Wild Rogue North

Watershed Analysis

Version 2.0

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of the life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island territories under U.S. administration.

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Watershed Analysis

Summary

MORPHOLOGY	
Watershed size	• 61,693 acres Wild Rogue North watershed • 57,718 acres BLM land (93 percent) • 105,000 acres (Entire HUC5)
Elevation range	• 690 - 4,300 ft mouth of Grave Creek to near Mount Bolivar
Transient Snow Zone (land above 2,500 ft)	• 28,900 acres
Drainage pattern	• Dendritic
Orientation	• North to South
Drainage density	• 6.3 miles/mile^2
Total stream miles	• 611 miles
Total fish stream miles	• 59 miles
METEOROLOGY	
Annual precipitation	• 40-120 inches east to west
Type	• Rain and snow
Timing	• 80% occurring October thru May
Temperature range	• 0-100 degrees F

SURFACE WATER	
Minimum flow (Near Grants Pass) (Near Agness)	• 195 ft^3/s (Recorded on Jan 30, 1961) • 608 ft^3/s (Recorded on July 9/10, 1968)
Maximum peak (Near Grants Pass) daily flow (Near Agness)	• 152,000 ft^3/s (Recorded on Dec. 23, 1964) • 290,000 ft^3/s (Recorded on Dec. 23, 1964)
Reservoirs	• Several small pump chances & heliponds in Kelsey and Mule Creeks. • Bobby pond - only constructed helipond. • No large bodies of water within watershed.
Water quality limited stream miles	• 37.4 miles (303d listed for temperature above 64 degrees)
GROUNDWATER	
Aquifers	• None
Springs	• Numerous springs (not mapped)
GEOLOGY	
Geographic Province	• Klamath Mountains
Formation	• Rogue - metavolcanic rock composed of volcanic rock including altered, greenish lava flows and rocks comprised of lava cinders and fragments. • Dothan -metasedimentary rock composed of thick sandstone layers alternating with other sedimentary rock and dense pillow lava flows. Sand, silt and mudstone contact prone to landslides.
Soils	• Shallow depth, many different series and complexes. • Basin wide, generally a low water holding capacity and relatively infertile. • Nutrient quality, depth and fertility increase moving from east to west across the watershed.

HUMAN INFLUENCE	
Roads	• 237 miles
Roads within one tree length of streams	• 84.0 miles (14% of total stream miles)
Roads within one tree length of fish-bearing streams	• 2.1 miles (3% of total stream miles)
Road density	• 2.4 miles/mile^2
Agriculture	• Historical use on private lands.
Communications sites	• Nine Mile Repeater
Communities	• No major communities • Several private residences scattered throughout the watershed.
Improvements	• Calvert Airstrip
Mining	• Current placer claim on East Fork Whiskey Creek. • Numerous historical claims along the Rogue River and lower reaches of Whiskey and Mule Creeks. • Several hard rock mines.
Recreation	• Rogue National Wild & Scenic River • Wild Rogue Wilderness • Grave Creek to Marial Back Country Byway • Tucker Flat Campground • Various undeveloped campsites and trails
Timber production	There are 9,253 acres (16%) of BLM land within the watershed that are available for timber harvest. Age distribution on GFMA lands includes: 0-40 years: 28 % 40-80 years: 17 % 80-200 years: 33 % 200+ years: 22 %.
Progeny Test Sites	• Three test sites near Quail Creek, Mule Creek and Jacob Weil Spring
Utility corridors	• Fiber optics line along Whiskey Creek Road

BIOLOGICAL	
Vegetation	• Primarily mixed conifer and hardwood. • Vegetative communities differ by slope, aspect, elevation and soils.
Candidate, Threatened, or Endangered Species	• Northern spotted owl (13 active sites) • Marbled murrelet (none found) • Steelhead • Coho salmon
Survey and Manage species	• Del Norte salamander • Mollusks • Red tree voles • Fungi • Bryophytes • Lichens
Special Status Plants	• Numerous species and locations.

Wild Rogue North
Watershed Analysis

I. Introduction

The area covered under this watershed analysis was first analyzed in preliminary watershed analysis documents completed for the Rogue Frontal East and Rogue Frontal West watershed areas in October, 1994. The current analysis is designed to update information and analyses and conform with the recent interagency guidance for ecosystem analysis.

This Watershed Analysis is designed to characterize the physical and biological elements, processes, and interactions within the watershed. It is not a decision-making document, but serves to set the stage for future decisions by providing a context in which plans and projects can be developed while considering all important issues within the watershed.

The format for the Watershed Analysis follows the format in Ecosystem Analysis at the Watershed Scale, Federal Guide for Watershed Analysis; August 1995. The process for conducting ecosystem analysis at the watershed scale has six steps:

1. Characterization of the Watershed, in which the physical setting and the land allocations and designations are described;
2. Identification of Issues and Key Questions, which define the scope and level of detail of the analysis;
3. Description of Current Conditions within the watershed;
4. Description of Reference Conditions, or historic conditions and trends;
5. Synthesis and Interpretation of Information; and
6. Recommendations.

This analysis is basically organized around this format, with a few modifications. The Current Conditions and Reference Conditions are combined into one chapter. The chapters are based on the Key Issues identified; however, overlap does occur among some sections.

The first part of this analysis will address the physical, biological, and human processes or features of the watershed which affect ecosystem functions or conditions. Secondly, the Current and Reference Conditions of these important functions are described; followed by Synthesis and Interpretation, which is the comparison of these conditions and their significant differences, similarities, or trends and their causes. Finally, recommendations are made to guide the management of the watershed toward the desired future condition.

An interdisciplinary team developed the analysis utilizing direction in the Northwest Forest Plan (NFP) dated April 13, 1994 and the Medford District Resource Management Plan (RMP) dated April 14, 1994. Resource-specific objectives and constraints common to all lands were used in planning management actions within this watershed.

