synthesis portion of the analysis.

The final portion of the analysis identifies the recommendations for the Wild Rogue - South Watershed taking into account land management constraints and the demand for the watershed's resources. These recommendations will guide the management of the watershed's resources toward the desired future condition.

Two key management documents are frequently referred to throughout this analysis. These are:

1. *The Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl* and its Attachment A, entitled *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* (April 13, 1994), (NFP);

2. The *Record of Decision and Resource Management Plan for the Medford District* (June 1995) (RMP-ROD).

Wild Rogue - South Watershed Analysis Team Members

The following staff specialists worked as members of the watershed analysis team:

Frank Betlejewski	–	Vegetation
Matt Craddock	–	Cultural/Minerals
Jon Raybourn	–	Aquatic Habitat/Fisheries
Jeanne Klein	–	Recreation
Jim Roper	–	Roads/Quarries
Dave Maurer	–	Soil/Water and Team Lead
Linda Mazzu	–	Botanical, Special Status Plants
John McGlothlin	–	GIS, Proofreader
Tom Murphy	–	Fuels and Fire
Steve Small	–	Terrestrial Wildlife Species and Habitats

I. CHARACTERIZATION

A. PURPOSE

The purposes of the Characterization section are: to identify the dominant physical, biological, and human processes and factors in the watershed that affect ecosystem function or condition; to relate these features and processes to those occurring in the river basin or province; to provide the watershed context for identifying elements that need to be addressed in the analysis; and to identify, map, and describe the land allocations, the forest plan objectives, and the regulatory constraints that influence resource management in the watershed. (*Federal Guide for Watershed Analysis*, Version 2.2, 1995)

B. INTRODUCTION

The Wild Rogue - South Watershed is located within the Klamath Mountain Physiographic Province of southwestern Oregon in Josephine and Curry Counties, northwest of Merlin. (See Map 1. *Note:* all maps are in Appendix A). Approximately 14 million years ago this area began uplifting and has been subsequently shaped by water into a mountainous terrain with a narrow valley floor. This surface ranges in elevation from 400 feet to near 4,900 feet. It has approximately 236 miles of waterways that drain into and include the Rogue River. Approximately 18% of these waterways provide habitat for salmonids. The watershed's soils formed from Klamath Province metavolcanic, metasedimentary, and small amounts of granitic rocks. The soil supports diverse forest vegetative types. Historically the forests have supplied wood, recreation, and other special products for human purposes while providing habitats for many species of terrestrial and aquatic wildlife and plants.

C. CLIMATE

The east half of the watershed has a Mediterranean climate with cool, wet winters and warm, dry summers. The west half of the watershed has a Marine (coastal) climate with cool very wet winters and temperate, mild summers. Average annual precipitation in the watershed ranges from approximately 50 inches in the east to 150 inches in the central west portion. Temperatures recorded at the Grants Pass weather station, about 20 miles southeast of the southeast boundary, show the lowest average monthly minimum occurs in January (32.3^{o} F). The highest average monthly maximum in Grants Pass occurs in July (89.8^{o} F). Temperatures at lower elevations within the Wild Rogue - South Watershed would be comparable.

D. OWNERSHIP

This watershed analysis addresses all lands south of the Rogue River within the Rogue River - Kelsey Creek fifth-field watershed. The Wild Rogue - South Watershed encompasses 42,531 acres. The rest of the watershed is in the BLM's Glendale Resource Area and is covered under the Wild Rogue - North Watershed Analysis. Table I-1 notes the general land ownership distribution within the watershed.

Table I-1: Land Ownership in the Wild Rogue - South Watershed

Land Ownership/Administration	Acres	Percent of Total
BLM	41,886	98%
U.S. Forest Service	281	1%
Private	364	1%
Watershed Total	**42,531**	

Map 2 (Appendix A) shows the location of BLM and other government-administered land in the watershed.

The Northwest Forest Plan (NFP) and the Medford District's RMP made a variety of land use allocations as a framework within which the broad federal land management objectives vary. Together, they are designed to meet the broader objectives of the regional plans. Table I-2 summarizes these allocations as they occur within the watershed. Map 3 shows the location of the BLM land use allocations in the watershed.

Table I-2: Land Allocations on BLM-Administered Lands in the Wild Rogue - South Watershed

Land Use Allocation	BLM Acreage	Percent of BLM in Watershed	Comments
Congressionally-Reserved Areas (within the LSR)	3,159	8%	Rogue Wild and Scenic River (Wild Section)
Late-Successional Reserve (excluding the W&S River)	38,727	92%	Fish Hook (FS)/Galice (BLM) LSR
Riparian Reserves	nd		Acreage not determined, included in other allocations
TOTAL BLM	**41,886**		

The Wild Rogue - South Watershed is a “non-key” watershed. All of the federal land is within the Fish Hook/Galice Late-Successional Reserve. Objectives for late-successional reserves are to protect and enhance conditions of late-successional and old-growth forest ecosystems which serve as habitat for late-successional and old-growth forest-related species, including the northern spotted owl and marbled murrelet, and to maintain a functional, interacting, late-successional and old-growth ecosystem (RMP - ROD p. 32).

Riparian reserves, which protect aquatic and late-successional forest habitats, border all the streams throughout the LSR. These areas are a critical part of the NFP's Aquatic Conservation Strategy to restore and maintain the ecological health of watersheds and aquatic ecosystems. The main purposes of the reserves are to protect the health of the aquatic system and its dependent species, and to provide benefits to upland species. These reserves help maintain and restore riparian structures and functions, benefit fish and riparian-dependent nonfish species, enhance habitats for organisms dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for terrestrial and aquatic animals and plants, and provide for greater connectivity of late-successional

forest habitats (NFP, p.7).

E. REGULATORY CONSIDERATIONS

Important federal laws pertinent to management of the federal lands in the watershed include: The National Environmental Policy Act (NEPA), Federal Land Policy and Management Act (FLPMA), the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), National Wild and Scenic Rivers Act, and the Oregon and California Lands Act (O&C Act).

F. EROSIONAL PROCESSES

The dominant erosional processes occurring in this watershed are concentrated flow erosion (sheet/rill erosion and gully erosion) and mass wasting. Steep and very steep areas that may be susceptible to these kinds of erosional when not protected are extremely common based on the SCS Soil Survey (Soil Survey of Josephine County, Soil Conservation Service, 1983 and Unpublished Soil Survey of Curry County, Natural Resource Conservation Service). Most of the soils on steep and very steep slopes also have high to very high rates of infiltration. Erosional processes within the landscape are driven by gravity and the influence of water (precipitation and runoff) on soil shear strength. Other factors that have influenced the erosional processes on the landscape are climate, vegetation and fire. Water erosion is important, as it not only detaches soil particles (and sometimes earthen material), but also transports the material downhill.

Concentrated flow erosion is a concern on hill slopes that have had most of the vegetation removed and where roads have concentrated runoff in unconsolidated ditches and diverted it to areas where surface protection is inadequate. Soil erosion occurs when soil particles are detached by raindrop splash or the overland flow of water and moved to another location on the landscape. In this watershed this effect can be magnified by large concentrations of surface flow caused by warm rain falling on snow. Eroded soil particles can move from less than an inch to many miles depending on the topography and vegetative cover. This erosion is of concern because it can reduce the productivity of the land and increase sediment in local waterways.

Mass movement processes in the watershed occur in different forms: raveling slopes, rock landslides or rock falls. These phenomena occur on steep to very steep slopes. Most soils that occur in the watershed are on very steep slopes, contain gravel in the upper layers, and receive high rates of precipitation. These conditions are indicative of mass movement potential. However, mass movement in this watershed appears to be dominated by raveling and rapid detachment of gravel and bedrock by gravity on steep slopes.

These erosional processes, combined with the uplifting of the landscape that has been occurring for the last 14 million years, are primarily responsible for the morphological characteristics of the watershed. As the landscape was uplifted, belts of varying rock types were exposed to weathering. The uplifting process occurred faster than the erosional process which has resulted in deeply incised stream canyons (draws) with high gradients in most of the watershed (Rosgen Aa+ and A) and in narrow alluviated valley streams with moderate gradients and entrenched channels (Rosgen B). Riparian areas along

these streams provide habitats for plants and animals associated with the aquatic resources. Some riparian areas have been disturbed as a result of timber harvest, roads, construction, fire, or mining.

Road density is the measurement of total road length for a given area, commonly expressed as miles of road per square mile. The watershed has highly variable road densities, from very low to high. Road density and future road development are concerns because roads intercept surface water and shallow groundwater and route it to natural drainageways. This concentrates and increases natural runoff and may cause erosion. It may bring sediment to the stream system. Peak stream flows may increase compared to stream flows in areas with few or no roads. Increase peak flows may increase streambank erosion. Road densities in excess of four miles per square mile are considered a high level and could have detrimental cumulative effects on stream water quality and quantity. Two drainage areas with high road density are Missouri Creek and Jenny Creek. Within the Missouri Creek subwatershed, the Missouri-Trout area (approximately 3,752 acres) is designated in the RMP as a deferred watershed due to the cumulative effects of past forest management activities, including high road density. The RMP deferred this area from all but limited management activities for 10 years starting in January 1993.

G. HYDROLOGY

There are approximately 236 miles of streams in the watershed. The headwaters of these streams are generally steep and fast flowing. The stream flow in the watershed fluctuates with the seasonal variation in rainfall. Peak flow events occur during high-intensity storm events of long duration, usually in the winter and early spring. The flows of the Rogue River in this watershed are heavily affected by storm events, snow melt, and to some degree by water release or retention at the Lost Creek and Applegate dams. The are no stream gauges in this watershed. The maximum recorded discharge for the Rogue River in Grants Pass was 152,000 cubic feet per second (cfs) on December 23, 1964 (USGS 1998). The maximum recorded discharge (after flow regulation began) from Lost Creek dam (February 1977) was 90,800 cfs on January 1, 1997. The maximum recorded discharge for the Rogue River near Agness was 290,000 cfs on December 23, 1964.

H. WATER QUALITY

Water quality varies somewhat throughout the watershed. There is little water quality data except for the Rogue River. The Rogue River has been identified as water quality limited (303(d) listed). The types of water quality and pollution are detailed in Chapter III, Current Condition.

I. STREAM CHANNEL

The major tributary streams in the watershed can be classified into one of two stream types, based on the Rosgen system of stream classification: A or B (Rosgen 1996). Type A are steep entrenched, cascading, step/pool streams with high energy transport associated with depositional soils and are very stable if bedrock or boulder dominated. Type B are moderately entrenched, have a moderate gradient with a riffle-dominated channel and infrequently spaced pools. They have a very stable plan and profile with stable banks. The Rogue River itself is entrenched in rock canyons or steep mountain slopes resulting in Type F (no flood plain, wide relatively shallow channel), Type G (narrow relatively deep channel) and

Type B (a narrow band of flood plain) classifications.

J. VEGETATION

The existing vegetation in the watershed developed as a result of geology, climate, natural disturbance regime, and human influence. The natural disturbance regime is primarily one of high fire frequencies both historically and, to a lesser extent, in the present. Recent fire suppression has resulted in significant increases in stand density (stems/acre), shifts in species composition (*e.g.*, increases in fire-intolerant, shade-tolerant species) and changes in stand structure. These transformations have made the forests more susceptible to large, high-severity fires and to epidemic attack by insects and disease.

Relatively recent human influences have had additional direct effects on the plant communities in the Wild Rogue - South Watershed. Mining, logging, and road building have reduced the number of acres of late-successional forest from 1950's levels while increasing the acres in the early seral stages. Even with this, the current extent of late-successional forest in the watershed has increased from 1920's levels indicated by our earliest records (revestment notes; Map 19), primarily as a result of fire exclusion.

The Wild Rogue - South Watershed contains at least five plant series: Douglas-fir, Jeffrey pine, ponderosa pine, tanoak and white fir. Plant communities (associations) with the same climax dominant(s) are referred to as plant series. The Jeffrey pine series, for example, consists of associations in which Jeffrey pine is the climax dominant (Atzet and Wheeler 1984). (Map 7)

K. SPECIES AND HABITATS

1. Terrestrial

a. Special Status Plants

Botanically speaking, the Wild Rogue - South Watershed is the least understood of all the watersheds in the Grants Pass Resource Area. To date, only 6% of BLM lands in the watershed have been surveyed for vascular plants. With the exception of one meadow survey, all of these surveys took place in clearcuts. The uncut forest vegetation in the watershed has not been extensively surveyed. Some of these surveys were conducted when older timber sales (*e.g.*, Big Winds) were prepared and are more than 10-years old. As such, they are outdated as the species of interest and the species required for survey have changed significantly. No nonvascular (fungi, lichens or bryophytes) surveys have taken place.

Within the clearcuts surveyed, 21 populations of survey and manage (S&M) or special status vascular plants were found. For S&M species, eight populations of *Allotropa virgata* were found. For Bureau-sensitive species, 10 populations of *Bensoniella oregana*, three populations of *Sedum moranii* and one population of *Frasera umpquaensis* were found. Seven populations of the Bureau-tracking species, *Asarum caudatum var. novum* (White Flowering Ginger) were also found. This species is yet to be described taxonomically. Also, two populations of the Bureau-watch species, *Cypripedium*

californicum, were located.

b. Wildlife

In 1994 the Northwest Forest Plan designated 41,886 acres (100%) of the Wild Rogue-South Watershed as late-successional reserve (LSR). A key function of the LSR system is to provide large blocks of critical habitat dispersed throughout the Pacific Northwest provide connectivity for late-successional forest species (*e.g.*, northern spotted owl), help sustain populations, and aid dispersal into the surrounding area. A key processes is dispersal and migration of wildlife within and through the watershed. This process is highly dependent on quality, quantity, and spatial distribution of appropriate habitat through time. Species habitat requirements vary greatly and a single dominant vegetative structure does not meet the needs of all species. Migration can occur at a localized level or at a regional level. Species migrating through the watershed on a regional level include animals as diverse as insects, bats and birds. Localized migration allows for species to take advantage of foraging opportunities and cover during inclement conditions. Localized dispersal of species is critical for ensuring gene flow and repopulation of uncolonized habitat.

The high diversity of soil types and consequent vegetative communities and habitats in the Wild Rogue - South Watershed provides potential for a large number of sensitive animal species. There is potential habitat for at least 46 vertebrate special status species (15 mammals, 19 birds and 12 reptiles and amphibians). In addition, a number of survey and manage and invertebrate species may occur in the vicinity (see Chapter III, Current Condition for complete list of sensitive species). Few formal wildlife surveys have been conducted in the watershed. Distribution, abundance, and presence of the majority of the species is unknown. Other vertebrates of concern include cavity-nesting species, band-tailed pigeons, and neotropical migrant birds. Twenty-one special status species are associated with older forest, eight with riparian, and eight with special habitats such as caves, cliffs and talus. The remaining species are associated with habitats such as oak stands, meadows, and pine savannahs (see Chapter V, Synthesis and Interpretation for habitat trends). The NFP has identified additional survey and manage wildlife species that probably occur in the watershed (see Chapter III, Current Condition).

The threatened northern spotted owl (*Strix occidentalis caurina*) and bald eagle (*Haliaeetus leucocephalus)* are the only known species in the watershed listed under the Endangered Species Act (1973) as threatened or endangered species. In 1992, prior to the implementation of the NFP, the U.S. Fish and Wild Service (USFWS) designated 31,715 acres (75%) of the 42,531 acres within the watershed as critical habitat for the northern spotted owl. This watershed has also been identified by the USFWS as being within the potential nesting range (Zones 1 & 2) for the threatened marbled murrelet (*Brachyramphus marmoratus*). Surveys for marbled murrelets have not located any sites.

2. Aquatic

Factors such as stream temperature, number and depths of pools, abundance of large woody material, stream meander, road/stream crossings and sedimentation are key to the survival of salmonids and can severely limit fish production. Rearing salmonids require a water temperature of less than 58°F for optimum survival condition. Stream temperature is influenced by riparian ambient temperature and direct exposure to sunlight. The factors which determine stream temperature include the presence of heat

sinks such as nearby roads and open meadows, the density of overhead canopy, and the flow, aspect, and channel form of the stream. Recent habitat surveys have shown that many streams in the Rogue Watershed have less than an optimum density of pools. Pools provide depth for hiding cover and volume for rearing habitat. The goal for adequate pool-to-riffle ratio is 40:60 or 30:70 depending on the geomorpholgy of the watershed.

Cutthroat trout, steelhead, coho and chinook salmon are found in the watershed. (See Maps 11 and 12) Each is a cold water species and requires a complex habitat, especially in its early life stages. Quantitative abundance estimates are absent. Professional observation indicates a low abundance of coho, and low to moderate abundance for cutthroat trout, steelhead, and chinook. Coho salmon can be considered an indicator species for the health of an aquatic ecosystem. Cutthroat and steelhead typically have a wider range of distribution and are found higher in the tributaries than coho and chinook. Factors limiting salmonid production in the watershed include: inadequate stream flows in the summer months; high water temperatures; erosion/sedimentation to streams; low levels of large woody material in the stream and riparian area; lack of rearing and holding pools for juveniles and adults, respectively; and loss of natural connectivity due to human activities.

The mainstem of the Rogue River flows through the watershed. Anadromous fish such as the Pacific lamprey, summer and winter steelhead, cutthroat trout, fall and spring chinook and coho salmon use the Rogue River for migration. Fall chinook spawn in the mainstem primarily below Gold Ray dam. As summer water temperatures rise, disease rates in salmonids increase. Spring chinook, which remain in the wild section all summer, are particularly affected by disease.

L. FIRE

1. Fire History

Fire has been a dominant process in the forest ecosystems of southwestern Oregon, which has a long history of wildfire occurrence (Pyne 1982, [Haefner 1975, Cooper 1939], Morris 1934). The warm-temperate and dry-summer climate allows frequent fires of widely varying intensities (Whittaker 1960). Morris (1934) noted written accounts of fires in southwestern Oregon in the years 1853, 1857, 1864, 1867, 1868, and 1902. The Siskiyou National Forest was created in 1907 and included all the lands within the Wild Rogue Watershed. Records for the Siskiyou National Forest show large-fire years in 1917 (179,000 acres burned) and 1918 (152,000 burned), and a total of 50,800 acres burned in 1938. Between 1910 and 1939, 624,994 acres burned (Silver Creek Watershed Analysis 1995).

Atzet, Wheeler and Gripp (1988) described the settlement period of 1820-1910 as a period when fire was widely used by trappers, miners, ranchers and settlers to eliminate vegetation, for hunting, to enhance forage and to clear land. Burns were ignited during the hottest, driest weather periods with the intent to burn off as much vegetation as possible. Many of the 70 to 170-year old stands on the Siskiyou National Forest are on sites burned by settlers and miners (Siskiyou Final EIS 1989). A similar history is probable for the Wild Rogue - South Watershed.

In 1933 the Wild Rogue - South Watershed was surveyed for forest cover type as part of a state-wide

survey. One of the cover types mapped at that time was the category "Deforested Burn." This was defined as "lands not cut over on which the stand has been killed by fire, and which are less than 10 percent restocked." The 42,531 acre area of the Wild Rogue Watershed south of the Rogue River shows between 9,000 to 14,000 acres mapped in the deforested burn cover type. This is in the Howard Creek and Big Windy Creek drainages. The O&C Revestment Survey conducted in 1920 on this same area noted numerous recently burned areas in the same areas mapped in 1933. These areas could have been part of the burning that occurred in 1917-1919. Large portions of these drainages currently are vegetates with shrubs and are poorly stocked with conifer trees. This indicates frequent, large-fire occurrences in the Howard Creek and Big Windy Creek drainages. These are the same areas that burned in the 1987 Galice Fire.

Native Americans used fire extensively for the last 10,000 years. Prehistoric settlement in the watershed dates back beyond 8,500 years (BLM-Rogue River Survey 1994). Specific information for the use of fire in southwestern Oregon is limited (Lewis 1990). Ethnographic information is available for the Willamette Valley to the north, and for tribes known to use fire in similar plant communities in northern California. Based on the known fire use in similar plant communities, Lewis (1990) extrapolated burning techniques to native populations in the Rogue Valley area. He described three probable burning strategies based on broad plant communities: oak-grasslands, mixed brush, and forest areas.

- The oak-grasslands were burned shortly after the end of the spring rains through September to initiate early growth, provide habitat for game, and control acorn-destroying insects.

- Mixed brush was burned in the fall and in the spring. Fall burning had the goal of maintaining a mosaic of early to mid seral plant communities for game habitat and edible plant species. Spring burning created more permanent openings. This mosaic created natural fuelbreaks.

- Forest burning in dry interior areas (verus wet coastal areas to the west of the watershed) maintained open understories in stands of Douglas-fir and ponderosa pine. This provided forage for game and eliminated the buildup of ground and ladder fuels. Fire was probably also used to maintain meadows within forest areas.

Native Americans managed portions of the ecosystem using fire as a management tool. They played an active role in maintaining fire-dependent plant communities. Their burning maintained a mosaic of patches of different vegetative conditions, thereby creating edge or ecotones across the landscape. The long history of Native American burning makes it difficult to separate the effects of this burning from those of natural fires (*i.e.*, lightning caused). Native American burning no doubt contributed to the effects of the natural fire regime on the watershed's vegetation, but it is difficult to know the extent of that effect. This pre-European settlement fire frequency is a better indication of the natural role of fire due to the large degree of burning that occurred during the settlement era.

Fire suppression programs were begun during the first decade of the 20th century. Effective fire suppression in the watershed was starting to have an impact by the early 1920's, and peaked in the early 1940's with the establishment of the smoke jumper base at Cave Junction (Silver Creek Watershed Analysis 1995). Fire suppression has reduced both the number of fires and the number of acres burned. Atzet, Wheeler and Gripp (1988) found few fire scars on trees in stands less than 70 years of age.

Thomas and Agee (1986) determined that fire suppression had effectively eliminated five fire cycles in the mixed conifer stands of southwestern Oregon. Most areas within the 1987 Silver Fire Complex, which is immediately adjacent to the Wild Rogue Watershed, had not experienced fire for 70 to 120-years prior to the Silver fire (Silver Creek Watershed Analysis 1995). Fire suppression and exclusion has appreciably lengthened the fire-free period from that which previously existed in the watershed. This recent reduction in fire is new to the ecosystem and has had a substantial effect on the vegetation.

2. The Role of Fire Disturbance

Fire regimes in the Pacific Northwest are a function of the vegetation growth environment (temperature and moisture patterns), ignition pattern (lightning, human) and plant species characteristics (fuel accumulation, adaptations to fire, etc.). Effects of forest fires can be better described by grouping effects based on fire regimes. Agee (1981) describes three broad fire regime categories (these can and often do overlap considerably with one another):

> *High-severity regimes*: Fires are very infrequent (more than 100 years between fires); they are usually high-intensity stand-replacement fires.
>
> *Moderate-severity regime*: Fires are infrequent (25-100 years); they are partial stand-replacement fires, including significant areas of high and low severity.
>
> *Low-severity regime*: Fires are frequent (1-25 years); they are low-intensity fires with few overstory effects.

Fire regimes are the manifestation of the biological, physical, climatic and human components of an ecosystem as reflected in the type, frequency and size of fires (Pyne 1982). This is a relationship that perpetuates itself in a circular and stable pattern. The biotic components are an expression of the fire regime, and in turn maintain the pattern and occurrence of fire. However, when any components of the ecosystem are modified, the fire regime is prone to change.

The persistence of certain species in southwestern Oregon through the millennia can be attributed to their adaptations to fire (Kauffman 1990). Adaptations for fire survival are adaptations to a particular ecosystem and its specific fire regime. If the regime is altered, the capacity for that species to survive in the environment may be greatly changed.

Both moderate-severity and low-severity fire regimes have been present in the watershed. A coastal influence and elevation contributes to a wide variation in precipitation on west-to-east axis within the watershed. The far western portion receives 80 to 150 inches of precipitation annually while the eastern half of the watershed receives from 40 to 50 inches annually. Atzet and Wheeler (1982) determined that fire frequency ranged from 20 to 60 years for areas to the south and west of the Wild Rogue Watershed. For a majority of the watershed the natural fire cycle is probably between 20 and 30 years.

A majority of the watershed has historically experienced a moderate-severity fire regime. This regime has dominated from approximately the Rum Creek-Peavine Mountain-Peggler Butte area westward. Areas at the highest elevations are in this regime, along with cool, moist aspects and locations.

Fires in a moderate-severity regime show a wide range of effects, from high to low severity. The overall effect is a patchiness over the landscape as a whole, and individual stands will often consist of two or more age classes. Natural stands with two and three stories are the result of repeated low to moderate-severity surface fire which produces even-aged stories. This layered understory vegetation then often contributes to the intensity of the fire. Waxy-leaved shrubs and trees can carry flames into the overstory, creating a high-intensity fire. Tanoak will sprout from roots following high-intensity fire and a solid canopy of tanoak can form. If Douglas-fir is present in the stand it can take 30 years or more to outgrow and dominate the tanoak. When overstory mortality begins in older stands of Douglas-fir, tanoak in the understory is released. This increases the fuel loading and ladder fuels in a stand and tends to increase the extent of high-intensity burning.

The portion of the watershed from approximately the Rum Creek-Peavine Mountain-Peggler Butte area and east is an area of low-severity fire regime. A low-severity fire regime is one with frequent fires of low intensity. In a low-severity fire regime most of the dominant trees are adapted to resist low-intensity fire. They develop thick bark at a young age. This limits overstory mortality and most of the fire effects occur on small understory trees. Fires in a low-severity regime are associated with ecosystem stability, as the system is more stable in the presence of fire than in its absence (Agee 1990). Frequent low-severity fires keep sites open so that they are less likely to burn intensely, even in severe fire weather conditions.

With the advent of fire exclusion, the pattern of frequent low-intensity fire ended. Dead and down fuel and understory vegetation were no longer periodically removed. Species composition changed and thinner barked, less fire-resistant species increased in numbers and extent of sites occupied. This creates a trend of an ever-increasing buildup in the amounts of live and dead fuel. The understories of stands become dense and "choked" with conifer and hardwood reproduction. The longer interval between fire occurrence allows both live and dead fuel to build up. This ultimately results in higher-intensity, stand-replacement fires rather than the historical lower-intensity ground fires that maintained stands.

It is important to recognize that each vegetative type is adapted to its particular fire regime (Agee 1981). The significance of this is that the historic vegetative types that existed prior to Euro-American settlement cannot be maintained in the fire exclusion.

3. Fire Risk

Human presence in the watershed is limited to visitation actions such as recreation (hiking, camping, and rafting) and land management activities. There are only two areas of residential use: Black Bar lodge and the Rogue River ranch. The watershed as a whole has a relatively low level of risk of human-caused ignition compared to other watersheds to the east. For the period 1980-1997, 17% of the fires were human caused. Activities which create ignition risk include forest management activities, recreation, tourist and travel activities. The human-caused fire occurrence pattern for the watershed would generally be fires starting at low elevations along the Rogue River, along roads, and from campfires in undeveloped camping sites.

Lightning occurrence in the watershed is high. The watershed typically experiences at least one lightning

storm event each summer. Multiple fire starts often result from these storms.

A sampling of current fuel loading conditions was gathered from five vegetative categories and modeled for fire behavior predictions. These predictions (Murphy 1991) indicate that the potential for large fires is high to extremely high for this watershed. This is due to the buildup of fuels (both live and dead), overstocking of conifers, hardwoods and shrubs, the presence of less fire-resistant species which have invaded in the absence of frequent fire occurrence, and past management practices that created but did not treat slash.

M. HUMAN USES

The land ownership in the watershed is primarily public lands administered by the BLM. There are 364 acres of private land within the watershed, all private inholdings along the Rogue River. There are 281 acres of lands administered by the Forest Service within the watershed along the south and west boundaries.

The lands within the watershed administered by the BLM are lands formerly owned by the Oregon and California Railroad with title having been revested back to the General Land office in 1916. The General Land office combined with the Grazing Service in 1946 to form the BLM.

The private lands in the watershed were originally public lands. Those public lands were transferred to the private parties as authorized by either the general mining laws or homestead laws.

Current human use of the watershed includes river recreation, mining, and dispersed recreation. Recreational use of the area is concentrated along the Rogue River and includes rafting, fishing, day hiking, and backpacking. Dispersed recreation includes driving for pleasure, off-highway vehicle (OHV) use, hunting, mountain biking, and horseback riding. There are many historic but non-designated trails and footpaths in the area.

The Rogue National Wild and Scenic River flows through the watershed. This section of river is designated wild and receives a high amount of use, particularly during the summer. Designated in 1968 as one of the first eight rivers included within the Wild and Scenic Rivers Act, the Rogue was recognized for its outstanding recreational values, fisheries and scenery. The river's free-flowing condition was ensured with this designation. The wild section of the Rogue River within the watershed is 20 miles long (6,800 acres included within the designated wild river corridor, north and south sides; 3,159 acres on the south side).

The predominant use of the river corridor at present is for water-based recreational activities, both commercial and noncommercial. The river is used all year; however most use occurs between May and November. A substantial commercial recreation provider industry exists which produces many local jobs. Approximately 15,000 people yearly visit this area for the express purpose of visiting the Rogue. The Rogue River Trail and the Rainie Falls Trail provide opportunities for day hikes and backpacking trips.

A portion of the 39-mile Galice-Hellgate Back Country Byway crosses the southern tip of the watershed.

This is also the main route for shuttle traffic for people who float or hike the wild section of the Rogue River, and as well as a popular route to the coast. This road is closed due to snow during the winter months.

II. KEY ISSUES

INTRODUCTION

The purpose of this section is to focus the analysis on the key elements of the ecosystem that are most relevant to the management questions, human values, or resource conditions within the watershed *(Federal Guide for Watershed Analysis,* Version 2.2, 1995). Key issues are addressed throughout the watershed analysis process within the context of the related core questions *(Federal Guide for Watershed Analysis*, p. 12-14). Key issues identified for the Wild Rogue - South Watershed are summarized in Table II-1. A short narrative then follows which discusses the relevance of each key issue. Issues are not listed in any order of relative importance.

Table II-1: Key Issues

Key Issues	Related Core Topic
A. Wild and Scenic River Corridors (Rogue River, Big Windy Creek, East Fork Windy Creek, Dulog Creek, Howard Creek): Recreational use/noxious weeds along river corridor	Human Uses, Vegetation, Species and Habitat
B. Fuel/Fire -The watershed encompasses LSR lands and critical VRM area along the Rogue River and important recreational use. The risk of fire occurrence is high. There is a high potential for large-scale, high-intensity, stand-replacement fire due to vegetation density and fuels buildup.	Fire, Vegetation, Erosion Processes, Water Quality, Species and Habitat
C. Compound Hydrologic Conditions - There are a number of overlapping conditions that can cause high tributary stream yield coupled with extremely high flash flows.	Human Uses, Hydrology, Erosion Processes, Species and Habitats
D. Fisheries and Aquatic Habitat - The watershed contains designated critical habitat for coho, a listed salmonid. Limiting factors for salmonid survival and recovery are related to the watershed geomorphology, hydrology, disturbance history, and riparian condition.	Water Quality, Human Uses, Hydrology, Stream Channel
E. Elk Management Areas - The watershed contains two designated Elk management areas. These areas are important for foraging, calving, cover, etc.	Species and Habitats, Vegetation
F. Late-Successional Reserve Designation/Critical Habitat Designation	Species and Habitats

A. WILD AND SCENIC RIVER CORRIDORS: RECREATIONAL USE

In addition to the congressionally-designated wild and scenic, there are four creeks that have been found to be suitable for designation as “wild”: Dulog Creek, Big Windy Creek, East Fork Windy Creek, and Howard Creek (see Appendix J of the Final Medford District Proposed RMP/EIS, October 1994 and RMP-ROD, p. 68). These creeks are managed as if they were designated and management is directed at protecting their outstandingly remarkable values and maintaining and enhancing the natural integrity of river-related values.

Purple loosestrife (*Lythrum salicaria)* is invading the Rogue River corridor. This is one of the most noxious weeds in Oregon. The plant spreads by both rhizomes and seeds. A statewide effort to inventory the species and to develop an eradication program is currently underway. The greatest challenge for this section of the Rogue is that problem populations upstream continue to spread into the

watershed by water transport.

Recreational use of the watershed is concentrated in the Rogue River corridor. Uses include rafting, hiking, and driving for pleasure. The Grave Creek to Marial Back Country Byway begins at Grave Creek and continues to the Rogue River ranch at the western tip of the watershed. The Galice-Hellgate Back Country Byway crosses the southern portion of the watershed. Use of the river is greatest from May through October. Trail use occurs year-round, but is heaviest from spring through fall.

Pertinent questions include: What types of silvicultural prescriptions will best maintain the Rogue River viewshed? What plant series (if any) are most compatible with these management objectives? How does management of the corridor relate to or influence the management of the adjacent LSR?

B. FUELS AND FIRE

There is a high level of risk for the occurrence of a large-scale (500+ acre) wildland fire within the watershed. Fire exclusion has created vegetative and fuel conditions with a high potential for a large, destructive, and difficult to suppress wildfire occurrence. High-intensity, stand-replacement fire would be expected to occur on a minimum of 15-25% of the burn area. High-intensity wildland fire presents a threat to nearly all resource values within the watershed, especially LSR and Wild and Scenic River values. Management activities can reduce the potential for stand-replacement type fires through the use of hazard-reduction treatments. Public acceptance of hazard-reduction management activities, as well as agency funding, will be critical for the long-term health and stability of the forest ecosystem within the watershed.

C. COMPOUND HYDROLOGIC

There are a number of overlapping conditions within the Wild Rogue - South Watershed that will cause mass movement, high tributary stream yield, and extremely flashy flows.

Slides commonly occur in the west one-third of the watershed (the area of high precipitation). Rock slides have been observed in the Big Windy Creek area. Mass movement may be associated with precipitation (90 to 150 inches) annually causing extensive saturated conditions, road placement and the level of road drainage system maintenance. The high precipitation of 90 to 150 inches occurs on predominately very steep slopes of 60 to 100 percent. This area is mostly in the transient snow zone (2,500 to 4,000 foot) (Map 4). This zone is commonly subject to rain-on-snow events where rapidly melting snow in warm rainy conditions exacerbates the amount of water that reaches and infiltrates the soil.

D. CONDITION OF FISHERIES AND AQUATIC HABITAT

Human activities such as logging, road construction, mining, and fire suppression, as well as natural events such as wildfire and floods, have impacts on fisheries and aquatic habitat. In order to assess these impacts, the historic and current levels of fish populations and quality of habitat must be known. Evaluating the range of current conditions in the watershed allows for a characterization of the properly functioning condition of the aquatic systems in the watershed which takes in to account the natural

potential of an ecosystem to provide habitat.

Salmonid survival and production depend on complex habitat elements and environmental conditions. In general, factors that can limit salmonid production include: inadequate stream flows in the summer months; high water temperatures; disproportionate stream erosion/sedimentation; low levels of large woody material in the stream and riparian area; lack of rearing and holding pools for juveniles and adults, respectively; channelization of streams in the canyons and lowlands; and blockages of migration corridors.

E. ELK MANAGEMENT AREA

There are two RMP-designated Elk management areas located within the watershed. The largest is located east of Howard Creek and the other is located west of Jenny Creek and extends to the western edge of the watershed boundary. Elk were extirpated in this region during the late 1800's and early 1900's but were reintroduced in the 1960's by the Oregon Department of Fish and Wildlife. The management objective (see RMP) of this designation is to enhance elk habitat consistent with LSR management objectives. Issues include: the disturbance and poaching of elk due to motorized vehicle activity on the extensive open road network; the encroachment of brush and timber into natural openings and meadows; adequate thermal cover; and the availability of warm, gentle slopes with ample hiding cover for calving grounds.

F. LATE-SUCCESSIONAL RESERVE DESIGNATION/CRITICAL HABITAT DESIGNATION

All of the Wild Rogue - South Watershed is within a late-successional reserve (see Map 3). Portions of the watershed were also designated in 1992 by the USFWS as critical habitat for the northern spotted owl. This designation was made in order to facilitate the recovery of the northern spotted owl. The USFWS-designated areas that would protect clusters of reproductively-capable spotted owls. Like critical habitat, the late-successional reserve system was developed around clusters of owls, while taking into consideration the needs of other late-successional forest species. In 1994, the USFWS accepted the late-successional reserve system under the Northwest Forest Plan as the federal agencies' contribution to the recovery of the northern spotted owl. Key issues influencing the effectiveness of the LSR/critical habitat designations include the past fire history in the watershed, the effects of past timber management and salvage practices, and the ability of the watershed to produce late-successional forest characteristics and provide for late-successional species, consistent with the Northwest Forest Plan.

III. CURRENT CONDITION

A. PURPOSE

The purpose of the Current Condition section is to develop detailed information relevant to the key issues from Section I, and to document the current range, distribution, and condition of the core features and other relevant ecosystem elements.

B. CLIMATE

The east half of the watershed has a Mediterranean climate with cool, wet winters and warm dry summers. The west half of the watershed has a marine (coastal) climate with cool very wet winters and temperate, mild summers. Average annual precipitation in the watershed ranges from approximately 50 inches at the east end to 150 inches in the central west portion. Most of the precipitation is in the form of rain. About 25% of the watershed is located above 2,500 feet in elevation in the transient snow zone (TSZ). The TSZ is where shallow snow packs accumulate and then melt throughout the winter in response to alternating cold and warm fronts (USDI-BLM 1993). The least amount of precipitation falls in the east portion of the watershed. The greatest amount of precipitation falls in the far west portion of the watershed at the highest elevations, approximately 4,000 feet and above. The greatest increase in precipitation (70 inches) occurs in a two-mile band in the west half of the watershed. This shows a strong rain shadow effect from coastal storms.

The nearest National Oceanographic Atmospheric Administration (NOAA) weather station is in Grants Pass. This station shows that the lowest monthly minimum average temperature occurs in January (32.3^{o} F) and the highest average monthly maximum occurs in July (89.8^{o} F). The 30-year average (1951-1980) rainfall recorded at the Grants Pass weather station is 31.01 inches.

C. SOILS

1. Erosional Processes

Erosion hazard is an indication of a soil's susceptibility to particle or mass movement from its original location. Particle erosion hazard, concentrated flow assumes a bare soil-surface condition. If the soil is protected by vegetation, litter, and duff, such that no mineral soil is exposed, concentrated flow erosion is not likely to occur and mass movement or streambank erosion is less likely to occur.

A dominant erosion process is concentrated flow erosion. This form of erosion occurs when water accumulates on the soil surface, predominately where there is little or no protective organic material. As the water flows downslope it builds energy which allows for detachment of soil particles that then travel as sediment in the flowing water. Sediment is then deposited where flow rates diminish.

The following soils with high to very high concentrated flow erosion hazard are extremely common in the watershed on slopes greater than 35% (most being on slopes greater than 60%): Jayar, Beekman, Vermissa, Woodseye, Acker, and Kanid (Soil Survey of Josephine County, USDA - SCS, 1983 and

unpublished Soil Survey of Curry County, USDA - NRCS).

These soils have surface textures ranging from gravelly sandy loam to cobbly clay loam. These soils have high erosion hazard due to the severity of the slope. The steep slopes give flowing water high erosive energy as it increases velocity running downslope. However, they also have high infiltration rates which often allows for water to be absorbed before concentrated flow can get started.

Modified conditions that are most conducive to concentrated flow erosion include road drainage outlets, unprotected road ditches, areas of bare soil usually created by ground-disturbing activities or fire, wheel ruts on natural-surface roads, and highly-altered ground surface created by OHV's or other motorized equipment. Areas of high road density, which often experience more intense ground disturbance than would naturally occur, are commonly prone to this type of erosion (see Road Density section below).

Mass movement is another dominant form of erosion in this watershed. Mass movement occurs in larger bodies of soil and weathered rock. Examples include colluvial movement, debris flows, slumps, and landslides. Colluvial movement of gravels is one type of mass movement that likely commonly occurs in the watershed. Colluvial movement is caused by the force of gravity on steep slopes which results in patches of gravel lag. The gravel is commonly 2 - 6+ inches thick. Areas that accumulate gravel include draw and swale bottoms and other depressions on steep sloping landscapes.

Conditions that tend to accelerate the rate of movement of colluvial gravel include lack of vegetation and root mass and exposure of surface gravel to moisture and temperature effects (*i.e.,* frost heaving, expansion/contraction).

Simple rock slides or rock falls are probably common in the watershed. They occur in areas where bedrock is exposed and is in the process of fracturing and weathering. As rock becomes detached from its parent, gravity pulls it down slope in the form of talus material.