This watershed is part of a fifth-field watershed known as the Rogue River/Kelsey Creek watershed (REO #1710031004). This document analyzes the portion of this fifth-field watershed which is north of the Rogue River. The portion south of the Rogue River is within the Grants Pass Resource Area, Medford District BLM. That southern portion is also being analyzed in a watershed analysis document - Wild Rogue South Watershed Analysis - which is being prepared at the same time this is, but by a different interdisciplinary team. Since the fifth-field watershed is split by the Rogue River, the north and south sides differ substantially in physical features, geology, vegetation and other aspects. For this reason, as well as being administered by different Resource Areas, the two portions are being analyzed separately. Some data for the entire fifth-field watershed is presented in Appendix N. For the rest of this document, the analysis focuses on the portion north of the Rogue River.

There were five Key Issues identified for the Wild Rogue North watershed:

Hydrology and Fisheries
Forest Management
Late-successional Habitat/Species
Roads and developments
Recreation

II. Key Issues and Key Question

Hydrology/Fisheries

- What are the effects of roads on hydrologic functions, water quality and riparian habitat, especially in Mule Creek?
- What are the effects of timber harvest and fire on hydrologic functions, water quality and riparian habitat?
- How does the relatively high precipitation affect hydrology in the watershed?
- What are the present and historic conditions of runoff quantity and timing?
- What were the pre-settlement characteristics of mass wasting and other sedimentation?
- What are the effects of roads on mass-wasting?
- Are there sensitive areas for management?
- What are the current hydrologic parameters (i.e. equivalent clearcut acreage (ECA), transient snow zone (i.e. higher than 2,500 feet elevation), and compaction)?
- What are current water quality concerns (e.g. 303d list)?
- What are the effects of mining on water quality and habitat?
- What are the current patterns and causes of sedimentation?
- Are there sediment problem areas which need special management actions?
- What are the distribution and barriers to fish species?
- What is the condition of fish and aquatic habitat?
- What is the significance of the relatively low percentage of streams with fish?
- What are the historic variations of fish distributions and runs?
- How do current conditions relate to the Aquatic Conservation Strategy (ACS)?
- How do fish habitat conditions in this watershed relate to other watersheds?
- What is the status of riparian habitat conditions, historic conditions and enhancement opportunities?
- What are the conditions of culverts for fish passage, 100-year floods, sedimentation and longevity?
- What are the effects of future management on fish?

Forest Management

- What Special Forest Products (SFPs) occur in the watershed?
- What are the markets for SFPs?
- How sustainable are SFP harvests?
- What are the current timber inventory and characteristics of the available timber?
- How does timber harvest affect late-successional habitat fragmentation?
- What are the effects of reserves and other allocations on timber availability?
- What are the productivity concerns in the watershed?
- What are the transportation planning needs for future timber harvest?
- What are the management concerns for the isolated BLM blocks west of the Wilderness Area?
- Where do noxious weeds and invasive species occur; what problems do they pose?
- What are the reforestation problems?
- What is the harvest history in the watershed and in adjacent areas?
- What is the future harvest likely to be?
- Where are recent timber sales located?
- Where does Port Orford Cedar (POC) exist?
- What is the status of POC root rot; what relationships exist with roads and streams?
- Do stands need density management to maintain or improve health and vigor?
- Are there health problems with overly dense stands?
- Has fire suppression affected species composition or stand density?
- Are there insect, disease or other problems?
- How does forest health management affect late-successional habitat and early seral stages?
- Where are fragile soils, unstable slopes and erosion problems?
- What are the current and historic characteristics of forest diversity?
- What management opportunities exist to improve forest health?
- Where are the greatest fire risk, hazard and values?
- What are the fuels characteristics?
- What is the fire history within and adjacent to the watershed?
- What are prescribed fire and other fuels treatment opportunities?
- What are the factors affecting wildfire suppression efforts?
- What effect do weather patterns have on fire in the watershed?
- How does smoke management affect fire and fuels management?
- What are current management direction and options in the watershed concerning fuels?
- How does fire and fuels management affect the Late-successional Reserve?

Late-successional Habitat/Species

- Does the unfragmented portion of the watershed provide significant source population habitat?
- How is the analysis area functioning for connectivity?
- What is the current distribution of late-successional habitat within the watershed?
- What is the status of late-successional habitat in the watershed relative to the 15 percent standard and guide in the RMP?
- What and where are the special status species and habitats within the watershed?
- How is the function of late-successional habitat potentially affected by disturbances such as fire and disease?
- How has previous management affected the quality and quantity of wildlife habitat?
- How does the habitat within this watershed interact with surrounding watersheds?

Large, Unroaded Area

- Is there a need for a transportation system in the unroaded portion of the watershed?
- How does the unroaded portion function as an entity?
- Is it appropriate to re-visit the roadless area status?
- How does the lack of roads affect forest management practices?
- What are the economic implications of road development, or lack thereof?
- What are the social implications of road development?
- What are the resource management implications of road development?
- What are the conditions of existing/abandoned roads within the roadless area?

Recreation

- How does recreation affect fish?
- How does recreation affect other resources?
- What are the Visual Resource Management (VRM) designations in the watershed?
- How does VRM affect fire and timber management?
- How do roads affect wildlife?
- How does access affect recreation?
- What are the recreational uses and opportunities of the unroaded area?
- What are the anticipated future recreational opportunities?
- What are the current recreational uses in the watershed?
- How does management and use of the watershed affect management of the Wild and Scenic section of the Rogue River?
- What are the characteristics of recreational use of the Wild Rogue Wilderness Area and the Tucker Flat campground?

III. Characterization

The Wild Rogue North watershed is part of a fifth-field watershed in the Klamath Mountains province, located in southwest Oregon, approximately 26 miles north of Grants Pass (Map 1). The entire fifth-field watershed is approximately 105,000 acres, with the majority of public lands managed by two Resource Areas in the Medford District of the Bureau of Land Management (BLM). This fifth-field watershed is dissected by the Rogue River which is the boundary between lands managed by the Glendale Resource Area to the north (approximately 61,000 acres) and the Grants Pass Resource Area to the south (approximately 49,000 acres). The south side of the river is being analyzed by the Grants Pass Resource Area in a separate document dealing with the Wild Rogue South watershed. Some specific data for the entire fifth-field (or HUC 5) watershed is presented in Appendix N.

There are no major communities in the watershed. There are several private landowners living within the analysis area primarily in the vicinity of Marial. Galice, a seasonal recreational community is about ten miles upstream of the analysis area.

Geology

The watershed is located within the Klamath Mountains. These mountains extend from southwest Oregon into northwest California. The Klamath Mountains are made up of seven different exotic terranes that were once parts of the ocean crust or island archipelago environments. Formed in an ocean setting, these tectonic slices were carried toward the North American land mass via plate tectonics. Upon arrival they were joined to the existing continent, and folded, faulted, and broken upon collision.

These terranes or belts of rock trend in a northeast direction. Large early Cretaceous thrust faults separate all the terranes. It is thought that the Klamath terranes became joined to the north American continent in the early Cretaceous. Later, the Klamath Mountains were intruded by granitic rocks (Orr and Baldwin,1992).

There are two of these terranes within the watershed: the Yolla Bolly terrane and the Rogue Valley subterrane. These terranes have been sub-divided into geologic formations, the Dothan and the Rogue formations, which cover a majority of the watershed.

The geologic map of the watershed (Map 2) shows the northeast trend of the rock formations. The Dothan formation covers most of the middle of the watershed, from Booze Creek west to Mule Creek. Tributaries within the Dothan include Bunker, Meadow, Kelsey and Quail Creeks. The Rogue formation is located on the west and east sides of the Dothan. It occurs from the Grave Creek boat landing, west to Booze Creek, and is also east of Mule Creek. Thin bands of ultramafic rocks are also present. Extensive erosion has created steep canyons, with slopes averaging 50-55 percent.

The Dothan formation is approximately 18,000 feet thick and is Cretaceous to Jurassic in age. It is composed of oceanic continental slope rocks of turbidite sands, silts, and muds (Orr and Baldwin, 1992). The sandstone is typically very massive or thickly bedded; fine-grained mudstone and siltstone form thin interbeds within the deposit. The deposit also includes pillow lavas, which are lavas that erupted under the sea. Lenticular bodies of thin-bedded chert are also present.

The Dothan formation has some areas where translational slides (linear flow material, shallow in nature) and rotational slides (slides in which the toe uplifts and depth of material is deep) have occurred. In general the massive sandstone is stable, and slides occur along mudstone and siltstone layers.

The Rogue formation has been dated at approximately 150 million years before present, which is Jurassic in age (Geologic map of the Klamath Mountains, W. Irwin, 1994). Most of the formation is comprised of volcanic rocks that originated underwater. It consists predominantly of tuffs, agglomerates, and flow breccias. Andesite and basalt lava flows, some of which exhibit pillow structure, are less extensive.

Adjacent to the rocks of the Rogue formation are two northeast-trending bands of ultra-mafic rocks, which are part of an ophiolite sequence. Ophiolites develop in the deep ocean floor between two spreading tectonic plates and consist of ocean crust as well as upper mantle rocks that came from more that three miles below the sea floor. At the base of the ophiolite sequence, dark colored ultramafic rocks of peridotite are overlain by gabbros that form the base of the ocean crust. On top of these rock dikes, pillow basalts, cherts and clay can be found. Within the watershed the rocks are serpentinized peridotite and gabbro.

The Rogue formation and the ophiolite rocks have undergone metamorphism which altered the basalt to green stone, the ash to tuffs, and the ultramafics to serpentine.

The Rogue formation has trace element chemistry typical of modern island arc volcanic rocks, which matches the geologic interpretation of this formation. Ocean floor spreading centers can have submarine hot springs with temperatures up to 650 degrees Fahrenheit. This hydrothermal activity can create deposits of gold, silver, and copper. As a result, most mining activity within the watershed has occurred within the Rogue formation and along fault contacts (see Historic Mining section). The middle area of the watershed, the sedimentary Dothan formation, is basically barren of economic mineralization. The volcanic rocks of the watershed are sometimes enriched with economic minerals including gold, copper, nickel and chromite due to their origin on the sea floor, as well as the granitic intrusions.

The Briggs Creek amphibolite also occurs within the watershed. It is in fault contact with the neighboring formations and strikes in a northeasterly direction starting near Rainie Falls. The formation's age is unknown.

Soils

Soils in the watershed are derived from metasedimentary and metavolcanic rock types. Soils associated with metasedimentary rocks tend to be deeper and have more nutrients available, while soils developed from metavolcanic rock types tend to be shallow and have fewer nutrients and less soil development than the sedimentary formations. Organic matter plays an important role in the productivity of the metavolcanic sites. Some areas within the watershed are dominated by serpentine-derived soils which are low in calcium and high in magnesium and other minerals which produce unique vegetative communities. Conditions here preclude many plant species (including Douglas-fir) which are adapted to calcium-based soils.

Soils consist mainly of the Beekman-Vermisa Complex and the Josephine/Speaker Series. Vermisa soils are shallow, less than 20 inches deep, and are found in conjunction with steep slopes and ridge tops. Due to the shallow nature of the soil, rooting depth of plants is restricted. Josephine/Speaker soils are generally found on slopes less than 60 percent slope and are relatively deep and well-drained. They are generally more productive than the Beekman-Vermisa Complex.

Climate / Precipitation

The area has a Mediterranean climate, characterized by cool, wet winters and hot, dry summers. Annual precipitation ranges from 40 inches on the eastern side of the watershed near the mouth of Whiskey Creek, to nearly 120 inches on the far west side near Mount Bolivar (Map 3), indicating that the Wild Rogue North watershed is the wettest area within the Glendale Resource Area. Table 1 lists the precipitation ranges within each HUC 6 watershed.