2. Variable Road Densities

Roads on sloping ground intercept surface water and shallow groundwater. The water is commonly routed by the road to a draw or other drainageway that is part of the natural stream system. This process causes drainage water to reach streams quicker than would naturally occur. The more roads that exist in a particular area, the more the increase in peak stream flow. With an increase in peak stream flow, streambanks are more susceptible to erode as the stream channel adjusts to the change in flow pattern. Additional stream sediment caused by this phenomenon predominately comes from eroded streambanks. Other sources for stream sediment are the road surface, slough from steep road banks, and eroded channels created by flows at drainage outlets downslope.

The above gives a general perspective on high road densities. However, road design and location on the landscape produce varying effects. For example, an outsloped road with water dips, rocked surface and outlet filters would have less effect than a lower slope natural-surfaced road with ditches. This is because of differences in proximity to the stream system, the degree of concentration/distribution of surface water flow due to road design, and differences in the amount of protection of the road surface. In order to understand the comprehensive nature of road effects in the Wild Rogue - South Watershed, a full

analysis of all subwatersheds is needed which considers road densities and existing road conditions, design and location on the landscape. This will be accomplished by evaluating each road in the transportation system through the BLM's Transportation Management Objectives (TMO's) process.

Within the subwatersheds of the watershed, there are extremely variable road densities, from low (less than 2 miles/mile^2) to very high (over 6 miles/mile^2). The subwatersheds known to have high to very high road densities are Long Gulch Rogue, Missouri Trout, Big Windy, Little Windy Rogue, Jenny Dulog Rogue (see Table III-3).

D. HYDROLOGY

There are an estimated 236 miles of streams in the watershed other than order 1. Table III-1 notes the estimated miles of stream in orders 2 through 6 (See Map 10).

Table III-1: Miles of Stream by Stream Order (BLM Lands Only)

Stream Order	2	3	4	5	6	9	Rogue River	Total
Miles	120	55	24	12	4	1	20	236
Percent of total	51%	23%	10%	5%	2%	0.4%	8%	

Source: Medford BLM GIS

Stream orders are defined by how many streams come together to create a larger stream. A stream that is at the headwaters and has no tributaries is a first order stream. When two first order streams flow together, the stream becomes a second order stream, and so on.

First and second order streams in the watershed have a major influence on downstream water quality since they comprise a majority of the total stream miles in the planning area. Both aquatic and terrestrial wildlife species are supported by these streams. Most first and second order streams in the watershed are characterized by intermittent stream flow, and are characterized by having generally very narrow and V-shaped channels with steep gradients. Large woody debris, which dissipates stream energy and slows channel erosion, is a key component of these headwater streams. The amount of large woody debris in first and second order streams in the planning area has likely been greatly reduced as a result of timber harvest and prescribed burning. This loss of woody debris contributes to reduced channel stability and increased sediment movement downstream during storm events (USDI-BLM 1994).

Third and fourth order streams comprise approximately 33% of the stream miles in the watershed. Most of the third order streams do not support fish but many of the fourth order streams do. All of these streams contribute to the water quality of fish-bearing streams. Third and fourth order streams in the watershed are generally perennial, fairly narrow, have stream gradients less than 15%, and have V and U-shaped channels. During winter storms, these streams can move large amounts of sediment, nutrients, and woody material. Channel condition of these streams varies and depends upon the inherent channel stability and past management practices in the watershed. The amount of large woody debris contributed to these streams was likely reduced by past management practices in the riparian areas (USDI-BLM 1994).

Fifth order and larger streams make up approximately 7% of the stream miles in the watershed. These streams support fish and have other benefits. Fifth order and larger streams tend to be wider, have flatter gradients and, occasionally, also have a noticeable floodplain. Flood events play a major role in the channel condition of these larger streams.

Mature forest stands along streams on BLM-administered land generally contain trees of sufficient size to provide a future source of large woody debris. However, past practices such as salvage logging from stream channels, leaving few conifers in riparian areas, and removing debris jams to improve fish passage have reduced the amount of large woody debris in fifth order and larger streams (USDI-BLM 1994).

E. WATER QUALITY

Water quality varies greatly throughout the greater Rogue Basin. The Oregon Department of Water Quality has monitored or collected water quality data from various sources for different streams and water bodies of the state. This information is captured in DEQ's 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution. Information has been periodically updated and compared to water quality standards. This has led to listing of some streams as "Water Quality Limited." The most recent stage of this process has been the publication for public review of Oregon's 1998 Section 303(d) Decision Matrix by the Oregon DEQ. There is little data regarding water quality for streams in the Wild Rogue - South Watershed. The Medford BLM has performed limited water quality testing (temperature) in the Wild Rogue Watershed. Those streams tested are all in the Wild Rogue - North portion of the watershed (Whisky and Mule Creeks). Table III-2 lists the 303(d) listed streams in the watershed based on data from the DEQ's 1998 303(d) Draft List Decision Matrix.

Table III-2: Oregon DEQ's 303(d) Listed Streams

Stream & Segment	Parameter/ Criteria	Basis for Consideration	Supporting Data or Info	Listing Status
Rogue River: Illinois River to Grave Creek	Temperature (Fish Rearing, 64°F)	USFS Data; NPS Assessment Data (DEQ 1988)	USFS Data (3 sites): exceeded standard, 1993,1994	303(d)
Whisky Creek	Temperature (Fish Rearing, 64°F)	BLM Data	BLM Data: exceeded standard 1994	303(d)
Mule Creek	Temperature (Fish Rearing, 64°F)	BLM Data	Exceeded standard in 1995	303(d)

All streams in the above table have a 303(d) status of water quality limited. As such, they are required to be managed under water quality management plans. Other streams with a status of "Need Data" are candidates for water quality limited status but, due to insufficient data, a conclusion has yet to be made. Future data collection may change their status. There are other streams that simply have not been tested, such as all tributary streams in the Wild Rogue - South Watershed. Observation by BLM specialists indicates that some of these streams may be candidates for 303(d) listing due to warm summer temperatures, sedimentation, and habitat modification. Some inferences regarding water- quality and stream ecosystem function may be made from macroinvertebrate monitoring that has been conducted under BLM contract. Though temperatures were not recorded, the assemblages of invertebrates indicate

the following :

Big Windy Creek — Surveyed in 1997. Cold water species present indicate that the stream is probably functioning at risk for temperature. Summer levels are lethal for some invertebrate species, making the stream temperatures borderline supportive for salmonids.

Howard Creek — Surveyed in 1992 and 1997. The absence of some cold water species indicates that the stream is probably not functioning properly for temperature. Summer levels are lethal for many invertebrate species, making the stream temperatures borderline supportive for salmonids. The differences between the two surveys years suggest a warming trend, possibly due to moderate shade levels.

Missouri Creek — Surveyed in 1993 and 1997. Cold water species presence indicates that the stream is functioning properly for temperature. Summer levels are within the range which supports the indicator species, making the stream temperatures supportive for salmonids. No upward or downward change is indicated by the two surveys.

1. Water Temperature

Many factors contribute to elevated stream temperatures in the watershed. Low summer stream flows, hot summer air temperatures, low-gradient valley bottoms, lack of riparian vegetation, and high channel width-to-depth ratios can all contribute to higher stream temperatures that can stress cold water aquatic life. Natural disturbances that can affect stream temperature are high air temperatures, below- normal precipitation (low flows), wildfire and floods (loss of riparian vegetation). Human disturbances affecting stream temperatures include water withdrawals, channel alterations and removal of riparian vegetation through logging, mining, grazing or residential clearing. Logging and road construction are the two forms of human disturbances that are most evident in this watershed. Some streams in natural (undisturbed) condition may have temperatures higher than the 7-day average of the daily maximum allowed under the 303(d) listing criteria due to lack of vegetation for shade (particularly in rocky areas) and the warm summer temperatures in this watershed.

The DEQ has established that the 7-day moving average of the daily maximum shall not exceed the following values unless specifically allowed under a department-approved basin surface water temperature management plan:

- 64°F
- 55°F during times and in waters that support salmon spawning, egg incubation and fry emergence from the egg and from the gravels.

2. Stream Flow

The stream flow in the Wild Rogue Watershed fluctuates with the seasonal variation in precipitation for tributary streams. The Rogue River also fluctuates with upstream variation caused by releases at Lost Creek dam, Applegate dam and input from tributaries between the Wild Rogue Watershed and Lost Creek dam.

a. Peak Flow

Maximum peak flows generally occur in December, January and February. No data is available for the watershed.

Upland disturbances can result in increased magnitude and frequency of peak flows which may result in accelerated streambank erosion, scouring and deposition of stream beds, and increased sediment transport. The natural disturbance having the greatest potential to increase the size and frequency of peak flows is a severe, extensive wildfire. In the Wild Rogue - South Watershed the primary human disturbances that can potentially affect the timing and magnitude of peak flows include roads, heavy logging in the transient snow zone (TSZ) (See Map 4), and vegetation removal (heavy logging). Quantification of these effects on stream flow in the watershed has not been attempted. Roads quickly intercept and route subsurface water and surface water to streams. The road-altered hydrologic network may increase the magnitude of increased flows and alter the timing when runoff enters a stream (causing increased peak flows and reduced, low flows). This effect is more pronounced in areas with a high road density and where roads are in close proximity to streams. Current road densities per mile are listed for selected drainage areas in Table III-3.

Vegetation removal reduces water interception and transpiration and allows more precipitation to reach the soil surface and drain into streams or become groundwater. Until crown closure reaches pre-removal levels, a site is considered to be hydrologically unrecovered. Rates of hydrologic recovery are site-specific and depend on many factors including the type and extent of disturbance, soils, climate and rates of revegetation (Lindell 1993). Extensive vegetation removal in the transient snow zone is of particular concern due to resultant alterations of the stream flow regime and increased peak flow magnitudes. Equivalent Clearcut Acres (ECA) (*i.e.*, acres of unrecovered vegetation) and snow zone openings are shown in Table III-3. ECAs describe the acres within a particular subdrainage that do or will (in the foreseeable future and within the recovery period) exist in a clearcut condition. The ECA is determined by adding the area actually in clearcut condition to an "equivalent" clearcut area that

represents the area occupied by roads outside of clearcut units and partial or selective cut areas. The drainage areas listed in Table III-3 constitute roughly 50% of the Wild Rogue - South Watershed.

The transient snow zone (TSZ) is the zone in which rain on snow will commonly fall. It is represented by an elevation band (2,500 to 4,000 feet) that is between the common snow level and where rain is the usual form of precipitation.

Table III-3: Current Hydrologic Conditions of Selected Drainage Areas of Wild Rogue - South Watershed (BLM and Non-BLM Lands, Est. Based on 1992 Data)

Drainage Area (subwatershed)	Total Acres	Acres in TSZ (est.)		Open Acres in TSZ (est.)		Equivalent Clearcut Acres		Compacted Acres		Average Road Density (mi/mi^2)
	Acres	Acres	% of DA	Acres	% of DA	Acres	% of DA	Acres	% of DA	
Long Gulch Rogue	2,598	NA	<6	NA	<2	210	8%	258	10%	5.2
Missouri Trout	3,888	1,450	37%	1,225	32%	550	14%	310	8%	7.4
Hewitt Rogue	2,299	690	30%	184	8%	140	6%	90	4%	3.5
Jenny Dulog Rogue	4,381	2,190	50%	595	14%	315	7%	324	7%	6.2
Little Windy Rogue	2,206	662	30%	130	6%	88	4%	66	3%	5.2
Big Windy (est.)	9,000	4,500	50%	2,250	25%	1,800	20%	360	4%	High

TSZ = Transient Snow Zone; NA = Data not available

Table III-3 indicates that, due to the extent and condition of the transient snow zone, runoff from rain on snow in openings is a major contributor to rapid runoff and thus peak stream flows. This particularly applies to the Missouri Trout, Jenny Dulog Rogue, and Big Windy drainage areas. This is because the opening areas appear to be large in relation to these drainage areas. Two other factors that can add to rapid runoff are that much of the transient snow zone is in a very high precipitation band (80 to 150 inches per year, see Map 4 and many of the roads are located within the TSZ. Also, soils are, for the most part, gravelly which may mean high infiltration rates with shallow ground water reaching streams rapidly under unmanaged conditions (*i.e.*, a naturally flashy system).

b. Low Flow

Low summer flows in the watershed reflect the low summer rainfall. Naturally low summer flows are exacerbated for tributaries to the Rogue River by periods of below-normal rainfall. Low flow in the Rogue River is augmented through releases to the Upper Rogue from Lost Creek Lake and releases to the Applegate River from Applegate Lake.

The lowest daily mean flow of the Rogue River at Grants Pass since the filling of Lost Creek Lake was 744 cubic feet per second. The lowest flow since the filling of Applegate Lake was 744 cubic feet per second (USGS 1997).

There is no quantitative information about stream flows for the Rogue and its tributaries in the watershed. It should be noted that the larger tributaries (those listed above in Table III-3) usually flow year-round during years of average or greater annual precipitation. Summer flow is attributable to sizable areas where snow accumulates and melts during the summer.

F. STREAM CHANNEL

A system of stream classification has been developed by Rosgen (Rosgen 1996) that is useful in

interpreting various types of streams as to their sensitivity to disturbance and their recovery potential. The classifications are symbolized by a combination of letters and numbers. The first letter determines the stream reach type and the small case letter refers to the slope of the reach. The number represents the channel material. The plus sign refers to very steep slopes. The plus sign refers to very steep slopes. Table III-4 provides a description of the stream classifications prevalent in the watershed.

Table III-4: Rosgen Stream Classification

Stream Type	General Description	Landform/Soils/Features
Aa+	Very steep, deeply entrenched, debris transport, torrent streams.	Very high relief. Erosional, bedrock or depositional features; debris flow potential. Deeply entrenched streams. Vertical steps with deep scour pools; waterfalls.
A	Steep entrenched, cascading, step/pool streams. High energy/debris transport associated with depositional soils. Very stable if bedrock or boulder dominated.	High relief. Erosional or depositional and bedrock forms. Entrenched and confined streams with cascading reaches. Frequently spaced, deep pools in associated step/pool bed morphology.
B	Moderately entrenched, moderate gradient, riffle-dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.	Moderate relief, colluvial deposition, and/or structural. Moderate entrenchment and width/depth ratio. Narrow, gently sloping valleys. Rapids predominate w/scour pools.
F	Entrenched, meandering, riffle/pool channel on low gradients with high width/depth ratio.	Entrenched in highly-weathered material. Gentle gradients with shallow, wide channel. Riffle/pool bed morphology.
G	Entrenched gully step/pool channel on moderate gradients with low width/depth ratio.	Entrenched gullies. Moderate gradients, with a low width/depth ratio. Narrow valleys, may have high bank erosion rates. Step/pool morphology.

Much of the Rogue River in the Wild Rogue - South Watershed is stream type B, F, or G, with bedrock control commonly occurring that constricts the channel.

Table III-5: Rosgen Management Interpretations of Various Stream Types

Stream Type	Sensitivity to Disturbance	Recovery Potential	Sediment Supply	Streambank Erosion Potential	Vegetation Controlling Influence
A2	very low	excellent	very low	very low	negligible
A3	very high	very poor	very high	high	negligible
A4	extreme	very poor	very high	very high	negligible
B4	moderate	excellent	moderate	low	moderate
B5	moderate	excellent	moderate	moderate	moderate
B6	moderate	excellent	moderate	low	moderate

Table III-5: Rosgen Management Interpretations of Various Stream Types					
Stream Type	**Sensitivity to Disturbance**	**Recovery Potential**	**Sediment Supply**	**Streambank Erosion Potential**	**Vegetation Controlling Influence**
C3	moderate	good	moderate	moderate	very high
C4	very high	good	high	very high	very high
F2	low	good	low	low	moderate
G3	high	moderate	very high	high	moderate

Within the adjacent Rogue - Recreation Section Watershed, 24 Aa+ stream reaches have been surveyed in the Peavine area of the LSR. Aa+ streams are located in steep draws; many are class 4 (intermittent). There were low amounts of large woody debris (LWD) in the stream channels. Pieces that were counted were as small as six inches in diameter. Six out of the 24 reaches surveyed were identified as low in LWD. In streams LWD contributes to the form and structure of a stream's channel. Woody debris significantly contributes to stream complexity and habitat diversity. This diversity of channel form results in diversity of habitat for aquatic organisms (see Aquatic section for further discussion and other streams observed). The large woody debris is particularly critical for the steep tributaries because it creates a stepped stream profile and dissipates stream energy in relatively short, steep sections of the channel. Large woody debris also traps and slows the movement of sediment and organic matter through the stream system. Seven of the surveyed reaches had large wood levels below ODFW benchmark standards. This means that there will be a long-term deficiency of large wood in the identified reaches. Also, nine of the 24 reaches were identified as having upland watersheds that contribute to riparian degradation.

Substrate varies throughout the watershed by the reach and stream. At the lower elevations, low-gradient stream reaches predominantly contain gravel, sand or silt. Sources of fine sediment in the Wild Rogue - South Watershed appear to primarily come from road surfaces, fill slopes and ditchlines. Soil that moves into the ditchlines is carried to stream systems by ditch runoff. Drainage areas with high numbers of road-stream crossings are likely to experience the most sediment movement into stream channels. The high energy types A and Aa+ streams are capable of transporting sediment to downstream reaches that support fish.

The trend for channel stability and condition should improve with additional large wood recruitment over the long term. Roads will continue to supply sediment, although maintenance and decommissioning would reduce the sediment source.

Undersized culverts can affect the stream channel by restricting stream flow. Culvert installation prior to 1992 in the watershed was either designed for a 25 to 50-year flood event, or sized based on channel width and stream flow. Today's culverts are designed for a 100-year flood event as required by the Northwest Forest Plan and the Medford District RMP. During road inventories conducted as a part of the BLM's transportation management objectives (TMO's) process, existing culverts are evaluated for

potential replacement and resizing to meet the 100-year flood event requirements. Also included as a part of this process are evaluations of erosion on and related to the roads, road prism geometry, and presence of cut/fill failures. TMO road inventories have not been conducted for this watershed.

G. VEGETATION

1. Description

Data on BLM land used to compile this section was collected in 1997 and 1998. The plant series listed below were identified and mapped within the Wild Rogue - South Watershed (Maps 5, 6, 7, and 8).

Douglas-fir	(*Pseudotsuga menziesii* ((Mirb.) Franco.))
Jeffrey pine	(*Pinus jeffreyii* (Grev. & Balf.))
Ponderosa pine	(*Pinus ponderosa* (Laws.))
Tanoak	(*Lithocarpus densiflora* (Hook. & Arn.) Rehd.))
White fir	(*Abies concolor* ((Gord. & Glend.)Lindl.))
White oak	(*Quercus garryana* (Dougl.))

Table III-6 summarizes the extent of each of these series in the Wild Rogue - South Watershed.

Table III-6: Major Plant Series on Federal Land - 1998

Plant Series	BLM *		USFS		Total Federal	
	Acres	%	Acres	%	acres	%
Douglas-fir	10,890	26%	nd			
Douglas-fir currently dominated by Canyon Live Oak or Knobcone Pine	818	2%	nd			
Jeffrey pine	28	0.1%	nd			
Ponderosa pine	48	0.1%	nd			
Tanoak	29,013	69%	nd			
White fir	1,058	3%	nd			
Non-Vegetated, Non-Forest, or Grass	31	0.1%	nd			
Totals	**41,886**		**281**		**42,167**	

*Data Source = BLM GIS nd = not determined

2. Site Productivity

Basal area is used as a relative measure of site productivity. For example, an area that can support 200 ft^2/acre of basal area is more productive than an area that can support 100 ft^2/acre of basal area. Basal area in a plant series considers all species; it is not limited to the tree species the series is named for. The following discussion addresses the relative productivity of each of the series in the watershed.

Douglas-fir is the most common tree species in southwestern Oregon. Sites within the Douglas-fir series average 254 ft^2/acre (Atzet and Wheeler 1984). Douglas-fir tends to produce conditions that favor fire

wherever it occurs. This species is self-pruning, often sheds its needles, and tends to increase the rate of fuel buildup and fuel drying (Atzet and Wheeler 1982).

The Jeffrey pine series is confined to areas of ultrabasic (serpentine and serpentine-influenced) soils (Atzet and Wheeler 1982). Serpentine areas dominated by Jeffrey pine may have the lowest productivity of any conifer series in the Klamath Province with an average basal area per acre of 83 ft^2/acre (Atzet and Wheeler 1984). While not considered important in terms of timber production, these sites are floristically diverse supporting many special status plants. They also have value as unique habitats for a variety of wildlife species.

Forests in the ponderosa pine series average approximately 170 ft^2/acre of basal area. This series is relatively rare as ponderosa pine does not often play the role of a climax dominant (Atzet and Wheeler 1984). This series tends to occupy hot, dry aspects that burn frequently. Ponderosa pine regeneration is restricted by reducing the number of fire events. Due to the success of fire suppression over the last 70 years, overall cover of this series has decreased (Atzet and Wheeler 1982).

Sites in the white fir series are also considered productive, with basal area averaging over 341 ft^2/acre (Atzet and Wheeler 1984). The white fir series is widespread, diverse and productive (Atzet and McCrimmon 1990). White fir's thin bark provides little insulation during low-intensity underburns until tree diameter reaches at least eight inches. Moreover, the shade-tolerant nature of white fir, which allows branches to survive close to the ground, makes the lower crown a ladder to the upper crown (Atzet and Wheeler 1982). Due to the effectiveness of fire suppression efforts over the last 70 years, white fir occupancy has increased.

In general, tanoak sites are considered productive. Average total basal area for this series is 262 ft^2/acre (Atzet and Wheeler 1984). The tanoak series occurs where both soil and atmospheric moisture are plentiful. The series occurs most frequently on cooler aspects with fine-textured soils (Atzet and Wheeler 1984). Fire is the principal inhibitor of dominance of individual tanoak trees (Tappeiner *et. al.* 1990). Due to the success of fire suppression efforts over the last 70 years, overall presence of this species has increased in the watershed.

The white oak series occurs at low elevations and is characterized by shallow soils. Average basal area is 46 ft^2/acre. Although Oregon white oak is usually considered a xeric species, it also commonly occurs in very moist locations such as in flood plains, on heavy clay soils, and on river terraces. On better sites white oak is out competed by species that grow faster and taller (Stein 1990). Water deficits significantly limit survival and growth (Atzet and McCrimmon 1990). White oak has the ability to survive as a climax species as it is able to survive in environments with low annual or seasonal precipitation, droughty soils, and where fire is a repeated natural occurrence (Stein 1990). The natural fire regime of this series is one of high frequency and low intensity (Atzet and McCrimmon 1990). Due to the success of fire suppression over the last 70 years, the prominence of this series has declined.

Table III-7: Vegetative Condition Class on BLM Land - 1998						
Vegetative Condition Class	**BLM ***		**USFS**		**Total Federal**	
	Acres	**%**	**Acres**	**%**	**Acres**	**%**
Non-Vegetated, Grass, or Forb	31	0.1%	**nd**			
Hardwood dominated	5,437	13%	nd			
Early (stand age < 10 years)	603	1%	nd			
Seedling/Sapling (average stand diameter < 5")	3,092	7%	nd			
Poles (average stand diameter 5" to 11")	4,112	10%	nd			
Mid (average stand diameter 11" to 21")	5,226	12%	nd			
Mature (average stand diameter > than 21")	23,385	56%	nd			
Total	**41,886**		**281**		**42,167**	

* Data Source: BLM GIS nd = not determined

3. Landscape Patterns

Several important landscape patterns are apparent:

a) The watershed is prone to large-scale fire events. Two large-scale (> 1,000 acres) fire events have occurred in the last 30 years. The Quail Creek fire burned over 2,800 acres in 1970. This fire burned on both sides of the Rogue River. More recently, the Galice fire burned over 25,000 acres in 1987, all on the south side of the Rogue River.

b) The dominant plant series is tanoak. About 69% of the watershed is currently in the tanoak series. This plant community generally occurs below 3,000 feet in elevation in this watershed.

c) The Douglas-fir series is the second most common plant series in the watershed, occurring on approximately 26% of the acres. On the south and west side of the watershed, it is transitional between the tanoak and white fir series.

d) The white fir series is found sporadically at the highest elevations (periphery) of the watershed.

e) Sixty-eight percent of the watershed is either mid seral (12%) or mature (56%) forest. These condition classes occur in the central and north portions of the watershed.

f) Knobcone pine occurs on the driest sites in the Howard Creek drainage, indicating historic stand-replacement fire events.

H. SPECIES AND HABITATS

1. Introduction

The responsibilities of the federal agencies include the active management of special status species and their habitats, survey and manage species and their habitat, special areas, and native plants. The following are special status protection categories used as guidelines for management of special status species and their habitats.

Listed and proposed listed species are those species that have been formally listed by the USFWS as endangered or threatened, or officially proposed for listing. The goals are to enhance or maintain critical habitats and increase populations of threatened and endangered plant species on federal lands. An additional goal is to restore species to historic ranges consistent with approved recovery plans and federal land use plans after consultation with federal and state agencies.

Survey and manage species were identified as needing special management attention by the Northwest Forest Plan ROD in Table C-3 (USDA/USDI ROD 1994). These species must be managed at known sites and located prior to ground-disturbing activities (Survey Strategy 1 & 2). Some species listed in the NFP need to be inventoried extensively, and, if any are found, some of the sites need to be managed (Survey Strategy 3). A regional survey would be conducted on Survey Strategy 4 species.

Candidate and Bureau-sensitive species are federal or state candidates and those species that BLM feels might become federal candidates. The goal is to manage habitats to conserve and maintain populations of candidate and Bureau-sensitive plant species at a level that will avoid endangering such species and could lead to listing species as endangered or threatened by either state or federal government.

State-listed species and their habitats are those plants listed under the Oregon Endangered Species Act. Conservation will be designed to assist the state in achieving its management objectives.

Bureau-assessment species are those species considered by the state BLM office to be important species to monitor and manage, but not to the same extent as candidate or Bureau-sensitive species. The goal is to manage where possible so as not to elevate their status to any higher level of concern.

BLM tracking species are not currently special status species, but their locations are tracked during surveys to assess future potential needs for protection.

2. Terrestrial

a. Botanical

Compared to the adjacent watersheds (Rogue - Recreation Section, Indigo Creek, and Silver Creek), the Wild Rogue - South Watershed is not as botanically diverse. Although surveys have been few, this can be postulated because of the lack of habitat diversity in the watershed. Conifer forests dominate with little meadow, oak woodland/savannah, or serpentine habitats. Table III-8 lists the survey and manage

and special status plants found within the Wild Rogue - South Watershed. Four special status or survey and manage species have been found in the watershed: eight populations of *Allotropa virgata*, ten populations of *Bensoniella oregana*, three populations of *Sedum moranii*, and one population of *Frasera umpquaensis*. The Bureau-tracking species, *Asarum caudatum var. novum* and the Bureau-watch species, *Cypripedium californicum* have also been found in the watershed.

Table III-8: Special Status Plants

Species	Species Status *	Habitat
Allotropa virgata	SM	mixed evergreen
Bensoniella oregana	SC/BS	riparian
Sedum moranii	SC/BS	cliffs, rock outcrops
Frasera umpquaensis	SC/BS	openings
Asarum caudatum var. novum	BT	riparian forest
Cypripedium californicum	BW	wetlands, riparian

* SC = Species of Concern, SM = Survey and Manage species, BS = Bureau Sensitive, BA = Bureau Assessment, BT = Bureau Tracking, BW = Bureau Watch

All of these populations were found during recent surveys of silviculture units (clearcuts). Only about 6% of the BLM lands in the watershed have been surveyed. Since little of the watershed has been surveyed, current conditions must be estimated based on consideration of the potential habitats of the species that have been found. Late-successional forest conditions exist on approximately 64% of the BLM land in the watershed *(i.e.*, roughly 27,000 acres of old growth and mature seral stages). The plant series most likely to harbor survey and manage species within these seral stages are the tanoak and Douglas-fir series, which occupy approximately 95% of BLM land in the watershed. Therefore habitat for *Cypripedium fasciculatum* (clustered ladyslipper) (CYFA), *Cypripedium montanum* (mountain ladyslipper) (CYMO) and *Allotropa virgata* (candystick) (ALVI) could exist within the intact forests of the watershed. Fragmentation of intact forest stands in these series is high in some portions of the watershed, however, thereby reducing the potential for occurrence.

According to the NFP Management Recommendations for Vascular Plants (1998), CYFA and CYMO are most likely found in areas with 60-100% shade provided by older stands in various plant communities within Douglas-fir forests. Although these species are not attached to a specific vegetative community, they are, more importantly, dependent on specific microsite characteristics, including a high percent of shading, high moisture, and undisturbed mychorrhizal connections in older age class forest stands. The actual viable habitat for these species would then also be limited to microsites with moist, north aspects, larger vegetation condition classes, and sites with 60%-90% canopy closure. They would not likely be near ecotones *(e.g.*, clearcut borders), due to the disrupted mychorrhizal connections. Although these species have not been documented, they most likely occur sparsely in these limited areas.

Allotropa virgata is found in late-successional forest habitats where conditions are drier. It is linked to

dead and down components of the forest ecosystem and to undisturbed mychorrhizal connections. It can be closely associated with high canopy cover in tanoak plant associations and is, therefore, probably more common than CYFA or CYMO in this watershed.

The Wild Rogue - South Watershed is a stronghold for *Bensoniella oregana*. This Bureau-sensitive species is also considered a survey and manage species in California due to the small number of populations found there. It is still, however, considered a rare component of riparian areas, wet meadows and bogs in the Klamath region in Oregon.

The watershed also contains the Bureau-sensitive species *Frasera umpquaensis*. The known range of this species is limited to five counties in southwest Oregon (Jackson, Douglas, Lane, Curry, Josephine). The majority of known populations are found along the Rogue-Umpqua Divide further upstream in the Rogue basin. A small number are found on the divide between the Silver Creek, Indigo Creek and the Wild Rogue - South Watersheds. The species grows in openings, primarily in mid to high elevation true fir or mixed conifer forests. In order to ensure the viability of the species over the long term, a conservation strategy was developed by the BLM in cooperation with the U.S. Forest Service and the U.S. Fish and Wildlife Service. The strategy set aside some selected populations where no further impacts would be permitted. A monitoring strategy to determine population trends for those species has been in effect since 1995. The population within the Wild Rogue - South Watershed is one of the largest in the area and is included in this monitoring strategy. Currently the population, which is located in the forested edge adjacent to a gravel pit, has been threatened by the noxious weed diffuse knapweed. Carefully applied herbicide treatments were initiated in FY99 to combat the knapweed.

Another Bureau-sensitive species, *Sedum moranii*, is endemic to the Wild Rogue - South and Rogue-Recreation Watersheds. It grows on rock outcrops and cliff faces. Populations in the Wild Rogue - South Watershed are located on the north bank of the Rogue River along the Rogue River trail.

One species of interest in the Wild Rogue - South Watershed that is in riparian areas in late-successional forest habitat is *Asarum caudatum var. novum*. This white flowered ginger is yet to be described as a true species, but has only been found in this watershed on BLM lands. Genetic analysis would be needed to determine whether it is truly a different species than *Asarum caudatum.*

Serpentine areas are rare within the Wild Rogue - South Watershed. They are found only on a small portion of Mt. Peavine (most of Mt. Peavine is outside of the watershed) and in a small area (about 28 acres) in the vicinity of Serpentine springs. These sites have not been surveyed, but based on surveys in the adjacent Rogue - Recreation Watershed it can be postulated that the following species could occur: *Camassia howellii, Microseris howellii, Lewisia cotelydon var. howelli* and *Fritillaria glauca.*

Meadows and grassland habitats are also rare in the Wild Rogue - South Watershed. The only meadow of any significant size (Hewitt Creek meadow) is slowly being encroached upon by the surrounding forest vegetation. One small population of *Allotropa virgata* has been found on the edge of this meadow under a tanoak canopy. No other special status vascular plants have been found in the meadow. The meadow is dominated by exotic grasses and bracken fern, with only small pockets of native grass species such as *Bromus carinatus, Elymus glaucos* and *Danthonia californica.*

Although it has not yet been found in the watershed, *Sophora leachiana* is a special status plant species which appears to thrive in disturbed areas and has a high probability of being in the watershed. It is a unique species as it is a very narrow endemic found only in openings and disturbed areas on serpentine-influenced soils in the vicinity of the Galice/Mount Peavine area, in the Picket Creek area, and on the eastern edge of the Kalmiopsis wilderness.

A thorough inventory of noxious weeds has not been completed in the watershed but their occurrence has been documented. They are most common in the forested area skid trails and roadsides and include such species as Canadian thistle, scotchbroom, and meadow knapweed. These species are a threat because they compete with native vegetation and reduce plant diversity.

The most noxious weed in the watershed is purple loosestrife (*Lythrum salicaria).* This species is spreading along the banks of the Rogue River where upstream sources provide a continuous seed source during high water.

Surveys have just begun in the adjacent Rogue - Recreation Watershed for both survey and manage and protection buffer species as required by the NFP. To date, one Strategy 1 species, *Dendriscocaulon intricatulum,* and two protection buffer species, *Ulota meglospora* and *Otidea onotica*, have been found in the watershed. These new *Dendricocaulon intricatulum* locations have meant a large range extension for this rare species from that previously known. Riparian areas will be of great importance for maintaining dispersal corridors for these species. The Wild Rogue - South Watershed is the only location in the resource area which may harbor some of the nonvascular survey and manage species that are associated with coastal environments, especially in riparian zones.

b. Wildlife

The Wild Rogue - South Watershed contains a diverse array of wildlife. As many as 11 species of bats, 12 species of amphibians, 18 species of reptiles, hundreds of species of birds, and many thousands of species of insects may occur here. All but three indigenous mammals (grizzly bear, wolf and wolverine) are thought to have the potential to occur in the watershed.

Within the Wild Rogue - South Watershed there are several habitats of concern and numerous unique features.

(1) Habitats

Wildlife habitats of southwest Oregon are extremely complex. Terrain, climatic factors and vegetation combine to create the diversity of habitats found from the valley floor to the peaks of the Siskiyou Mountains. The Wild Rogue - South Watershed is characterized by steep, forested hillsides leading into the rocky canyon of the Rogue River. The terrain above this canyon is characterized by plant series currently in or capable of reaching a late-successional forest condition. The Rogue River canyon itself is very steep, rocky, hot and dry in the summer, and dominated by a canyon live oak plant community. This area will likely never attain old-growth conifer forest characteristics. Structural characteristics of

late-successional forest habitat typically include older trees, multilayered canopies, large snags and downed wood, and deep forest litter and soil (Ruggiero, *et al,* 1991). Except along the banks of the river and in a few creek valleys, very little flat terrain exists. The majority of the watershed is dominated by mixed hardwood and conifer forests. The age and the structure of these forests range from saplings to old growth. Habitats found throughout the watershed include old growth, mixed hardwood stands, meadows, serpentine areas, riparian areas, alder thickets, sandy beaches, and Jeffrey pine.

The diversity of plant communities provides for a variety of habitats which support an array of native wildlife. Habitats that are an issue in the Wild Rogue - South Watershed include late-successional forest, old-growth forest, meadows, pine stands, oak groves, and riparian zones. All of these habitats have been affected by human activity in the watershed.

Natural disturbances are important in generating and maintaining a number of plant communities and habitats. Historically, many of the fires in this region were low-intensity, mosaic burns rather than stand-replacing events. Occasionally, large stand-replacement fires did occur, with resulting changes in forest composition (see fire section). Stand-replacement fires in this watershed allowed hardwoods to re-sprout and dominate sites for a period of time until conifers regenerated from seeds, and shaded out the hardwoods. In times when Douglas-fir did not have good seed production, hardwood sprouting would dominate, resulting in some stands with large tree-form hardwoods such as tanoak. Other natural disturbances include windthrow and laminated root rot that create canopy openings of various shapes and sizes, allowing more light to penetrate to the forest floor and enhancing the production of saplings and understory vegetation. Human-caused disturbances such as logging, mining, and road building have all affected the condition of the forested and non-forested habitats. In some instances, past logging has resulted in stands with only widely scattered overstory trees and an understory of brush, small conifers and hardwoods. This has led to substantially greater risk of increased fire spread and intensity, and of stand-replacement fires, due to the significantly greater brush component currently present in these stands. With fire exclusion, the current fuel loading will now support large, intense fires, putting older forest habitats at greater risk of stand-replacement fire. The shift from older, structurally diverse forests to younger, structurally less diverse forests has benefitted generalist species, but has not been advantageous to species that depend on late-successional forest habitat. Fire has and

will continue to play an important role in the development and maintenance of the vegetation and habitats in this watershed.

To facilitate logging and salvage operations, numerous roads were constructed throughout the upland areas of the watershed starting in the late 1950's. Areas with high road density are of particular concern because roads have many adverse impacts on wildlife. Roads lead to increases in vehicular/human disturbance, increased chance of human-caused fire, provide increased access for poaching, and further fragment areas of late-successional forest habitat. Areas with low road densities offer important refugia from human disturbance for species such as black bear (*Ursus americanus*) and Roosevelt elk (*Cervus elaphus*).

c. Aquatic Habitat

Riparian areas are one of the most heavily used habitats in the watershed, both by humans and by

wildlife. Many life cycle requirements of animals are met in these areas. Aquatic and amphibious species are intrinsically tied to these habitats, as are all the species that feed on these animals. Riparian habitats within the watershed have been heavily affected by mining, road building and logging. The riparian reserves vary from early to old-growth stands of conifers, hardwoods, or both. The hydrologic cycle greatly influences the usefulness of a stream to aquatic species. Within the Wild Rogue - South there have most likely been changes in peak flows due to reduction of canopy by logging and the interception of flows by the associated roads can reduce stream flows at critical times. During low flow periods, the flow can become the determining factor for the existence of many aquatic species. Many native aquatic and amphibious species are probably no longer as prevalent as they were prior to the beginning of mining, logging, and road building. In general, the riparian habitat is probably supporting a lower number of species than it has historically. Stream invertebrate sampling conducted in three streams (Missouri, Howard, and Big Windy) indicated that the communities present were truncated in comparison to what would be expected for these stream types undisturbed conditions (see water quality temperature for more details).

d. Specialized/Sensitive Habitats

Special habitats are those that are either naturally scarce (*e.g.*, caves, springs, mineral licks), rare because of human influence on the environment (*e.g.*, low elevation old-growth, oak/grasslands) or that fluctuate in number and size because of natural cycles such as fire and drought (*e.g.*, snags, meadows). Often these habitats receive a greater level of use by wildlife than surrounding habitats, or are essential for certain aspects of a particular animal's life history (*e.g.*, hibernation). The Wild Rogue - South Watershed contains a number of these habitats. The continued maintenance of these habitats will help ensure the presence of many sensitive species. Sensitive habitats of issue include:

Old-growth forest habitat is a forest stand with a multi-canopy structure, dominated by large trees, snags and large down logs. Due to the wide variety of niches, these forests have a greater diversity of wildlife species than do younger forest stands. This habitat type is principally located in the Missouri Creek, Jenny Creek, Hewitt Creek, Dulog Creek, Little and Big Windy Creek drainages. This area is dominated by high precipitation and fertile soils. The patch size of the remaining stands partially determines the usefulness to some species of wildlife. Small, fragmented stands may offer refugia for species with limited home ranges, but do not provide optimal habitat for species with larger home ranges. Large area stands (>100 acres) are very important contributors to maintaining the biodiversity of the watershed. Abundant snags and course woody debris, characteristic of late-successional forests, appear to meet RMP standards in most of the watershed. However, in portions of Missouri Creek, upper Howard Creek, and upper Big Windy Creek where partial cutting, clearcutting and post-fire salvage logging took place, inventory data is lacking on the snag and course woody debris components.

Meadows are uncommon in the Wild Rogue - South Watershed. Shallow soils, perched water tables, and old homesteads are the most common source of these meadows. Currently, the most significant threat to this habitat is tree and brush encroachment due to the disruption of the natural fire cycle. Meadows are the primary habitat for a number of species such as California vole (*Microtus californicus*) and the western pocket gopher (*Thomomys mazama*), and are the primary feeding location for species such as the black-tailed deer (*Odocoileus hemionus*), Roosevelt elk (*Cervus elaphus*), great grey owl (*Strix nebulosa*), and the American black bear (*Ursus americanus*).