Table 1. Precipitation ranges by sixth-field watershed.

HUC6 Watershed	Annual Precipitation Range (inches)
RW01 Rogue - Whiskey	40-70
* RW02 Rogue - Howard	46-58
*RW03 Rogue - Big Windy	54-80
RW04 Rogue - Horseshoe Bend	58-90
RW05 Kelsey	71-103
*RW06 Rogue - Missouri	80-102
RW07 Mule	90-118

CIndicates entire sixth-field watersheds that extend to the south side of the Rogue River and have been separated for the purpose of this analysis

The majority of the streams within the watershed are first and second order streams with steep gradients, narrow incised channels and largely seasonal flows. Most of the streams drain directly into the Rogue River. Stream densities increase as one moves west across the watershed. As a result, there are more perennial streams, higher stream flows and noticeable changes in vegetation characteristics. The precipitation is largely seasonal, with the majority of runoff occurring in the winter months. Evidence of high winter flows and increased water velocities moving large amounts of debris and rocks downstream has been documented by stream surveys in recent years.

The geology and soils of this basin do not allow for a great degree of water storage. Uplands on the eastern side of the watershed are steep and soil profiles are relatively shallow. While soils are deeper and upland slopes more moderate on the western edge, the seasonal nature of precipitation does not supply much rainfall between June and October. As a result, recharge of streams by ground water is very limited during the summer months. Summer daily high air temperatures are typically 80-100 degrees, with moderate humidity. Extended summer drought is common. Winter air temperatures can drop to zero degrees Fahrenheit.

Physical Description - Streams

The Rogue River canyon is a steep, mountainous area where the river has carved a v-shaped notch into the landscape and lacks a defined flood plain. The topography changes dramatically several hundred feet above the river level, giving the indication that the river has downcut to its present depth into a more moderately dissected channel (Purdom 1977).

The nature of the river and the direction in which it flows is a reflection of the manner in which the underlying rocks of the various geologic formations respond to the scouring effects of the river channel. The Rogue River flows almost due north until it reaches the Grave Creek confluence, and the eastern boundary of the Wild Rogue North watershed. At this point, the river encounters the volcanic rocks of the Rogue formation which causes the channel to bend nearly 90 degrees to the west, until it reaches Mule Creek, approximately 20 miles downstream. Near Mule Creek, the aspect of the river is deflected toward the southwest in response to another band of volcanic rock belonging to the Rogue formation. This is also the point where the river leaves the boundaries of the Wild Rogue HUC 5 watershed.

Although this reach of the Rogue River is remote and has limited access, it has not escaped human impacts. The volcanic nature of the rocks in the Rogue Formation contains lode gold deposits, and the gravels of the Rogue and its tributaries have been mined extensively. Attempts at improving navigation by early settlers involved the use of dynamite along this river segment in the hopes of reducing turbulent flows encountered at several rapids and creating passage to the Oregon coast (Atwood 1978).

Major tributaries north of the river include Whiskey, Russian, Booze, Alder, Bunker, Meadow, Kelsey, East Fork Kelsey, Ditch, Slide, Quail, and Mule Creeks (Map 4). The area has been classified into seven sixth-field watersheds (Map 5 and Table 2) and 42 seventh-field watersheds ranging from about 180 acres to 4,481 acres. Table 3 lists the miles of streams within each subwatershed. Stream miles for the entire HUC 5 watershed are presented in Appendix N.

Table 2. Sixth-field watersheds and major streams within the Wild Rogue North watershed.

Sixth-field Watershed	Major Streams	Fish-bearing Streams
RW01 **Rogue - Whiskey**	California Gulch Drain Creek Whiskey Creek East Fork Whiskey Creek West Fork Whiskey Creek	Whiskey Creek East Fork Whiskey Creek West Fork Whiskey Creek
CRW02 **Rogue - Howard**	Alder Creek Russian Creek Booze Creek	Russian Creek Booze Creek
CRW03 **Rogue - Big Windy**	Bronco Creek Bunker Creek	Bunker Creek
RW04 **Rogue - Horseshoe Bend**	Copsey Creek Cowley Creek Francis Creek Meadow Creek Shady Creek	Meadow Creek
RW05 **Kelsey**	Kelsey Creek East Fork Kelsey Creek	Kelsey Creek East Fork Kelsey Creek
CRW06 **Rogue - Missouri**	Corral Creek Ditch Creek Quail Creek Slide Creek	Ditch Creek Slide Creek
RW07 **Mule**	Arrasta Fork Mule Creek Mule Creek North Fork Mule Creek West Fork Mule Creek	Mule Creek North Fork Mule Creek West Fork Mule Creek

CIndicates entire sixth-field watersheds that extend to the south side of the Rogue River and have been separated for the purpose of this analysis.

Table 3. Miles of Stream by HUC6 Watershed for the Wild Rogue North watershed.

HUC	Drainage	Miles
HUC6	RW01 Rogue - Whiskey	128
	*RW02 Rogue - Howard	24
	*RW03 Rogue - Big Windy	62
	RW04 Rogue - Horseshoe Bend	40
	RW05 Kelsey	114
	*RW06 Rogue - Missouri	63
	RW07 Mule	181
HUC5	Wild Rogue North	611

CIndicates entire sixth-field watersheds that extend to the south side of the Rogue River and have been separated for the purpose of this analysis

Range of natural variability

The following narrative is taken from the United States Forest Service Great Lakes Assessment http://www.lic.wisc.edu/gla/range.htm and is a description of the concept of Range of Natural Variability and its usefulness as a tool to resource management.

> "Range of Natural Variability (RNV) is a term used to reference the variation of physical and biological conditions within an area due to climatic fluctuations and disturbances of wind, fire, and flooding. This range is determined by studying the ecological history of the area in question. The RNV description provides information on characteristics of the environment that apparently sustained many of the species and communities that are now reduced in number, size, or extent, or changed functionally. It does not imply that National Forests intend to return the area to historical conditions; indeed, it is impossible to do so and may be undesirable within the context of achieving multiple-use objectives. The description of RNV is used as a baseline for comparison with current conditions to assess the degree of past change and to better predict future vegetative succession. Maintaining or restoring some lands to resemble historic systems, and including some structural and compositional components of the historic landscape within actively managed lands, provides part of an ecological approach to multiple-use management. An ecosystem within its RNV provides a coarse-filter for biological diversity and meets many of the legal and regulatory requirements

for maintaining viable populations of native species.

Our ability to describe RNV is limited by availability of information on past landscapes. We draw information from research findings and descriptive records of historical conditions, and from recent fire, wind, or flood disturbances. Information quality varies depending on the geographic area in question, time period, and type of disturbance. Thus, some inferences are made based on information from other areas, and some portions of RNV descriptions will not be complete without further research.

A central assumption in the application of RNV is that species are adapted to certain environmental conditions and can tolerate a range of disturbances similar to that which influenced them over evolutionary time. Loucks (1970) has noted that genetic differentiation within major forest genera occurred between 30 million and 2 million years ago, and it was at this time that one or more species in each genus adapted as "opportunists" capitalizing on different kinds of disturbances, and on shade or open conditions. This is why most species will generally be adapted to disturbance regimes that have historically dominated an area (Alverson et al. 1994). Many species are known to depend on natural disturbances to complete portions of their life cycles, as in the example of jack pine, which has serotinous cones that open in fire. It is essential to have information about the type, frequency, severity, and spatial arrangement of natural disturbances to provide for species' needs.

The time frame used for describing RNV is chosen based on certain criteria; we used a period of similar climate and species presence as exists in current times. Because species migrated northward at different rates after Pleistocene glaciation, community composition was unstable for some time after major climatic trends had stabilized. At about 3,000 years ago, today's forest species were present in the northern Wisconsin-western Upper Michigan area, and the climate had stabilized after a major shift in the mid-Holocene (Davis et al. 1993, Webb et al. 1993). Thus, we have selected the period beginning 3,000 years before present as an appropriate time frame for analysis of RNV" (USFS--Great Lakes Assessment 1997, Cleland and Padley http://www.lic.wisc.edu/gla/range.htm).

Table 4 summarizes some of the important watershed elements in comparison with a range of natural variability (RNV) in the Wild Rogue North watershed. The precise relationships are often very uncertain because we have little data on pre-historic conditions. Most of the relationships are based on professional judgment and on observed ecological processes.

Table 4. Comparison of present conditions to the range of natural variability (RNV) thought to exist during the period of 3,000 years ago to 200 years ago (i.e., pre-European settlement), Wild Rogue North watershed.

ELEMENTS, PARAMETERS, or INDICATORS	Less than RNV	Within RNV	Greater than RNV	COMMENTS (All comments refer to the tributary streams and not the main stem of the Rogue River unless specifically cited)
WATER QUALITY				
Temperature	X[1]	X		! Xeric periods in the past may have resulted in higher water temperatures due to extreme low flow periods. ! Relatively shallow soils have low water holding capacity, causing stream flow responds quickly to storm events. ! Low ground water input to streams during summer contributes to heating during low flow months. ! High ambient air temperatures combined with low flows result in elevated water temperatures during the summer months. ! [1]Rogue River is cooler now due to releases from Lost Creek and Applegate Dams.
Sediment/substrate		X	X[2]	! Historically, episodic events probably produced more sediment. ! Placer mining and roads probably produce more continuous risk to fish requirements by degrading water quality. [2]Greater only in upper Mule Creek and upper Kelsey Creek.
HABITAT ACCESS				
Physical Barriers		X		! Natural barriers and steep instream gradients restrict movement of aquatic species. ! No human constructed barriers within the watershed.

ELEMENTS, PARAMETERS, or INDICATORS	Less than RNV	Within RNV	Greater than RNV	COMMENTS (All comments refer to the tributary streams and not the main stem of the Rogue River unless specifically cited)
FISH HABITAT ELEMENTS				
Fish		X		Affected by factors in and outside the watershed: ! Rogue River influenced by more regional factors. ! Tributary streams influenced by factors internal to the watershed.
Large woody debris		X		! Lower than ODFW Standards for "desirable conditions". ! Wildfire and Native American burning may have reduced LWD and potential LWD. ! Modern fire suppression over prior decades is probably slowly contributing to more LWD. ! Timber harvest and placer mining have reduced both standing and down LWD in isolated areas. ! Pool formation is dependent more on geomorphologic features than on LWD.
Pool frequency		X		! Existing condition is highly variable between streams. ! Natural barriers, geomorphology are limiting.
Pool quality		X		! Less LWD for pool complexity and depth.
Off-channel habitat		X		! Braided channels and beaver dams are absent on lower gradient reaches due to historic placer mining. ! Higher gradient streams probably more closely resemble conditions within RNV.
Refugia		X		! Not much initially but what is existing is in good condition.
CHANNEL CONDITION AND DYNAMICS				
Width/depth ratio		X		! Higher gradient streams are generally within RNV.
Stream bank		X		! Same as above.
Flood plain connectivity		X		! Lack of a broad valley bottom flood plain.

ELEMENTS, PARAMETERS, or INDICATORS	Less than RNV	Within RNV	Greater than RNV	COMMENTS (All comments refer to the tributary streams and not the main stem of the Rogue River unless specifically cited)
FLOW/HYDROLOGY				
Peak/base flows		X	X[3]	! Low flows may be affected by partial conversion of riparian vegetation from conifer to hardwood, which consumes large amounts of water. ! Peak flows in some streams may be affected to some degree by roads (timing) but riffle substrate does not currently indicate that peak flows have increased to a level that is causing adverse effects to aquatic habitat. [3]Greater in four HUC7 watersheds in upper Mule & Kelsey
Drainage network increase			X	! Roading along the northern side of the watershed has created many more miles of streams resulting from road ditches. ! Diversion ditches historically delivered water for placer mining.
WATERSHED CONDITIONS				
Riparian reserves	X[4]	X		! Timber harvest on both federal and non-federal lands has reduced riparian structural diversity buffering the riparian microclimate and natural connections between lowlands and uplands. ! Mining activities have also reduced quality of riparian habitat. [4]Lower in Upper Mule & Kelsey Creek.