Dispersal corridors aid in gene pool flow, natural reintroduction and successful pioneering of species into previously unoccupied habitat. Generally these corridors are located in saddles, on low divides, ridges, and along riparian reserves. Numerous ridgelines within the watershed allow for localized dispersal and contribute to the regional web of dispersal corridors. Chrome Ridge, along with others, allows for movement from the Wild Rogue Watershed into the adjacent Shasta Costa system and the coast range. The Rogue River acts as an excellent corridor allowing species to move west toward the coast and east toward the Cascade mountains. Without corridors connecting habitat, many isolated wildlife habitats could be too small to support the maximum diversity of species. Connectivity is particularly important for certain fur bearers, such as fisher and marten (USDA and USDI, 1994), and species such as the northern spotted owl (*Strix occidentalis*), which depend on higher levels of canopy closure to successfully move between habitats without becoming victims of predators such as great horned owls (*Bubo virginianus*) and red-tailed hawks (*Buteo jamaicensis*) (Forsman, *et al*, 1984). Movement of northern spotted owls between large areas is thought to be crucial to long-term population viability (Thomas, *et al*, 1990). The Wild Rogue - South Watershed is thought to be currently providing significant source population habitat for northern spotted owls. When the surrounding landscape is assessed, it is apparent that this watershed, with its extensive mature and old-growth forests is critical to providing many source populations to adjacent areas on both public and private land which have been logged in the past. Its importance to other areas is highlighted by the description of its value in the Southwest Oregon Late-Successional Reserve Assessment (1995), in which it is noted that the east-west older forest link helps connect the coastal mountains east across the valley to the Rogue-Umpqua divide.

Elk management areas are critical for successful maintenance of elk populations. Key components include riparian zones, natural openings, specific old-growth stands, quality forage, gentle warm slopes, and areas free from human disturbance with very low road densities. Fawning areas are found in many small meadows scattered throughout the watershed and in areas with southern exposures. There are currently two distinct elk herds known to use the Wild Rogue - South Watershed, one in the Peavine Mountain area and the other in the vicinity of Stair Creek.

e. Special Status Species

There are 54 potential sensitive species in the watershed (18 birds, 15 mammals, 7 amphibians, 5 reptiles, 8 insects, and 1 mollusk). The habitat requirements for these animals vary from species to species.

The northern spotted owl is the only documented species listed under the ESA known to nest within the watershed. At least one pair of bald eagles is nesting in the Whisky Creek area on the north side of the Rogue River. There is a high likelihood of other nest sites being established within the Wild Rogue - South Watershed. A pair of peregrine falcons (de-listed in August 1999) nest in the watershed near the Rogue River and forage throughout the Wild Rogue - South Watershed. There is a high likelihood of other peregrine falcons establishing nesting territories within the watershed.

In addition to the known listed species there are also candidate species, Bureau-sensitive species, ROD buffer species, and survey and manage species (see NFP, C-49). Tables III-9 and III-10 list the known and potential special status species found in the watershed, along with legal status and level of survey completed to date. This list includes species listed under the ESA, proposed for listing, and candidate species being reviewed by the USFWS. State listed species, Bureau-assessment species, and species

listed in the ROD as "buffer" species are also listed (for more information on this list and habitat needs see Appendix D).

Table III-9: Wild Rogue - South Watershed Potential Special Status Species (Vertebrates)

Common Name	Scientific Name	Presence	Status	Survey Level (8/99)
Gray wolf	*Canis lupus*	absent	FE,SE	none to date
White-footed vole	*Aborimus albipes*	unknown	BS,SP	none to date
Red tree vole	*Aborimus longicaudus*	present	SM	limited surveys
California red tree vole	*Aborimus pomo*	unknown	BS	none to date
Fisher	*Martes pennanti*	unknown	BS,SC	none to date
California wolverine	*Gulo gulo luteus*	unknown	BS,ST	none to date
American marten	*Martes americana*	unknown	SC	none to date
Ringtail	*Bassacriscus astutus*	present	SU	none to date
Peregrine falcon	*Falco peregrinus*	present	BS,ST	limited surveys
Bald eagle	*Haliaeetus leucocephalus*	seasonally	FT,ST	limited surveys
Northern spotted owl	*Strix occidentlis*	present	FT,ST	limited surveys
Northern goshawk	*Accipiter gentilis*	present	BS,SC	some surveys
Mountain quail	*Oreortyx pictus*	present	BS	none to date
Pileated woodpecker	*Dryocopus pileatus*	present	SC	none to date
Lewis' woodpecker	*Melanerpes lewis*	unknown	SC	none to date
White-headed woodpecker	*Picoides albolarvatus*	unknown	SC,BF	none to date
Flammulated owl	*Otus flammeolus*	unknown	SC,BF	none to date
Purple martin	*Progne subis*	unknown	SC	none to date
Great gray owl	*Strix nebulosa*	unknown	SV,SM	limited surveys
Western bluebird	*Sialia mexicana*	present	SV	none to date
Acorn woodpecker	*Melanerpes formicivorus*	present	SU	incidental sightings
Tricolored blackbird	*Agelaius tricolor*	unknown	BS,SP	none to date
Black-backed woodpecker	*Picoides arcticus*	unknown	SC,BF	none to date
Northern pygmy owl	*Glaucidium gnoma*	present	SU	limited surveys
Grasshopper sparrow	*Ammodramus savannarum*	unknown	SP	none to date
Bank swallow	*Riparia riparia*	migratory	SU	none to date
Townsend's big-eared bat	*Corynorhinus townsendii*	unknown	BS,SC	limited surveys
Fringed myotis	*Myotis thysanodes*	present	BS,SV,BU	limited surveys

Table III-9: Wild Rogue - South Watershed Potential Special Status Species (Vertebrates)

Common Name	Scientific Name	Presence	Status	Survey Level (8/99)
Yuma myotis	*Myotis yumanensis*	present	BS	limited surveys
Long-eared myotis	*Myotis evotis*	present	BS,BU	limited surveys
Hairy-winged myotis	*Myotis volans*	present	BS	limited surveys
Silver-haired bat	*Lasionycterus noctivagans*	suspected	BF	limited surveys
Pacific pallid bat	*Antrozous pallidus*	unknown	SC	limited surveys
Western pond turtle	*Clemmys marmorata*	present	BS,SC	incidental sightings
Del Norte salamander	*Plethodon elongatus*	present	BS,SV,SM,BF	limited surveys
Foothills yellow-legged frog	*Rana boylii*	suspected	BS,SU	limited surveys
Red-legged frog	*Rana aurora*	unknown	BS,SU	none to date
Clouded salamander	*Aneides ferreus*	present	SC	limited surveys
Southern torrent salamander (variegated salamander)	*Rhyacotriton variegatus*	unknown	BS,SV	limited surveys
Black salamander	*Aneides flavipunctatus*	suspected	SP	limited surveys
Sharptail snake	*Contia tenuis*	unknown	SC	none to date

Table III-9: Wild Rogue - South Watershed Potential Special Status Species (Vertebrates)

Common Name	Scientific Name	Presence	Status	Survey Level (8/99)
California mountain kingsnake	*Lampropeltis zonata*	present	SP	incidental sightings
Common kingsnake	*Lampropeltis getulus*	present	SP	incidental sightings
Northern sagebrush lizard	*Sceloporus graciosus*	unknown	BS	none to date
Tailed frog	*Ascaphus truei*	suspected	SV	none to date

STATUS ABBREVIATIONS:
FE--Federally-Endangered SC--ODFW Critical SM--Survey and Manage
FT--Federally-Threatened SV--ODFW Vulnerable BF--Buffer Species FP--Federally-Proposed
SP--ODFW Peripheral or Naturally Rare BS--Bureau Sensitive FC--Federal Candidate
SU--ODFW Undetermined SE--State Endangered ST--State Threatened

Table III-10: Wild Rogue - South Watershed Potential Special Status Species (Invertebrates)

Common Name	Presence	Status	Survey Level (as of 5/97)
Burnells' false water penny beetle	unknown	BS	none to date
Denning's agapetus caddisfly	unknown	BS	none to date
Green Springs Mtn. farulan caddisfly	unknown	BS	none to date
Schuh's homoplectran caddisfly	unknown	BS	none to date
Obrien rhyacophilan caddisfly	unknown	BS	none to date
Siskiyou caddisfly	unknown	BS	none to date
Alsea ochrotichian micro caddisfly	unknown	BS	none to date
Franklin's bumblebee	unknown	BS	none to date
Oregon pearly mussel	unknown	BS	none to date

BS = Bureau Sensitive

f. Survey and Manage Species

Tables III-11 and III-12 list the species that are to be protected through survey and management guidelines outlined in the NFP and describe the level of protection.

Table III-11: Survey and Manage Species & Buffer Species in the Wild Rogue - South Watershed

Species	Presence	Protection Level
Del Norte salamander *S&M *(Plethodon elongatus)*	present	Manage known sites and survey prior to activities, buffer length of one potential site tree or 100 feet whichever is greater.
White-headed woodpecker * *(Picoides albolarvatus)*	unknown	No cutting snags 20" DBH or over. Maintain green trees to provide for 100% population potential.
Black-backed woodpecker * *(Picoides pubescens)*	unknown	No cutting snags 20" DBH or over. Maintain green trees to provide for 100% population potential.
Flammulated owl * *(Otus flammeolus)*	unknown	No cutting snags 20" DBH or over. Maintain green trees to provide for 100% population potential.
Great gray owl S&M *(Strix nebulosa)*	unknown	1/4 mile protection zone around nest sites, survey prior to activities, 300-foot buffers of meadow and natural openings.
Red tree vole S&M *(Aborimus pomo)*	present	Manage known sites and survey prior to activities.

* = Buffer species, S&M = Survey and Manage

Table III-12: Survey and Manage Molluscs Species

Species	Status
Blue-grey taildropper *Prophysaon coeruleum*	Unknown if present in the watershed (Suspected)
Papillose taildropper *Prophysa on dubium*	Unknown if present in the watershed
Chace sideband *Monadenia chaceana*	Unknown if present in the watershed
Oregon megomphix *Megophix hemphilli*	Unknown if present in the watershed
Helminthoglypta hertleini	Unknown if present in the watershed
Tehama chaparral	Unknown if present in the watershed
Trilobopsis tehamana	Unknown if present in the watershed

g. Threatened or Endangered Species

Northern Spotted Owl (Threatened) - The northern spotted owl, currently listed as threatened under the ESA, is known to nest in the watershed. There are 15 known centers of activity in the watershed and all are within the LSR. Of these 15 sites, nine have provincial home ranges (1.3 mile radius) that may be affected by activities occurring outside the watershed (see Appendix D for the list of sites and results

of nesting surveys). An active site is one in that has been occupied by a territorial single or pair at least once since 1985. Sporadic surveys for northern spotted owls have been conducted in the watershed since the mid 1970's. Early surveys were opportunistic, but since 1985 formal surveys have been conducted prior to implementing forest management activities. Intensive surveys within this watershed are very difficult due, in part, to the very steep terrain, lack of roads, and large areas requiring a survey. Only very limited surveys have been conducted in this watershed since its inclusion in the Northwest Forest Plan as a late-successional reserve (LSR) in 1994.

The USFWS uses levels of suitable habitat around spotted owl sites as an indication of the sites' viability and potential productivity. The minimum level to maintain a site's viability has been defined as 50% of the area within 0.7 mile of the center of activity (approximately 500 acres) and 40% of the area within 1.3 miles (approximately 1,388 acres).

Table D in Appendix D describes the condition of the spotted owl sites mapped and in adjacent watersheds at the time of the NFP's preparation. Three sites within the watershed exceed the 1,388 acres considered necessary for long-term site viability.

Spotted owl habitat on BLM lands has been analyzed using the McKelvey rating system. The McKelvey rating system is based on a model that predicts spotted owl population based on habitat availability (see Appendix D for more information on this system). Stands were examined for criteria such as canopy layering, canopy closure, snags, woody material, and other features. Biological potential of a stand to reach desired conditions is also taken in consideration. During the spring of 1997 stands were visually rated and placed into one of six categories. Map 9 displays the results of this study. Table III-13 summarizes the amount of habitat available for spotted owls in the watershed on lands administered by the BLM.

Table III-13: McKelvey Rating Classes

McKelvey Class	**BLM** (1977)		**Forest Service**		**Private**	
	Acres	**Percent**	**Acres**	**Percent**	**Acres**	**Percent**
1	8,564	20%	nd		nd	
2	6,642	16%				
3	12,470	30%				
4	857	2%				
5	13,332	32%				
6	21	0.05%				
	41,886	100%				

Class 1 - Spotted owl nesting, roosting, and foraging habitat
2 - Spotted owl roosting and foraging
3 - Currently does not meet 1 or 2 criteria
4 - Will never meet 1 or 2 criteria
5 - Currently does not meet 1 or 2, but meets dispersal
6 - Will never meet 1 or 2 but meets dispersal

The largest contiguous blocks of spotted owl nesting, roosting and foraging habitat (McKelvey rating #1) are located in Long Gulch, Missouri Creek, Hewitt Creek, Jenny Creek, and the Little and Big Windy Creek drainages. Other large blocks of McKelvey 1 are located in the Rum Creek and Montgomery Creek drainages.

The largest patches of spotted owl roosting, and foraging habitat (McKelvey rating #2) are found in the Dulog Creek, Jenny Creek, Little Windy Creek, East Fork Big Windy Creek, and Rum Creek drainages.

Spotted owl dispersal habitat (McKelvey rating #5) is defined as stands that have a canopy closure of 40% or greater, are open enough for flight and predator avoidances, and have the potential to develop into McKelvey rating #'s 1-2. (see Map 9).

Marbled Murrelet (Threatened) - Critical habitat for marbled murrelet was designated by the U.S. Fish & Wildlife Service (USFWS) in May of 1996. There are 41,886 acres within the Wild Rogue - South Watershed designated as critical habitat for the Marbled Murrelet. Nesting habitat for marbled murrelet consists of older forested stands with trees that have large moss-covered limbs and high (70+%) canopy closure. This habitat is further defined by its distance from the coast. Based on timber stand inventory information and field verification of McKelvey rating, approximately 14,659 acres of suitable marbled murrelet habitat is found within Zone 1, and 6,305 acres within Zone 2, on lands managed by the BLM in the watershed (calculated from FOI data ca. 1995 without ground trolling).

Zone 1 is identified as all marbled murrelet habitat within 35 miles of the ocean. Zone 2 is defined as all marbled murrelet habitat within 36 - 50 miles of the ocean. This land, for the most part, corresponds

with spotted owl suitable/optimal habitat (McKelvey rating 1 & 2) (see Map 9). There are no known nest locations within the Wild Rogue - South Watershed. It is unknown at this time if the stands that contain components that would be used by marbled murrelets. These sites are generally warmer and drier then those lands located closer to the coast that are occupied by nesting murrelets. The BLM has conducted surveys in proposed project areas but has not detected any murrelets.

Bald Eagles (Threatened) - At this time there are no documented nest sites within the Wild Rogue - South Watershed, although a pair is nesting in the vicinity of Whiskey Creek on the opposite side of the river in the eastern portion of the watershed. There is considerable nesting habitat on federally-administered land along the Rogue River within this watershed. Preferred nesting habitat consists of older forests, generally near water, with minimal human disturbance.

Peregrine Falcons (Recently De-Listed) nest on ledges located on cliff faces. There is one active peregrine falcon nest in the watershed. Habitat for more nesting sites does occur along the cliff faces within the watershed.

h. Other Species of Concern

Neotropical Migratory Birds - A number of neotropical birds inhabit the Wild Rogue - South Watershed. Neotropical migrants are species of birds that winter south of the Tropic of Cancer, and breed in North America. More then twenty years of Breeding Bird Surveys (BBS), Breeding Bird Census (BBC), Winter Bird Population Study, and Christmas Bird Counts indicate that many species of these birds are experiencing a precipitous decline. This is particularly true for birds that use mature and old-growth forests either in the tropics, in North America, or both (DeSante & Burton 1994). Rates of decline are well documented for birds on the east coast of North America but less so on the west coast. In 1992 the BLM signed a multi-agency agreement called "Partners in Flight." The purpose of this program is to establish a long-term monitoring effort to gather demographic information. This monitoring will establish the effect that deforestation and forest fragmentation have on temperate breeding bird populations.

The Wild Rogue - South Watershed contains a number of neotropical migrants that utilize various habitats. Studies conducted on the Medford District have found that neotropical migrants comprise between 42% and 47% of the breeding species in lower elevation forests dominated by Douglas-fir (Janes 1993). In higher elevation forests dominated by white fir, neotropical migrants are less abundant, representing a smaller portion of the bird species present. In the fall of 1994 a banding station was established in an adjacent watershed. In the spring of the following year a Migratory Avian Productivity and Survivorship (MAPS) station was established. Species found at this location are also expected to be common in the Wild Rogue Watershed. Table III-14 lists the species from the MAPS inventory, which are known or suspected to be found in the watershed, and national population trends. Habitats of particular concern are old-growth forest, riparian, and oak woodlands communities. It is important to keep in mind neotropicals will often use more than one habitat type during various

seasons. Overall, 46% of these birds are habitat generalists using four or more habitat types, while 34% are habitat specialists utilizing one or two habitats.

Table III-14: Potential Neotropical Birds in the Wild Rogue - South Watershed

Common Name	Presence	Trend*
Green-winged teal	unknown	insufficient data
Sora	unknown	insufficient data
Turkey vulture	present	stable or increasing
Osprey	present	stable or increasing
Flammulated owl	unknown	insufficient data
Common nighthawk	present	insufficient data
Rufous hummingbird	present	decline
Calliope hummingbird	unknown	insufficient data
Western kingbird	present	insufficient data
Ash-throated flycatcher	present	insufficient data
Western wood-pewee	present	decline
Olive-sided flycatcher	present	decline
Hammond's flycatcher	present	insufficient data
Dusky flycatcher	present	insufficient data
Pacific-slope flycatcher	present	insufficient data
Vaux's swift	present	decline
Tree swallow	present	insufficient data
Northern rough-winged swallow	present	insufficient data
Violet-green swallow	present	decline
Cliff swallow	present	insufficient data
Barn swallow	present	decline
House wren	present	insufficient data
Blue-gray gnatcatcher	present	insufficient data
Swainson's thrush	present	decline
Solitary vireo	present	insufficient data
Warbling vireo	present	insufficient data
Townsend's warbler	present	insufficient data
Hermit warbler	present	insufficient data
Black-throated gray warbler	present	insufficient data
Nashville warbler	present	insufficient data

Table III-14: Potential Neotropical Birds in the Wild Rogue - South Watershed

Common Name	Presence	Trend*
Macgillivray's warbler	present	insufficient data
Yellow warbler	present	insufficient data
Orange-crowned warbler	present	decline
Common yellowthroat	present	stable/increase
Yellow-breasted chat	present	insufficient data
Wilson's warbler	present	decline
Brownheaded cowbird	present	decline
Northern oriole	present	decline
Western tanager	present	decline
Chipping sparrow	suspected	decline
Green-tailed towhee	present	stable/increase
Black-headed grosbeak	present	stable/increase
Lazuli bunting	present	insufficient data

* Based on information from Partners in Flight in Oregon and might not necessarily represent nationwide figures.

Unusual sightings - Due to its rocky terrain, the Wild Rogue - South Watershed is a stronghold for ringtail cats in southern Oregon. These nocturnal animals are spotted frequently along the Rogue River and the Galice Creek road at the eastern edge of the watershed.

A fisher, a rare carnivore, was seen by a resource area biologist crossing the Galice access road in December 1996. This was the first report of this elusive animal in a neighboring watershed. Another elusive carnivore, a wolverine, was reportedly seen in the Chrome Ridge area in the 1960's. The reliability of this sighting is unknown. This animal naturally occurs at low densities and may have home ranges as large as 2,000 km^2. The Lynx also has the potential to be found in this watershed. There are historic reports from trappers in the area that they were trapping an animal called the "Oregon lynx." It is unclear whether these were bobcat or indeed the rare and elusive lynx. The Wild Rogue - South Watershed is characterized by steep, inaccessible draws. These areas are relatively free from disturbance and are very hard to inventory for carnivores. It is quite likely that fisher are found throughout the lower riparian areas in the watershed.

Game Species - Species of game animals located within the Wild Rogue - South Watershed include elk, blacktailed deer, black bear, mountain lion, wild turkeys, ruffed grouse, blue grouse, grey squirrels, mountain and valley quail. The watershed is located in Oregon's Department of Fish and Wildlife's (ODFW) Chetco game management unit. Management of game species is the responsibility of the Oregon Department of Fish and Wildlife. The entire watershed is open to hunting during the appropriate season for game species, except within 1/4 mile of the Rogue River where discharging of firearms is prohibited, and within a 1-mile no-bear-hunting buffer along the Rogue River. Information from the

ODFW indicates that black-tailed deer populations are stable overall and meeting department goals. Elk are present in the watershed, with recent reports of animals ranging throughout the watershed.

Black bear populations are extremely hard to monitor due to the bears' secretive nature. The population in the watershed appears to be stable. Cougar sightings in the watershed have increased with their overall population on the rise.

Grouse and quail had poor nesting years in 1998 and 1999 due to the late spring rains. The populations of these birds are cyclic, depending on weather conditions. Long-term trends appear to be stable. Wild turkeys have not been introduced in this watershed, but appear to have established themselves from adjacent watersheds.

In general, game species are generalists that benefit from edge habitats. Past land management practices have increased the overall amount of forest edge within the watershed. In addition, roads have also effected the suitability of all habitat types. High road densities have been shown to have negative affects on deer and elk populations, and to lead to increased poaching opportunities. For these species, populations could be expected to increase with a decrease in the road densities. Remaining unroaded sections offer key refugia for these species.

Band-tail pigeons *(Columba fasciata)* are known to occur in the watershed. This bird has experienced precipitous decline in population throughout its range since monitoring began in the 1950's (Jarvis, *et al*, 1993). These birds are highly prized as a game species and restrictive hunting regulations have not led to an increase in bird populations. Habitat alteration due to intensive forestry practices may partially explain their decrease in population. Ongoing research is trying to answer this question (Jarvis and Leonard 1993). Band-tail pigeons are highly mobile and utilize many forest habitat types. Their preferred habitat consists of large conifers and deciduous trees interspersed with berry and mast-producing trees and shrubs. In the spring and fall, large flocks are seen migrating through the watershed. The birds use higher elevation habitat to feed on blue elderberries, manzanita berries, and Pacific madrone berries. With the exclusion of fire from the landscape, many stands of mast-producing plants have been adversely impacted.

Cavity-dependent species such as many bat species, the western bluebird (*Sialia mezicana*), Vaux's swift (*Chaetura vauxi*), the acorn woodpecker (*Melanerpes formicivorus),*and the northern pygmy owl *(Glaucidium gnoma),* which use abandoned woodpecker holes and snags, are of special concern in the watershed because of past silvicultural practices. These practices have focused on producing even-aged stands and have resulted in deficits of snags and down logs in areas harvested. Fire suppression also has a negative effect on the number of snags in the watershed. Fires, insect infestations, and other disturbance events are important generators of snags. Species associated with this habitat type have also declined.

Exotic Species - Many non-native species have become established in the watershed. Introduced exotic species compete with native species for food, water, shelter, and space. Bullfrogs (*Rana catesbeiana*) directly compete with native frogs and consume young western pond turtles (*Clemmys marmorata*). Opossums (*Dedelphis virginiana*) occupy a similar niche as our native stripped skunk (*Mephitis mephitis*) and raccoon (*Procoyon lotor*). They also consume young birds, amphibians, and reptiles.

Other introduced species include European starlings (*Sturnus vulgaris*), ring-necked pheasants (*Phasianus colchicus*), and turkeys (*Meleagris gallopavo*). These species have some negative impacts on native flora and fauna.

3. Aquatic Habitats and Species

a. Special Status Species

The threatened coho (*Oncorhynchus kisutch*) is the only federally-listed fish occurring within the Wild Rogue - South Watershed. There are several other special status species present within the watershed whose habitat requirements overlap the requirements of the coho salmon. (See Maps 11 and 12)

Table III-15 lists special status and federally-threatened aquatic species inhabiting the Wild Rogue - South Watershed.

Table III-15: Special Status and Federally - Threatened Aquatic Species

Species	Status
Steelhead	• Federal Candidate in Oregon • Oregon Natural Heritage Program* (ONHP) Status List 1 • State of Oregon "vulnerable"
Chinook Salmon	• Ruled not warranted for federal listing (9/99) • Oregon Natural Heritage Program (ONHP) Status List 3 • State of Oregon "critical" • Critical Habitat Proposed
Cutthroat Trout	• Ruled not warranted for federal listing (4/99) • Oregon Natural Heritage Program (ONHP) Status List 3 • State of Oregon "vulnerable"
Reticulate Sculpin	• Bureau Tracking in Washington
Coho Salmon	• Federally-Threatened All Stocks south of Cape Blanco • Oregon Natural Heritage Program (ONHP) Status List 1 • State of Oregon "critical"
Pacific Lamprey	• Federal Category 2 (USDI 1994)

* Oregon Natural Heritage Program (ONHP) Status :
List 1: Taxa that are threatened with extinction or presumed to be extinct throughout their entire range.
List 2: Taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon.
List 3: Species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.
List 4: Taxa which are of concern, but are not currently threatened or endangered.

b. General

Large woody debris contributes to the riparian and stream habitat by providing both shade and nutrients for terrestrial and aquatic insects. Large woody material, especially key pieces ($\geq$ 24" diameter), is important for creating the habitat complexity needed to rear juvenile anadromous fish and to provide

cover for adults during migration. Stream complexity (*e.g.*, meandering) is important for dissipating stream velocity and increasing winter refuge habitat for juvenile fish, especially coho salmon. Adult and juvenile fish production can also be limited by migration barriers such as road culverts. Yearling juvenile fish can move miles within one watershed, especially during summer months when they seek cool waters.

Timber harvesting and associated roads accelerate the delivery of water to streams, changing peak flows and the timing and magnitude of sediment transport and erosion (see Water Quality Peak Flows). Excessive sedimentation, especially delivered at wrong time intervals, can delay adult migration and spawning and suffocate eggs in the redds. Suspended sediment can cause gill damage in overwintering juvenile fish. Where overwintering habitat is insufficient to escape high water velocities and sediment, fish may become stressed and vulnerable to secondary infections .

Roads next to streams in the Missouri, Big Windy, and Rum Creek drainages may disconnect the riparian reserves from adjacent uplands or act as heat sinks which transfer heat to the riparian areas with consequent increases in stream water temperature.

The cumulative effects of management activities and natural events combined have altered the timing and quantity of erosion, modifying stream channels and affecting fish production at one time or another.

c. Class I, II, III and IV Stream Conditions (Specific/Stream Channel and Riparian Area)

Table III-16 summarizes habitat conditions in Class I-IV streams in the watershed for which ODFW has completed physical habitat surveys, and in Missouri Creek where only macroinvertebrate survey data are available.

Table III-16: Class I - IV Stream Habitat Conditions

Stream	Fish Bearing (Y/N)	Key Pieces LWD	LWD levels	Sediment levels within spawning gravels	Canopy Closure	Pool Freq.	Residual Pool Depth	Avg. Gradient (%)
Anna Creek	Y	U	A	D	D	U	A	10
Big Windy Creek	Y	U	A	A	D	D	A	6
E. Fork Big Windy Creek	Y	U	U	D	D	A	A	6
Little Windy Creek	Y	A	A	D	D	A	A	15
Howard Creek	Y	U	A	A	A	A	A	6
Jenny Creek	Y	A	D	A	D	D	A	10
Rum Creek	Y	A	U	A	D	U	A	17
E. Fork Rum Creek	N	A	U	n/a	D	n/a	n/a	53
Missouri Creek	Y	U	U	U	U	U	A	7

ODFW Benchmark standards: A = Adequate; U= Undesirable; D= Desirable. See Table III-17.

Table III-17: Oregon Department of Fish and Wildlife Habitat Benchmarks

Habitat Type/Feature	Undesirable (U)	Adequate (A)	Desirable (D)
LWD pieces/100 m stream length	< 10	?	> 20
Key pieces LWD (≥ 60 cm diameter, ≥ 10 m length)/100 m stream length	< 1	?	> 3
Sediment Levels (Percent fines in spawning gravels)	> 20	?	< 10
Canopy Closure (Percent)	< 70	?	> 75
Pool Frequency (Channel Widths Between Pools)	> 20	?	5-8
Residual Pool Depth (m)	< 0.5	?	> 1.0

Anna Creek is a perennial, high-gradient, fish-bearing stream. Rapids and cascades are the dominant habitat types, and the stream channel is constrained by hillslopes in a moderate v-shaped valley. Anna Creek flows into Howard Creek and is a third-order stream with a basin area of 9.9 km^2. There is active mining within the channel.

Big Windy Creek is a perennial fish-bearing stream with a moderate gradient. The channel is constrained by hillslopes and bedrock in moderate and steep v-shaped valleys and is characterized by rapids, cascades, and scour pools. Big Windy Creek flows into the Rogue River and is a fourth-order stream with a basin area of 33.1 km^2 .

East Fork Big Windy Creek is a perennial fish-bearing stream with a moderate gradient. The channel is constrained by hillslopes and bedrock in a steep v-shaped valley, and rapids, cascades, and scour pools are the dominant habitat types. East Fork Big Windy Creek flows into Big Windy Creek 9.4 km upstream of the Rogue River and is a fourth-order stream with a basin area of 12.9 km^2 .

Little Windy Creek is a perennial fish-bearing stream with a high gradient. The channel is constrained by hillslopes in a moderate V-shaped valley and is characterized by rapids, cascades, and scour pools. Little Windy Creek flows into the Rogue River and is a second-order stream with a basin area of 7.0 km^2 . There is active mining within the channel.

Howard Creek is a perennial fish-bearing stream with a moderate gradient. The channel is primarily constrained by hillslopes in a moderate to steep v-shaped valley and is characterized by rapids, cascades, and scour pools. Howard Creek flows into the Rogue River and is a fourth-order stream with a basin area of 16.6 km^2 . There is active mining within the channel. Some reaches are prone to landslides.

Jenny Creek is a perennial fish-bearing stream with a high gradient. The channel is constrained by hillslopes in a moderate v-shaped valley and is characterized by rapids, cascades, and scour pools. Jenny Creek flows into the Rogue River and is a third-order stream with a basin area of 10.7 km^2 . Debris jams and landslides are common.

Rum Creek is a perennial fish-bearing stream with a high gradient. The channel is constrained by hillslopes in a moderate v-shaped valley and is characterized cascades. Rum Creek flows into the Rogue River and is a second-order stream with a basin area of 8.8 km^2 . There is active mining within the channel.

East Fork Rum Creek is an intermittent nonfish-bearing stream with a very high gradient. The channel is constrained by hillslopes in a moderate v-shaped valley and is comprised almost entirely of cascades. East Fork Rum Creek flows into Rum Creek and is a first-order stream with a basin area of 3.4 km^2.

Missouri Creek was not surveyed by ODFW in 1998, but macroinvertebrate monitoring conducted in 1993 and 1997 provided data from the sampling site and allowed for some conclusions to be drawn. Missouri Creek is a perennial, fish-bearing stream with cool summer temperatures. It has a high gradient and is confined to a narrow valley. Missouri Creek flows into the Rogue River and is a third-order stream with a basin area of approximately 13 km^2. Approximately 2.5 km upstream of its mouth, Missouri Creek is joined by Trout Creek, a small tributary which is probably fish bearing. The habitat of Missouri Creek is dominated by large and small boulders which are embedded. High velocity flows have the ability to remove large woody debris, yet the amount of fine sediments remains high. Lack of spawning gravels, large wood, and pools probably limit salmonid populations. The Missouri Creek Watershed was deferred from ground-disturbing activities for a period of 10 years by the RMP due to the cumulative impacts of past management activities (*i.e.*, roads and timber harvest).

d. Large Woody Material

In almost all of the surveyed streams of the Wild Rogue - South Watershed, large woody material is below benchmark levels set by the ODFW as desirable (see Tables III-16, 17). In all the larger streams, the number of key pieces (≥ 60 cm diameter, ≥ 10 m length) is below adequate levels. Large wood is an important component of stream habitat. It plays a critical part in determining the productivity of a stream. It is an important determinate of stream hydraulics, microsite habitat condition, feeding substrate, and pool and drop features. The amount and size of instream large woody material is associated with the amount of coarse wood material in the riparian zone. The Southwest Oregon Late-Successional Reserve Assessment (USDA and USDI 1994) has listed the following (Table III-18) as the minimum levels for large woody material in forest stands after stand replacement (*e.g.*, fire with timber salvage) and non-stand replacement (*e.g.*, commercial thinnings) events.

Table III-18: Coarse Wood Target Levels by Plant Series (per acre) **

Plant Series	Stand-Replacement Event	Non-Stand-Replacement Event
Douglas-fir Tanoak Hemlock	15 pieces > 20 feet long and > 16 inches in diameter (small end);snags >24 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
Jeffrey pine	10 pieces > 20 feet long and > 16 inches in diameter (small end);snags >12 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
Ponderosa pine	10 pieces > 20 feet long and > 16 inches in diameter (small end);snags >24 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
White fir POC	12 pieces > 20 feet long and > 16 inches in diameter (small end);snags >30 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
White oak	Unknown	Unknown

** Source: Southwest Oregon Late-Successional Reserve Assessment, 10/95

e. Macroinvertebrates

Macroinvertebrate health within the surveyed drainages of the Wild Rogue - South Watershed is rated as moderate, with a downward trend in Missouri Creek (see Water Quality section for invertebrate discussion). There are many factors which have contributed to the current condition. The lack of large, instream woody debris decreases the ability of the stream to retain detritus and nutrients upon which the macroinvertebrates are dependent. Additionally, without large wood to dissipate energy from high peak flows, macroinvertebrate populations are vulnerable to winter scour which has been magnified by the sediment inputs from logging, roads, and the erosional effects of fire and floods. The decline in canopy cover in Howard and Big Windy Creeks has probably increased water temperatures in both creeks, but the loss of canopy in Missouri Creek has not resulted in the same temperature increase, possibly due to the higher amount of precipitation.

Table III-19: Macroinvertebrate Condition Within the Wild Rogue - South Watershed			
Stream	**Erosional Habitat**	**Margin Habitat**	**Detritus Habitat**
Missouri Creek	High → Moderate	Moderate → Moderate	High → Moderate
Big Windy Creek	High	Moderate	Moderate
Howard Creek	Low → Moderate	Moderate → Moderate	Moderate → Moderate
Source: BLM surveys; arrows show trend between 1992-3 and 1997 surveys; Big Windy Creek surveyed in 1997 only. For meaning of bioassessment scores see Table III-20.			

Table III-20: Macroinvertebrate Bioassessment Scores (Percent)			
	Erosional Habitat	**Margin Habitat**	**Detritus Habitat**
Very High	90-100	90-100	90-100
High	80-89	80-89	80-89
Moderate	60-79	70-79	70-79
Low	40-59	50-69	50-69
Very Low	< 40	< 50	< 50

Source: Aquatic Biology Associates 1993

f. Distribution and Abundance

Table III-21 summarizes the fish-bearing streams within the watershed. See also Maps 12 and 13.

Table III-21: Fish-Bearing Streams Within the Wild Rogue - South Watershed (Miles)				
Stream	**Chinook**	**Coho**	**Steelhead**	**Resident Trout**
Rogue River	20.0	20.0	20.0	20.0
Anna Creek			0.75	1.25
Big Windy Creek			3.5	5.7
E. Fork Big Windy Creek			ND	1.1
Little Windy Creek			0.3	0.3
Howard Creek			2.8	5.3
Jenny Creek			0.4	2.0
Rum Creek			0.75	0.75
Missouri Creek			1.0	1.25
Total Miles	20.0	20.0	29.5	37.65

Source: ODFW database, 1999

Chinook salmon use the mainstem Rogue River for spawning. In addition, they may spawn in Lower Howard, Big Windy, Rum, and Wildcat Creeks, (see Data Gaps). Spring chinook salmon begin to enter the Rogue River in March and rest in some of the Rogue River's deeper pools throughout the summer. They are susceptible at this time to *Columnaris*, a disease which is exacerbated by warmer water temperatures.

Coho salmon may spawn in Howard, Rum, and Wildcat Creeks (see Data Gaps). Steelhead and cutthroat trout use Rogue River tributaries for spawning and rearing. During the summer the juveniles may leave the smaller tributaries in search of adequate water temperatures and food. Salmonid use is also reported for Wildcat Creek and Long Gulch, but verification is needed (see Data Gaps).

Pacific lamprey (*Lampetra tridentatus*) are anadromous and use Rogue River tributaries for spawning. The juveniles rear in the tributaries until they are ready to migrate to the ocean. Little is known about lampreys in the Rogue Basin, although it is assumed their distribution overlaps that of steelhead.

Reticulate sculpin (*Cottus perplexus*) are one species found throughout the Wild Rogue - South Watershed. Their range overlaps that of resident trout.

The redside shiner (*Richardsonius balteatus*) is an introduced species that is present in the lower reaches of the Rogue tributaries that have elevated temperatures and lower flows. In addition, they are found in the backwaters of the mainstem Rogue.

The speckled dace (*Rhinichthys osculus*) is a native fish found within the Wild Rogue - South Watershed. It's range overlaps that of resident trout.

The Klamath smallscale sucker (*Catostomus rimiculus*) is the only species of sucker found within the Rogue Basin. It inhabits the mainstem Rogue River and spawn in tributaries in the spring. Little is known about its distribution.

g. Fish Passage Barriers

High gradients present natural barriers to fish passage in many streams in the watershed. Large boulders and bedrock create natural barriers to fish passage and often mark the upper limits of fish use in surveyed streams. Artificial barriers to fish passage such as culverts may be present, but they appear to be upstream of the natural barriers and conditions which already limit the upper extent of fish use. The following streams have barriers to fish passage:

Anna Creek: There is a natural barrier to fish passage 1.25 miles upstream from the confluence with Howard Creek.

Big Windy Creek: Natural barriers to anadromous fish passage exist 3.5 miles upstream of the mouth. These barriers are upstream of the confluence with East Fork Big Windy Creek.

East Fork Big Windy Creek: No natural barriers to fish passage were found within 1.1 miles upstream

of the confluence with Big Windy Creek. These data are from an incomplete survey which will be completed in 1999.

Little Windy Creek: There is a natural barrier to fish passage 0.3 miles from the mouth of the creek.

Howard Creek: There is a natural barrier to anadromous fish passage 2.8 miles upstream of the mouth.

Jenny Creek: There is a natural barrier to anadromous fish 0.4 miles upstream of the mouth.

Rum Creek: There is a 30-foot high waterfall 0.9 miles from the creek mouth which is a barrier to fish passage. This barrier is upstream of the confluence with East Fork Rum Creek.

East Fork Rum Creek: The average gradient of 53% and waterfalls dropping 6-30 feet present natural barriers to fish passage starting at a point close to the confluence with Rum Creek.

Missouri Creek: It is not known if natural barriers are the cause of the limit of fish use on Missouri Creek, which has been reported to extend 1.25 miles upstream from the mouth. The upper limit of fish use is downstream of the confluence with Trout Creek and of any road crossings which might otherwise have represented potential blockages.

I. FIRE MANAGEMENT

1. Fundamental Changes to the Natural Fire Regime

The historic fire regimes for the watershed have been that of low-severity and moderate-severity regimes. The exclusion of fire occurrence (both natural and prescribed) is leading to a shift in the fire regime to a high-severity one with an unnaturally long fire return interval where fires are infrequent, usually of high intensity, and cause stand replacement. Where natural high-severity fire regimes normally occur (*e.g.*, northern Cascades and Olympic Mountains), fire return intervals are long and usually associated with infrequent weather events such as prolonged drought or east wind, low- humidity events, and lightning ignition sources. Southwest Oregon and the Wild Rogue - South Watershed have the same weather conditions and topography that created the historic low and moderate-severity fire regimes. The only change in the fire environment has been the fuel conditions created since the removal of more frequent fire. This has caused a vegetation shift to dense, overstocked stands of less fire-resistant species, with an increase in dead and down fuels. This has created a current condition for large, increasingly destructive, difficult-to-suppress wildfire with the capability to destroy many of the resource values present in the watershed. The Galice Fire in 1987 is an example. This fire burned over 21,514 acres and was 13 to 25% high-intensity, stand-replacement fire; 19 to 25% moderate-intensity, partial stand-replacement fire; and 50 to 68% low intensity, understory removal fire with individual and small patch overstory mortality. The fire burned for over a month.

2. Fuel Hazard, Wildfire Ignition Risk, Values at Risk

The data collected for the watershed for hazard, ignition risk, and values at risk for loss from wildfire

are summarized in Tables III-22 through III-25. Ratings within the watershed are displayed on Maps 14, 15, 16, 17, and 18. Rating classification criteria are summarized in Appendix E.