ELEMENTS, PARAMETERS, or INDICATORS	Less than RNV	Within RNV	Greater than RNV	COMMENTS (All comments refer to the tributary streams and not the main stem of the Rogue River unless specifically cited)
TERRESTRIAL HABITAT				
Large Down Wood (in upland areas)		X		! Fire suppression has increased tree density, increased competition in stands and reduced growth, producing more *small* down wood (less than 16" diameter and 16' long) than in pre-European times and smaller diameters of snags and resulting down wood. ! Recruitment of large snags has been reduced by timber cutting and fire suppression (due to decreased mortality from fire). ! Vegetation patterns have shifted to more hardwood dominated stands.
Meadow associates (wildlife)	X			! Reduction in fire frequency and extent, compared with pre-European times, has probably reduced the amount and quality of habitat.
VEGETATION				
Late Successional		X		! High percentage of unlogged lands.
Forest Openings		X		! The amount of forested area in the watershed is probably within the range of natural variability, but some stands may be younger and of slightly different species composition due to selective logging and fire suppression.
PHYSICAL				
Fire Patterns	X			! Greater disturbance agent in the past due to lack of wildfire suppression and Native American burning practices.
Soil Compaction		X		! Mainly as a result of roads, agricultural activities and timber harvest.

Land Uses / Ownership

The Wild Rogue North watershed, which is managed by the Glendale Resource Area, contains about 61,693 acres. BLM administers about 57,674 acres, or 93 percent of the watershed (Table 5 and Map 6).

The U.S. Forest Service manages 358 acres of land within the watershed (Figure 1). Other land owners include the State of Oregon, which owns 795 acres (1 percent of the watershed) and private land owners, who own 2,863 acres (5 percent).

Figure 1: Land Ownership within the Wild Rogue North Watersh

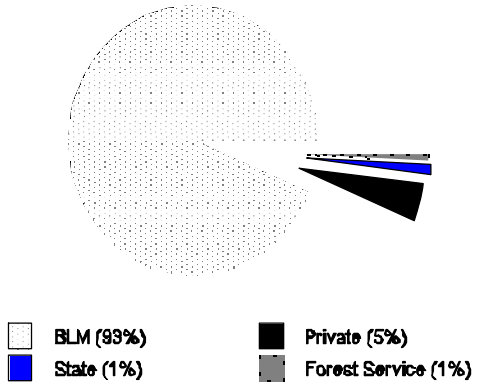


Table 5. BLM ownership by sixth-field watersheds, Wild Rogue North watershed.

Drainage	Total Acres	BLM Acres	Percent
RW01 Rogue - Whiskey	11,212	10,137	90
RW02 Rogue - Howard	2,971	2,971	100
RW03 Rogue - Big Windy	5,447	5,447	100
RW04 Rogue - Horseshoe Bend	4,726	4,535	97
RW05 Kelsey	11,546	10,656	92
RW06 Rogue - Missouri	6,235	4,801	77
RW07 Mule	19,556	19,171	98
TOTAL	61,693	57,718	93

Federal Land Use Allocations

The Medford District Resource Management Plan (RMP) designated several land use allocations for federal lands within the watershed (Map 7, Figure 2 and Table 6). The RMP provides overall management direction, management objectives, and levels of resource protection for each allocation.

Table 6. Federal Land Use Allocations within the Wild Rogue North watershed.

Land Use Allocation	Acres	Percent of federal land
Late-successional Reserves/1	23,490	41
Wilderness Area and Rogue River Corridor	11,488	20
Connectivity/Diversity Blocks	529	0
Northern General Forest Management Area/2	22,142	38
Total	57,649	99

/1Late-successional reserves include portions of large LSR and 100-acre spotted owl core areas
/2 General Forest Management Area includes Riparian Reserves

Late-successional reserves (LSR) are areas designated in the RMP where the major management objective is to maintain or promote late-successional (i.e., mature and old growth) habitat. In this watershed a large area in the southern and western portions of the watershed has been designated LSR. It is part of the Fishhook/Galice LSR (#RO-258) which extends south onto the Siskiyou National Forest. There are 12 spotted owl core areas of about 100-acres each which are also considered LSR. In addition, there are numerous Managed Late-successional Areas occupied by Del Norte salamanders.

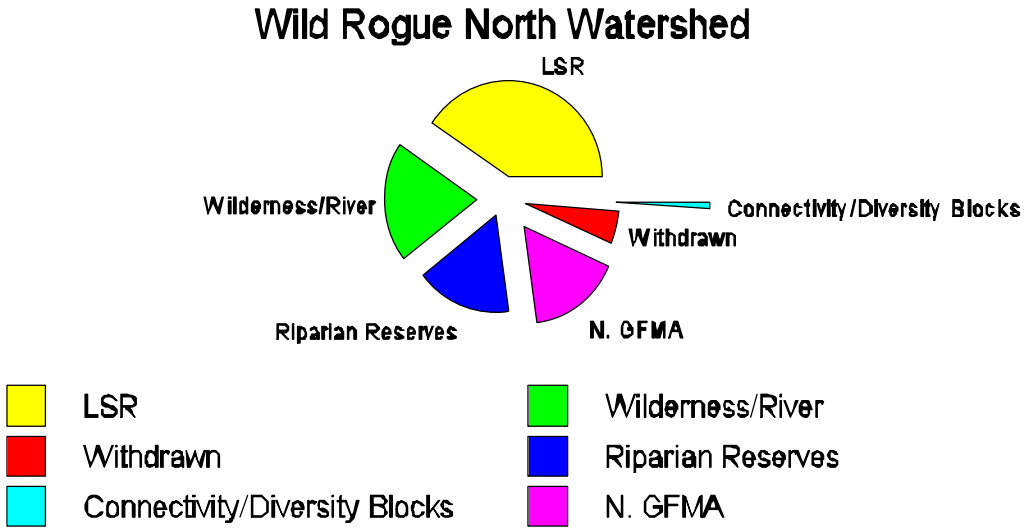
Connectivity/Diversity blocks are generally square-mile sections in which at least 25-30 percent of each block will be maintained in late-successional conditions. They are designed to promote movement of species associated with late-successional habitat across the landscape and add diversity to areas outside of LSRs. There are two Connectivity/Diversity blocks in the watershed.