Hazard, risk, and value at risk are classifications that are used to better understand and plan for potential fire management problems and identify opportunities to manage the watershed to meet goals, objectives and desired future conditions. Wildfire occurrence can often prevent the successful achievement of short-term and mid term land management goals and objectives. Stand-replacement wildfire can prevent the development of mature and late-successional forest conditions and convert existing mature forests to early seral forests.

a. Fuel Hazard

Table III-22: Hazard Classification

Ownership	Acres	High Hazard		Moderate Hazard		Low Hazard	
		Acres	% of Ownership Total	Acres	% of Ownership Total	Acres	% of Ownership Total
BLM	41,886	25,529	61%	14,556	35%	1,801	4%
USFS	281	nd		nd		nd	
Private, State, County	364	nd		nd		nd	
TOTAL	42,531						

Vegetation and dead and down fuel conditions in the watershed on BLM lands have led to only 4% of the area being in a low hazard condition to nearly two-thirds being in a high hazard condition. The primary factor is the result of exclusion of the natural fire process. Forest management practices that did not treat activity fuels have also contributed to the current condition. This is the case in areas of the Galice fire that were salvage logged without subsequent fuel treatments (approximately 1,200 acres), and in areas of precommercial thinning or brushing with untreated slash. Many areas within the Galice fire had high mortality in understory conifer reproduction and shrubs, and lower overstory layers with conifer and hardwood trees less than 10" DBH. These trees were left standing and not salvaged or treated. Much of this formerly standing dead wood has fallen down since 1987 creating a large buildup of fuels in a short time period. This is similar to the pattern of conditions that have caused the repeated burning at Tillamook.

b. Wildfire Ignition Risk

Table III-23: Risk Classification - Acres and Percentage of Ownership - Current Condition							
Ownership	**Acres**	**High Risk**		**Moderate Risk**		**Low Risk**	
		Acres	**% of Ownership Total**	**Acres**	**% of Ownership Total**	**Acres**	**% of Ownership Total**
BLM	41,886	10,483	25%	28,484	68%	2,919	7%
USFS	281	nd		nd		nd	
Private, State, County	364	nd		nd		nd	
TOTAL	42,531	10,483					

Risk is defined as the source of ignition. The frequency of lightning and the current level of human use results in an overall moderate level of risk for wildfire occurrence. A large factor is the recreational use of the Rogue River.

c. Values at Risk

Table III-24: Values at Risk Classification - Current Condition							
Ownership	**Total Acres**	**High Values at Risk**		**Moderate Values at Risk**		**Low Values at Risk**	
		Acres	**% of Ownership Total**	**Acres**	**% of Ownership Total**	**Acres**	**% of Ownership Total**
BLM	41,886	27,332	65%	10,034	24%	4,520	11%
USFS	281	nd		nd		nd	
Private, State, County	364	nd		nd		nd	
TOTAL	42,531						

Values at risk are the resource and human values for components of the watershed. The watershed has almost two-thirds of the area in high values. This is due largely to the amount of high-value wildlife habitat, recreational value, and other forest resource values found within the watershed.

Table III-25: Areas of High Rating in Hazard, Risk, and Value at Risk Classification by Ownership Acreage - Current Condition			
Ownership	**Acres**	**Acres with High Rating in All Three Categories**	**% of ownership total**
BLM	41,886	7,215	17%

Table III-25: Areas of High Rating in Hazard, Risk, and Value at Risk Classification by Ownership Acreage - Current Condition

Ownership	Acres	Acres with High Rating in All Three Categories	% of ownership total
USFS	281	nd	
Private, State, County	364	nd	
Total	42,531		

The Wild Rogue - South Watershed has over 60% of the area rated as high in both hazard and value, but the large amount of area rated as moderate in risk resulted in only 17% of the area having a high rating in all three categories. Additionally, the Peavine area has a large amount of acres rated high value for value and hazard, but with low risk ratings due to human access restrictions in the form of locked gate system. This indicates that concern over loss to high-intensity wildfire should focus on HUC 6 or 7 level drainages rather than solely on individual stands.

Table III-26: Fire Behavior Prediction Fuel Models for BLM Lands By Model and Acreage - Current Condition

Fuel Model	Acres	Percent
FM - 1 Grass	141	0.3%
FM - 2 Grass	20	0.05%
FM - 5 Shrub	4,624	11%
FM - 6 Shrub	2,328	6%
FM - 8 Timber	14,380	34%
FM - 9 Timber	10,783	26%
FM - 10 Timber	9,287	22%
FM - 11 Slash	321	1%
N/A	2	0.00%
Eight Fuel Models Present	41,886	

Fire behavior fuel models are used to model the characteristics of fire intensity and rate of spread in both wildland and prescribed fire planning. The timber litter fuel models 8, 9 and 10 are representative of most of the watershed. Although fuel model 9 can represent long-needle conifers, it is also representative of hardwood stands. This model was used for hardwood-dominated stands with trees and shrubs greater than 10 feet tall in this analysis.

3. Fire Protection and Suppression

Currently, fire protection is accomplished through contract with Oregon Department of Forestry. The objectives include fire prevention and limiting the size of wildland fires when they do occur. Current contract organization specific to the watershed includes a lookout tower on Mount Peavine, a fire patrol hiking the Rogue River Trail each week of fire season, a 500-gallon fire engine stationed at Cold Springs on the north side of the Rogue River, and the use of aerially-delivered firefighters (repellers) stationed in Merlin, Oregon. Additional fire patrol and suppression forces are available on an as-needed and shared basis.

The road system for the watershed allows only limited access to the lower elevation areas along the Rogue River. There is little access to the immediate areas along the river except at Marial and Grave Creek. A large area with very limited road access (*i.e.,* single road) exists in the Howard Creek and East Fork Windy Creek drainages. Inadequate road access increases the potential for large wildland fire occurrence (e.g., the Galice Fire of 1987) by limiting the effectiveness of wildland fire suppression efforts. The ability to conduct effective fuels management treatments is also compromised by limited access in these parts of the Wild Rogue - South Watershed.

J. HUMAN USE

1. Socioeconomic Overview

Current human use of the watershed includes, but is not limited to, tourism, river recreation, mining, and dispersed recreation.

The only residents within the watershed include the caretakers of Black Bar lodge and the Rogue River ranch. Other uses are primarily concentrated along the river and the shuttle route for the river. Use primarily occurs from May-October. The shuttle road (Galice Access Road/Bear Camp Road) is closed in winter due to snow.

There is no rural interface in this watershed because the majority of land in the watershed is federally owned. The only private land is a 364 acre parcel in the Rogue River corridor.

2. Recreation

a. Rogue Wild and Scenic River

The 33-mile wild section of the National Wild and Scenic Rogue River (Grave Creek to Watson Creek) provides a broad range of land and water-based recreational opportunities. The BLM manages the first 20 miles of the wild section from Grave Creek to Marial (designated wild), and the Forest Service manages the river from Marial to Watson Creek (an additional 37 miles designated wild, scenic and recreational). Recreational opportunities include whitewater rafting, fishing, day hiking, backpacking and photography. Although there are many activities allowed, access is generally limited to boat ramps at Grave Creek and Foster Bar. Management of the area is currently covered by the Recreation Area Management Plan for the Rogue River Wild Section (1983). In 1993, a recreation opportunity spectrum

(ROS) inventory was completed on the first 20 miles of the designated wild section corridor.

Black Bar lodge, located on 36 acres of private land along the river, is 9 miles downriver from Grave Creek, on the south side of the river. The lodge is on a flat above the river, and is not visible from the river. A scenic easement was acquired by the BLM for Black Bar lodge. The easement covers future activities that might occur on the private land and ensures that they would be compatible with objectives of Wild and Scenic River Act.
The Grave Creek to Marial Back Country Byway allows access to Marial, which is the site of a former town, a current lodge, and the Rogue River Ranch National Historic Site. Commercial recreation is regulated by permit. Present commercial activities permitted are guided whitewater trips, fishing trips, and raft-supported hiking trips. The number of people allowed per day on commercial trips is limited from May 15 through November 15. The number of people allowed per day on private float trips is limited from May 15 through October 15. Private hiking trips do not require a permit unless they have raft support during the permit season.

There are five wild and scenic river corridors within the watershed. Of these, only the Rogue River has been congressionally designated; the ohers have been determined to be suitable for designation. They are: Dulog Creek, Big Windy Creek, East Fork Windy Creek, and Howard Creek (see Appendix J of the Final Medford District Proposed RMP/EIS, October 1994 and RMP-ROD, p. 68). The four creeks, covering 20 miles, were found suitable for wild designation in the 1994 RMP. Management is directed at protecting their outstandingly remarkable values and maintaining and enhancing the natural integrity of river-related values. All BLM administered land within 1/4 mile on either side of the creeks is protected by interim management, which will follow the guidelines presented in Appendix 2-WS2 of the Draft Medford District RMP, 1994. Generally, allowable management practices could include minor construction for habitat protection or improvement or rehabilitation of damaged resources. Developments such as trail bridges, occasional fencing, flow measurements or other water devices will be unobtrusive and not have a significant direct and adverse effect on the natural character of the river area.

b. Trails/Campgrounds

The Rainie Falls Trail and Rogue River National Recreation Trail begin at Grave Creek on the east edge of the watershed. The two-mile Rainie Falls Trail on the south side of the river provides access to day hikers and bank anglers. The Rogue River Trail follows the north bank for the entire 40-mile length of the wild section of the river and is a popular day hiking trail and backpacking trail, especially in the spring and fall.

There are also many historic trails within the watershed. According to the 1954 Geological Survey topographic maps, there was a historic trail from the river at the mouth of Rum Creek, running south to Mt. Peavine. Another trail began just downriver from Jenny Creek and headed southeast to a lookout on Bear Camp Ridge. Another trail began across from Marial and traveled south along the ridgeline to the Bear Camp Ridge lookout. These trails are now mostly overgrown, or obliterated by roads or logging activity.

c. Dispersed Recreation

Dispersed recreation includes off-highway vehicle use, hunting, mountain biking, hiking, horseback riding, and driving for pleasure. The Galice-Hellgate Back Country Byway passes through the south end of the watershed. This nationally-designated driving tour begins in Merlin and continues to Grave Creek and branches off at Galice Creek. The byway provides opportunities for exploring the Wild and Scenic Rogue River area by motorized vehicle. The Grave Creek to Marial Back Country Byway begins at Grave Creek and continues north and west, ending at the Rogue River ranch and Marial. The Peavine Mountain area also provides opportunities for non-motorized recreation and access to the lookout tower on top of the mountain. Winter recreation opportunities include cross-country skiing on BLM and Forest Service roads in the higher elevations along the Galice Access Road.

d. Visual Resource Management

Visual resource management classes range from VRM I along the Rogue River corridor and along the wild and scenic creeks (1/4 mile each side), to VRM II in the viewshed of the river, to VRM IV in the areas unseen from the river corridor.

3. Roads

Eleven per cent (11%) of the roads have a natural surface, lack appropriate drainage structures, and need to be inventoried for potential decommissioning or improvements. The midslope and low elevation natural-surfaced roads may be sources of erosion into and sedimentation of streams. The BLM has no authority over private roads and private land use.

Road construction and improvement across BLM-managed lands was based mainly on timber management objectives as directed under federal O&C land management. Many natural-surfaced roads remained open for administrative access after timber sales were completed. These roads are known to be sources of erosion into and sedimentation of streams. BLM roads are managed and inventoried for potential decommissioning, improvements, or both, to help reduce sedimentation of neighboring streams.

Culverts installed prior to 1992 in the Wild Rogue - South Watershed were either designed for a 25 to 50-year flood event or sized based on channel width and stream flow. Today's culverts are designed for a 100-year flood event in accordance with the Northwest Forest Plan and the Medford District RMP. During road inventories existing culverts are evaluated for future replacement so as to meet the 100-flood event standard.

The Wild Rogue - South Watershed varies in road density and type of roads within the drainage area. The average road density across all lands in the Wild Rogue - South Watershed is 2.94 miles per square mile. The average BLM road density in the Wild Rogue - South Watershed is 2.37 miles per square mile of BLM land. (Note: Total miles of all roads in the analysis area is 195.68 miles. Approximately 35 miles of roads controlled by the Forest Service are located on the ridge line that is the watershed boundary. These are BST roads that are kept in good shape and have little or no effects on soils or hydrology.) The BLM continues to analyze and inventory BLM-controlled roads in an attempt to improve the roads and/or reduce road densities to a level appropriate for land management and the environment.

Table III-27: Road Information by Surface Type			
Road Ownership	**Surface Type**	**Miles**	**% of total**
BLM	Natural (NAT)	22.16	11%
BLM	Pit Run Rock (PRR)	33.11	17%
BLM	Grid Rolled Rock (GRR)	13.15	7%
BLM	Aggregate Base Coarse (ABC)	11.71	6%
BLM	Aggregate Surface Coarse (ASC)	46.45	24%
BLM	Bituminous-Surface Treatment (BST)	28.39	15%
Private & Other Agencies	Unknown/Various Types (UNK)	40.71	21%
Total Road Miles		**195.68**	

4. Quarries

Quarries are located at higher elevations and far from many roads that should be surfaced and maintained. It is necessary to maintain quarries that are free of weeds and *Phytophthora lateralis* to prevent the spread of noxious plants and Port- Orford cedar root disease.

5. Minerals and Mining

a. Minerals

An inventory, utilizing the mining claim microfiche prepared by the BLM Oregon State office, revealed that there are approximately thirty mining claims currently existing within the watershed. All of the claims are placer claims. The rights of mining claimants for activities on unpatented claims are outlined in Appendix B.

On the lands administered by the BLM, there are three levels of operations that may occur. The lowest level of operations is casual use. Casual use operations include those operations that usually result in only negligible disturbance. These types of operations usually involve no use of mechanized earthmoving equipment or explosives, and do not include residential occupancy. No administrative review of these types of operations is required. The number of casual users in this category are not known.
The most common level of operations involve activities above casual use in an area of five acres. This level of operations requires the operator to file a mining notice pursuant to the BLM Surface Management Regulations. The mining notice informs the authorized officer of the level of operations that will occur, the type of existing disturbance at the location of the operations, the type of equipment to be used in the mining operations, and the reclamation plans following the completion of the mining activities.

Mining notices involve an administrative review of access routes used in the mining operations and a

review to determine if unnecessary or undue degradation may occur as a result of the mining operations. There are three mining notices that have been submitted for operations proposed to occur on the BLM-administered lands within the watershed. These are small dredging operations.

A plan of operations is required for mining operations that meet any of the following criteria:

- Proposed operations that may exceed a disturbance level of five acres;
- Activities above casual use in specially-designated areas such as areas of critical environmental concern (ACEC), lands within an area designated as a Wild or Scenic River, and areas closed to off-highway vehicle use; and
- Activities that are proposed by an operator who, regardless of the level of operations, has been placed in noncompliance for causing unnecessary or undue degradation.

The review of plans of operations involves a NEPA environmental review to be completed no later than 90 days from the date of the submission of the plan. No plans of operations exist within the watershed at this time.

In addition to federal laws, mining claimants must comply with state laws and regulations that are administered by:

- The Oregon Department of Environmental Quality monitors and permits dredging activities and activities where settling ponds are used.
- The Oregon Department of Geology and Mineral Industries (DOGAMI) permits all activities over one acre in size and ensures reclamation is completed in a timely manner. DOGAMI requires reclamation bonds where applicable.
- The Department of State Lands permits instream activities where the removal, or displacement, of 50 cubic yards of material is anticipated and where the movement of a stream channel is planned.
- The Oregon Department of Fish and Wildlife (ODFW) monitors turbid discharges from mined sites. The ODFW also recommends preferred dredging periods for operations within anadromous fish-bearing streams. The ODFW also approves variances for operations outside the preferred work periods where applicable.

There is no mining allowed within the designated Wild section of the Rogue River. However, panning of material below the existing waterline of the river is allowed. Dredging of all tributaries of the Rogue River is allowed between June 15 and September 15 annually unless a variance allowing such work is given the operator by the ODFW.

If mining claim occupancy is proposed by the operator/claimant the use is reviewed by the authorized officer. The occupancy must be determined to be reasonably incident to mining, and is reviewed in a manner similar to a plan of operations since this determination is a federal action covered by NPEA. No occupancy may occur until the proposed occupancy is reviewed and written permission is issued by

the authorized officer.

b. Surface Uses of a Mining Claim

In some instances the surface of the mining claim is managed by the claimant. These are usually claims that were filed before August 1955 and determined valid at that time. The claimants in these cases have the same rights as outlined above. However, they also have the right to eliminate public access across the area on which they have surface rights. There are no instances within the watershed where the claimants have surface rights. These rights are outlined in Appendix B.

c. Mineral Potential

Mineral potential is defined in the Medford District RMP (Chapter 3, p. 102) as low, moderate, or high (USDI-BLM 1994). The mineral potential map (Map 13) shows there is a high potential for gold, generally in the area adjacent to the Rogue River downstream from the townsite of Galice and along the lower stretches of Galice Creek. There is a moderate potential for gold west of the townsite of Galice and in the area from Pickett Creek north to the Rogue River.

There is a moderate potential for gold in the east portion of the watershed (east of Howard Creek). The remainder of the watershed has a low potential for minerals.

d. Physical Condition Resulting from Past Mining Activities

The existing physical condition of all areas within the watershed that have been mined is in good to fair.

6. Cultural Resources

There are several recorded cultural sites within the watershed. Those areas include prehistoric sites along the Rogue River and historic sites related to homesteading and mining along the river and in the area near Peavine Mountain. Two sites in the watershed are on the National Register of Historic Places: Whisky Creek cabin and the Rogue River ranch. Whisky Creek cabin is about 3 miles downriver from Grave Creek. The Rogue River ranch is located 20 miles downriver from Grave Creek, at the western end of the watershed.

Within the watershed many areas have been surveyed during the planning of projects such as timber sales and road construction.

7. Lands/Realty

The land ownership pattern within the watershed is a solid block of BLM and Forest Service ownership with the exception of a single private inholding at Black Bar lodge.

Rights-of-way issued to private landowners are for such uses as roads, water systems, power lines, phone lines, and communication sites. The actual locations of these rights-of-way can be found in master title plats kept updated at the Medford District BLM Office. In this watershed there are some

road ROW's that have been issued along with a waterline ROW issued to the Black Bar lodge.

There are filming permits issued periodically along the Rogue River for movie filming.

There are several mineral and land withdrawals within the watershed. The Medford District RMP lists those withdrawals. The most notable withdrawals within the watershed are:

Rogue Wild and Scenic River Corridor - There are several withdrawals within the Wild section of the Rogue River in the watershed. One was already in place when Congress designated the Rogue River a wild and scenic river. This withdrawal segregates the lands from entry under most general land laws and the mining laws. The other withdrawal that has existed since the late 1950's withdrew all lands within the corridor from mineral entry. This withdrawal prohibits the filing of new mining claims within the corridor. However, claims filed prior to the withdrawal and not abandoned would have prior existing rights. Together, both withdrawals preclude the filing of new locatable mining claims and restricts entry under the general land laws.

8. Illegal Dumping

Illegal dumping occurs in places throughout the watershed. However, because of the remote nature of the lands within the watershed, the amount is relatively small. Some measures such as road gating and blocking have deterred dumping and may be important long-term measures to eliminate this problem.

IV. REFERENCE CONDITION

A. PURPOSE

The purposes of this section are to explain how ecological conditions have changed over time as the result of human influence and natural disturbances, and to develop a reference for comparison with current conditions and with key management plan objectives (*Federal Guide for Watershed Analysis*, Version 2.2, 1995).

B. CLIMATE

The climate of southwestern Oregon has not been static. During the Holocene (the past 10,000 years), shifts in temperature and precipitation affected the type and extent of vegetation, the viability of stream and river flows, fish and animal populations, and human access to higher elevations. At the beginning of the Holocene, temperatures were rising and the climate was warmer and drier than today. This trend continued until sometime after 6,000 years ago, when wetter and cooler conditions began to appear. During the past few thousand years modern climatic patterns and vegetative regimes have prevailed. However, during this period the environmental forces have not been constant. Fluctuating cycles of drier or wetter conditions, varying in duration, characterize the modern climatic pattern (Atwood and Grey 1996).

This long period of drier and warmer conditions in southwestern Oregon began to change at some point in the mid Holocene. The onset of wetter, cooler conditions gradually changed vegetation patterns, as well as the quantity and distribution of game animals and migrating fish (Atwood and Grey 1996).

At the time of Euro-American settlement, precipitation rates in the Wild Rogue - South Watershed were similar to those of today: between 40-70 inches on the east side and 70-150 inches on the west.

C. EROSIONAL PROCESSES

The historic erosional processes were generally the same as those described under the Current Conditions section. Native people probably did not accelerate the rate of movement by their burning practices because they did not burn on very steep slopes. Native burning practices generally involved burning near level to gently sloping areas in valley bottoms, footslopes, and upland meadows. Their fires were spotty and designed to enhance habitats and thus increase numbers of desirable plant and animal species (BLM 1997). Since valleys and gently sloping footslopes compose very little of this area, it is likely that native people limited their burning activities to upland meadows.

Concentrated flow (gully and rill) erosion occurred mainly in draws where channels were created. The density of these channels varied with climatic cycles. During cycles the intermittent stream channels were more common. During dry cycles, cobbles, gravel, and plant debris accumulated in the draws, burying the channel. According to Pullen (1996) the natives recognized the value of riparian areas for humans and animals and therefore did not burn within them. Furthermore, the riparian areas of Class I, II, III and sometimes IV streams are very moist due to the stream influence and do not burn as easily as

the uplands.

Mass movement occurred historically much the same way it does today, through rock fall. The watershed consists of many lag slopes, which are gravelly slopes with colluvial movement. Colluvial movement is the transport of loose rock and soil by gravity; it is increased by disturbances such as wide trails and roads.

Native peoples created foot trails instead of roads. These narrow foot trails had little effect on erosion, water quality, and water quantity. In the 1850's, with the settlement of the area for mining, larger trails were beginning to be constructed for transporting gear and supplies. With increased trails came increased erosion from cutbank and fill failures and an increase in colluvial movement. The trails were also often built on steep side slopes that eroded easily. Starting around 1910, the USFS began constructing better trails to replace the roundabout trails through the steep slide areas (Atwood and Grey 1996).

D. HYDROLOGY

1. Floods

Periodic flooding within the Rogue River basin has had devastating consequences for the cultural environment. River flows were high enough during major flood years to destroy bridges, trails, cabins, and mining structures, and to inundate agricultural lands and stream courses. No written record exists of flood impact on human improvements, soil vegetation, or aquatic life before Euro-American settlement and development, although certainly catastrophic 100-year floods occurred then, as in the recent past (Atwood and Grey 1996).

Warm rain on snow events are frequent in the Rogue Basin. These events have resulted in flooding (Hill 1980). An article in the Rogue River Courier, January 29, 1903, pointed out that there had been floods in 1853, 1861, 1862, 1866, 1881 and 1890. All of these except for the flood of 1890, which was a rain event, were caused by rain-on-snow events. Warm rain on snow events have historically been a large factor in flooding in the Wild Rogue - South Watershed. Almost half of the watershed lies in the transient snow zone. The combination of warm rain on snow in such large open areas creates the potential for large floods that could be very flashy.

The flood of December 1861 was the largest flood on record on the Rogue River. In that year, severe flooding inundated fields, destroyed cabins, and washed out flumes along the river and its tributaries. Major floods of record in the 1900's occurred in 1927, 1955, 1964 and 1974. (Atwood and Grey 1996). Another major flood occurred in 1997. In the flood of 1927, the Rogue River was swept clear of every bridge between Grants Pass and the Pacific Ocean (Rogue River Courier, March 4, 1927).

2. Droughts

Drought conditions were noted in 1841, 1864, 1869-74, 1882-85, 1889, 1892, 1902, 1905, 1910, 1914-17, 1928-35, 1946-47, 1949, 1959, 1967-68, 1985-88, 1990-92, and 1994 (LaLande 1995). During the drought years, many of the smaller streams in the area went dry and the larger streams had low flow.

During these dry periods lag graves accumulated in draws.

3. Dams

Beaver dams were prevalent in low-gradient tributary streams in the Rogue River system before Euro-American influence. Between 1827 and 1850, fur traders removed virtually all of the beaver from the Rogue River system upstream of the Wild Rogue Watershed (Atwood and Grey 1996). Consequently, the dams were no longer maintained and were destroyed over time. Beaver dams added woody material to streams, trapped and stored fine sediments, and reduced water velocities. The loss of beaver dams likely resulted in scouring of channel beds and banks, increased width-to-depth ratios, and fine sediment deposition in pools. Most likely, there were established beaver dams only in Missouri Creek.

There have been manmade dams on the Rogue River upstream of the Wild Rogue - South Watershed for nearly 100 years. Ament dam was built in the early 1900's at Pierce Riffle on the Rogue River for mining and irrigation. In 1919, Ament dam was removed and was replaced with Savage Rapids dam in 1921 (Sutton 1966). The Savage Rapids dam, along with the Lost Creek and Applegate dams (built in the 1970's) have substantially altered the natural flow regime of the river downstream which had been characterized by flooding and summer droughts.

4. Mining Effects

Mining began in the Wild Rogue - South Watershed in the early 1850's. Hydraulic mining was done in the Rogue River and some of its tributaries such as Howard Creek and Rum Creek (Atwood and Grey 1996). Hydraulic mining diverted water from mountain streams into ditches, then carried it across ravines and through flumes before dropping it into a pipe and nozzle. The water was sprayed at the bottom of a bank until the bank caved in. The concentrated stream of water washed entire hillsides down and the loose soil was run through sluices to extract the gold (Atwood and Grey 1996). Miners sometimes mined down as far as 40 feet in a river bar to find gold (Atwood and Grey 1996), completely disrupting the substrate. Hydraulic mining continued until the early 1900's along the Rogue in such places as Tyee Bar, Black Bar, Little Windy Bar, Horseshoe Bar, Winkle Bar, and Battle Bar (Atwood and Grey 1996). Hydraulic mining results in increased entrenchment, lower sinuosity, and increased sediment loads that fill pools with fine sediment. The flumes carrying the water from streams for the nozzle were up to one mile long, such as the one to Tyee Bar (Atwood and Grey 1996), and sometimes 300 feet tall (Atwood 1978). Mining ditches were located in the lower section of these streams to divert water for the flumes (U.S. Surveyor General's office survey maps, 1914-1920).

E. STREAM CHANNEL

Prior to Euro-American settlement, the steep headwater streams in the Wild Rogue - South Watershed had coarse woody debris creating a step/pool profile. Forests along the streams provided shade and an abundant source of coarse woody debris resulting from mortality. The coarse woody debris provides both structure and nutrients for the stream. Hydraulic mining in the Rogue River and some tributaries resulted in some downcutting in some channels.

F. WATER QUALITY

Overall, prior to Euro-American settlement, historic summer water temperatures were likely similar to what they are today. Given the fire occurrence prior to 1920, some stream reaches could have been sparsely vegetated for periods of time, resulting in higher water temperatures during that time (USDI-BLM 1997).

Mining in the late 1800's and 1900's caused a reduction in riparian vegetation, allowing more solar radiation to reach the streams. Increased water temperatures resulted from this activity. Sediment loads and turbidity levels were historically lower due to fewer sediment sources prior to Euro-American influences. Sedimentation and turbidity rose dramatically in conjunction with hydraulic mining, land clearing upstream, road and trail building, and settlement along creeks and rivers. In addition, miners sometimes used a process called cyanidation to extract gold from ore (Atwood and Grey 1996). If used incorrectly, this process can result in cyanide entering the river.

G. VEGETATION

Historic vegetation patterns, or reference condition, refers to the forests or vegetation that existed on a site prior to significant Euro-American modification. Examples of significant Euro-American modification include clearing for settlement and agriculture, human development (homes, buildings, roads, etc.), timber harvesting, mining, grazing, and fire suppression.

The information presented here was gathered from the O&C revestment notes. These notes are from the inventories done to determine the economic worth of the land at that time, how much timber volume was present, and how the land should be used. Every 40-acre parcel of O&C land was surveyed. Although some of the notes are hard to interpret, some conclusions can be drawn about how the general landscape looked liked circa 1920.

Enough information is present in the old surveys to develop approximate major plant series and seral stage maps and also to estimate the extent of fire occurrence. The information in the survey notes describes the conifers present in both the overstory and understory, the amount of board feet present at that time, the major hardwood species (madrone, tanaok, etc.), the dominant brush species such as *Ceanothus* and manzanita, and whether or not there were any recent signs of fire events.

Information was taken from the available data for BLM lands. The reference condition of Forest Service land was similar to that of the BLM lands.

The data shown below summarizes the historic major plant series within the Wild Rogue - South Watershed. This is shown to give an idea of past vegetation in the watershed and does not represent exact acreage totals of series, mature/late-successional habitat, or fire events. In interpreting the notes, an average of 10 MBF/acre for each 40-acre parcel was used to index the lower end of mature/late-successional habitat. This was done for two reasons: to show the amount of high-volume acres in the watershed in 1920 and to give an estimate of suitable habitat for late-successional forest-dependent species. It should be kept in mind that cruise data from the 1920 notes are based on different methods

and standards than those used today and the yield is a conservative estimate by today's standards (Harris 1984).

Table IV-1: Historic Major Plant Series and Acres Burned Within the Wild Rogue - South Watershed (Circa 1920)

Major Plant Series	Number of Acres Surveyed*	Estimated % of Watershed for Each Series	Burned		
			Acres	% of Series Total	% of Watershed Total
Douglas-fir	4,756	23%	1,235	15.2%	6%
Non-Forest	796	4%	218	2.7%	1%
Port-Orford cedar	30	0.1%	30	0.4%	0.1%
Ponderosa pine	107	1%	0	0.0%	0.0%
Tanoak	14,832	72%	6,598	81%	32%
Western hemlock	25	0.1%	25	0.3%	0.1%
Total	20,546	100%	8,106	-	**39%**

*The 1920 surveys covered every other section in the watershed. All odd-numbered sections were surveyed.

Table IV-2: Historic Late-Successional Forest Acreage Within the Wild Rogue - South Watershed (Circa 1920)

Major Plant Series	Acres Surveyed *	Estimated Late-Successional Forest		
		Acres	% of Series total	% of watershed total
Douglas-fir	4,756	317	6.7%	1.5%
Non-Forest	796	0	0.0%	0.0%
Port-Orford cedar	30	0	0.0%	0.0%
Ponderosa pine	107	0	0.0%	0.0%
Tanoak	14,832	4,923	33.2%	24.0%
Western hemlock	25	0	0.0%	0.0%
Total	20,546	5,240	-	**26%**

*The 1920 surveys covered every other section in the watershed. All odd numbered sections were surveyed.

Table IV-3: Historic Late-Successional Forest Burned by Major Plant Series Within the Wild Rogue - South Watershed (Circa 1920)

Major Plant Series	Acres	Late-Successional Forest		Percent Burned Acres of Late-Successional Forest by Series (estimated)	Percent Burned Watershed of Late-Successional Forest (estimated)
		Total Acres	Acres Burned		
Douglas-fir	4,756	317	40	0.8%	0.2%
Non-Forest	796	0	0	0.0%	0.0%
Port-Orford cedar	30	0	0	0.0%	0.0%
Ponderosa pine	107	0	0	0.0%	0.0%
Tanoak	14,832	4,923	600	4.0%	2.9%
Western hemlock	25	0	0	0.0%	0.0%
Total	20,546	5,240	640	-	3.1%

*The 1920 surveys covered every other section in the watershed. All odd numbered sections were surveyed.

1. Landscape Patterns

Five geographically distinct fire events were listed in the revestment notes:

a) East Fork of Hewitt Creek (T. 33 S., R. 9W, Sec. 17) - 80 acres;

b) Curry Ridge (T. 33 S., R. 9W., Sec. 31) - 440 acres;.

c) Anna Creek (T. 34 S., R. 8 W., Sec. 17) - 480 acres;

d) Quail Creek (T. 33 S., R. 10 W., Sec. 15) - 600 acres.

e) Howard & Windy Creeks: a minimum of 6,000 acres, perhaps more than 10,000; almost all of the Windy Creek drainage and the south portion of Howard Creek.

Except for Howard and Windy Creeks, the fires occurred on ridgetops and warmer aspects. Windy Creek had evidence of fire throughout the drainage. Howard Creek had evidence of fire in the south half of the drainage.

Ridgetops were more open and less forested then. Cattle were grazed in T. 34 S., R.10W., Section 1. The highest portions of Curry Ridge (T33S, R9W, Section 31 with an elevation of approximately 4,000 feet) were not forested.

The most common plant series was tanoak, which occupied 72% of the watershed. The Douglas-fir series occurred on about 23% of the watershed. Roughly 3% of the watershed was non-forest.

Late-successional forests covered approximately one quarter of the watershed. Ninety percent of the old growth occurred on sites in the tanoak series, with the remainder on sites in the Douglas-fir series. About 12% of the late-successional forest had signs of underburning.

H. SPECIES AND HABITATS

1. Terrestrial Environments

a. Special Status Plants

It can be postulated that the habitat for late-successional forest survey and manage vascular species was much once more extensive in the watershed before timber harvest was common. The 1920 revestment notes provide an important view of late-successional forest conditions at that time. This was one of recovery after large fires. The amount of old growth in the watershed varied over time and spatially across the region, reflecting differences in climate-based fire regimes and fires caused by both Europeans and Native Americans (Ripple 1994). Therefore, the amount of late-successional habitat could have been greater in periods prior to collection of the 1920 revestment notes.

Even though stands of larger trees do exist in the watershed today, they tend to be in islands surrounded by clearcuts, with an abundance of edge habitat where mychorrhizal connections and moisture conditions have been disrupted. These high quality microhabitats were most likely more abundant and contiguous before clearcutting. At the time of the revestment notes, larger trees were more sparsely scattered across the landscape than typical late-successional forests due to the presence of fire.

Due to the complex life history of the survey and manage orchids, they were probably never a dominant species in the herbaceous layer. They could have occurred more frequently in the watershed and with higher numbers of plants per population area if moister, shaded microsite conditions occurred more frequently. This frequency could also have been maintained during periods of higher fire frequency, since orchids have been shown to respond favorably to low-intensity burning (Management Recommendations 1998). It is impossible, though, to know which presettlement habitats harbored orchid populations and how extensive they were in the past. The same can be said for *Allotropa virgata*, except that it was probably found more commonly than the orchids. *Bensoniella oregana* most likely existed more commonly before riparian reserve disturbance occurred from timber harvesting.

A more contiguous forest could also mean that nonvascular species associated with the coast could have been more prevalent before timber activities began in the watershed and in watersheds to the west. Those species found today would be considered quite rare considering the loss of connectivity that has occurred.

Since serpentine habitats occur because of unusual soils, the total amount of serpentine habitat close to what it is now and probably contained the same types of plants. The low-intensity more frequent fires of the past in this type of habitat probably helped to promote higher species diversity. Species composition may have been because the fires prevented encroachment from trees and shrubs. Also, more openings and oak woodlands/savannah probably existed, since fire frequencies could have been higher in those habitats. This would mean that such special status species as *Eschscholzia caespitosa* and *Delphinium nudicaule,* which are found in adjacent watersheds, may have been more common then they are now. Other openings created by fire in forested habitats (which was at times stand replacing in this watershed) most likely created a natural patchiness allowing for higher species diversity and better habitat for *Frasera umpquaensis.*

Meadow vegetation was most likely predominantly native grass species before settlers introduced exotic grasses and orchard species to Hewitt Creek meadow. The portion of the meadow taken over by bracken fern (a colonizer after disturbance) was probably much smaller. This meadow and other small openings found in the watershed were probably more extensive in size due to more frequent fires. Changes in the size of Hewitt Creek meadow can be seen by comparing aerial photos taken as recently as 1991 and 1996.

Noxious weeds were nonexistent before the advent of European settlers. Purple loosestrife would not have been a problem, so native vegetation would have been more intact along the banks of the Rogue River. Other species such as diffuse knapweed or Canada thistle would not have been present to compete with native vegetation, which is especially the case now with *Frasera umpquaensis*.

b. Wildlife

A pre-Euro-American view of the Wild Rogue - South Watershed would be dramatically different than one would see today. Native Americans were managing the landscape for habitats and products they found useful. Fires were used to burn off undesirable vegetation and to promote production of desired products. Wildlife was extensively used by these people to meet their everyday needs. Human exploitation of these wildlife resources was at a sustainable level. Each species maintained its role in an intricate food chain, where its presence benefitted the community as a whole. Large predator species, such as grizzly bears *(Ursus horribilis)* and wolves *(Canis lupus),* were present in the watershed (Bailey 1936) and, along with cougar *(Felis concolor)* and black bear *(Ursus americanus)*, maintained the balance of species such as Roosevelt elk *(Cervus elaphus)* and black-tailed deer *(Odocoileus hemionus)*. Predator species helped to maintain a balance between herbivorous species and vegetation. Predator species also benefitted other community members such as ground-nesting birds. They consumed small mammals such as raccoons *(Procyon lotor)* that fed on the young birds. Predators also made carcasses available in the winter that benefitted species as diverse as the striped skunk *(Mephitis mephitis*) and the black-capped chickadee *(Parus atricapillus*).

The landscape was open and the movement of animals was unrestricted. Many animals migrated with the seasons to take advantage of food, shelter, and water. Black bears in the early spring sought green grass to activate their digestive system. Winter kills that remained were utilized by the bears at this time. In early summer, California ground-cone *(Boschniakia spp.)* was an important part of their diet, until berries became available. As fall approached, the salmon returned to the river, spawned and died.

This abundant food source was available to a host of consumers and scavengers. Deer and elk also followed the seasons. Winter was primarily spent on the southerly-facing slopes in a mixture of conifer and oak/hardwood stands. As the seasons progressed, they would enter the uplands until fall arrived. Other species, such as the wolverine *(Gulo gulo luteus),* remained with high elevations throughout the year. This species was an opportunistic predator, feeding on animals such as porcupines *(Erithizon dorsatum)* and on occasional winter kills.

The upper ridges and north slopes were dominated by conifers. Stages of stand development varied due to disturbance events such as fire. Forests found on north and east-facing slopes were generally multi-canopied, with large amounts of snags, down wood, and large trees. South and west-facing aspects were composed of stands with a higher fire return interval, scattered large pines, and were often devoid of large amounts of down woody material. The amount of old-growth forest historically found in the watershed varied through time in response to disturbance events. Old-growth/mature forest was the dominant forest type in southwestern Oregon prior to Euro-American settlement, occupying as much as 71% of the area (Ripple 1994). The 1920 revestment notes provide an important view of late-successional forest conditions at that time. South and west-facing slopes and ridges were comprised of large openings with scattered, very large pine (both sugar pine and ponderosa pine) intermixed with brush. This era was one of recovery after large fires. History shows that this watershed was continuously influenced by large-fire events. The amount and type of old-growth forest in the watershed varied over time and perhaps never provided the late-successional forest characteristics for the identified species on the scale BLM is mandated to maintain by the Northwest Forest Plan. There is very little historic information available identifying the frequency of occurrence of species currently identified as late-successional obligates.

Species that benefitted from these forests, such as the pileated woodpeckers *(Dryocopus pileatus),* northern flying squirrels *(Glaucomys sabrinus),* and red tree voles *(Phenacomys longicaudus)* were found in greater numbers than they are now. Dispersal of animals, recolonization of former habitats, and pioneering into unoccupied territories was accomplished more effectively than it is today due to the connectivity of the older forest. Ripple (1994) estimated that 89% of the forest in the larger-size classes was in one large, connected patch extending throughout most of western Oregon. Due to the connectiveness of mature habitat, species that benefitted from edge environments, such as striped skunks *(Mephitis mephitis)* and great horned owls (*Bubo virginianus),* were less common than they are today.

Snags were more numerous than they are today and species that use snags as their primary habitat were more common. Numerous disturbance events such as fire, windthrow, and insect infestations played an important role in snag production. Due to the greater habitat, species that use snags were more common than they are today. Species such as the northern pygmy owl *(Glaucidium gnoma),* acorn woodpecker (*Melanerpes formicivorus),* western screech owl *(Otus asio),* and northern flicker *(Colaptes auratus)* had more habitat than is currently available.

c. Riparian

Prior to European settlement of the Rogue Valley, pristine streams flowed from their source to the Rogue River. Water quality was extremely high. Seeps, springs, snow and riparian vegetation all contributed to keeping the water cool. During the winter and spring, occasional floods would flush the system clear

of sediment deposited by natural slides and erosion. Stream courses in uplands were primarily lined by conifers and a narrow band of deciduous trees, and were well defined by entrenched channels. These stream systems consisted of undercut bank, and woody material that created a diverse aquatic system and associated habitats. Due to higher humidity, conifers near the streams resisted burning, allowing them to mature and resulting in heavy loading of large woody debris in the water. Adding to the diversity was a myriad of wildlife species. Beavers *(Castor canadensis*) were an important species in the lower reaches, maintaining streamside vegetation, creating backwater areas behind their dams, and adding finer woody material to the stream. This fine material benefitted fish, providing them with cover. Species such as ducks and geese also benefitted from the creation of ponds that provide nesting habitat. The diversity of wildlife species was not restricted to the surface, as a profusion of aquatic insects took advantage of the variety of available niches. These insects in turn supported an assortment of vertebrate species including anadromous fish. As the adult fish returned to their native streams, their carcasses produced a rich source of food that, in turn, supported the juvenile salmon of the year, minks *(Mustela vision),* American black bears *(Ursus americanus),* grizzly bears (*Ursus horribilis*), bald eagles *(Haliaeetus leucocephalus),* and a number of other scavenger species.

2. Aquatic Environments

a. Fisheries

Pre-Euro-American Settlement: A pre-Euro-American view of the Wild Rogue - South Watershed would have included established populations of beaver, particularly in Missouri Creek, but also possibly in the lower reaches of Big Windy and Howard Creeks. Robust populations of salmon would have been evident not only on the Rogue, but in its tributaries, especially Howard, Big Windy, and Missouri Creeks. In addition, the riparian corridors would have been comprised of a mixture of mature conifer and hardwood stands with dense canopies. Summer water temperature was probably cool and not a limiting factor in salmonid production. There would have been large woody debris dispersed throughout the streams providing complex habitats for juvenile cutthroat trout, steelhead, and salmon. There probably would have been an abundance of fish in most of the streams which currently have fish, that is, those without extreme gradients and natural barriers. Native Americans relied heavily on salmon, steelhead, lamprey, and suckers for subsistence and ceremonial purposes.

Prior to Euro-American settlement, the streams of the Wild Rogue - South Watershed flowed in channels constrained mostly by canyon walls, as they do currently. Riparian vegetation and trees buffered the heavy winter rains, limiting effects from annual peak flows. Winter scour did not limit macroinvertebrate or fish populations and large instream wood tended to hold back spawning gravels in flashy systems such as those now found in the watershed. Sediment within the spawning gravels was not limiting to fish or macroinvertebrate populations. Occasionally, landslides would deliver sediment to streams. However, large wood almost always accompanied the sediment delivery. The wood controlled sediment movement throughout the system and spawning gravels were not embedded with sediment as a result.

Post-Euro-American Settlement: Euro-Americans trapped beaver extensively, and as a result complex, deep pools associated with beaver activity started disappearing where their habitat had existed. Coho salmon populations associated with beaver began declining. The overall decrease in large instream wood suppressed the aquatic prey populations available for fish, negatively affecting

trout and salmon. In addition, mining roads and other travel ways became more numerous. This led to an increase in peak winter flows, especially when the roads were located near the streams. Sedimentation of streams increased as a result. Hydraulic mining operations began to peak from 1890-1910, and decreased slowly until 1930. Hydraulic mining caused extensive erosion of the streambanks. Extensive mining in the early 1900's caused the Rogue River to run brick red with silt (ODFW 1994). Large hydraulic mines were found in gold-bearing creeks. Further stream sedimentation began to decrease salmon populations.

Timber harvest had one of the biggest impacts on juvenile salmon, steelhead, and cutthroat trout habitat. Large trees that grew next to the stream were harvested due to their size and value. When the majority of the large wood was removed, there was little remaining for fish habitat. Habitat complexity rapidly declined, as did the salmon, steelhead, and cutthroat trout populations dependent upon the large wood. The loss of spawning gravel and pools suitable for holding in winter flows was

also associated with the decrease in the amount of instream large wood. In addition, the increased effect of winter scour on stream macroinvertebrates decreased the prey base for salmonid populations.

Road construction associated with timber harvest increased and generally had a negative effect on salmonid habitat. Sedimentation increased and began limiting salmonid production. Winter flows began to have higher peaks as a result of the interception, the focusing of subsurface flow, and the increased surface area of roads. High winter scour limited macroinvertebrate populations and transported wood from streams. The function of streams as fish habitat declined. In addition, many roads were constructed next to streams in the upper reaches, decreasing the area of functioning riparian habitat. Elevated peak flows increased erosion, as streams could not naturally diffuse the higher energy.

Commercial salmon harvest further affected the declining salmon runs further. Insufficient restrictions on commercial harvest, coupled with a rapid degradation of freshwater habitat, led to a decimation of salmon and steelhead populations.

I. FIRE

The reference condition for fire is the prehistoric condition, which includes the natural fire regime and Native American fire use. This last occurred prior to 1820.

Prehistoric fire disturbance within the watershed appears to have been of low to moderate intensity with a large proportion of trees in the larger size classes surviving the fires. High-intensity, stand-replacement fire occurrence was infrequent. High-intensity fires range at intervals from approximately 151 years (standard deviation = 30 years) on warmer, drier sites where the Douglas-fir series predominates, to approximately 287 years (sd = 62 years) on the more productive sites where the tanoak and white fir series' are found (Silver Creek Watershed Analysis 1995).

Frequent fires act as agents of stocking control, producing stands occupied by widely spaced, older, larger trees. Fires in prehistoric time left relatively great amounts of large, woody material and snags. Even where burning was intense and most of the large trees were consumed, the consumption was not complete. The frequent fire of varied severity thinned areas, allowing residual trees to grow to larger

diameters. Thus the size of large wood and snags was probably greater than what we see today. The amount of area in early seral stages (grass/forb and small shrub) was also greater prior to fire exclusion.

Portions of the watershed developed into non-forest or shrubland due to frequent burning over long periods of time. This was typically on ridgetops and on the warmer, wind-exposed aspects. Areas of low fire occurrence appear on moist, concave, northerly aspects. These are often riparian drainages.

1. Air Quality

Poor air quality due to wildland and prescribed (human) fire has been no historic occurrence in the spring, summer, and fall seasons in southern Oregon. Numerous references are made by early Euro-American explorers and settlers to Native American burning and wildfire occurrence in southern Oregon. Smoke-filled sky and valleys were once typical during the warm seasons. Air quality impacts from natural and prescribed fires declined with active fire suppression and declines in land clearing and mining burning. Factors influencing air quality shifted away from wildfire and human burning to fossil fuel combustion as population and industry grew. This created a shift in the season of air quality concern to the winter months when stable air and poor ventilation occurs. By the 1970's, fossil fuel emissions had become a major factor along with wood stove and backyard burning. Prescribed burning related to the forest industry increased throughout this period and was an additional factor, particularly in the fall. Regulation of prescribed burning smoke emissions and environmental regulation of fossil fuel combustion sources has led to a steady improvement in air quality since the 1970's.

Air quality as a reference condition is determined by legal statutes. The Clean Air Act and the Oregon State Air Quality Implementation Plan have set goals and objectives. Management actions must conform such that an effort is made to meet national ambient air quality standards, prevent significant deterioration, and meet the Oregon visibility protection plan and smoke management plan goals.

2. Hazardous Fuels Buildup

The reference condition for fuel conditions in a presettlement period would have been one of low buildup over the vast majority of areas. Lack of fire suppression and Native America use of fire maintained a comparatively open forest understory with limited fuel accumulation or understory vegetation growth. This would have occurred across the watershed with areas of dense undergrowth and fuel accumulation occurring primarily on northerly aspects at higher elevations in the western half of the watershed. These areas would change over time. Location would largely be dependent on lightning occurrence pattern, with the exception of areas used by Native Americas for food production. The buildup of fuel and vegetation that has resulted from modern human settlement and subsequent fire exclusion has created a hazardous situation that is reaching the outside of the reference condition and natural range of variation.

J. HUMAN USES

1. Cultural/Historical Use

a. Prehistoric Occupation

Archeological evidence indicates that human occupation of southwest Oregon dates back about 10,000 years. During these prehistoric times, the native inhabitants occupied southwest Oregon and minimally affected the physical landscapes. The native inhabitants of the area (Takelma) were hunters and gatherers. Small, mobile groups of people used the river's resources for thousands of years. In the canyons below Grave Creek, the only occupied areas were the occasional river terraces, which allowed Native Americans sufficient space and access to resources to serve as encampments. The Takelma used acorns, camas, deer, elk, fish, and many other plants and animals for food and materials. During the winter, they lived in the lowlands in permanent villages. During other months, they would set up temporary camps in the surrounding uplands to hunt and gather. At some point cultural practices changed, and a less mobile, more sedentary way of life emerged.

Archaeological excavations took place at Marial in 1978 and 1982. These excavations uncovered artifacts dating back 8000 to 9000 years. The excavations at Marial represent the earliest firmly dated site in southwest Oregon.

b. Settlement

The first known Europeans to enter the Rogue Valley passed through in early 1827. They belonged to a party of Hudson's Bay Company trappers from Fort Vancouver under the leadership of Peter Skene Ogden. The Hudson Bay Company trappers continued to visit the area for several years. Other trappers and explorers made periodic visits to the area up to the time of the discovery of gold in Jackson County.

Gold was discovered on Jackson Creek (near present day Jacksonville) in the Rogue Valley in late 1851, or early 1852. Although gold was previously discovered elsewhere along the Applegate and Illinois Rivers, this gold discovery brought an influx of thousands of miners to the region.

As mentioned in the Characterization section, the land ownership pattern of the watershed was primarily established in the late 1800's and early 1900's. The lands in the watershed in the mid 1800's were public lands owned by the United States and administered by the General Land office. The first primary transfer of public lands out of ownership by the United States was to the State of Oregon following statehood in 1859. There was a large land exchange between the Forest Service and the BLM in 1956 in which several acres of lands administered by both agencies were transferred so as to consolidate ownership. This occurred primarily in the east portion of the watershed near Peavine Mountain.

In order to further develop the west, Congress passed several laws enabling settlers to develop and obtain ownership of the public lands. These laws allowed for Donation Land Claim patents, entry under the Homestead Acts, military patents, and mineral patents. In addition, land was deeded to the Oregon and California Railroad, with some of those lands being sold to private individuals.

c. Mining

Gold mining began within the watershed in the late 1800's. The majority of the mining appears to have been placer mining; however, there have been several lode (hard rock) mines in operation within the watershed. Mining occurred in the Mule Creek area, Grave Creek, China Gulch, and on many of the bars along the river, such as Tyee, Black Bar, Little Windy, Winkle Bar, and Battle Bar.

The abrupt influx of miners into the Rogue country devastated local Indian bands. Miners were ruthless in their treatment of the Indians. The mining destroyed the river banks and the way of life of the Indians. Clashes between the United States government and Indians occurred between 1851 and 1856. By the spring of 1856 the Indians were defeated and those remaining were taken to reservations elsewhere.

In the 1860's and 1870's, after the Indians left the canyon, there were only a few settlers in the canyon. The small terraces were just wide enough to hold a shelter and equipment. Chinese miners came into the canyon later after the whites had extracted the more easily mined gold.

Around 1880, an unknown miner built the first cabin at Whisky Creek. This area was mined for almost 75 years, and ownership of the claim changed hands many times. Whisky Creek cabin is the oldest known mining cabin still standing in the Rogue River canyon, and is now on the National Register of Historic Places.

In 1895, a permanent settlement was constructed along a flat above Mule Creek, which had been extensively mined since the early 1880's. This area, currently known as the Rogue River ranch, became a gathering area, trading post and boarding house for travelers. The Billings family owned the land from 1898 to 1931 and the ranch was the center of social life for 75-100 residents of the Mule Creek-Marial area. In 1931, Billings sold the house to Stanley Anderson, who’s family lived there until they sold the land to the BLM in 1970 under the National Wild and Scenic Rivers program. The Rogue River ranch is on the National Register of Historic Places.

d. Wild and Scenic River

The Wild and Scenic Rivers Act of 1968 was the first legislative action to preserve free-flowing rivers in their natural state, preserving their outstandingly remarkable values for generations to come. The Rogue was one of the first eight rivers to be included in the 1968 legislation. Eighty-four miles of the Rogue were designated within the language of the original act. Forty-seven miles of the Rogue are included within this watershed, from the mouth of the Applegate River to Grave Creek.

The Wild and Scenic Rivers Act allowed for three different classifications of river stretches: wild (little or no shoreline development and essentially primitive), scenic (some development visible but not dominant), and recreation (maximum shoreline development). The section within the Wild Rogue - South Watershed is designated as wild.

The BLM has assumed an active management role on this 47-mile stretch. The Rogue River program was established by the BLM in 1970 to initiate the protective measures referenced above and to manage

recreational use of the river, both on public and private land. The administrative center for the river program is the Rand Visitor Center. Rand is a National Historic Register Site and was previously the headquarters of the Galice Ranger District of the Siskiyou National Forest. The BLM acquired the site through a land exchange that had occurred some years earlier.

e. Zane Grey Roadless Area

In 1979, approximately 45,000 acres in the Wild Rogue Watershed were reviewed for wilderness characteristics. This area encompasses lands both north and south of the river from Grave Creek to Marial, with the Rogue River running through the middle of the proposed roadless area. In 1980, the area was eliminated from wilderness review due to the limited opportunities for solitude and the presence of human structures used in mining. The area is bounded by roads and O & C lands which have been intensively managed.

2. Recreation

Historically, recreational activities centered around the Rogue River. Activities included fishing, swimming and boating. Fishing in the Rogue River has undergone startling changes in the last seventy years. The use of rowboats for pleasure or incidental fishing was practically unknown in older days (Booth 1984). In the 1920's and 30's, an increasing number of anglers and vacationers used Glen Wooldridge's guide service. In 1947, Wooldridge began motorized boat trips up the river from Gold Beach (Atwood and Grey 1996). This began the steady influx of river recreationists. Black Bar lodge, located 9 miles downstream from Grave Creek, was built around 1935 and became a popular place to stay among boaters. Developments in recreation equipment technology have allowed recreationists to enjoy the river year-round and in relative comfort.

During the earliest years of the 20th century, recreational activity was intertwined with work and food acquisition (Atwood and Grey 1996). The 1930's brought about the Civilian Conservation Corps (CCC) which, along with other duties, was responsible for building roads. These new roads provided recreational opportunities that were not previously available to many people. People began using roads to access sites for hiking, camping, and driving for pleasure. In 1935, a suspension bridge was built by the CCC across Grave Creek. When completed, it opened up a new scenic loop for sightseers. Going by way of Merlin to Galice and on down the Rogue, motorists were able to cross the bridge and return to the Pacific Highway via the Grave Creek road (Hill 1980). Other recreational activities included camping, hunting, and horseback riding.

In the 1920's the Forest Service had two guard stations in the Rogue River Canyon, one at Whisky Creek and one between Meadow Creek and Horseshoe Bend. One of the major tasks of the Forest Service was trail building. By 1918, work was underway on a primary route known as the Rogue River Trail. The trail was planned to be completed by July, 1918 from Almeda to Gold Beach, a total distance of 78 miles, to provide access for mail service and to supply packers and anglers (Atwood and Grey 1996).

V. SYNTHESIS AND INTERPRETATION

A. PURPOSE

The purposes of synthesis and interpretation are to compare existing and reference conditions of specific ecosystem elements, to explain significant differences, similarities or trends and their causes, and to assess the capability of the system to meet key management plan objectives.

B. EROSIONAL PROCESSES

The major changes between historic reference conditions and current conditions are due to increases in the intensity and the types of human interaction with the environment. Relatively recent intensive forest management practices has included fire suppression, extensive road construction, logging with yarders on steep slopes, and logging with tractors on the few gentle to moderate slopes. Fire suppression has resulted in accumulation of fuels which contributed to relatively recent large fires. There was a large fire just prior to 1920 that burned over 6,000 acres in Windy Creek and upper Howard Creek drainages. Part of this fire, particularly in upper Howard Creek, was a stand-replacement fire. This area has continued to burn periodically, with the latest fire having been in 1987. The Galice fire of 1987 burned over 20,000 acres with 13 to 25% being a high-intensity, stand-replacement fire (see Fuels section, Chapter 3). A high-intensity fire consumes the duff, litter, and most of the coarse woody debris. The top layer of mineral soil affected by a high-intensity fire commonly shows color changes due to the consumption of organic matter and the effects of heat on the mineral components.

The cumulative effects analyses of roads completed on six small watersheds within the Wild Rogue - South Watershed showed that five of the six had road densities greater than 4.0 miles per section.

High road densities combined with patch clearcuts, such as have been done in the recent past in these small watersheds (also areas subjected to high-intensity fire), result in substantial increases in peak flow (Jones and Gram 1996). Other effects that may be attributable to high road densities combined with clearcuts are the destabilization of stream channels and reductions in the intermediate and low flows.

C. HYDROLOGY

The stream flow regime in the Wild Rogue - South Watershed reflects human influences that have occurred since European settlers arrived (USDI-BLM 1997). Potential changes may include channel widening, bank erosion, channel scouring, and increased sediment loads.

Road construction, timber harvest, and fire suppression are the major factors having the potential to adversely affect the timing and magnitude of stream flows in portions of the Wild Rogue - South Watershed. Extensive road building and timber harvest have raised the potential for increasing the magnitude and frequency of peak flows in many tributaries. The magnitude of the effect on the Rogue River is small, but part of a cumulative effect that includes all the upstream basin. As vegetation in the harvested areas recovers, the magnitude and frequency of peak flows will diminish. Permanent road systems will not allow the stream flow to return to predisturbance levels (USDI-BLM 1997).

Roads were located where the natural gradients made road location and construction easiest, in this case on or along ridgetops extending from the Galice to Gold Beach road. Secondary roads drop down midslopes and, in some cases, cross tributary streams including Big Windy, Jenny, Missouri, and Trout Creeks. Most of these secondary roads are unsurfaced.

D. WATER QUALITY

Changes in water quality and temperatures from reference to current conditions that can stress aquatic life are predominantly caused by past high-intensity fires, past heavy timber harvest, and roads. Water quality elements known to be affected the most by human disturbances and fire are temperature, sediment, and turbidity. Roads are the primary source of sediment in the analysis area. This is compounded by the unusually high extent of transient snow zone (TSZ) in the watershed.

The recovery of riparian vegetation will provide shade and should bring about the reduction of stream temperatures over time. Road maintenance (*i.e.,* drainage improvements including surface regrading to outslope wherever possible) and decommissioning(including tree planting in the road prism within the TSZ) would decrease sedimentation in the analysis area.

E. STREAM CHANNELS

Channel conditions and sediment transport processes in the Wild Rogue - South Watershed have changed since Euro-American settlers arrived in the 1830's. These changes have been due primarily to mining, road building, and changes to the riparian vegetation. Hydraulic mining which resulted in entrenched channels with greater width-to-depth ratios, occurred mostly in the Rogue and on Rum Creek. Increases in stream gradients and sediment transport were a consequence of the larger width-to-depth ratios.

Sediment is mainly transported from road surfaces, fill slopes, and ditchlines. Increases in sediment loads are generally highest during the five-year period after construction; however, roads continue to supply sediment to streams as long as they exist. Road maintenance and decommissioning would reduce the amount of sediment moving from the roads to the streams with emphasis on the TSZ where peak flows in open areas are highest.

Loss of riparian vegetation through fire has had a major detrimental effect on the presence of large woody debris in the stream channels. There appears to be a minimal amount of large woody debris in the watershed, with many areas lacking the potential for short-term future recruitment. Large woody debris is essential for reducing stream velocities during peak flows and for trapping and slowing the movement of sediment and organic matter through the stream system. It also helps to diversify aquatic habitat. Riparian reserves along intermittent, perennial, nonfish-bearing, and fish-bearing streams will provide a long-term source of large woody debris recruitment for streams on federal land once the vegetation has been restored.

F. VEGETATION

The vegetative and structural conditions of the forests in the watershed have seldom been constant and

have changed frequently in response to historic disturbance patterns. Disturbance has played a vital role in providing for a diversity of plant series, seral stages, and distribution of series and stages, both spatially and temporally. The presence of fire, insects, disease, periods of drought, and the resultant tree mortality, have always been part of the ecosystem processes.

Relatively recent timber harvesting has tended to simplify forest structures, and it has been a primary factor in the vegetative mosaic seen today in the watershed. The increase in fire exclusion in relatively recent time has driven forest structure towards a higher level of complexity in the current forest stands. This has occurred on the full range of sites, including sites where it is not sustainable such as those areas that historically supported ponderosa pine. Due to both timber harvesting and fire exclusion, there has been a substantial reduction in the presence of ponderosa pine over the past 50-75 years.

Consideration of the watershed's vegetation, its historical and current conditions, and successional patterns indicates four distinct areas for consideration.

1. Plant Series

The tanoak and Douglas-fir series were the dominant vegetation types in 1920 and remain so today. In 1920, the tanoak series was apparent on 68% of the watershed. Today it appears on 72% of the watershed. The Douglas-fir series occupied approximately 23% of the watershed in 1920 compared to 25.6% today. The white fir series has become apparent at higher elevations and covers 2.5% of the watershed, roughly equal to the difference between tanoak and Douglas-fir acres today versus 1920. The distribution of plant communities in the watershed is also similar to that of 1920.

The Douglas-fir series is observed on 25.6% of the watershed compared to 23.1% in 1920. The tanoak series has increased slightly, from 68.2% in 1920 to 72.1% today. A decrease in non-forest (3.8% to < 0.1%) is shown over the same time period. The white fir series is now observed in the watershed but was not mentioned in the old records. The change in the amount of acres in the individual plant series is minor and indicates that plant species composition has been relatively stable. Two trends that do come out are that more vegetation exists, and at the west and south periphery of the watershed (higher elevations) more shade-tolerant vegetation is appearing. Non-forested areas are disappearing as vegetation moves onto them over time. In the absence of fire disturbance at the higher elevations, white fir forests are developing. The correlation is a rough one, but useful to demonstrate changes in plant communities over time.

2. Late-Successional Forest

In 1920, roughly 25% of the watershed was in a late-successional forest condition. Today it is nearly three times as much: 67.3%. While this is close to the upper end of the 45-70% desirable range of late-successional forest for the LSR (Southwest Oregon Late-Successional Reserve Assessment 1995), maintaining this amount of late-successional habitat may prove to be a most challenging task. (See Fire Events below.) Based on evidence from the 1920 revestment notes, late-successional forest was historically (presettlement) 90% in the tanoak series with the remaining 10% primarily Douglas-fir.

3. Fire Events

Fire has been a prominent and consistent part of the natural disturbance regime within the Wild Rogue South Watershed. Areas have been burned repeatedly, sometimes in large-scale fire events. The revestment notes show that a large-scale, perhaps 10,000 acre stand-replacement event occurred sometime prior to 1920 in the Windy Creek and Howard Creek drainages. The area is often described as a wasteland in the inventory notes. This is significant as parts of this fire event overlap acres burned in the 1987 Galice fire. During the Galice fire, the fire was stopped at Lucky Boy ridge which separates the Windy Creek and Howard Creek drainages. Two large fires (in the tens of thousands of acres in the same area within 70 years) have implications for management strategies. This area is also home to knobcone pine which cannot reproduce in the absence of fire.

A similar pattern can also be seen on a smaller scale at Quail Creek. Land in T. 33 S,, R. 10 W., Section 15 burned prior to 1920 and again in 1970. The 1920 fire was an underburn where late-successional characteristics were maintained. In 1970, section 15 underburned again (Reed 1999). The pattern is again replicated at Anna Creek (T34S, R8W, Section 17). This area had a burn noted in 1920 and burned in 1987 as part of the Galice fire. The 1920 burn was a stand-replacement event and this situation was repeated in 1987.

Lastly, Curry Ridge was not forested as it is today. This is the characteristic for ridges in this part of the Rogue basin. Parts of the ridge had burned off and were being used to graze cattle. Shifting from open ridges to forest has been documented by the Siskiyou National Forest. This change was demonstrated by the Siskiyou National Forest's Eastside Zone Ecologist Vince Randell in 1997. Review of photos from fire lookouts generally showed less vegetation than seen today. On Burnt ridge (approximately 10 miles west of the Wild Rogue South Watershed) the area was classified as open brush type with numerous mountain meadows. Randell's 1994 photo shows a dense stand of second growth where an open non-forested ridge existed in 1917.

4. Late-Successional Forest Distribution

Based on past distribution of late-successional forest, the historic (and not so historic) burn patterns and site potential, different parts of the Wild Rogue - South Watershed have varying potentials for maintaining late-successional forest habitat. The best opportunity for this is that part of the watershed is northwest of Curry ridge. This high rainfall, sometimes gentle topography, has good road access and high densities of arborescent vegetation in a wide spectrum of seral stages make for good potential for long-term retention of late-successional forests and for development of this type of forest where it currently doesn't exist. This could be coupled with some early seral stages which over time to provide a broad variety of forest conditions, with the emphasis being on late-successional forest.

A similar approach is feasible for the eastern portion of the watershed. The management regime would have to be somewhat different there as it is the driest portion of the watershed. However, the emphasis on late-successional forest would be the same, but with greater potential for drier plant communities and a greater composition of pine species, particularly ponderosa pine. Historically, ponderosa pine accounted for as much as 25 to 30% of the overstory trees in this part of the watershed.

The area in the center of the watershed (*i.e.*, Windy and Howard Creek drainages) poses different challenges for management. Due to the topography, the area is more prone to stand-replacement fire events. Review of the revestment notes indicates that the fire pattern left unburned refugia on the more gentle slopes and along stream channels. Management here could develop late-successional features in areas where stand-replacement events are least likely to occur, and connect them with riparian reserves which have a greater chance of remaining in a later seral stage.

5. Size Class Distribution

A high percentage of the watershed (68.3%) exists in large (11-21" DBH) pole and greater size classes. Fire exclusion in this century has permitted dense pole stands to develop in parts of the watershed (outside Windy and Howard Creeks), crowding out important mid seral species that are less tolerant to shade such as ponderosa pine, Pacific madrone, California black oak, and Oregon white oak.

When forests remain at unsustainable densities for too long, a number of trends begin to occur that effect stand health. Species composition, relative density, percent live crown ratio, and radial growth are all indicators of how forests can be expected to respond to environmental stresses.

G. SPECIES AND HABITATS

1. Terrestrial Environments

a. Botanical

1) Special Status Plants

Habitat for special status and survey and manage plants differs between the current and reference conditions in the Wild Rogue - South Watershed. Changes have occurred primarily from fragmentation of habitat due to timber harvest, and increased stem densities and changes in species composition due to fire suppression. Past fragmentation of late-successional forest habitat lends uncertainty to the possibility or viability of the S&M vascular species in this watershed, especially in, or adjacent to, clearcuts. S&M plant populations in the watershed and potential habitat for them will most likely remain isolated, with a lower chance of expansion in areas of clearcuts. This will also make known populations and potential habitat more susceptible to extirpation from chance events (such as a hot-burning wildfire). Connectivity along riparian zones could be the best chance for improving late-successional forest conditions.

The NFP listed a host of vascular and nonvascular species survey and manage species because their future viability was uncertain due to their dependence on late-successional forest habitat. The intent of the NFP was to have late-successional reserves provide refuge for such species. The majority of survey and manage species populations, though, are still known to exist on matrix lands. Extensive surveys in the watershed may provide a different conclusion regarding these species. The management recommendation for vascular plants (NFP) not only discusses the need to protect known sites of these species, but also recommends retaining canopy closures of 60% or greater, and moist microsite

conditions, and protecting mychorrhizal connections.

Although management recommendations for nonvascular species are not finalized at this time, recommendations similar to those for vascular plants (discussed in Appendix J2) could improve the chances for protection of S&M nonvascular plant species. Silvicultural prescriptions for stand treatments in past clearcuts to promote late-successional habitat must incorporate measures to protect hardwood species, which are the more common substrate (other than conifers) for lichens and bryophytes.

Besides a decrease in late-successional forest habitat, the biggest difference in habitat affecting species diversity in the Wild Rogue - South Watershed is the reduction in number and size of natural openings. Maintaining such habitats is important to maintaining the range and mosaic of vegetation types and habitats in the late-successional reserve. The same can be said regarding serpentine habitats, which harbor by far the highest concentrations of special status plants in southwestern Oregon. Care must be taken to ensure that any nonvascular S&M species are protected during other treatments that could decrease population viability. This is especially true in areas of black oak where *Dendriscocaulon intricatulum* could be found.

Besides managing late-successional habitat, an ecosystem management approach would ensure that openings still occur in the late-successional habitat of the Wild Rogue - South Watershed. This is especially important for *Frasera umpquaensis.* Any work in riparian areas must be carefully planned to maintain habitat for *Bensoniella oregana* as well. For the species *Sedum moranii,* habitat has most likely not changed, but recreational use has probably increased along the Rogue River trail. Education regarding the protection of wildflowers should protect this species.

BLM policy as stated in the Medford District RMP includes the objective of "studying, maintaining or restoring community structure, species composition and ecological processes of special status plants." The RMP includes management actions and directions that require the maintenance or enhancement of habitats such as these. Any treatment of these areas must consider the habitat requirements of the native species dependent on them.

b. Wildlife

1) Species

The conservation of native biodiversity is limited by a number of factors including the availability of species to repopulate habitat, land ownership, the spatial relationship of land ownership patterns, and habitat quantity and quality. A important distinction of the Wild Rogue - South Watershed which is pertinent to this is that it includes a large block of federal land ownership.

The extirpation of native wildlife from an area alters how the remainder of the community functions. Native species play roles that benefit the community as a whole. Removal of one species may lead to a population imbalance in another. Historically, wolves and grizzly bears served as predators in the

watershed. The act of predation played a critical role in the community. Prey remains not consumed by the wolves were available to a host of other animals. Deer and elk populations were kept in balance and the community as a whole benefitted from the predation. When exotic species are introduced into a community the food chain is set out of balance. For example, the introduction of the bullfrog into the watershed has had deleterious effects on turtles, native frogs, and ducks.

Species known to be extirpated from the watershed include grizzly bear and wolf. Wolves have remained on the sensitive species list due to sightings of large canids within southwestern Oregon. Currently, Oregon is not included in the recovery plans for these two species. Species such as the wolverine that have remnant populations in the province may have the ability to recover themselves in this watershed due, in part, to the block federal ownership in it.

Habitat quantity and quality are critical factors determining the absence or presence of species in the watershed. Species with narrow habitat requirements, such as late-successional forest-dependent species will not maintain populations in areas void of older forest. Table V-1 displays the expected habitat trend for species of concern in the watershed. The majority of federal land the watershed is classified as LSR and critical habitat. Specific actions such as commercial and precommercial thinning may possibly hasten the development of older forest in the watershed, which would be beneficial for the majority of the species of concern.

Table V-1: Expected Federal Habitat Trends for Species of Concern

Common Name	Habitat	Expected Habitat Trend
Grey wolf	Generalist, prefers remote tracts of land	Increase in the watershed
White-footed vole	Riparian alder/small streams	Increase in habitat as riparian areas recovers from past disturbance
Red tree vole	Mature conifer forest	Increase in the watershed
California red tree vole	Mature conifer forest	Increase in the watershed
Fisher	Mature conifer forest	Increase in the watershed
California wolverine	Remote/high elevation forest	Increase in the watershed
American marten	Mature conifer forest	Increase in the watershed
Ringtail	Rocky bluffs, caves and mines	Stable
Peregrine falcon	Remote rock bluffs	Nesting habitat available
Bald eagle	Riparian/mature conifer forest	Increase in the watershed
Northern spotted owl	Mature conifer forest	Increase in the watershed
Marbled murrelet	Mature conifer forest	Increase in the watershed
Northern goshawk	Mature conifer forest	Increase in the watershed
Mountain quail	Generalist	Stable
Pileated woodpecker	Mature conifer forest/snags	Increase in the watershed

Table V-1: Expected Federal Habitat Trends for Species of Concern

Common Name	Habitat	Expected Habitat Trend
Lewis' woodpecker	Oak woodlands	Decrease until management strategy developed for oak woodlands
White-headed woodpecker	High elevation mature conifer forest	Increase in the watershed
Flammulated owl	Mature ponderosa pine/mature Douglas-fir forest	Increase in the watershed
Purple martin	Forage in open areas near water/cavity nesters	Increase as riparian areas recover and forest mature
Great grey owl	Mature forest for nesting/meadows & open ground for foraging	Decrease in foraging habitat, increase in nesting habitat
Western bluebird	Meadows/open areas	Decrease as clearcuts recover and meadows become encroached with trees
Acorn woodpecker	Oak woodlands	Decrease until management strategy developed
Tricolored blackbird	Riparian habitat/cattails	Stable/increase as riparian habitat recovers
Black-backed woodpecker	High elevation mature conifer forest	Decrease in the watershed
Northern pygmy owl	Conifer forest/snags	Decrease in the watershed
Grasshopper sparrow	Open savannah	Decrease until management strategy developed for savannah habitat
Bank swallow	Riparian	Increase as riparian habitat recovers
Townsend's big-eared bat	Mine adit/caves	Decrease as trees around caves/adits harvested
Fringed myotis	Rock crevices/snags	Stable
Silver-haired bat	Conifer forest	Increase in the watershed
Yuma myotis	Large trees/snags	Increase in the watershed
Long-eared myotis	Large trees/snags	Increase in the watershed
Hairy-winged myotis	Large trees/snags	Increase in the watershed
Pacific pallid bat	Large trees/snags/rock crevices	Increase in the watershed
Western pond turtle	Riparian/uplands	Increase as riparian habitat recovers
Del norte salamander	Mature forest/talus slopes	Increase in the watershed
Foothills yellow-legged frog	Riparian/permanent flowing streams	Increase as riparian habitat recovers
Red-legged frog	Riparian/slow backwaters	Increase as riparian habitat recovers
Clouded salamander	Mature forest/snags/down logs	Increase in the watershed
Southern torrent salamander (Variegated salamander)	Riparian/cold permanent seeps/streams	Increase as riparian habitat recovers
Black salamander	Talus/down logs	Increase in the watershed

Table V-1: Expected Federal Habitat Trends for Species of Concern

Common Name	Habitat	Expected Habitat Trend
Sharptail snake	Valley bottom	Stable
Calif. Mtn. Kingsnake	Generalist	Stable
Common kingsnake	Generalist	Stable
Northern sagebrush lizard	Open brush stands	Stable
Tailed frog	Riparian/mature forest	Increase as riparian habitat recovers

2) Dominant Processes from Historic Condition to Current Conditions

Management direction for the watershed is derived from the Northwest Forest Plan on a coarse scale, and the Southwest Late-Successional Reserve Assessment on a fine scale. Factors that influence the goals identified in these two documents include physical ones such as soils, aspect, and precipitation, and human factors such as fire suppression, road building, and timber harvest.

The watershed is a relatively large block of federally-owned land (42,250 acres). The goals identified in the above plans are to manage the area for old-growth species and ecosystems. The amount of old-growth forest found in the watershed prior to European settlement was never stable and continually fluctuated through time due to disturbance. It appears that the area had major stand-replacing fire events in the 1860's (Yachats fire) and in the early 1900's (Cooper 1939). This is also reflected in the H.J. Andrew and R.W. Cowlin mapping exercise of the 1930's which characterized a large percent of the analysis area as early seral vegetation. The natural fire return interval rate for this area is between 20 and 60 years. The majority of the fires were ground fires that did not play a major role in reduction of the overstory. The 1860's and 1900's fires were the results of extended droughts which created more severe fire conditions.

Forests are constantly developing toward their climax community, while periodically being set back to earlier seral stages by disturbances. When large-scale disturbances moved through the watershed the amount of old-growth would be reduced, sometimes substantially. As time passed, the old-growth habitat would recover, allowing species associated with this habitat to recolonize. Colonization was aided by the higher population level of old-growth dependent species as well as the greater amount of mature and old-growth forest historically present in the broader region. This larger amount of old-growth forest allowed for greater connectivity of habitat and easier dispersal of species associated with this habitat. The amount of old-growth forest that the area can maintain through time is based on physical factors such as soil and human factors such as fire management. The amount of late-successional forest and late-successional habitat are not synonymous. Currently the watershed is comprised of 70% late-successional forest and 36% late-successional forest habitat (based on McKelvey ratings). Age is not necessarily a determinant of late-successional habitat; rather it is structural characteristics such as canopy closure, coarse wood, and canopy layering that are the important features. Late-successional forest is more strongly based on overstory age and or size class regardless of structural characteristics.

Another key goal for Wild Rogue - South Watershed and surrounding land is the maintenance of genetic flow of species associated with older forest conditions. This comes in many forms: natural corridors across the landscape (which are often associated with ridges and riparian reserves), low elevation to high elevation corridors, and stepping stone refugia habitat for species with greater dispersal capabilities. Dispersal corridors function when they provide foraging, hiding, and resting cover. Species that depend on late-successional forests are poor dispersers and more vulnerable to extinction in fragmented landscapes than species associated with early successional stages (Noss 1992). This is particularly true for flightless species such as the fisher (*Martes pennanti*). Fishers are reluctant to travel through areas lacking overhead cover (Maser, *et al.* 1981) and are at risk for genetic isolation. Species that are more mobile, such as the spotted owl, may be capable of dispersing into isolated patches of habitat but run a higher risk of predation when crossing areas of unsuitable habitat.

The current checkerboard land ownership pattern east of the watershed will limit the potential for connectivity between late-successional reserves. Forest practices on private land are at the discretion of the land owner consistent with forest practice regulations. Generally, forest stands on private land are harvested on a rotation that is too short to maintain late-successional habitat conditions. Federally-managed public land has a mixture of stands with various age and size classes that represent habitat from early seral to late seral. The remaining mature and old-growth habitats on these lands are widely fragmented. Species dependent on older forest, such as the American marten (*Martes americana*), the fisher (*Martes pennanti*), and the northern spotted owl (*Strix occidentalis*) have limited habitat outside the LSR. Some of the remaining older stands no longer serve as habitat for late-successional forest-dependent species due to the amount of edge the stands contain, which is increased by irregular shapes, partial entry by logging, high road densities, and small tree sizes. The edge-to-interior ratio effects how useful the stand is for some late-successional species. Stands with a great deal of edge no longer function as interior forest. The microclimatic changes of the edge effect can be measured up to three tree lengths into the interior of the stand.

Fragmented habitats leads to isolated populations of animals which lose genetic vigor, and is a serious threat to biological diversity (Wilcox and Murphy 1985). Intact old-growth corridors are critical for ensuring gene pool flow, natural reintroduction, and successful pioneering of species into unoccupied habitat. Animals disperse across the landscape for a number of reasons including food, the search for cover, mates, refuge, and to locate unoccupied territories. The vast majority of animals must move during some stage of their life cycle (Harris and Gallagher 1989).

Small patches of old-growth forest can provide important refugia for poor dispersers and species with small home ranges such as the Del Norte salamander (*Plethodon elongatus*), and allow for recolonization into surrounding areas if future conditions become more suitable. Isolated patches of old-growth forest also offer important refugia for a number of late-successional associated bryophytes, fungi, and plants.

The success of maintenance and reestablishment of late-successional species will depend on habitat requirements of the species, dispersal capabilities, habitat condition in the watershed, the success of management recommendations, and perhaps most importantly, the ability of the watershed to sustain late-successional forest characteristics.

Past timber harvest, fire exclusion, and road building provide challenges for meeting goals identified in the LSR assessment. Maintaining and restoring the remaining late-successional habitat and species dependent on it will depend on innovative active management efforts such as broad-scale fuel reduction projects and maintaining fire-dependent habitats such as Jeffrey pine savannahs. In areas such as the Rum Creek drainage where there are numerous young plantations, treatments will need to emphasize disturbances that set or accelerate the stand's trajectory toward older forest conditions.

Maintaining species associated with older forest will depend on the life history of each particular species. Species with a broad home range, such as the Wolverine (*Gulo gulo*), will be harder to maintain due to the size of the reserves, while species with much narrow home range such as the Del Norte salamander (*Plethodon elongatus*) will be much easier to maintain. Another consideration is the dispersal capabilities of the individual species. Species such as the spotted owl have the ability to traverse through areas with no habitat while species such as the red tree vole or survey and manage molluscs have much lower capacities for moving through such areas.

Potential limiting factors for the recovery of the habitats of sensitive species in the watershed include fire suppression and habitat loss and fragmentation. Historically, many habitats within the watershed were created and maintained by disturbance events, especially fire. Fire for the most part has been essentially excluded from the watershed for the last 80 years. Fire-created habitats, especially oak savannah and pine stands, and associated wildlife species have been adversely affected by this.

Past timber harvest is another dominant disturbance factor that has shaped current vegetation and habitat patterns. The majority of the species of concern are associated with late-successional forest habitat. This habitat has been altered by timber harvest, subsequent road construction, and fire exclusion. Species associated with late-successional habitat have been affected through the conversion of older stands to younger stands. At the same time, species utilizing early seral habitat and edges have benefitted from this shift from older forest to younger forest. Timber harvest and road building have also led to increased sedimentation, increased stream temperatures, and decreased stream stability and structural diversity, which in turn negatively affect aquatic and semiaquatic wildlife. Road building has also decreased the effectiveness of a number of habitats due to disturbance and the fragmentation of late-successional forest.