The General Forest Management Area (GFMA) is the allocation where timber harvest is a primary objective. Most of the Wild Rogue North watershed is classified as northern GFMA, where the RMP calls for retaining at least 6-8 large trees per acre in regeneration harvests.

Within the General Forest Management Area lands there are 3,301acres which have been withdrawn from intensive timber harvest using the Timber Productivity Capability Classification (TPCC) inventory. The majority of these lands were withdrawn due to rocky soils which preclude successful replanting, but steep slopes were also withdrawn.

There are 29,180 acres within the watershed which have been designated as Critical Habitat for the northern spotted owl, a federally-listed threatened species. The primary purpose of the Critical Habitat Units (CHU) is to help provide east-west dispersal of owls between the Klamath and Coast Range provinces and the Cascade Mountain province.

Figure 2. Federal Land Use Allocations



IV. Current and Reference Conditions

A. Hydrology/Fisheries

Preliminary data indicate that the streams in the Wild Rogue North exhibit some of the best water quality and riparian habitat in the Medford District. The solid block ownership pattern, large unroaded area, along with the rugged nature of the terrain has largely deterred human access and consequent disturbance activities. The majority of smaller stream reaches have remained unaltered and continue to function as they have for thousands of years. However, the larger streams within the Rogue formation do have a history of mining activities, which is still ongoing in several locations, particularly along Whiskey Creek. Stream channels have been altered and riparian vegetation has been destroyed as a result of mining activities primarily along Whiskey Creek and Mule Creek, as well as clearing on private parcels of land. Streams in the Dothan formation have had little, if any, mining activity since there is little or no gold associated with these rock types.

Water Quality

The Oregon Department of Environmental Quality (DEQ) designates beneficial uses of all tributaries of the Rogue River Basin, including the Wild Rogue North watershed. Designated beneficial uses for the Rogue River include: private domestic water supply, public domestic water supply, industrial water supply, irrigation, livestock watering, anadromous fish passage, anadromous fish rearing, anadromous fish spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation and hydro power (Oregon Administrative Rules Chapter 340, Division 41). In this analysis these beneficial uses apply to the Wild Rogue North watershed, even though some of them occur outside the watershed boundaries.

The Clean Water Act of 1977, as amended by the Water Quality Act of 1987, provides direction for designation of beneficial uses and limits of pollutants (section 303d). DEQ is responsible for designating streams which fail to meet established water quality criteria for one or more beneficial uses. These designated streams are often referred to as the 303d list. Water quality monitoring by several agencies throughout the Wild Rogue North watershed has resulted in 303d listings for 37.4 miles of stream which have failed to meet established criteria for one or more beneficial uses (Map 8 and Table 7).

All of the 303d listed streams occur on BLM land, with the exception of approximately ½ mile of Whiskey Creek which is in private ownership. Temperature is listed as being the limiting factor for the beneficial use of waters of streams in the Wild Rogue North watershed (Table 7).

Table 7. Water quality limited streams in the Wild Rogue North watershed.

Stream	Boundaries	Water Quality Parameter	Approximate Miles
Mule Creek	Mouth to Headwaters	Temperature	11.0
Whiskey Creek	Mouth to Headwaters	Temperature	6.4*
Rogue River	Illinois River to Grave Creek	Temperature	20.0

*DEQ lists all 303d streams from mouth to headwaters. However, the GIS data from DEQ for 303d streams displays the Whiskey Creek listing from the mouth to the East and West Forks (2.4 miles on DEQ GIS map). Current DEQ water quality guidelines state that when discrepancies occur in the spatial display, the published 303d listing takes precedent.

Streams listed for temperature do not meet the DEQ designated criteria for anadromous fish rearing (water temperature exceeds 64 degrees F). This also applies to resident fish and other aquatic life, particularly resident cutthroat trout, which are present in these streams.

There are many factors which contribute to listing these streams as water quality limited. In many cases there is more than one factor operating on a stream. The most important factors are:

-Several of the tributary streams have segments that have no surface flow during summer periods,
-Low summer discharge,
-Riparian cover is absent in the wider reaches near the stream mouth of Whiskey and Mule Creeks,
-Logging on historic mining claims has removed shade over streams,
-Wide streams and stream orientation allow for direct solar heating,
-Wide, shallow gravel bedrock channel,
-Shallow soils with steep gradients have low water storage capacities within the basin,
-Placer mining.

In addition, the main stem Rogue River flows through this watershed and upstream effects from agriculture, industry, urban communities and several dams influence this segment of the river.

Maximum summer water temperatures in the Rogue River, lower Mule Creek and Whiskey Creek have probably always exceeded the current DEQ standard because their channel width, low gradient, and lack of stream shading create conditions that allow for maximum absorption of solar radiation throughout the day. In addition, bedrock, which is a major component of the substrate, absorbs heat during the day and radiates it to the stream at night. Since there has been little timber harvest within the riparian zones and adjacent uplands along the tributary streams in this watershed, the cause of these elevated water temperatures is not related to past management or associated logging practices and is most likely within the range of natural variability. Historic mining activities may have contributed to riparian canopy removal on a localized level, although sufficient time has passed since the major activity period between 1890-1930 to have allowed for recovery.