Areas in the watershed with a high density of roads are of concern due to their effects on habitat. The construction of roads contributes to sediments in the aquatic system. Road building along streams has also led to increased channelization of streams. Sediments can negatively effect fish by filling pools, embedding spawning gravel, and smothering eggs. Roads also lead to increased disturbance, such as poaching, that decreases habitat effectiveness. Increased disturbance to deer and elk increases their metabolic rate and decreases their reproductive success (Brown 1985). Roads also further fragment patches of old-growth forest, creating edge which changes interior forest conditions and allows generalist species to compete with old-growth dependent species. Species such as the great horned owl (*Bufo virginianus*) utilize fragmented landscapes and prey on northern spotted owls.

3) Expected Habitat Trends

Riparian: The condition of the riparian habitat is significantly different from presettlement conditions.

Timber harvest, associated road building, and an altered fire regime have led to degraded functions in some stream systems. Recovery of the aquatic biodiversity on public land is partially limited due to the condition of non-BLM land outside the watershed. On the Rogue mainstem, fish habitat quality is affected not only by the condition of tributaries within the watershed, but also, and to a vastly greater extent, by the land use affecting the Rogue upstream of the watershed. The expected trend for riparian habitat outside of the watershed and not under federal management is for it to remain static or degrade in condition due to the increasing demand put on nonfederal land to produce forest products. Quality of riparian habitat on federally-administered land should increase under the current management aquatic conservation strategy objectives.

Douglas-Fir Forest with Significant Pine Component: The majority of pine component can be found in the eastern portion of the watershed, within the Douglas-fir plant series. In the Rum Creek sub-drainage, this plant series historically contained a greater overstory component of pine species than seen today. The O&C revestment notes, circa 1920, show the overstory pine component at approximately 30 - 40%. The current extent of the overstory pine component is unclear, but field review during the watershed analysis process showed that this component is less than what was seen in 1920. The pine component has changed over time due to management practices, fire suppression, and the encroachment of fire-intolerant species. The reference condition of these stands is a fire-tolerant, shade-intolerant forest community dominated by large pine (ponderosa and sugar pine), black oak, madrone, and a more developed grass component than seen today. Restoration of the pine/grass stands will enhance wildlife forage and diversity while providing natural fuel breaks within the watershed, thereby decreasing the potential for catastrophic stand-replacing fire events.

Old-Growth Forest Habitat: Old-growth forest within the watershed has been heavily influenced by logging, historic fire frequency, current fire exclusion tactics, salvage logging, and encroachment of brush and shrub species. Under the current guidelines established by the Northwest Forest Plan, the quantity and quality of old-growth forest within this watershed will increase. The historic variability in the amount and distribution of old-growth forest habitat was due to large-fire frequency. At times the amount of old-growth habitat has dropped as low as 25% (in the 1920's) and been as high as 70% (currently). The management recommendations (Chapter 6) include a prioritization of young stands for work to accelerate the rate of succession towards late-successional conditions. In the long term, this will reduce the level of habitat fragmentation in the riparian reserves and will enhance connectivity between existing owl core areas.

4) Species

The conservation of native biodiversity is limited by a number of factors including the availability of species to repopulate habitat, land ownership, and the spatial relationships of habitat quantity and quality.

The extirpation of native wildlife from an area alters how the remainder of the community functions. Native species play roles that benefit the community as a whole. Removal of one species may lead to a population imbalance in an another. Historically, wolves and grizzly bears served as a predators in the watershed. The act of predation played a critical role in the community. Prey remains not consumed by the wolves were available to a host of other animals. Deer and elk populations were kept in balance with the vegetation, and the community as a whole benefitted from the predation. When exotic species

are introduced into a community the food chain is set out of balance.

Species known to be extirpated from the watershed include grizzly bear and wolf. Wolves have remained on a sensitive species list due to sightings of large canids within southwestern Oregon. Currently, Oregon is not included in the recovery plans for these two species. Species such as the wolverine that have remnant populations in the province may have the ability to recover themselves in this watershed.

Habitat quantity and quality are critical factors in determining the presence or absence of species in the watershed. Species with narrow habitat requirements, such as late-successional forest-dependent species, will not maintain populations in areas void of older forest. The degree of recovery or loss of a species population varies between species, but in general it is expected that species requiring late-successional forest will decrease in numbers on lands classified as matrix and increase in numbers within the LSR.

Currently identified data gaps of particular interest are listed in Table VI-2.

2. Aquatic Environments

a. Stream and Riparian Trends

The future trend in aquatic habitat conditions in the watershed will be influenced by three major limiting factors:

(1) Successional stage of vegetation in riparian zones;

(2) the amount of stream flow between early summer and fall, and

(3) the rate and magnitude of sediment delivery.

Typically, the expected fish habitat trend in a watershed will vary by land ownership. The Wild Rogue Watershed is almost exclusively BLM-managed, and therefore the habitat trend should be homogenous across the watershed.

b. Riparian Reserves and Coarse Woody Material

Streamside shade and coarse woody material will increase. It will take approximately 150-300 years without active riparian management for streamside areas to attain late-successional characteristics. Active riparian management in many instances will produce large trees faster. Large mature trees will contribute to fish habitat complexity after falling into streams.

Age and structural diversity of vegetation in riparian areas may increase in response to BLM actions that meet aquatic conservation strategy (ACS) objectives. There is no intent to change forest plan riparian reserve widths at this time. Rather, it is the objective to protect and actively manage the riparian reserves where it would promote the attainment of the ACS objectives in the long term.

Roads on BLM land will be maintained and renovated using current standards of stormproofing. The improvements of outsloping, water dipping, and culvert replacement will reduce the delivery of sediment to streams and tend to restore the natural hydro-period to the watershed, thus reducing the impacts of peak flows. This will relieve some of the suppression of salmonid populations caused by degraded spawning gravels and scoured stream beds.

c. Instream - Large Woody Debris

The greatest potential for improvement in complexity of fish habitat on the watershed scale over the long term will be through the rehabilitation of instream large woody debris. All streams in the Wild Rogue - South Watershed will become more effective at dissipating stream flow energy, creating scouring pools, providing complex habitat for fish, amphibians and invertebrates, and retaining organic detritus.

Boulders and rubble(rather than large wood) play major roles in creating fish habitat in larger streams (>3rd order). However, large woody debris continues to be important in the steeper streams by dissipating stream energy (*i.e.*, forming a stepped channel profile), controlling the movement of sediment and small organic matter, and providing habitat for fish and amphibians.

d. Sedimentation

Sedimentation is not a great concern in any of the subdrainages except for Missouri Creek, where past road building and logging activities led to its current deferred watershed status. Stream sedimentation in this subdrainage is expected to decrease over time as a result of the deferral status.

In other subdrainages, a disturbed sediment budget is expected to return to within its historic natural range of variability as a result of management goals for the riparian reserves and the upland LSR.

e. Stream Flow

Stream flows during dry seasons are expected to increase in the future. Intensity and frequency of peak flows, if they have occurred as a result of past management activities, will diminish as vegetation grows in previously-harvested areas. Potential indirect adverse effects of altered peak flows on salmonid reproduction would diminish.

f. Stream Temperature

Summer water temperatures in Big Windy and Howard Creeks should move from functioning - at risk to a properly functioning condition as riparian reserves are managed for increased canopy cover and shade retention, and increased levels of large woody debris. Based on preliminary temperature data, Missouri Creek summer water temperatures may be moving toward recovery since the establishment of the deferred watershed.

g. Aquatic Species

There is a comparatively small amount of salmonid habitat in the watershed in proportion to the size of

the watershed. The Wild Rogue - South Watershed encompasses approximately 42,000 acres (almost totally in BLM ownership) with approximately 236 miles of streams. Of these, only 38 are recorded as being used by salmonids (16%). This is a low figure relative to nearby watersheds. For example, the Rogue Recreation Section Watershed, which consists of approximately 38,000 acres of BLM land, has 98 recorded miles of salmonid use out of approximately 354 miles of streams (28%). Stated another way, though the areas of comparison are of similar size, the Rogue Recreation Section has one-third more miles of stream and nearly twice the number of miles of salmonid use by proportion (28%) than the Wild Rogue South Watershed (16%).

The lack of salmonid habitat may be due to a predominance of steep-gradient streams with falls and cascades that are not fish-passable. These streams may also have very flashy flows and few pools suitable as holding habitat for overwintering fish. Past disturbance that includes mining and removal of riparian vegetation can exacerbate the impacts of fires and floods, preventing the retention of large woody debris in the system. The loss of instream structure can accelerate streambed scouring, which decreases the amount and diversity of aquatic insects available to salmonids as food.

Factors outside the watershed that will continue to influence return of anadromous fish to the watershed include ocean productivity, recreational and commercial harvest, predation in the Rogue River and the ocean, habitat changes due to human developments in floodplains, and migration and rearing conditions in the Rogue River. Equal effort must be given to correcting human-related factors that limit fish survival in freshwater and marine environments. Habitat for Pacific lamprey and reticulate sculpin in the Rogue River is expected to remain in a stable to moderate condition.

Coho salmon are federally listed as a threatened species, chinook salmon are proposed, and steelhead are listed as a candidate. Implementation of the aquatic conservation strategy on public land will have a positive impact on the functioning condition of streams in the Wild Rogue - South Watershed. To the extent that the condition of the fishery is related to limiting factors such as spawning gravel, pool habitat, and water quality, the potential for recovery of salmonids in the watershed is high. The opportunity to improve fish habitat through land management techniques is great because almost the entire watershed is in BLM ownership.

Current resource management practices and water diversions on private lands outside of the Wild Rogue - South Watershed, which are beyond the scope of the ACS, will continue to limit potential for recovery of salmon and steelhead habitat and populations on the Rogue River. Private lands are expected to continue to be managed intensively for wood production. The cumulative effects of management activities have substantially altered the timing and quantity of erosion and have changed instream channels, all which have affected fish production. Streams and riparian areas with federal ownership are in much better condition than streams on private lands. The ACS must be applied equally across all ownerships to achieve potential for recovery of at-risk fish stocks.

H. FIRE MANAGEMENT

A major difference between the existing and the reference condition is the change in the fire regime. The watershed is on a trend of shifting from a low to moderate-severity to a high-severity fire regime. Previously, fire occurred with greater frequency, burned with a range of intensity, and functioned largely

in maintaining and propagating the existing vegetation. Currently, fire is less frequent, burns with high intensity, causes a high degree of mortality, and replaces vegetation rather then maintains it. This has resulted from nearly eight decades of fire suppression and exclusion. The change in vegetative conditions, fuel profile, and amount of fuel present is now such that a large wildfire will have severe effects on vegetation, erosion, habitat, and water quality.

Stand replacement as a result of wildfire was a low percentage in the reference condition. The Silver Fire in 1987 was 12 to 27% high-intensity burn on 96,240 acres. The 21,514 acre Galice Fire in 1987 was 13-25% high-intensity burn. The Cedar Camp Fire in the Silver Creek watershed burned with a 12% high intensity. The current trend is for increasing hazardous fuel buildup within the watershed and adjacent region. This trend can be expected to produce increasing percentages of high-intensity, stand-replacement burning. High-intensity, large-scale fire tends to produce more homogeneous vegetative conditions in locations where subsequent disturbance is lacking or of low intensity. This reduces the species diversity and the edge effect. Edge is one of the more productive habitats.

The magnitude of this change is widespread throughout the entire watershed. Only 4% of the watershed is currently in a low hazard condition. High hazard conditions occur throughout the watershed and in 61% of its area. (See Maps 14, 15, and 17) Vegetation in the watershed is at a high degree of risk for mortality and stand replacement from wildfire. The existing and future trend in fuel and vegetation condition is the predominant factor that will adversely effect the ability to achieve most management

objectives for the watershed. The capability of achieving management objectives for the watershed is low in the long term (20+ years).

Risk of ignition is slowly increasing trend within the watershed. This is due to the lack of human presence in the watershed. Recreational use of the Rogue River is regulated and the number of rafters permitted during the summer is limited. A large reduction in forest product utilization has reduced the number and frequency of people entering the watershed for harvest activities. Human use is on a gradual increase in the form of travel, hiking, hunting, and camping.

The continued ability to conduct fuel reduction treatments and wildfire suppression is a great concern along the Rogue River and in the Howard Creek and East Fork Windy Creek drainages. Access for management activities and fire suppression is currently limited. There is a single road (34-9-27.1) into the Howard and East Fork Windy Creek area. It is a very important road for wildfire suppression and fuel reduction treatments that will be necessary to provide some protection to the LSR and its habitat. Overall safety and cost efficiency of fuel treatments and fire suppression work is affected by the general lack of access. Poor access increases the potential for large, high-intensity wildfire.

Long-term fire exclusion results in stand size class distributions with more of the stocking in the seedling/sapling size classes, and in stands at or exceeding natural carrying capacity. The average size of large down wood and snags has probably been reduced by successful fire exclusion. Fire exclusion has also decreased the amount of area in the earliest seral stages (grass/forb and small shrub).

If fire exclusion were to be maintained for an extended period, stand structural changes such as dense understory development, increased presence of less fire-resistant, shade-tolerant trees and shrubs, and

increased development of ladder fuels would be the predominant trend in most stands. Average patch size would increase and age and size class distinctions between adjacent stands would become less distinct. Fuel loading would increase. Fire would be less frequent but more intense.

I. HUMAN USE

Significant changes have occurred in portions of the watershed. This includes more roads throughout the area, especially in the northwest part of the watershed. The majority of these roads were constructed because of BLM timber sales to access and to manage BLM lands. With the increase in roads, there is an increase in motorized recreation along and from these roads (before roads, there were mainly trails which accessed the area).

Due to the increase in population and access, as well as an increase in landfill fees, it is reasonable to expect that there will continue to be an increase in the use of the watershed for illegal dumping, illegal occupancy of BLM land, and illegal firewood cutting. However, this increase may be at a slower rate than in other watersheds which are located closer to populated areas.

Recreational use of the river corridor has increased since the 1920's and 30's when Glen Wooldrige blasted routes through major rapids to allow for safe passage. Today, use is administratively restricted during the busy summer months, and weather keeps use low in winter. According to Atwood and Grey (1996), “Within the wild section of the Rogue canyon, humans continue to use the river, but in a substantially new way. The gold miners, farmers, and packers are gone. Under US government management the river canyon is now briefly home to the large number of rafters, anglers and hikers who visit the area.”

An increase in population, which increases the demand for use of public lands, will have management implications.

VI. MANAGEMENT RECOMMENDATIONS

A. PURPOSE

The purpose of this section is to bring the results of the previous steps to conclusion by focusing on management recommendations that are responsive to watershed processes identified in the analysis. Recommendations also document logic flow through the analysis, linking issues and key questions from step 2 with the step 5 interpretation of ecosystem understandings. Recommendations also identify monitoring and research activities that are responsive to the issues and key questions, and identify data gaps and limitations of the analysis (*Federal Guide for Watershed Analysis*, Version 2.2, 1995.)

B. RECOMMENDATIONS

Table VI-1 lists recommended management actions that will help reach the desired future condition (DFC) of the Wild Rogue - South Watershed (see Appendix F). Actions that are required by the RMP or other decision documents, and which will be done as a matter of course, may not be included in the recommendations table.

It is important to keep in mind that these recommendations do not constitute management decisions. The recommendations may conflict with or contradict one another. They are intended to be a point of departure for project-specific planning and evaluation work. Project planning includes the preparation of environmental assessments and formal decision records as required by the National Environmental Policy Act (NEPA). It is within this planning context that resource conflicts would be addressed and resolved and the broad recommendations evaluated at the site-specific or project planning level. Project planning and land management actions would also be designed to meet the objectives and directives of the Medford District Resource Management Plan (RMP).

Recommendations listed in Table VI-1 reflect the following generalized desired future condition:

This watershed is located entirely within the late-successional reserve. The DFC is to have a predominance of older forest conditions within the natural ecological range of sites. For this watershed, the vegetation that existed just prior to European settlement is perhaps the best example of the ecological range. This includes extensive forest structure that is atypical of late-seral forests composed of very large well-spaced trees. Species composition would change as sites vary from east to west (*i.e.*, become wetter). The DFC for fire is one with a low potential for stand-replacement fire. Unique wildlife habitats include meadows, oak sites, and knobcone pine sites distributed in a manner consistent with a natural fire disturbance regime. Connectivity would be provided by a continuous forest canopy in large blocks in the Missouri and Rum Creek drainage areas, and by refugia of late-successional forest throughout the watershed connected by riparian reserves in mid to late seral stages. The DFC for all streams is for them to be in proper functioning condition (*i.e.*, physical, chemical, and biological ranges would be the same they were prior to intensive management activities). The Rogue River viewshed would be maintained.

This generalized DFC would be reviewed and adjusted with increased detail at the next iteration of this

analysis and as a part of project-level planning.

Table VI-1: Recommendations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
LSR	Special Status/Survey & Manage Plants	Species and Habitat (Botany)	Watershed Wide	Institute management strategies to maintain/improve these species habitats using such techniques as prescribed fire.
LSR	Ponds	Species and Habitat (Wildlife), Human Uses (Fire)	Watershed Wide	Where possible, improve ponds to enhance their value to wildlife and fire suppression.
LSR	Serpentine Habitat	Species and Habitat (Botany), Vegetation	Serpentine Sites	Institute low-intensity prescribed fire to reduce herbaceous layer accumulation and shrub/tree encroachment. Ensure ground-disturbing activities such as OHV use are minimized. Restore Jeffrey pine sites.
LSR	Meadows, Oak Groves, Shrublands, Ponderosa Pine and Knobcone Pine Sites	Species and Habitat (Botany, Wildlife), Vegetation	Watershed Wide	Restore and maintain ponderosa pine, knobcone pine, Oregon white oak, meadows and shrubland habitat through thinning, brushing and burning.
LSR	Knobcone pine	Vegetation	Knobcone pine sites	Reintroduce fire into knobcone pine pockets to maintain habitat diversity across the watershed.
LSR	Noxious Weeds	Species and Habitat (Botany), Vegetation	Watershed Wide	Develop an active noxious weed eradication program.
LSR	Road Closures	Fire	Watershed Wide	Utilize gate closures during periods of very high to extreme fire danger. Maintain road 34-9-27.1 in an open condition into the E. Fork Windy/Howard Creek drainages. Restrict access to management and fire suppression related uses.
LSR	Fire Management	Fire	Watershed Wide	Develop a fire management plan for the watershed. See Appendix E for objectives and guidelines for the plan.
LSR	Helispots	Fire	Watershed Wide	Create helispots and pump chances as opportunities are identified. Maintain and restore existing pump chances.
LSR	High-Intensity Fire Occurrence	Fire, Erosion Processes, Wildlife	Watershed Wide	Implement fuel hazard-reduction treatments at strategic locations throughout the watershed. These areas would be located on areas such as ridgetops or other natural or human-made features which can function as barriers to wildfire spread. These would create opportunities to compartmentalize wildfires into small drainages and reduce large-scale wildfire occurrences. This also creates anchor points for prescribed burning and the reintroduction of low-intensity fire. Other areas for treatment include within or around individual stands or areas of high values at risk of loss from wildfire. These treatments reduce the risk of a high-intensity fire occurrence and return fuels to a condition that would exhibit a low-intensity fire regime

Table VI-1: Recommendations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
LSR	Wildfire/ Prescribed Fire	Human Uses	Watershed Wide	Create defensible fuel breaks to compartmentalize and reduce the potential for large-scale stand-replacing fires. Fuel breaks should be concentrated in areas that historically did not support late-successional habitat and/ or in areas that provide strategic locations. Breaks should be located on Curry ridge, the subridge that extends east from T34S,R10W,Sec1 through T34S,R9W, Sec 6,5,4,3 ending in T34S,R9W,Sec 35, along Lucky Boy ridge and along the ridge between Anna Creek/Rum Creek. Snags and down wood should be concentrated on the edge of the fuel break.
LSR	Visuals from wild and scenic river/creeks	Human Uses, Vegetation	River Corridor and viewshed, nominated wild creeks viewshed	Maintain viewshed/VRM standards as seen from the Rogue River and dominated wild creeks, while maintaining stability in forest stands.
LSR	Dispersed Recreational Use	Human Uses	Watershed wide	Provide recreation sites where opportunities and access exist.
LSR	Illegal Use of Watershed	Human Uses, Wildlife	Watershed Wide	Clean up and close dump sites. Consider road access restrictions as a part of the Transportation Management Objectives process (TMOs).
LSR	Mine Shafts/Adits	Human Uses, Species and Habitat	Watershed Wide	Inventory mining shafts to determine wildlife habitat, access, and safety issues.
LSR	Spotted Owl Habitat	Species and Habitat	LSR wide	In areas where less than 40% of the home range of spotted owls is suitable habitat, maintenance and development of late-successional forest conditions within the provincial home range for these sites should be considered a high priority. In areas where more than 40% of the home range of spotted owls is suitable habitat, attempt to increase the habitat available with thin stands less then 80 years of age, to accelerate the development of older-forest components.
LSR	Late-Successional Forest Habitat	Species and Habitats	Curry and Rum Subdrainages	Forest management activities should emphasize young stand management as a priority (< 50 years). Pursue a young stand management plan (brushing, precommercial thinning, hand piling and burning the resulting slash) in natural stands, as well as old clearcuts. In areas west of Curry Ridge and east of Rum Creek, prioritize treatments based on site quality, not simply on whether or not the area has been clearcut. The best sites get the first treatment(s). "Link" treatments over time culminating in desired future condition.

Table VI-1: Recommendations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
LSR	Vegetation	Vegetation		Present indications are that the watershed will require extensive density management (thinning) in both natural and planted stands. General objectives for the thinning include reduction of total number of stems, species selection to provide a species mix that more closely resembles that which was thought to occur prior to fire exclusion and logging, and fuels management (prescribed fire) to reduce the activity fuels (slash) created via the density management.
LSR	Young Stand Management	Vegetation	Plantations and natural stands (Rum Creek and west of Curry Ridge)	Concentrate habitat development work in young stands where the greatest potential to grow and maintain late-successional habitat exists. Emphasize creation of snags, down wood and shade-intolerant hardwood components. Leave 10% of the areas untreated to provide diversity pockets. North aspects have the highest priority.
LSR	Offsite Pine	Vegetation	All offsite pine sites	Accelerate the development of late-successional forest conditions by reducing stocking levels within young plantations and restoring the mix of conifers to more historic conditions. Retaining all large diameter legacy trees, all existing snags, and all pieces of large down wood. Redirect stand successional and developmental trajectories in a manner that will maintain spatial diversity (age classes and vegetation types), and will accelerate the creation of more complex structural diversity within stands and across the landscape.

Table VI-1: Recommendations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
LSR	Young Stand Management	Vegetation	Watershed Wide	Forest management activities should emphasize young stand management as a priority (< 50 years). Pursue a young stand management plan (brushing, precommercial thinning, hand piling and burning the resulting slash) in natural stands as well as old clearcuts. In areas west of Curry Ridge and east of Rum Creek, prioritize treatments based on site quality, not simply on whether or not the area has been clearcut. The best sites get the first treatment(s). "Link" treatments over time culminating in desired future condition. In the portion of the watershed between Curry Ridge and Rum Creek, an area prone to stand-replacement fires, prioritize treatments to address the young stands in the riparian reserves to accelerate their succession to larger trees and later successional conditions. Prioritize by fish/water conditions. Long-term goal is to increase connectivity with NSO activity centers. Example: stand initiation (new age class) to initial canopy closure of the desired number of trees by species per acre. This would incorporate multiple treatments over a 10 to 20-year project window and enhance planning/budgeting efforts. Encourage canopy layering, non-tanoak hardwood development and retention, tighter spacing in hardwoods with priority for multiple stem (multiple canopy development). Implement multiple thinning prescriptions in individual units and incorporate no-treatment areas: approximately 10% no cut, 25% wide spacing (40x40 for hardwoods), (30x30 for conifers), and 65% 15x15 on conifers and 20x20 on hardwoods.
LSR	Coarse Woody Debris	Species and Habitat, Soil Productivity	LSR wide	Promote recruitment of snags and down wood as a routine management practice. Use CWD levels outlined by Jimerson, *et al.* (1996)
LSR	Elk Habitat	Species and Habitat	Elk Management Area	Enhance elk habitat by creating small openings, maintaining existing and new openings through prescribed burns, fertilization, and seeding; limiting road access to areas heavily used by elk; seeding decommissioned roads; and imposing seasonal restrictions on activities if needed to avoid disturbance and harassment.

Table VI-1: Recommendations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
LSR	Roads/ Transient Snow Zone	Erosion Processes	Watershed Wide	When developing the TMOs for the roads within the TSZ of the watershed, drainage features should pay heed to heavy runoff resulting from rain-on-snow. Emphasis would be on diversion of potential road surface water prior to entering natural drainage ways. Culvert sizing and cross drain spacing would be based on site-specific hydrologic calculations. Close natural-surface roads in the winter. Road decomissioning, when recommended by the TMO process, will be fully decommissioned (remove culverts, etc.) and planted with conifers to reestablish high canopy cover. Surfacing will also reflect the TSZ: surface roads with combination of surface coarse and base coarse rock
LSR	Canopy Closure/ Transient Snow Zone	Hydrology	LSR Wide	Manage the transient snow zone for high canopy closure levels. Optimal tree canopy cover is 70+%.
LSR	Winter road use	Human Uses, Hydrology	Galice/Bear Camp Roads	If Galice and Bear Camp roads are opened year round, prepare a management plan to ensure protection of the resources and safety of users while providing winter recreation opportunities.
LSR	Transportation	Restoration/ Resource Protection	LSR wide	TMOs and road management/closures will consider and maintain access needed for LSR restoration, stand management, fire protection, etc.
LSR	Road Signs/Safety	Human Uses	Galice Access Road	Improve signing at the junction of Bear Camp and Galice Access Road to better direct people to the coast.
LSR	High Value Areas at risk	Fire	Watershed Wide	Reduce fuel hazard within or adjacent to high value area at risk stands. Objective would be to preserve these stands in the short term from loss to wildfire.
Riparian Reserves	Large Woody Debris (Instream), Coarse Woody Debris (Riparian)	Species and Habitat (Aquatic), Erosion Processes, Water Quality, Water Quantity	Watershed Wide	Where appropriate, improve instream complexity by adding key pieces of wood (60 cm minimum diameter, minimum length of one bankfull width). Long-term goal is to reestablish coarse woody material in the riparian reserve consistent with characteristics of the plant series as described by Jimerson, *et al* (1996).
Riparian Reserves	Fish passage	Species and Habitat (Aquatic), Human Uses	(Rum, Howard, Big Windy, Jenny, and Missouri Creeks)	Improve or remove culverts at stream crossings that hinder juvenile and adult fish passage. Culverts on fish-bearing streams should have natural streambed.
Riparian Reserves	Headwater Condition	Species and Habitat (Aquatic)	Watershed Wide	Evaluate headwater tributaries for sediment production, water contribution and riparian potential.
Riparian Reserves	Sedimentation	Species and Habitat (Aquatic), Erosion Processes, Water Quality	(Rum, Howard, Big Windy, Jenny, and Missouri Creeks)	Work towards restoring spawning or riffle substrate embeddedness to 30% or less and sand content to 15% or less by reduction of fine sediment load and addition of structure. This would ensure adequate spawning gravels for adults. Erosion and sedimentation would be in balance with stream transport capacity resulting in pools with good depth and cover.

Table VI-1: Recommendations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
Riparian Reserves	Fish Habitat	Species and Habitat (Aquatic)	Missouri, Big Windy, and Howard Creeks and other streams	Improve long-term opportunity for recruitment of large woody debris by selectively releasing existing conifers. Favor stocking with shade-tolerant conifers which will compete with hardwoods. Analyze other tributary streams, prioritize for potential fish habitat improvement, plan and implement where appropriate.
Riparian Reserves	Mining and occupancy	Hydrology, Water Quality, Human Use, Species and Habitats	Watershed Wide, Rogue River and lower reaches of tributaries	Investigate mining impacts on valuable salmon spawning habitat, especially in the lower gradient reaches of the Rogue River's tributaries, as identified in the data gaps.
Riparian Reserves	Young Stand Management/ Streams		Plantations and natural stands outside of Curry Ridge and Rum Creek (Howard, Anna, and Big Windy Creeks)	Focus development of late-successional habitat within 3 tree lengths of streams. Fish-bearing streams should receive the greatest emphasis followed by perennial and intermittent. Retain direct shade-producing vegetation.

C. DATA GAPS

Currently identified data gaps of particular interest are listed in Table VI-2.

Table VI-2: Data Gaps

Core Topic	Data Gaps
Soils	Soil erosion sources have not been inventoried specific to location and mechanism. There is no information specific to this watershed regarding soil-dependent biological communities. More information on road densities and cumulative effects is needed about small watersheds within the watershed. More information about effects of varying levels of ground disturbance is needed.
Hydrologic Riparian	Stream and riparian surveys (proper functioning condition, coarse wood, stream class, riparian vegetation) have not been completed for all streams in the watershed. Inventory and classify all streams. Plant and animal species that inhabit the riparian reserves need to be surveyed. CWD standards appropriate to the watershed, vegetation type, etc., have not been determined.
Vegetation	Additional analysis of current vegetative conditions will be necessary to prescribe forest management activities. Plant series data needs to be combined with vegetative condition class to determine management opportunities. For example, information on the amount of acres in the Douglas-fir series is available as is information on the amount of pole stands, but not Douglas-fir pole stands. A second example could be acres of ponderosa pine and white oak stands that are declining due to the encroachment of Douglas-fir.
Botany	There as a paucity of survey-based information about occurrence and distribution of various plant species. *Nonvascular plants*: No surveys have been conducted. Need to survey for at least survey & manage species (Strategy 2 and protection buffers). *Vascular plants*: Only approximately 20% of the watershed has been surveyed. Need to survey the remainder. *Noxious weeds*: No surveys have been conducted except along roadsides. Need to survey for populations. *Wetlands/Seeps*: Little is known about the location and extent. No special status plant surveys have been done in this habitat.
Wildlife	Presence/Absence information for most of the special status species is unavailable. Little information on special status species habitats and condition of these habitats. Locations of unique habitats such as wallows, mineral licks, and migration corridors for the most part are unknown.
Fisheries	Physical habitat surveys have not been completed in the following streams and their tributaries: Hewitt, Trout, and Missouri Creeks, and Long Gulch. Need verification of coho and chinook use of Rum, Howard, and Wildcat Creeks, chinook use of Big Windy Creek, and steelhead and cutthroat trout use of Long Gulch. Non-salmonid fish distribution throughout the watershed is unknown. Non-native fish distribution throughout the watershed is unknown. There is little information on adult escapement in the form of spawning surveys. Though some temperature data will be collected within the watershed in 2000, currently there is no data for the following streams: Long Gulch, Big Windy, East Fork Big Windy, Little Windy, Jenny, Howard, Missouri, Trout, Hewitt, Anna, and Rum Creeks. Macroinvertebrate surveys have not been completed in the following streams: Long Gulch, East Fork Big Windy, Little Windy, Jenny, Trout, Hewitt, Anna, and Rum Creeks. Locations of features contributing to increased sediment problems are unknown.
Human Use	**Transportation Management Objectives (TMOs)**: The BLM's TMO process has not been completed for this watershed. They will be completed as required under the BLM Western Oregon Transportation Management Plan of 1996. This will result in the identification of road improvements, decommissioning, and other road management needs in the watershed. Hydrology and soil evaluations to meet drainage criteria for the 100-year flood cycle have not been done. **Recreation**: A recreation opportunity spectrum inventory of the existing opportunities in the watershed has not been completed, other than along the Rogue River. Winter recreational use and opportunities are not known. Dispersed recreation trails and mining ditches have not been inventoried and mapped.

Table VI-2: Data Gaps	
Core Topic	**Data Gaps**
Fire	Baseline emission data for various plant association and theoretical emission information for various plant association is unknown.

REFERENCES CITED

AGEE, J.K. 1981. *Fire Effects on Pacific Northwest Forests: flora, fuels, and fauna,* p.54-66. In Proc., Northwest Fire Council 1981.

AGEE, J.K. 1990. *The Historical Role of Fire in Pacific Northwest Forests*. In Walstad, J., *et al* (eds.), natural and prescribed fire in Pacific Northwest forests: p. 25-38. Corvallis: Oregon State University Press.

ATWOOD, K. 1978. *Illahe: The Story and Settlement in the Rogue River Canyon.* Ashland, Oregon.

ATWOOD, K. and D.J. GREY. 1996. *People and the River: A History of the Human Occupation of the Middle Course of the Rogue River of Southwestern Oregon,* Volume I. USDI-BLM Medford.

ATZET, T.A. and D.L. WHEELER. 1982. *Historical and Ecological Perspectives on Fire Activity in the Klamath Geological Province of the Rogue River and Siskiyou National Forests.* U.S. Department of Agriculture, Forest Service, Siskiyou National Forest, P.O. Box 440, Grants Pass, Oregon, 97526.

ATZET, T. A. and D.L. WHEELER. 1984. *Preliminary Plant Associations of the Siskiyou Mountain Province.* USDA, Forest Service, Siskiyou National Forest, P.O. Box 440, Grants Pass, Oregon, 97526.

ATZET, T.A., D.L. WHEELER and R. GRIPP. 1988. Fire and Forestry in Southwest Oregon. FIR Report 9(4):4-7.

ATZET, T.A. and L.A. Mc CRIMMON. 1990. *Preliminary Plant Associations of the Southern Oregon Cascade Mountain Province.* USDA, Forest Service, Siskiyou National Forest, P.O. Box 440, Grants Pass, Oregon, 97526.

BAILEY, V. 1936. *The Mammals and Life Zones of Oregon.* North Am. Fauna 55:1-416.

BOOTH, P.T. 1984. *Grants Pass the Golden Years 1884-1984.* Grants Pass Centennial Commission, Grants Pass, Oregon.

BROWN, F.R. (ed.). 1985. *Management of Wildlife and Fish Habitats in Forest of Western Oregon and Washington.* Part 1, Chapter Narratives. p. 129-169. Pacific Northwest Region, Forest Service, USDA, Portland, Oregon. Publication No. R6-F&WL-192-1985.

CHEN, J., J.F. FRANKLIN, and T.A. *Spies. 1992.* Vegetation Responses to Edge Environments in Old-Growth Douglas-fir Forest. Ecological Applications 2(4): 387-396.

DE SANTE, D.F. and K.M. BURTON. 1994. *1994 M.A.P.S. Manual: Instructions for the Establishment and Operation of Stations as Part of the Monitoring Avian Productivity and Survivorship Program.* The Institute for Bird Populations, Point Reyes Station, California.

EVANS, K.E. and R.N. CONNER. 1979. *Snag Management in: Degraaf,* R.M and D.E. EVANS (eds). Proceedings of the Workshop on Management of North Central and Northeastern Forests for Nongame Birds. Gen. Tech. Rep. NC-51. USDA, Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

FORSMAN, R.T., E.C. MESLOW, and H.M.WIGHT. 1984. Distribution and biology of the spotted owl in Oregon. Wildlife Monog. 87:1-64.

HARRIS, L.D. 1984. *The Fragmented Forest.* Chicago: University of Chicago Press, 211 p.

HARRIS, L.D. and P.B. GALLAGHER. 1989. *New Initiatives for Wildlife Conservation: The Need for Movement Corridors*. Pages 11-34 in G. MACKINTOSH (ed.) *In Defense of Wildlife: Preserving Communities and Corridors*. Defenders of Wildlife, Washington, D.C.

HILL, E.M. 1980. *Josephine County Historical Highlights*, Volumes I and II, Josephine County Historical Society.

JANES, S.W. 1993. *Neotropical Migrant Bird Studies*; Medford District BLM. Unpublished report.

JARVIS, R.L. and J.P. LEONARD. 1993. *Nesting and Foraging Ecology of the Band-Tailed Pigeons* - Neotropical Migrant in Western Oregon, Progress Report. Department of Fish and Wildlife, Oregon State University, Corvallis, Oregon.

JIMERSON. 1996. A Field Guide to the Tanoak and Douglas-fir Associations in NW California. US Forest Service. Pacific Southwest Forest and Range Experiment Station. R5-Ecol. TP-009.

JONES, J.A. and G.E. GRANT. 1996. *Peak Flow Responses to Clear-Cutting, Roads*. Water Resources Research, Vol. 32, No.4, Pages 959-974.

KAUFFMAN, J.B. 1990. *Ecological Relationships of Vegetation and Fire in Pacific Northwest Forests*. In Walstad, J., *et al* (eds.), Natural and Prescribed Fire in Pacific Northwest Forests: pp.39-52. Corvallis: Oregon State University Press.

LA LANDE, J. 1995. *An Environmental History of the Little Applegate River Watershed*. USDA, Forest Service, Rogue River National Forest, Medford, Oregon.

LEWIS, H.T. 1990. Reconstructing patterns of Indian burning in Southwestern Oregon. (In) N. Hannon and R. Olmo. Living with the land: the Indians of Southwestern Oregon. pp 80-84. Southern Oregon Historical Society. Medford, OR. 153 pp.

LINDELL, L. 1993.USDI. Inter-office: *Cumulative Watershed Analysis Effects Screen Process.*

MASER, C., B.R. MATE, J.F. FRANKLIN, and C.T.DYRNESS. 1981. *Natural History of Oregon Coast Mammals*. USDA, Forest Service General Tech. Rep. PNW-133, 496 p. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

MORRIS, W.G., 1934. Forest Fires in Oregon and Washington. Oregon Hist. Wuarterly. 35:313-339.

MURPHY, T.V. 1991. Preliminary Report on Determination of Wildfire Hazard and Potential for Fuel Reduction Treatment on the BLM Section of the Wild Rogue River.

NOSS, R.F. 1992. The Wildlands Project - Land Conservation Strategy. Pages 10-25 in Wild Earth. Special Issue: *The Wildland Project: Plotting a North American Wilderness Recovery Strategy*. Cenozoic Society Inc., Canton, NY.

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY. 1988. *Oregon Statewide Assessment of Nonpoint Sources of Water Pollution*. Planning & Monitoring Section, Water Quality Division, 811 SW Sixth Ave., Portland, Oregon. 97204.

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY. February 1998. 303(d), Decision Matrix.

OREGON DEPARTMENT OF FISH AND WILDLIFE. 1994. *Rogue Basin Fish Management Plan*. October 1994.

PULLEN, R. 1996. *Overview of the Environment of Native Inhabitants of Southwestern Oregon, Late Prehistoric Era*. Pullen Consulting, Bandon, Oregon.

PYNE, S.J. 1982. *Fire in America: A cultural history of wildland and rural fire*. Princeton, NJ: Princeton University Press.

RAPHAEL, M.G. and M. WHITE. 1984. *Use of Snags by cavity-nesting birds in the Sierra Nevada*. Wildlife Monograms, 86; 66 p.

REED, D.D. 1999. Personal Communication. BLM Medford District.

REGIONAL INTERAGENCY EXECUTIVE COMMITTEE. *Ecosystem Analysis at the Watershed Scale*. Federal Guide for Watershed Analysis, Version 2.2, Portland, Oregon, 1995.

RIPPLE, W.J. 1994. *Historic Spatial Patterns of Old Forests in Western Oregon*. Journal of Forestry. Nov: 45-59.

Rogue River COURIER, Oregon, January 29, 1903.

Rogue River COURIER, Oregon, March 4, 1927.

ROSGEN, D. 1996. *Applied River Morphology, Wildland Hydrology*. Pagosa Springs, Colorado.

RUGGIERO, L.F., K.B. AUBREY, A.B. CAREY, and M.H. HUFF. 1991. Wildfire and vegetation of unmanaged Douglas-fir forest. Gen Tech. Rep PNW-GTR-285. USDA Forest Service. PNW Research Station, Portland, OR. 533 pp.

STEIN, W.I. 1990. *Quercus garryana Dougl*. ex Hook,: Oregon white oak. In: BURNS, RUSSELL M; HONKALA, BARBARA H., tech. coords. Silvics Of North America: Volume 2, hardwoods. *Agricultural Handbook*, 654. Washington DC: Forest Service, USDA: 650-660.

SUTTON, JACK. 1966. *110 Years with Josephine: The History of Josephine County, Oregon 1856-1966*. Josephine County Historical Society, Grants Pass, Oregon.

TAPPEINER, J.C., P.M. McDONALD and D.F. ROY. 1990. *Lithocarpus densiloras* (Hook and Arn.). Rehd. Tanoak. (In): Silvics of North America: Vol 2 Hardwoods. (Pp. 417-425). R.M. BURNS and B.H. Honkala (eds). Agriculture Handbook 654. USDA-USFS. Washington, D.C.

THOMAS, T.L. and J.K. AGEE. 1986. Prescribed fire effects on mixed conifers forest structure at Crater lake, Oregon. Can J. For. 161082-1087.

THOMAS, J.W., E.D. FORSMAN, J.B. LINTY, E.C. MESLOW, B.R. NOON, and J. VERNER. 1990. *A conservation strategy for the northern spotted owl*. A report by the Interagency Scientific Committee to address the conservation of the northern spotted owl. USDA. Forest Service, USDI, BLM, FWS and NPS. Portland, OR, 427 pp.

USDA. Forest Service. 1989. Siskiyou National Forest LRMP Final EIS.

USDA. Forest Service. 1995. Silver Creek Watershed Analysis. 1995.

USDA, SOIL CONSERVATION SERVICE. 1983. *Soil Survey of Josephine County Oregon*, 258 p.

USDA and USDI. 1994. *Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl* and *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest-Related Species within the Range of the Northern Spotted Owl*. Portland, Oregon.

USDA and USDI. 1995. *Southwest Oregon Late-Successional Reserve Assessment,* Siskiyou National Forest and Medford District Bureau of Land Management, P.O. Box 440, Grants Pass, 3040 Biddle Road, Medford, Oregon, 97526 and 97504.

USDI. BUREAU OF LAND MANAGEMENT. MEDFORD DISTRICT. 1983. Recreation Area Management Plan for the Rogue River Wild Section.

USDI. BUREAU OF LAND MANAGEMENT. 1992. *Draft-Medford District Resource Management Plan/Environmental Impact Statement,* Vol. II. Medford, Oregon.

USDI. BUREAU OF LAND MANAGEMENT. 1994. *Medford District Proposed Resource Management Plan/Environmental Impact Statement,* Vol. 1 and Vol.2. Medford, Oregon.

USDI. BUREAU OF LAND MANAGEMENT, MEDFORD DISTRICT. Record of Decision and Resource Management Plan, Medford, Oregon, 1995.

USDI, BUREAU OF LAND MANAGEMENT, MEDFORD DISTRICT. Wild Rogue - North Watershed Analysis. 1999.

U.S. FOREST SERVICE. 1995. *Upper Rogue Above Galice National Watershed # 26*. Galice Ranger District Siskiyou National Forest, Feb. 1995.

U.S. GEOLOGICAL SURVEY. 1998. *U.S. Geological Survey Water-Data Report.* 97-1, pp. 400 and 397.

WILCOX, B.A. and D.D. MURPHY. 1985. *Conservation Strategy: The Effects of Fragmentation on Extinction. American Naturalist*

125: 879-887.

Appendix A: Maps

Map 1

GENERAL LOCATION OF THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

GOVERNMENT OWNERSHIP IN THE WILD ROGUE SOUTH AREA

Map 2

June 1999

John McGlothlin

LEGEND

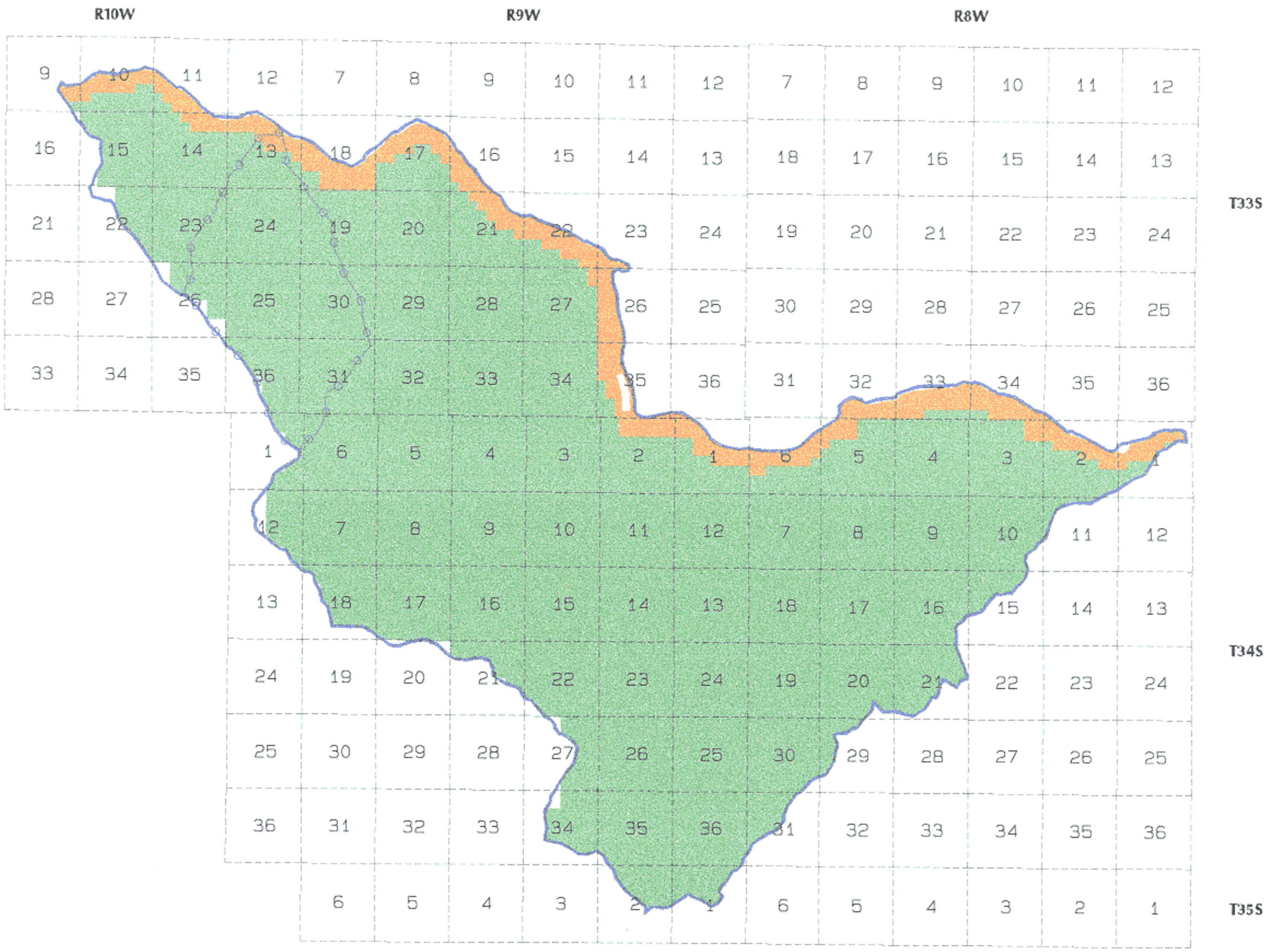
BLM LAND

USFS LAND

ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



SCALE 1:140000

MAP 3
LAND USE ALLOCATIONS ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

- LSR
- WILD ROGUE RIVER
- DEFERRED WATERSHED BOUNDARY
- ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 4

TRANSIENT SNOW ZONE (2500 - 4000 ft.) AND TEN-INCH PRECIPITATION BANDS IN THE WILD ROGUE SOUTH AREA

August 1999

John McGlothlin

LEGEND

TRANSIENT SNOW ZONE

TEN-INCH PRECIPITATION BAND

ANALYSIS AREA BOUNDARY

N

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 5

DOMINANT VEGETATION ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

NON-VEG.
HARDWOOD/ CONIFER
D.FIR
MIXED CONIFER
GRASS
J.PINE/ GRASS
D.FIR/ W.FIR
ANALYSIS AREA BOUNDARY
HARDWOOD
J.PINE/ SHRUB
W.FIR

N

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 6

SERAL STAGES ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

- OLD GROWTH
- MATURE
- MID
- EARLY
- NOT APPLICABLE
- ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 7

PLANT SERIES
ON BLM LAND IN
THE WILD ROGUE SOUTH AREA

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

June 1999

John McGlothlin

LEGEND

NON-VEG.	TANOAK	J.PINE	D.FIR	ANALYSIS AREA BOUNDARY
NON-FOREST	TANOAK/ D.FIR	P.PINE	D.FIR/ W.FIR	
GRASS	W.OAK	D.FIR/ PINE	W.FIR	

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 8

VEGETATIVE CONDITION CLASS ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

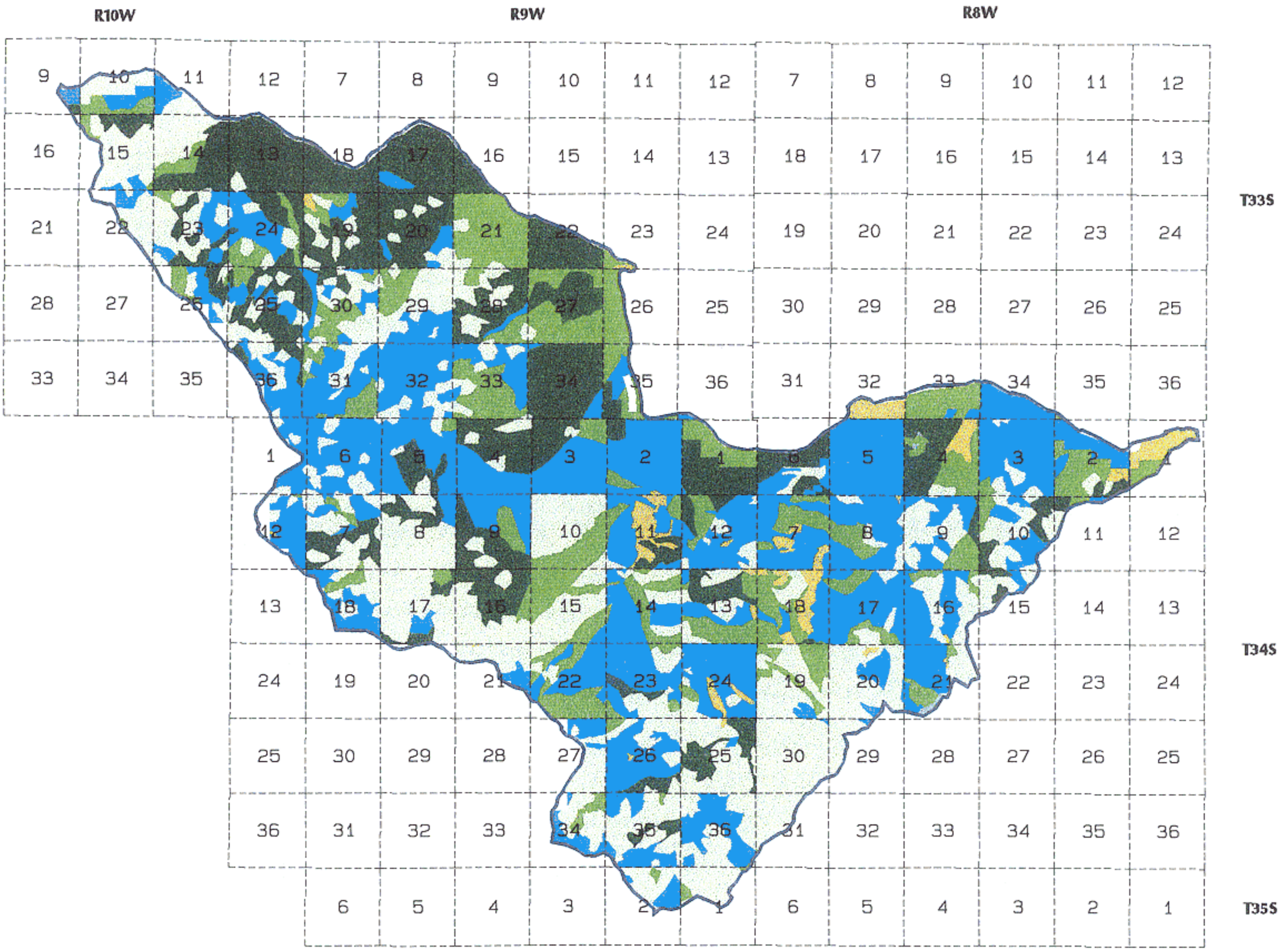
John McGlothlin

LEGEND

NON-VEG.
EARLY
MID-SERAL
ANALYSIS AREA BOUNDARY
GRASS
SEEDLING/ SAPLING
MATURE
HARDWOOD
POLES

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



SCALE 1:140000

MAP 9

SPOTTED OWL HABITAT RATINGS ON BLM LAND IN THE WILD ROGUE SOUTH AREA

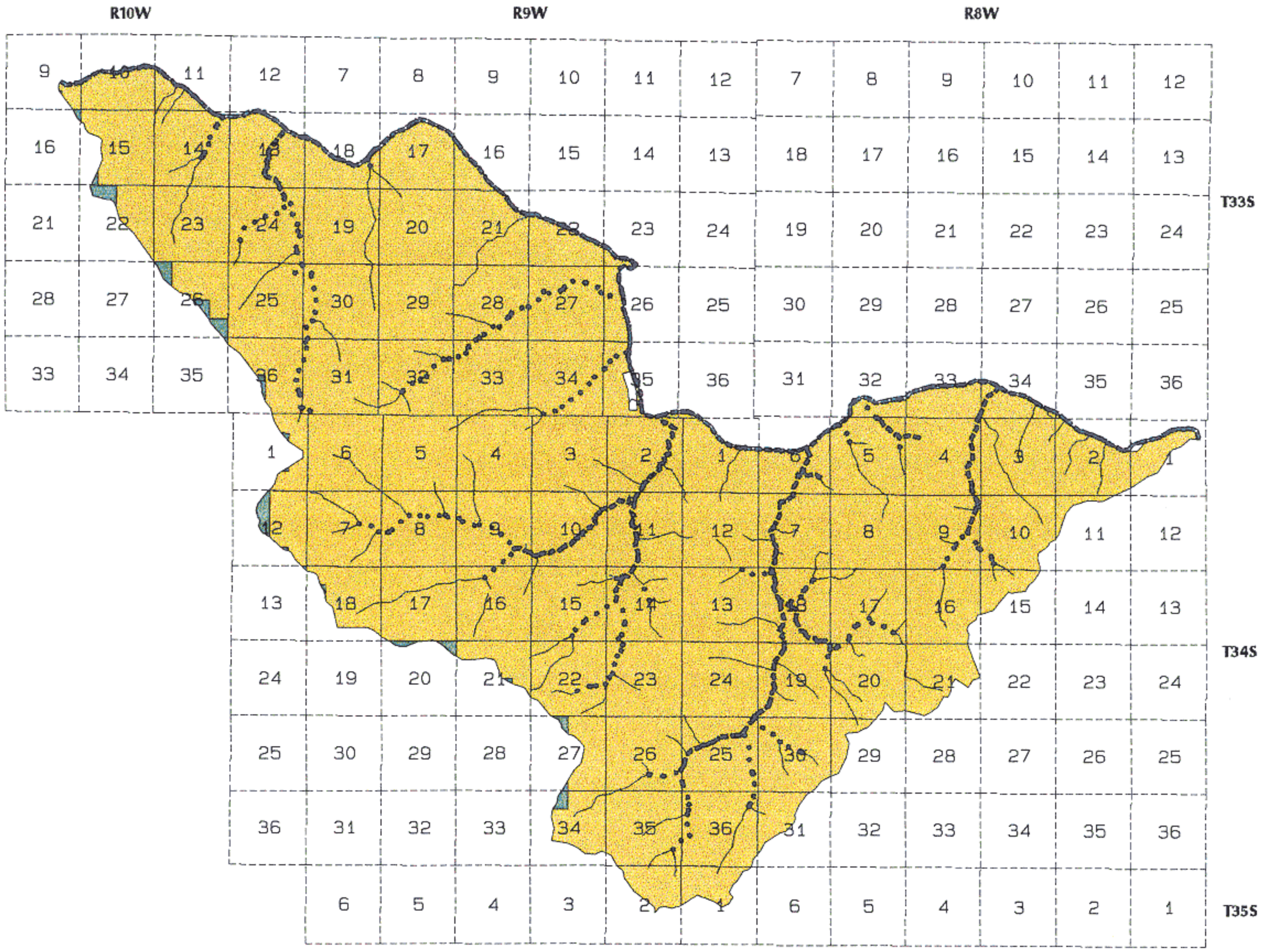
June 1999

John McGlothlin

LEGEND

- NONVEG (Not Rated)
- (1) OPTIMAL
- (2) MEETS FORAGING, DISPERSAL, ROOSTING
- (3) MEETS NO REQUIREMENTS; HAS POTENTIAL TO BECOME 1 OR 2
- (4) MEETS NO REQUIREMENTS; NOT LIKELY TO BECOME 1 OR 2
- (5) DISPERSAL ONLY; HAS POTENTIAL TO BECOME 1 OR 2
- (6) DISPERSAL ONLY; NOT LIKELY TO BECOME 1 OR 2
- ANALYSIS AREA BOUNDARY

N



SCALE 1:140000

MAP 10

STREAM ORDERS (> 2) ON BLM LANDS IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

ORDER 3

ORDER 4

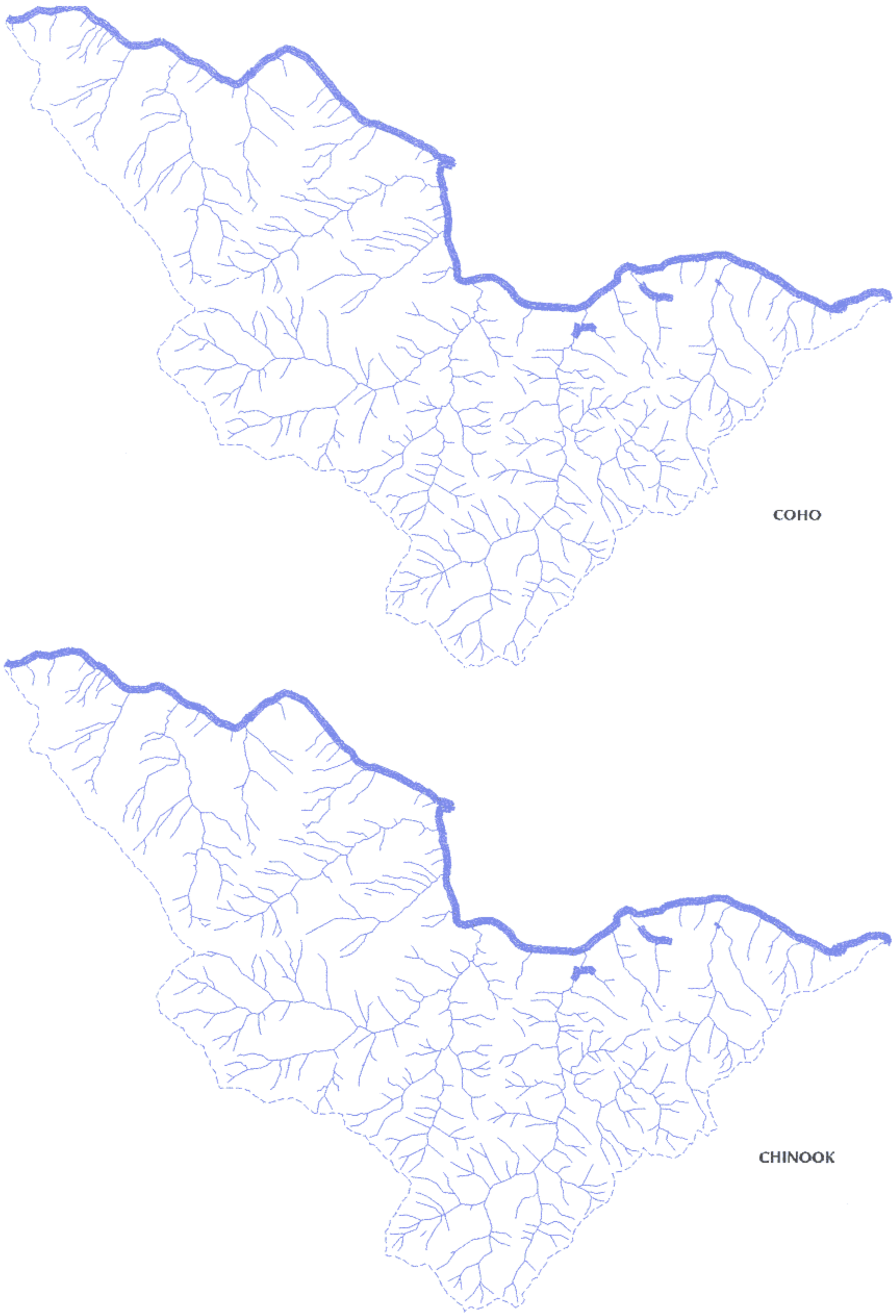
ORDER 5+

BLM LAND

USFS LAND

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



MAP 11

APPROXIMATE DISTRIBUTION OF COHO AND CHINOOK SALMONIDS IN THE WILD ROGUE SOUTH AREA

August 1999

John McGlothlin

LEGEND

STREAMS (ORDER > 1)

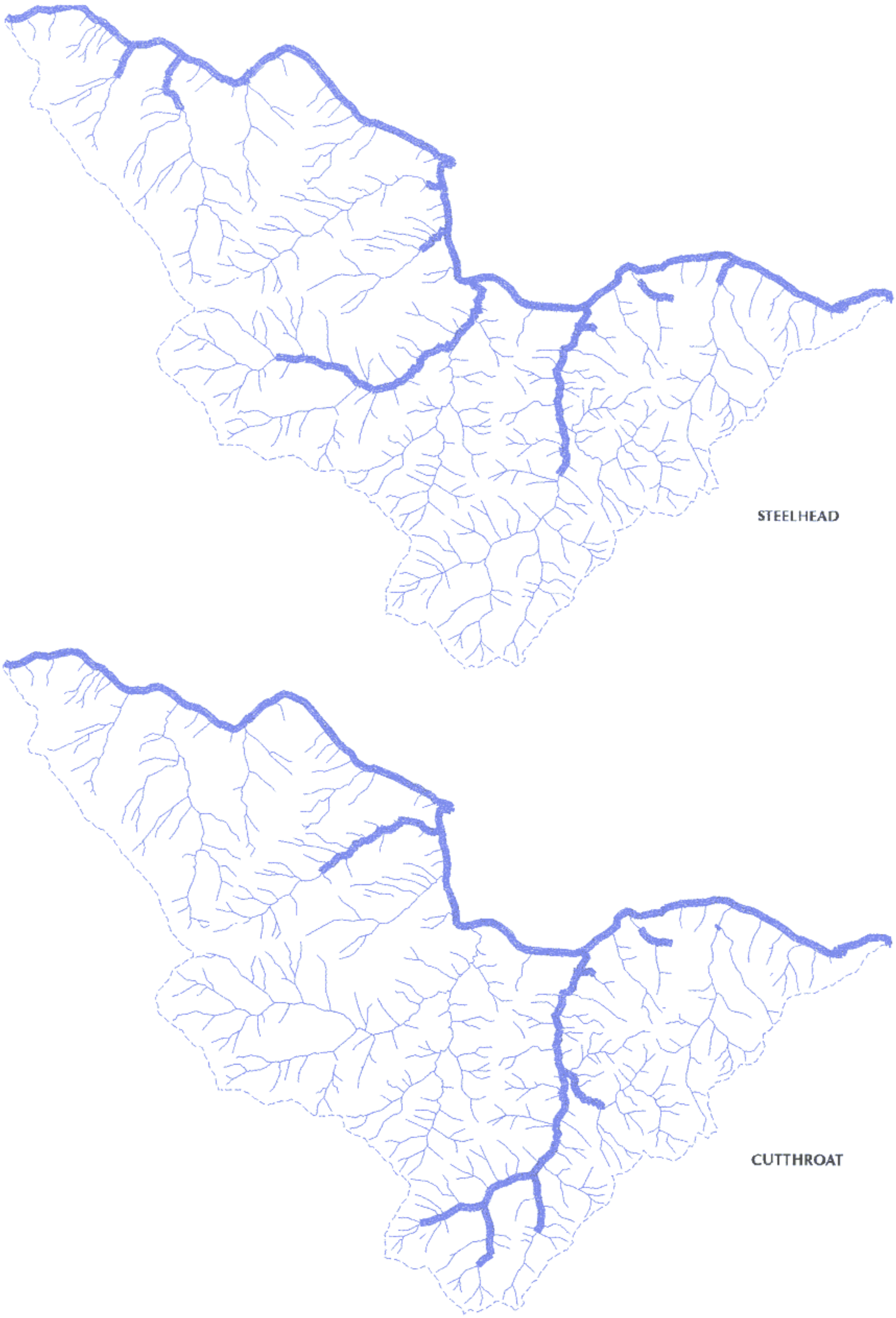
DISTRIBUTION OF FISH

ANALYSIS UNIT BOUNDARY

120

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



MAP 12

APPROXIMATE DISTRIBUTION OF STEELHEAD AND CUTTHROAT IN THE WILD ROGUE SOUTH AREA

August 1999

John McGlothlin

LEGEND

STREAMS (ORDER > 1)

DISTRIBUTION OF FISH

ANALYSIS UNIT BOUNDARY

121

N

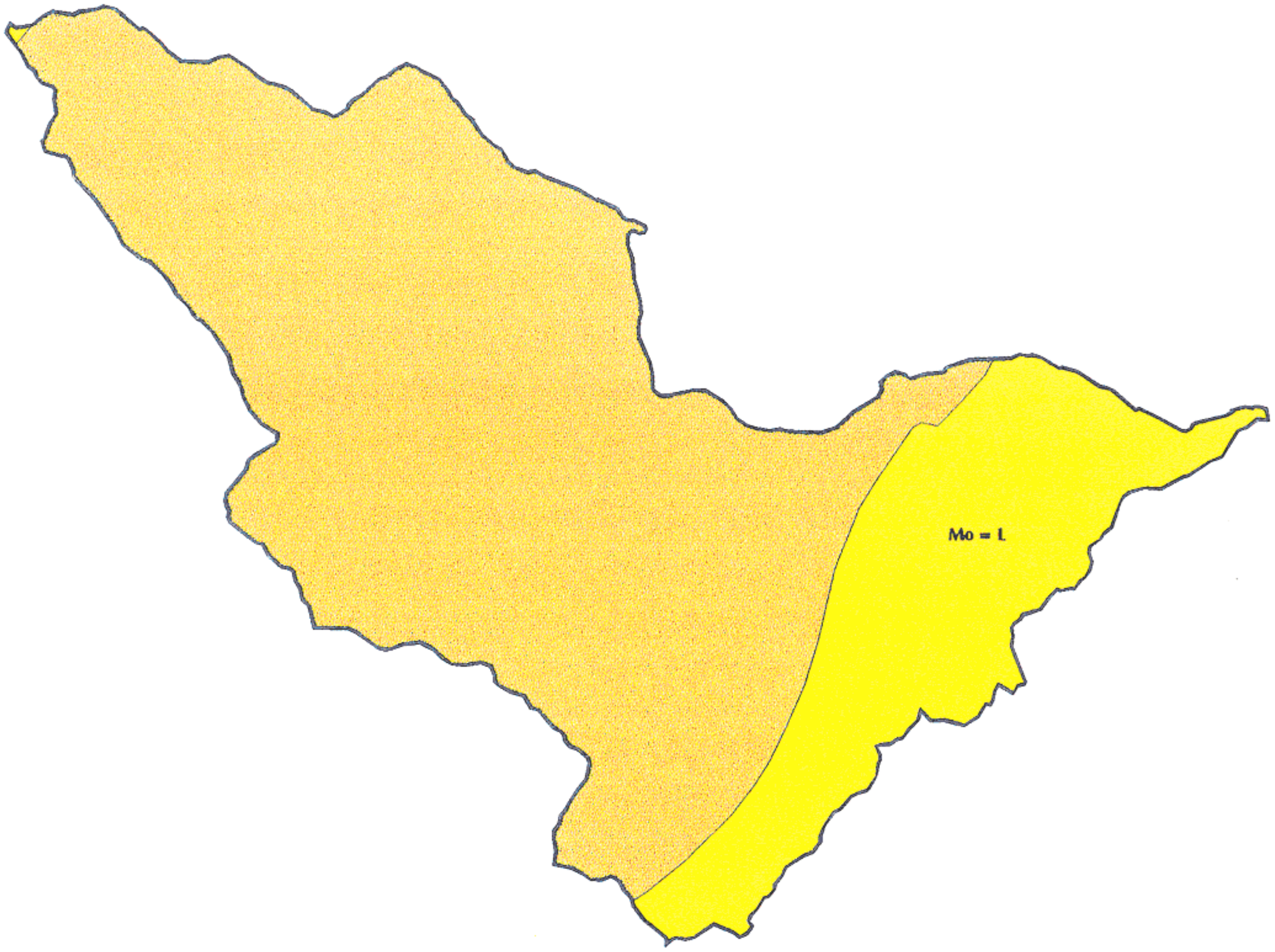
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W

R9W

R8W

T33S



T34S

T35S

SCALE 1:140000

MAP 13

MINERAL POTENTIAL IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

Medium Potential For Au

Low Potential For All

ANALYSIS AREA BOUNDARY

N

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 14

FIRE HAZARD RATING ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

HIGH

MEDIUM

LOW

ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 15

FIRE RISK RATING ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

HIGH

MEDIUM

LOW

ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 16

FUEL MODELS FOR BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

- GRASS AND GRASS DOMINATED
- CHAPARRAL AND SHRUB FIELDS
- TIMBER LITTER
- SLASH
- FUEL MODELING NOT APPLICABLE
- ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R10W R9W R8W

T33S

T34S

T35S

SCALE 1:140000

MAP 17

FIRE VALUE RATING ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

LEGEND

HIGH

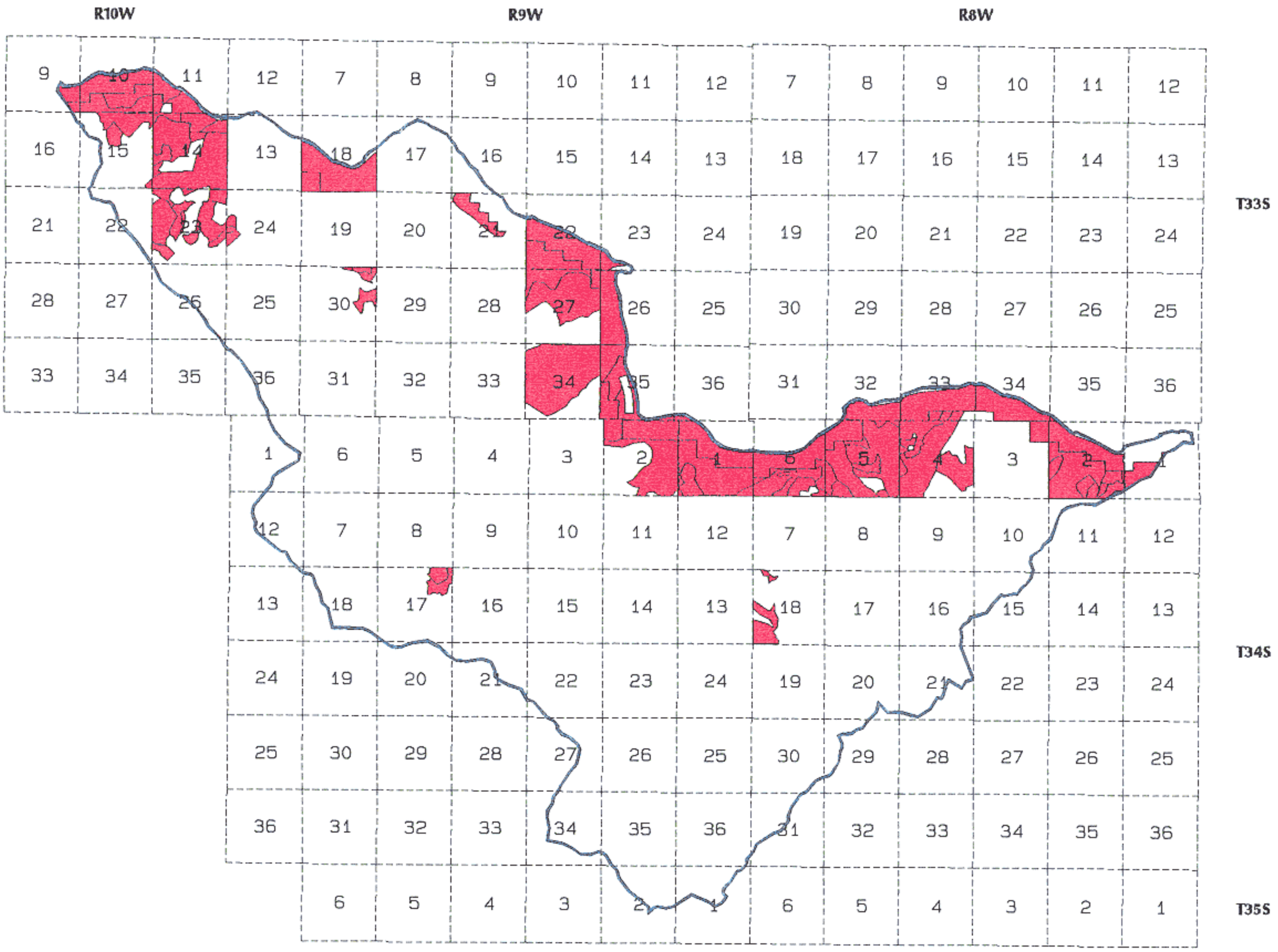
MEDIUM

LOW

ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



SCALE 1:140000

MAP 18

POTENTIAL HIGH PRIORITY HAZARD REDUCTION TREATMENT AREAS ON BLM LAND IN THE WILD ROGUE SOUTH AREA

June 1999

John McGlothlin

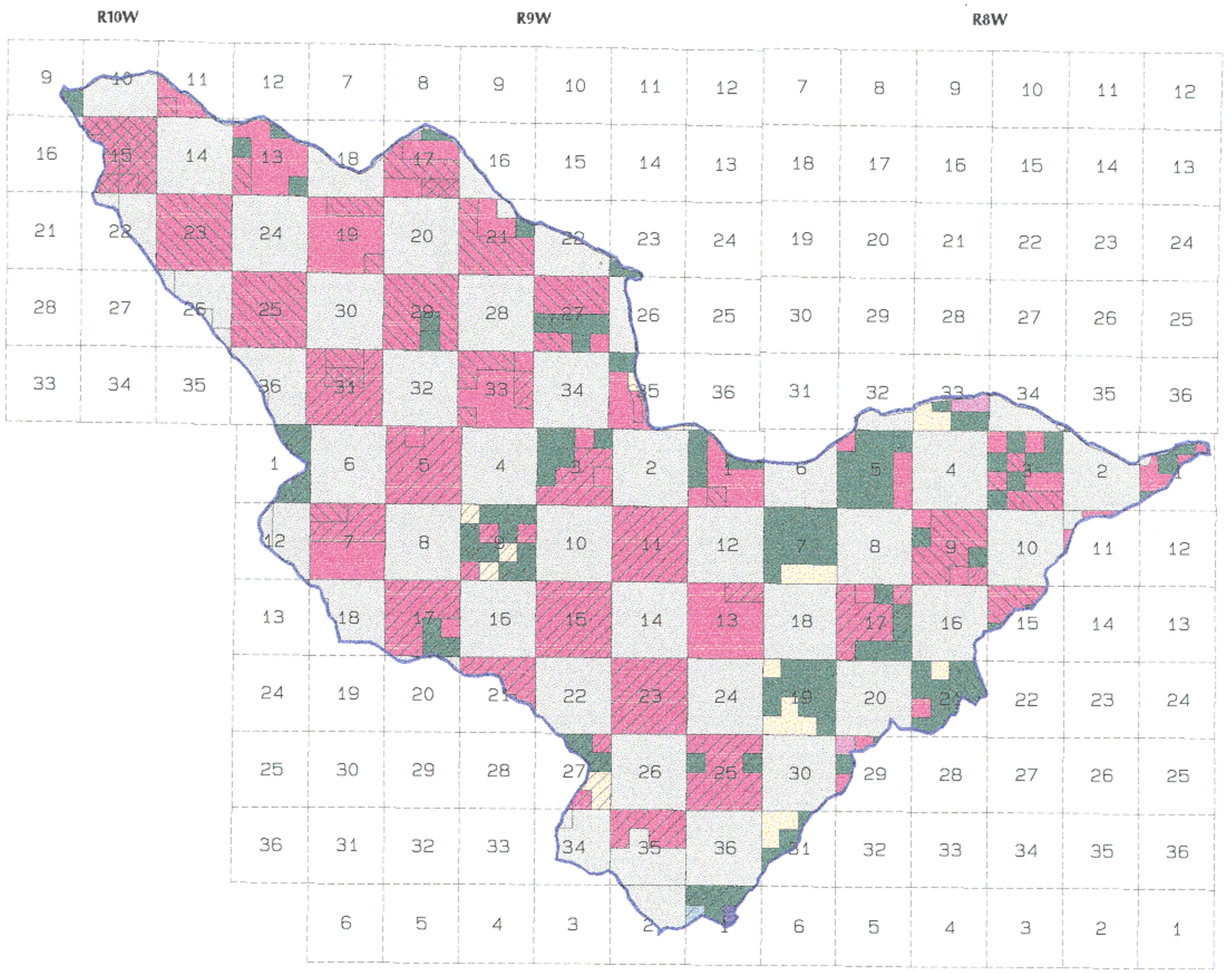
LEGEND

Areas With High Ratings

ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



SCALE 1:140000

MAP 19

HISTORIC PLANT SERIES, OLD GROWTH, AND FIRE OCCURRENCE CIRCA 1920 IN THE WILD ROGUE SOUTH AREA

September 1999

John McGlothlin

LEGEND

- NO DATA
- NONTIMBER
- TANOAK
- DOUGLAS FIR
- PONDEROSA PINE
- PORT ORFORD CEDAR
- WESTERN HEMLOCK
- BURNED
- OLDGROWTH
- ANALYSIS AREA BOUNDARY

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

Appendix B: Mining Claim Information

A mining claimant/operator has the right to prospect and develop the mining claim as authorized by the General Mining Laws and amendments. Acceptable activities that normally occur on mining claims include the development of the mineral resources by extracting the gold-bearing gravels, or ore, from the claim, and manufacturing of the mineral materials utilizing a trommel and sluice box system, or a millsite of some sort. After the gold is extracted the tailings (waste material) are stockpiled to either be utilized in the reclamation of the site or removed to an appropriate location. Timber on site may be used in some situations if outlined in a mining notice or plan of operations.

The operator, or claimant, will be allowed to build structures and occupy the site where such uses are incidental to mining and approved in writing by the appropriate BLM authorized officer. The use and occupancy of a mining claim will be reviewed on a case-by-case basis to determine if such uses are incidental. A letter of concurrence will be issued only where the operator shows that the use or occupancy is incidental to mining and that substantially regular mining activity is occurring. Issuance will be subject to the operator complying with all state, federal, and local governmental codes and regulations. This means that in addition to meeting the requirements to mine on a regular basis the claimant will need to meet the standards of the Oregon Uniform Building Codes and all state sanitation requirements.

The filing of mining claims gives the claimant the rights and ownership of the minerals beneath the surface of the lands encumbered by the mining claims. In most cases, management of the surface of the claims rests with the appropriate federal agency having jurisdiction.

The claimants/operators have the right to use that portion of the surface necessary to the development of the claim. In the cases where the surface of the claims are administered by the BLM or Forest Service the claimant/operator may, for safety or security reasons, limit the public access at the location of operations. Where there are no safety or security concerns, the surface of the mining claim is open to the public.

In some instances the surface of the mining claim is managed by the claimant. These are usually claims that were filed before August 1955 and determined valid at that time. The claimants in these cases have the same rights as outlined above. However, they have the right to eliminate public access across that area where they have surface rights.

Appendix C: Road Information

BLM road conditions and status in the Wild Rogue - South Watershed are summarized in Table C-1. Definitions of terms used and data elements in the table precede the table.

A. Definition of Terms

BLM Capitalized Roads: The BLM analyzes Bureau-controlled roads to determine capitalized or noncapitalized classification. During this analysis, the BLM considers many elements including the present and future access needs, type of road, total investment, and the road location. Each capitalized road is identified with a BLM road number and a capitalized value. BLM capitalized roads are managed and controlled by the BLM.

BLM Noncapitalized Roads and Skid Trails: BLM noncapitalized roads and skid trails are not assigned a capitalized value. Noncapitalized roads are generally jeep roads and spur roads that exist due to intermittent public and administrative use. Skid trails are ground disturbances, created under a timber sale, that have not been restored to their natural condition.

Non-BLM Roads and Skid Trails: Non- BLM roads and skid trails are administered by private landowners and other governmental agencies. The BLM has no control over these roads.

Quarries: Quarries are areas of land suitable for use as a rock source to develop aggregate material for the surfacing of roads, rip rap for slope protection, rock for stream enhancement projects, and for other miscellaneous uses.

Road Maintenance Level: The extent and intensity of road maintenance scheduled for a road.

> **Level 1:** This level is the minimal custodial care as required to protect the road investment, adjacent lands, and resource values. Normally, these roads are blocked and not open for traffic or are open only to restricted traffic. Traffic would be limited to use to high-clearance vehicles; passenger car traffic is not a consideration. Culverts, waterbars/dips, and other drainage facilities are to be inspected on a three-year cycle and maintained as needed. Grading, brushing, and slide removal are not performed unless they affect roadbed drainage. Closure and traffic-restricting devices are maintained.
>
> **Level 2:** This level is used on roads where management requires the road to be opened seasonally or for limited passage of traffic. Traffic is generally administrative with some moderate seasonal use. Typically these roads are passable by high-clearance vehicles. Passenger cars are not recommended (user comfort and convenience are not considered priorities). Culverts, waterbars/dips, and other drainage facilities are to be inspected annually and maintained as needed. Grading is conducted as necessary only to correct drainage problems. Brushing is conducted as needed (generally on a three-year cycle) and only to facilitate passage of maintenance equipment. Slides may be left in place provided that they do not affect drainage and there is at least 10 feet of usable roadway.

Level 3: This level is used on intermediate or constant-service roads where traffic volume is significantly heavier, approaching a daily average of 15 vehicles. Typically these roads are native or aggregate surfaced, but may include low-use, bituminous-surfaced roads. This level would be the typical level for log hauling. Passenger cars are capable of using most of these roads by traveling slow and avoiding obstacles that have fallen on the travelway. Culverts, waterbars/dips, and other drainage facilities are to be inspected annually and maintained as needed. Grading is conducted annually to provide a reasonable level of riding comfort. Brushing is conducted annually or as needed to provide for driver safety. Slides affecting drainage would receive high priority for removal; otherwise they would be removed on a scheduled basis.

Level 4: This level is used on roads where management requires the road to be opened all year and has a moderate level of concern for driver safety and convenience. Traffic volume is approximately a daily average of 15 vehicles and will accommodate passenger vehicles at moderate travel speeds. Typically these roads are single lane bituminous surface, but may also include heavily-used aggregate surfaced roads as well. The entire roadway is maintained on an annual basis, although a preventative maintenance program may be established. Problems are repaired as soon as discovered.

Level 5: This level is used on roads where management requires the road to be opened all year and has a high level of concern for driver safety and convenience. Traffic volume exceeds a daily average of 15 vehicles. Typically these roads are double or single lane bituminous, but may also include heavily-used aggregate surfaced roads as well. The entire roadway is maintained on an annual basis and a preventative maintenance program is also established. Brushing may be conducted twice a year as necessary. Problems are repaired as soon as discovered.

B. Road Records Data Elements

Information on road data elements is available through the Medford District road record files, right-of-way (R/W) agreement files, easement files, computer road inventory program, GIS maps, transportation maps, aerial photos, and employee knowledge of existing road systems. When data gaps are determined to exist, field data will be gathered to eliminate the gaps and at the same time existing data element information will be verified. Some information on private roads does exist, but the majority will need to be researched by the BLM through privately-authorized field investigations and answers to BLM's request for information from private landowners.

1. Examples of data elements for roads:

road density	road surface	surface depth	road use
road drainage	road condition	road grade	gates
R/W agreements	easements	maintenance levels	barricades

2. Examples of data elements for quarries**:**

active quarry depleted quarry

C. Descriptions of Columns in Road Information Table

T. = Township
R. = Range
Sec. = Section
Seg. = Road Segment

These columns describe the road number, location of the beginning point of the road, and the road segment. Example of a road number is: 35-7-24 A

Name	=	The name of the road.
O&C	=	Length of road in miles that crosses O&C lands.
PD	=	Length of road in miles that crosses Public Domain lands.
Other	=	Length of road in miles that crosses other lands.
Total Miles	=	Total length of the road in miles.
Srf. Type	=	Road surface type: (NAT) Natural, (PRR) Pit Run, (GRR) Grid Rolled, (ABC) Aggregate Base Course, (ASC) Aggregate Surface Course, (BST) Bituminous-Surface Treatment.
Sub. Wid.	=	Subgrade width of the road in feet.
Srf. Dp.	=	Road surfacing depth in inches.
Who Ctrls.	=	Who controls the road. (BLM) Bureau of Land Management, (PVT) Private.
Cus. Mtn.	=	BLM Custodial Maintenance Level. Level of maintenance needed during normal administrative use with no timber haul.
Opr. Mtn.	=	BLM Operational Maintenance Level. Level of maintenance needed during active timber hauling.
Who Mtn.	=	This column changes based on who's responsible for maintaining the road at any given time. (BLM) Bureau of Land Management, (PVT) Private, (TSO) Timber Sale Operator, or Other.
Comments	=	Comments pertaining to each road.

Table C - 1: Wild Rogue - South Watershed Road Information (Capitalized Roads)

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Type	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Comments
33	10	15		Firebreak	3.36	0	0	3.36	ASC	16	4	BLM	3	3	BLM	
33	10	15.1		Ranch Overlook	0.34	0	0	0.34	PRR	14	8	BLM	2	2	BLM	
33	10	15.2		Ranch Overlook sp	0.34	0	0	0.34	NAT	14		BLM	2	2	BLM	
33	10	22		Wayout Saddle	0.99	0	0	0.99	NAT	14		BLM	2	2	BLM	
33	10	22.1		Trout Creek	3.88	0	0	3.88	PRR	16	8	BLM	3	3	BLM	
33	10	22.2	A	Wayout Saddle sp	0.12	0	0	0.12	PRR	14	6	BLM	3	3	BLM	
33	10	22.4		Horse Prairie	0.54	0	0	0.54	NAT	14		BLM	2	2	BLM	Not in GIS inventory
33	10	22.5		Trout Firebreak	0.60	0	0	0.60	PRR	16		BLM	3	3	BLM	
33	10	22.6		Devil's Canyon	0.07	0	0	0.07	NAT	16		FS	3	3	FS	USFS r/w on BLM land not in GIS inventory
33	10	24		Firebreak sp	0.11	0	0	0.11	ABC	16	8	BLM	3	3	BLM	Not on GIS inventory
33	10	26		Masons Basin	3.53	0	0	3.53	ASC	14	8	BLM	3	3	BLM	
33	10	26.1		Rhododendron	3.01	0	0	3.01	ASC	14	8	BLM	3	3	BLM	
33	10	36		Missouri Bar	4.63	0	0	4.63	PRR	14	8	BLM	3	3	BLM	
33	9	19		Hewitt Creek P sp	1.80	0	0	1.80	ASC	14	6	BLM	3	3	BLM	
33	9	19.1	A	Hewitt Creek P3 sp	0.68	0	0	0.68	ASC	14	6	BLM	3	3	BLM	
33	9	19.1	B	Hewitt Creek P3 sp	0.26	0	0	0.26	ASC	16	6	BLM	3	3	BLM	
33	9	19.2		Hewitt Creek P2 sp	0.46	0	0	0.46	ASC	16	6	BLM	3	3	BLM	
33	9	19.3	A	Hewitt Creek P3 sp	0.13	0	0	0.13	ASC	14	6	BLM	3	3	BLM	
33	9	19.3	B	Hewitt Creek P3 sp	0.55	0	0	0.55	ASC	16	6	BLM	3	3	BLM	
33	9	21		Hewitt Creek	4.66	0	0	4.66	ASC	14	8	BLM	3	3	BLM	
33	9	28	A	Jenny Creek	0.72	0	0	0.72	GRR	14	8	BLM	3	3	BLM	
33	9	28	B	Jenny Creek	0.80	0	0	0.80	NAT	14		BLM	3	3	BLM	

Table C - 1: Wild Rogue - South Watershed Road Information (Capitalized Roads)

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Type	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Comments
33	9	28.1	A	Jenny Creek sp	0.57	0	0	0.57	GRR	14	8	BLM	3	3	BLM	
33	9	28.1	B	Jenny Creek sp	1.08	0	0	1.08	GRR	14	8	BLM	3	3	BLM	
33	9	29	A	Missouri Creek	0.50	0	0	0.50	ASC	16	3	BLM	3	3	BLM	
33	9	29	B	Missouri Creek	3.08	0	0	3.08	PRR	16	8	BLM	3	3	BLM	
33	9	29.2		Curry Fire	0.14	0	0	0.14	GRR	14	12	BLM	3	3	BLM	
33	`9	31		Curry Ridge P2 sp	0.43	0	0	0.43	PRR	14	8	BLM	3	3	BLM	
33	9	31.1		Curry Ridge P1 sp	0.30	0	0	0.30	PRR	14	8	BLM	3	3	BLM	
33	9	32		Wilson Camp sp	1.31	0	0	1.31	GRR	14	8	BLM	3	3	BLM	
33	9	32.1		Missouri Compromise	1.96	0	0	1.96	GRR	16	6	BLM	3	3	BLM	
33	9	33		Wilson Dive	0.32	0	0	0.32	NAT	16		BLM	3	3	BLM	
33	9	34		Jenny Breaks	2.20	0	0	2.20	PRR	14	8	BLM	3	3	BLM	
33	9	34.1		Jenny Breaks sp	0.56	0	0	0.56	PRR	14	8	BLM	3	3	BLM	
34	10	12		Bear Camp sp	0.02	0	0	0.02	NAT	14		BLM	2	2	BLM	
34	8	10	A	Smith Creek	1.00	0	0	1.00	ASC	16	8	BLM	3	3	BLM	
34	8	10.1	A	Smith Creek sp	0.63	0	0	0.63	PRR	14	6	BLM	3	3	BLM	
34	8	10.1	B	Smith Creek sp	0.59	0	0	0.59	ASC	14	8	BLM	3	3	BLM	
34	8	10.1	C	Smith Creek sp	0.83	0	0	0.83	NAT	16		BLM	2	2	BLM	
34	8	10.2		Rum Creek sp	0.20	0	0	0.20	NAT	16		BLM	2	2	BLM	
34	8	10.3		Zadie sp	0.47	0	0	0.47	ASC	16	8	BLM	3	3	BLM	
34	8	10.4		Maka sp	0.33	0	0	0.33	ASC	16	8	BLM	3	3	BLM	
34	8	10.5	A	Daisy Sp	0.54	0	0	0.54	ASC	16	8	BLM	3	3	BLM	
34	8	10.5	B	Daisy Sp	0.63	0	0	0.63	NAT	16		BLM	2	2	BLM	

Table C - 1: Wild Rogue - South Watershed Road Information (Capitalized Roads)

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Type	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Comments
34	8	10.6		Boomer	0.01	0	0	0.01	ASC	16	8	BLM	3	3	BLM	
34	8	13		Almeda	0.07	0	0	0.07	BST	18	6	BLM	5	5	BLM	
34	8	15	A	W Rum Creek	2.24	0	0	2.24	ABC	16	6	BLM	3	3	BLM	
34	8	15	B	W Rum Creek	2.00	0	0	2.00	ASC	16	6	BLM	3	3	BLM	
34	8	16		W Rum Creek sp	1.23	0	0	1.23	ABC	14	6	BLM	3	3	BLM	
34	8	21		Peavine Lookout	0.21	0	0	0.21	ABC	16	6	BLM	3	3	BLM	
34	8	21.1		Peavine a sp	0.37	0	0	0.37	ABC	16	6	BLM	3	3	BLM	
34	8	21.2		Peavine B sp	0.13	0	0	0.13	ABC	16	6	BLM	3	3	BLM	
34	8	21.3		Peavine C sp	0.01	0	0	0.01	ABC	16	6	BLM	3	3	BLM	
34	8	22.1	A	North Ridge	0.15	0	0	0.15	NAT	16		BLM	3	3	BLM	
34	8	22.1	B	North Ridge	0.79	0	0	0.79	ABC	16	6	BLM	3	3	BLM	
34	8	28		Mt Peavine	1.58	0	0	1.58	ABC	16	8	BLM	3	3	BLM	
34	8	34	B	Rum Creek	0.85	0	0	0.85	ASC	16	6	BLM	3	3	BLM	
34	8	34	C	Rum Creek	2.50	0	0	2.50	PRR	16	6	BLM	3	3	BLM	
34	8	36	B	Galice Access b	10.40	0	0	10.40	BST	18	6	BLM	5	5	BLM	
34	8	36	C	Galice Access c	5.20	0	0	5.20	BST	14	6	BLM	5	5	BLM	
34	8	36	D	Galice Access d	4.98	0	0	4.98	ASC	14	6	BLM	4	4	BLM	
34	8	36	E1	Galice Access e	3.40	0	0	3.40	PRR	20	8	BLM	3	3	BLM	
34	8	36	E2	Galice Access e	1.65	0	0	1.65	GRR	16	8	BLM	3	3	BLM	
34	8	8		West Rum Sp	0.10	0	0	0.10	ABC	14	6	BLM	3	3	BLM	
34	8	9		Montgomery Creek	0.90	0	0	0.90	PRR	16	8	BLM	3	3	BLM	
34	9	16		Windy Myrne	0.33	0	0	0.33	NAT	16		BLM	2	2	BLM	

Table C - 1: Wild Rogue - South Watershed Road Information (Capitalized Roads)

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Type	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Comments
34	9	17		Galice Access sp	1.50	0	0	1.50	PRR	14	6	BLM	3	3	BLM	
34	9	17.1		Sec 8 Big Windy	2.40	0	0	2.40	NAT	14		BLM	3	3	BLM	
34	9	17.2		Sec 17 Spur 1	0.35	0	0	0.35	GRR	16	8	BLM	3	3	BLM	
34	9	18		Windy Myrne	0.52	0	0	0.52	GRR	16	8	BLM	3	3	BLM	
34	9	18.1		Sec 18 Spur 1	0.01	0	0	0.01	NAT	16		BLM	2	2	BLM	
34	9	21	A	Long Gulch	3.40	0	0	3.40	BST	14	8	BLM	5	5	BLM	
34	9	21	B	Long Gulch	5.00	0	0	5.00	BST	14	8	BLM	5	5	BLM	
34	9	21	C	Long Gulch	4.32	0	0	4.32	BST	14	8	BLM	4	4	BLM	
34	9	21	D	Long Gulch	0.79	0	0	0.79	ASC	14	4	BLM	3	3	BLM	
34	9	21	E	Long Gulch	4.00	0	0	4.00	NAT	14	8	BLM	3	3	BLM	
34	9	21.1	A	Ridge	0.78	0	0	0.78	ABC	16	8	BLM	3	3	BLM	
34	9	21.1	B	Ridge	0.22	0	0	0.22	NAT	16		BLM	2	2	BLM	
34	9	21.2		Bear Camp Ridge	0.59	0	0	0.59	NAT	16		BLM	2	2	BLM	Not in GIS inventory
34	9	23		Lucky Boy Ridge	0.87	0	0	0.87	GRR	14	6	BLM	3	3	BLM	
34	9	25		Julie B	0.18	0	0	0.18	PRR	16	8	BLM	1	1	BLM	
34	9	25.1		Quick Creek D sp	0.13	0	0	0.13	GRR	16	12	BLM	3	3	BLM	
34	9	27.1		Lucky Boy Ridge	2.10	0	0	2.10	NAT	16		BLM	2	2	BLM	
34	9	3		Black Bar	2.00	0	0	2.00	NAT	14		PB	2	2	BLM	Private/BLM ownership
34	9	34	A	Julie Creek	1.50	0	0	1.50	ASC	14	3	BLM	3	3	BLM	
34	9	34	B	Julie Creek	4.30	0	0	4.30	ASC	14	3	BLM	3	3	BLM	
34	9	35		Sourgrass Saddle	0.15	0	0	0.15	ASC	14	6	BLM	3	3	BLM	
34	9	35.2	A	Quick Creek Ml	1.90	0	0	1.90	PRR	14	8	BLM	3	3	BLM	

Table C - 1: Wild Rogue - South Watershed Road Information (Capitalized Roads)

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Type	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Comments
34	9	35.2	B	Quick Creek Ml	1.30	0	0	1.30	ASC	14	3	BLM	3	3	BLM	
34	9	35.3	A	Quick Creek P2 sp	0.67	0	0	0.67	PRR	14	6	BLM	3	3	BLM	
34	9	35.3	B	Quick Creek P2 sp	0.10	0	0	0.10	PRR	14	8	BLM	3	3	BLM	
34	9	35.4		Julie Creek	O.52	0	0	0.52	PRR	16	8	BLM	3	3	BLM	
34	9	35.5		Julie D sp	0.33	0	0	0.33	PRR	16	8	BLM	3	3	BLM	
34	9	36		Julie a	1.04	0	0	1.04	PRR	16	8	BLM	3	3	BLM	
34	9	5		Wilson Camp	4.11	0	0	4.11	ABC	14	6	BLM	3	3	BLM	
34	9	5.1		Windy Ridge sp	0.86	0	0	0.86	NAT	14		BLM	2	2	BLM	
34	9	6	A	Curry Ridge	1.50	0	0	1.50	PRR	14	8	BLM	3	3	BLM	
34	9	6	B	Curry Ridge	0.33	0	0	0.33	GRR	14	12	BLM	3	3	BLM	
34	9	7		County Line	8.70	0	0	8.70	ASC	20	2	BLM	3	3	BLM	
34	9	7.1		Windy Rock	1.50	0	0	1.50	NAT	14		BLM	3	3	BLM	
34	9	7.2		N Fk Big Windy	0.80	0	0	0.80	NAT	16		BLM	2	2	BLM	
34	9	8	A	S Fk Big Windy Creek	2.90	0	0	2.90	GRR	16	8	BLM	3	3	BLM	
34	9	8	B	S Fk Big Windy Creek	0.50	0	0	0.50	NAT	16		BLM	3	3	BLM	
34	9	8.1		Big Windy Forks	1.70	0	0	1.70	NAT	16		BLM	3	3	BLM	
34	9	9		Big Windy Fk sp	0.25	0	0	0.25	NAT	16		BLM	2	2	BLM	
35	8	5		Mill Creek	0.01	0	0	0.01	NAT	14		BLM	3	3	BLM	
35	9	1	A	N Fk Silver Creek	0.02	0	0	0.02	ABC	14	6	BLM	3	3	BLM	
35	9	1.2	A	Serpentine Spring	0.40	0	0	0.40	GRR	16	6	BLM	3	3	BLM	
35	9	1.4	A	Hansen Saddle	0.02	0	0	0.02	ABC	14	6	BLM	3	3	BLM	
35	9	1.6		Silver Ridge Road	0.01	0	0	0.01	ABC	14	6	BLM	3	3	BLM	

Table C - 1: Wild Rogue - South Watershed Road Information (Capitalized Roads)

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Type	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Comments
35	9	2.1		Quick Creek	1.80	0	0	1.80	PRR	14	8	BLM	3	3	BLM	
35	9	2.2		Upper Sourgrass sp.	0.22	0	0	0.22	GRR	16	8	BLM	3	3	BLM	

Appendix D: Wildlife Information

Table D-1: Spotted Owl Sites Located Within the Watershed

Site Name	Level of Protection
Bang	Located in the Late-Successional Reserve
Big Windy	Located in the Late-Successional Reserve
Dulog Creek	Located in the Late-Successional Reserve
Hewitt Creek	Located in the Late-Successional Reserve
Howard Hole	Located in the Late-Successional Reserve
Jenny Breaks	Located in the Late-Successional Reserve
Jenny Shoe	Located in the Late-Successional Reserve
Josephine Sweeney	Located in the Late-Successional Reserve
Julie Creek	Located in the Late-Successional Reserve
Long Gulch	Located in the Late-Successional Reserve
Lucky Boy North	Located in the Late-Successional Reserve
Lucky Boy South	Located in the Late-Successional Reserve
Montgomery Creek	Located in the Late-Successional Reserve
Rum Creek	Located in the Late-Successional Reserve
Taylor Gulch	Located in the Late-Successional Reserve

Table D-2: Spotted Owl Sites Located Outside the Watershed with Provincial Home Range Falling Within the Watershed

Site Name	Level of Protection
Bailey Creek	Located in the Late-Successional Reserve
North Galice Creek	Located in the Late-Successional Reserve
Peggler Mill	Located in the Late-Successional Reserve
Rocky Gulch	Located in the Late-Successional Reserve

Table D-3: Spotted Owl Habitat Availability for Known Sites as of 1999

Site Name	Msno	BLM Administered Habitat within 1.3 Miles (McKelvey Rating 1 & 2 in Acres)	BLM Administered Suitable Habitat within 1.3 Miles (McKelvey Rating 1 &2 in Percent)
Bang	3392	512	15%
Big Windy	2280	968	29%
Dulog Creek	2283	2,115	63%
Hewitt Creek	0910	2,275	67%
Howard Hole	0947	865	25%
Jenny Breaks	0942	2,119	63%
Jenny Shoe	3389	2,130	63%
Josephine Sweeney	3284	920	27%
Julie Creek	0882	411	12%
Long Gulch	2659	1,588	47%
Lucky Boy North	0948	1,123	33%
Lucky Boy South	0949	959	28%
Montgomery Creek	0880	1,026	30%
Rum Creek	3386	849	25%
Taylor Gulch	0881	1,027	30%

* Habitat available as of 1/9/99

Table D-4: Results of NSO Nesting Surveys in the Rogue - Recreation Watershed

Site Name	87	88	89	90	91	92	93	94	95	96	97	98	99
Bang						PU	X	S	NS	X	NS	NS	NS
Big Windy				PU	P/0	P	PU	P/2	NS	P	NS	NS	NS
Dulog Creek				P/1	X	PU	S	X	NS	NS	NS	NS	NS
Hewitt Creek	X	X	X	PU	X	X	S	X	NS	NS	NS	NS	NS
Howard Hole	X	X	NS	NS	NS	X	NS	NS	NS	NS	NS	NS	NS
Jenny Breaks	NS	S	X	S	X	X	PU	NS	NS	NS	NS	NS	NS
Jenny Shoe						S	S	NS	NS	NS	NS	NS	NS
Josephine Sweeney						PU	PU	P	PU	PU	NS	NS	NS
Julie Creek	NS	X	X	X	X	PU	PU	P/2	X	X	NS	NS	NS
Long Gulch					S	S	X	NS	NS	NS	NS	NS	NS
Lucky Boy North	X	S	X	X	X	PU	X	NS	NS	NS	NS	NS	NS
Lucky Boy South	X	X	X	X	P/2	P	X	S	NS	NS	NS	NS	NS
Montgomery Creek	X	X	X	X	NS	X	NS	NS	NS	NS	NS	NS	NS
Rum Creek						P/2	X	NS	NS	NS	NS	NS	NS
Taylor Gulch	PU	S	PU	P	P/2	P	PU	P/0	P/1	X	NS	NS	NS

NS = Not surveyed BLANK = Site unknown at this time U = Unknown
S = Single bird P/(?) = Pair/Number young produced SI = Survey incomplete
X = No birds present P = Pair didn't nest PU = Pair next status unknown

McKelvey rating system: Spotted owl habitat managed by the BLM has been analyzed using the McKelvey rating system. The McKelvey rating system is based on a model that predicts spotted owl populations based on habitat availability. Stands are examined for factors such as canopy layering, canopy closure, snags, woody material, and other features. The biological potential of a stand to reach desired conditions is also taken into consideration. During the winter and spring of 1996, stands were visually inspected and rated into the six habitat categories. This rating system has some serious shortcomings and does not reflect the actual amount of habitat. Factors not considered are connectivity and fragmentation. For instance, a single acre of optimal habitat surrounded by clearcuts is as valuable in this rating system as an acre of optimal habitat connected to hundreds of other similar acres. Despite the shortcomings, this system reflects the best available data at this time.

Special Status Species

Special status species are species that are recognized by the federal or state government as needing particular consideration in the planning process, due to low populations (due to natural and human causes), restricted range, threats to habitat, and for a variety of other reasons. This list includes species

officially listed and those proposed for listing. State listed species are those species identified as threatened, endangered, or pursuant to ORS 496.004, ORS 498.026, or ORS 546.040. Also included are Bureau-assessment species which are plant and animal species that are 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 identified in BLM Instruction Memo No. OR-91-57. Bureau-sensitive species are those species eligible to be federally listed, state listed, on List 1 in the Oregon Natural Heritage Data Base, or approved by the BLM state director.

Table D-5: Special Status Species Habitat Needs

SPECIES (COMMON NAME)	HABITAT ASSOCIATION	SPECIAL HABITAT FEATURE	CONCERN
Grey wolf	Generalists	Large blocks of unroaded habitat	Extirpated
White-footed vole	Riparian	Alder/mature riparian	Naturally rare, modification/loss of habitat from development
Red tree vole	Mature/old-growth conifer	Mature Douglas-fir trees	Declining habitat quality/quantity from logging
California red tree vole	Mature/old-growth conifer	Mature Douglas-fir trees	Declining habitat quality/quantity from logging
Fisher	Mature/old-growth riparian	Down wood/snags	Declining habitat quality/quantity & fragmentation from logging
California wolverine	Generalists	Large blocks of unroaded habitat	Declining habitat quality/quantity & fragmentation from logging and road building, human disturbance
American martin	Mature/old growth	Down wood, living ground cover	Declining habitat quality/quantity & fragmentation
Ringtail	Generalists	Rocky terrain, caves, mine adits	Northern limit of range
Townsend's big-eared bat	Generalists	Mine adits, caves	Disturbance to nurseries, hibernacula & roosts, closing mine adits
Fringed myotis	Generalists	Rock crevices & snags	Disturbance to roosts and colonies
Yuma myotis	Generalists	Large live trees with crevices in the bark	Limited mature tree recruitment
Long-eared myotis	Generalists	Large live trees with crevices in the bark	Limited mature tree recruitment
Long-legged myotis	Generalists	Large live trees with crevices in the bark	Limited mature tree recruitment
Pacific pallid bat	Generalists	Snags, rock crevices	General rarity/disturbance/snag loss
Peregrine falcon	Generalists	Cliff faces	Low numbers, prey species contaminated with pesticides
Bald eagle	Lacustrine/rivers	Large mature trees w/large limbs near water	Populations increasing
Northern spotted owl	Mature/old growth	Late-successional mature forest with structure	Declining habitat quality/quantity & fragmentation
Marbled murrelet	Mature/old growth	Large limbed trees, high canopy closure	Declining habitat quality/quantity
Northern goshawk	Mature/old growth	High canopy closure forest for nest sites	Declining habitat quality/quantity & fragmentation, human disturbance
Mountain quail	Generalists		No concern in the watershed
Pileated woodpecker	Large trees	Large diameter snags	Snag and down log removal from logging, salvage & site prep
Lewis' woodpecker	Pine/oak woodlands	Large oaks, pines & cottonwoods adjacent to openings	Declining habitat quality/quantity fire suppression, rural & agriculture development, riparian modification
White-headed woodpecker	Pine/fir mountain forests	Large pines living and dead	Limited natural populations, logging of large pines and snags
Flammulated owl	Pine/oak woodlands	Pine stands & snags	Conversion of mixed-aged forest to even-aged forests
Purple martin	Generalists	Snags in burns with excavated cavities	Salvage logging after fire and fire suppression
Great grey owl	Pine/oak/true fir/mixed conifer	Mature forest with adjoining meadows	Declining quality/quantity of nesting and roosting habitat
Western bluebird	Meadows/ open areas	Snags in open areas	Snag loss/fire suppression competition with starlings for nest sites
Acorn woodpecker	Oak woodlands	Large oaks	Declining habitat quality/quantity

Table D-5: Special Status Species Habitat Needs

SPECIES (COMMON NAME)	HABITAT ASSOCIATION	SPECIAL HABITAT FEATURE	CONCERN
Tricolored blackbird	Riparian	Wetlands, cattail marshes	Limited & dispersed populations, habitat loss from development
Pygmy nuthatch	Pine forests	Large dead & decaying pine	Timber harvest of mature trees, salvage logging
Black-backed woodpecker	Pine	Snags and pine	Removal of mature insect infested trees
Williamsons sapsucker	Montane conifer forest	Trees with advanced wood decay	Removal of heart rot trees, snag removal, conversion to managed stands
Northern pygmy owl	Mixed conifer	Snags	Snag removal; depend on woodpecker species to excavate nest cavities
Grasshopper sparrow	Open savannah	Grasslands with limited shrubs	Limited habitat, fire suppression, conversion to agriculture
Bank swallow	Riparian	Sand banks near open ground or water	General rarity, declining habitat quality
Western pond turtle	Riparian/uplands	Marshes, sloughs ponds	Alteration of aquatic and terrestrial nesting habitat, exotic species introduction
Del norte salamander	Mature/old growth	Talus	Declining habitat quality/quantity & fragmentation
Siskiyou mtn. Salamander	Closed canopy forest	Talus	Declining habitat quality/quantity & fragmentation
Foothills yellow-legged frog	Riparian	Permanent streams with gravel bottoms	Water diversions, impoundments, general declines in genus numbers
Red-legged frog	Riparian	Marshes, ponds & streams with limited flow	Exotic species introduction loss of habitat from development
Tailed frog	Riparian	Cold fast flowing streams in wooded area	Sedimentation and removal of riparian vegetation due to logging, grazing & road building
Clouded salamander	Mature	Snags & down logs	Loss of large decaying wood due to timber harvest and habitat fragmentation
Variegated salamander	Riparian	Cold, clear seeps & springs	Water diversions & sedimentation from roads & logging
Black salamander	Generalists	Down logs, talus	Limited range, lack of data
Sharptail snake	Valley bottoms low elevation	Moist rotting logs	Low elevation agricultural and development projects that remove/limit down wood
California mountain kingsnake	Habitat generalists	Habitat generalists	Edge of range, general rarity, collectors
Common kingsnake	Habitat generalists	Habitat generalists	Edge of range, general rarity, collectors
Northern sagebrush lizard	Open brush stands	Open forests or brush with open understory	Edge of range, fire suppression

Other Species and Habitats

Cavity-dependent species and species utilizing down logs are of special concern in the watershed. Historically, snags were produced by various processes including drought, windthrow, fires, and insects. The number of snags fluctuated through time in response to these events. This natural process has largely been interrupted by demands for timber harvest. The potential recovery of snag-dependent sensitive species such as the pileated woodpecker will depend on the ability of the federal agencies to manage this resource. Silvicultural practices have historically focused on even-aged stands and have resulted in deficits of snags and down logs in harvested areas. Other activities that have depleted snags and down logs are site preparation for tree planting (particularly broadcast burning), fuelwood cutting, post-fire salvage, and previous entries for mortality salvage. Managed stands that currently contain 10-12 (5 MBF) overstory trees per acres or less are also of concern from a wildlife tree/down log perspective. Stands with remaining overstory trees have the potential to provide for current and future snag/down log requirements throughout the next rotation.

Snags and down logs provide essential nesting/denning, roosting, foraging, and hiding cover for at least 100 species of wildlife in western Oregon (Brown, 1985). For some species, the presence or absence

of suitable snags will determine the existence or localized extinction of that species. In forested stands, cavity-nesting birds may account for 30%-40% of the total bird population (Raphael and White, 1984). The absence of suitable snags (snags decay stage, number and distribution) can be a major limiting factor for these snag-dependent species.

The hardness (decay stage) of a snag is an important factor in determining its foraging, roosting and nesting use by individual species. Woodpeckers, such as the pileated (*Dryocous pileatus*), often choose hard snags (stage 1) for nesting whereas wrens and chickadees use the softer (stages 2 and 3) snags. The use of snags as a foraging substrate also changes with time and the decay stage of the snag. As a snag decomposes the insect communities found within it change. Evans and Conner (1979) identified three foraging substrates provided by snags: the external surface of the bark, the cambium layer, and the heartwood of the tree.

Snags are also used as food storage sites and as roosting/resting sites for many species. A variety of mammals, birds and some owls use snags to cache prey and other food items. Vacated nesting cavities are often used by wildlife for protection from inclement weather or on hot summer days. Martens (*Martes americana*) often use snags as resting and hunting sites and a single pileated woodpecker may use up to 40 different snags for roosting.

Snags continue their function as a key element of wildlife habitat when they fall to the ground as down logs. Once again, down log use by individual species is dependent on the decay stage of the log. The larger the diameter of the log and the longer its length the more functional it is for wildlife. Depending on the decay stage of the log, it will be used for lookout and feeding sites, nesting and thermal cover, for food storage or for foraging. For example, species such as the clouded salamander (*Aneides ferreus*) require the microhabitat provided by bark sloughing of the log whereas small mammals such as red-backed voles (*Clethrionomys occidentalis*) burrow inside the softer logs.

Bureau of Land Management policy, as outlined in the current Resource Management Plan (RMP), targets maintaining primary cavity-nesting species at 40% of their naturally occurring population levels (biological potential). Maintaining biological potential at 40% is considered to be the minimal viable population level for any given species. By managing for primary cavity nesters at 40% biological potential we have also managed for many other snag and dependent species, such as flying squirrels (*Glaucomys sabrinus*), mountain bluebirds (*Sialia currucoides*) and Vaux's swift (*Chaetura vauxi*) at an unknown level. Managing for populations at 40% biological potential does not allow for species flexibility in adapting to changing environments or to major environmental events such as wildfire or long-term climatic change. In addition, managing at 40% biological potential does not meet BLM policy guidelines for those species where we are trying to restore, maintain and enhance existing populations (BLM Manual 6840).

Appendix E: Road Information

I. Fire Management Hazard, Risk, and Value At Risk Rating Classification Method and Assumptions and Planning

A. HAZARD

Hazard rating is based on the summation of points assigned using the six elements as follows:

1) Slope:

Percent	Points
0-19	5
20-44	10
45+	25

2) Aspect:

Degree	Points
316-360, 0-67	5
68-134, 294-315	10
135-293	15

3) Position On Slope

	Points
Upper 1/3	5
Mid Slope	10
Lower 1/3	25

4) Fuel Model:

Model	Points
Grass 1, 2, 3	5
Timber 8	5
Shrub 5	10
Timber 9	15
Shrub 6	20
Timber 10	20
Slash 11	25
Shrub 4	30
Slash 12, 13	30

5) Ladder Fuel Presence:
Use when forest vegetation has DBH of 5" or greater (vegetation condition class 6). Exceptions are possible based on stand conditions.

	Points
Ladder fuel absent.	0
Present on less than one-third of area; vertical continuity > or < 50%.	5
Present on one-third to two-thirds of area; vertical continuity is <50%.	15
Present on one-third to two-thirds of area; vertical continuity is > 50%.	25
Present on greater than two-thirds of area; vertical continuity is <50%.	30
Present on greater than two-thirds of area; vertical continuity is > 50%.	40

6) Summary Rating:

POINTS	HAZARD RATING
0-45	LOW
50-70	MODERATE
75-135	HIGH

B. RISK

Assigned based on human presence and use, and on lightning occurrence.

High rating when human population areas are within 1/4 mile of the area; area has good access with many roads; relatively higher incidence of lightning occurrence; area has high level of human use.

Moderate rating when area has human access and experiences informal use; area is used during summer and fall seasons as main travel route or for infrequent recreational activities. Lightning occurrence is typical for the area and not notably higher.

Low rating when area has limited human access and infrequent use. Baseline as standard risk, mainly from lightning occurrence with only rare risk of human caused fire.

C. VALUE AT RISK

Best assigned through interdisciplinary process. Based on human and resource values within planning areas. Can be based on land allocations, special use areas, human improvements/monetary investment, residential areas, agricultural use, structures present, soils, vegetative conditions, and habitat.

Examples:

High rating - ACEC, RNA, LSR, Special status species present, critical habitats, recreation area, residential areas, farming, vegetation condition and McKelvey Ratings of 81, 82, 71, 72; vegetation condition of 4 or 5. Caves, cultural, or monetary investment present. Riparian areas.

Moderate rating - Granitic soils, informal recreational areas and trails. Vegetation and McKelvey Rating of 85, 75, 65.

Low rating - Vegetation condition class 1, 2, 3; and vegetation 5, 6, 7 with McKelvey Rating 4.

II. LSR Fire Management Plan Objective & Guidelines

Objective: A reduction of the potential for large, high-intensity wildfire is desired in order to meet LSR habitat, Wild and Scenic River, anadromous fish, and ecosystem function objectives. This potential can be reduced through the use of vegetation manipulation and fuel hazard-reduction treatments on both strategic and stand-specific levels to limit wildfire spread and high-intensity burning. Measures to reduce human ignition sources are also called for.

Develop a fire management plan for the LSR. Incorporate both prescribed fire and wildland fire suppression objectives, guidelines, and operational recommendations. The following are the fire management actions/directions from the RMP:

- Emphasize maintaining late-successional habitat in wildfire suppression plans.

- Identify the need for prescribed fire to restore and/or maintain critical wildlife habitat, key plant associations, plant communities, and fire-dependent/adapted species emphasizing special status plant and animal habitat need.

- Use minimum impact suppression methods for fuel management in accordance with guidelines for reducing risks of large-scale disturbances.

- During actual fire suppression activities, consult an interdisciplinary team or environmental specialist to ensure that habitat damage is minimized.

- Apply prescribed fire based on the role of fire within the landscape in a manner consistent with ecosystem management objectives, including fuel hazard reduction and retention of coarse woody debris.

- Limit the size of all fires until assessment or activity plans are completed.

- Consider allowing some natural fires to burn under prescribed conditions.

- Consider rapidly extinguishing smoldering coarse woody debris and duff.

- Determine the role of fire and probable risk of high-intensity wildfire destroying scenic values within the wild section of the Rogue River. Determine the appropriate use of prescribed fire needed to meet long-term resource management objectives. Pending completion of the fire management activity plan, continue to maintain a higher level of protection through identification of extra protection needs on a annual basis.

This would be a planning and NEPA document. The following are management recommendations to be used in development of the FMP.

It is anticipated that management recommendations would be made at the HUC 6 or 7 level, thereby

creating small management blocks or compartments.

For each subwatershed, analyze for the following:

1. Stand Specific - Identify individual stands that are critical to meeting LSR, VRM Class I visual, fish, and other resource objectives, both now and in the future. Evaluate each stand for susceptibility to loss (stand replacement) from fire of moderate to high intensity. Develop treatment prescriptions through an interdisciplinary NEPA process.

2. Strategic - Evaluate the drainages and determine the locations where the reintroduction of prescribed fire is desirable and establish a time line for treatment. Identify the most critical areas for treatment within the next decade. Evaluate through the NEPA process project design features that consider all resource values, as well as risks associated with proposed treatments and the no action alternative. Determine control and anchor point locations for operational use of prescribed fire over the long term.

3. Include a consideration of the feasibility of utilizing natural prescribed fire over all or portions of the watershed.

4. Incorporate fire suppression facilities such as pump chances, helispots, and roads into the fire management plan.

5. Determine the level of extra protection needed, including prevention, protection, and suppression response.

Appendix F: Facets of the Desired Future Condition for the Watershed

The following discussion outlines some preliminary desired future conditions for the watershed. These are meant to complement the desired future conditions presented in the Southwest Oregon Late-Successional Reserve Assessment and the RMP. These will be reviewed and developed further in future versions of the watershed analysis.

1. ≥70% of the LSR in older forest condition (from LSRA)

   - maximization of older forest on amenable sites 97.7% have potential to support late-seral in absence of disturbance (White fir has good potential, DF/TO has good potential)

2. Special habitats (e.g., meadows, oak sites, knobcone pine sites) would be managed as functioning parts of the landscape mosaic. Their extent and distribution would reflect that found under a more natural fire disturbance regime.

3. Current early seral stage within stand uniformity would be greatly decreased and more closely reflect the vegetation type and mosaic scale of the pre-logging landscape.

4. A reduced stand-replacement fire potential with prescribed fire an integral part of stand and landscape management activities.

5. Big game habitat would be managed within the two designated Elk management areas.

6. Connectivity:

   - Encouraged through presence of continuous forest canopy creating large blocks of late-successional forest in the Missouri and Rum Creek drainages
   - Late-successional forest refugia throughout the watershed connected by riparian reserves in mid to late-seral stages

7. Streams all in a properly functioning condition

   - water quality/quantity and aquatic habitat conditions would be similar to those of the pre-road construction/timber harvest era (circa 1960).

8. Vegetation types, mosaic and condition:

   - Relative amounts within the landscape units would be per the following range: Strive to maintain late-successional conditions within the pre-European historical range.

   - Distribution across the watershed would reflect the following goals: meet LSR goals and take into consideration what can be realistically maintained

   -Maintain the VRM qualities as seen from Rogue River per RMP designation, while maintaining

stand stability

- Forest stands able to survive low-intensity fire disturbance (underburning) particularly on the east side of the watershed. Species composition would change from east to west with wet site species and greater canopy closure (western red cedar, hemlock) increasing.