Stream channel widths on the majority of smaller fish-bearing streams and tributaries within the watershed are narrow enough for stream-side vegetation to provide adequate shade. However, canopy closure over the two larger fish-bearing tributary streams, Whiskey Creek and Mule Creek, is inadequate to maintain water temperatures below 64EF. The combination of ambient air temperatures that range from 90EF to over 100EF during the summer months, along with the naturally low summer flows, result in elevated in-stream water temperatures.

Stream temperatures during the summer and early fall have been monitored on BLM lands within the Wild Rogue North watershed since 1994. The program will continue in coordination with Oregon Department of Environmental Quality under the 303(d) Program.

The BLM has monitored several sites within the Mule Creek and Whiskey Creek drainages to determine which sections of the streams are water quality limited. Preliminary results have been tabulated in Appendix D. The data indicates that water temperatures are consistently above 64EF at the two sites along the Rogue River that have been monitored by the Siskiyou National Forest. Due to construction of the Applegate and Lost Creek Dams which are located approximately 50 miles upstream on the Rogue River, water temperatures today are probably lower than historic conditions because of cool water releases by the dams. On BLM lands, both West Fork Mule Creek and West Fork Whiskey Creek, two remote unharvested watersheds, exceed the 64EF DEQ criteria. Given the thin, shallow nature of the soils along with an average of 90-120 days of drought conditions each summer, these streams have probably always been warmer than 64 degrees.

Although the tributary streams exceed the desired temperature standards suggested by DEQ, the thermal increase ranges from between 1-5 degrees, which is much better than in the Rogue River. Temperatures at most of the monitored sites on BLM lands are elevated between two and four weeks of the year. During this short period of time, it is believed that fish and other aquatic organisms find thermal refuge by moving into smaller tributary streams or into deeper pools, areas shaded by undercut banks, or areas where groundwater enters the stream channel.

While the data from the sites at the mouth of both Whiskey Creek and Mule Creek show warmer water temperatures than the upper stream reaches, this is a common occurrence along most larger streams. Given the amount of historic mining activities that were concentrated at these locations (see discussion in riparian section), it is plausible that the disturbance effects from mining are still, at least partially, influencing the lower reaches of these streams.

However, the elevated temperatures in West Fork Mule Creek and West Fork Whiskey Creek are not a result of similar activities and the data suggest that these temperatures are well within the normal range and function for these watersheds. Factors which influence the low summer flows and elevated water temperatures within these streams are solely the result of climatic or natural physical conditions of the basin. The thin, shallow nature of the soils and associated lack of water storage, high ambient air temperatures during July and August, the months of historically low flow rates, and the fact that it is not uncommon to have between 90-120 days of drought conditions in the summer, all contribute to the existing condition of these drainages. However, in order to adequately support these initial conclusions, it will take several years of monitoring to determine the extent of water quality limits on those streams.

Sedimentation

Sedimentation is also known to be a major problem for water quality and fish habitat. Two of the greatest factors with the potential to add large amounts of sediment to streams are roads and events of mass wasting such as landslides.

Some other processes which could cause erosion and adversely affect fish habitat in this watershed include:

-road building,
-road failure,
-logging activities which create soil disturbance,
-dry ravel from adjacent slopes which fill intermittent channels,
-translational and rotational landslides blocking channels,
-floods, and
-normal road maintenance activities.

While the above activities are known to cause sedimentation into streams, there are currently no standards set for measuring this parameter and there is no consensus on how to measure stream sediment levels. Some sediment data were collected during the ODFW stream surveys. However, these were qualitative ratings, so the value of the data is limited.

The health of aquatic macroinvertebrate communities may be a better indicator of sedimentation effects and overall water quality conditions in aquatic systems. While this methodology is gaining popularity as a monitoring tool in professional organizations, there are some drawbacks with respect to the interpretation of results and the need for repeated monitoring over time in order to draw accurate conclusions regarding trends. Limited macroinvertebrate data has been

collected in the Mule Creek and Whiskey Creek drainages and will be discussed in more detail under the fisheries section of this document. Overall, water quality is in good condition. However, it appears that the larger fish-bearing streams have higher levels of embeddedness (i.e. extent to which the spawning gravel is embedded within fine sediments) than would typically be expected for a watershed of this nature.

Roads are typically a chronic sediment source to streams, particularly if they run adjacent to streams or if they are not properly maintained. They can be barriers to the upstream movement of fish due to culverts or other structures which can alter the channel gradient or increase flow velocities. Increased road densities in association with timber harvesting increases the potential for reduced water quality and fish habitat degradation.

There are 237 miles of roads in the watershed (Table 8, Map 9), with an average road density of 2.4 miles of road per square mile. Native surface roads comprise 13 percent of the watershed. These roads are generally the largest sediment sources, especially if they are open to public motor vehicle use. The surface classification of 50.0 miles of roads (21 percent) within the watershed is currently unknown, however, it is likely that a large portion of these roads also have native surfaces. If these are included in the native surface category, then approximately 80.2 miles or 34 percent of the roads in the Wild Rogue North watershed are native surface. Of these 80 miles, many are either ridge-top roads following sub-watershed boundaries or roads accessing the lands in non-federal ownership (Map 9).

Because of the contiguous BLM land ownership and because more than 40 percent of the watershed is designated LSR, it is unlikely that either BLM or private timber industry will be building extensive new road systems in the near future.

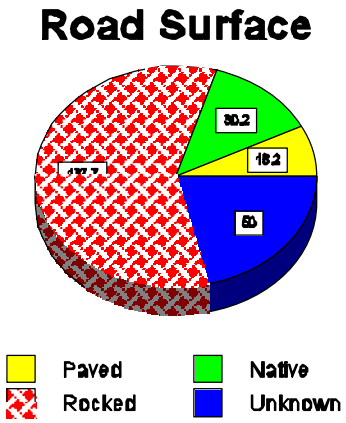
Table 8. Road mileage and road densities in the Wild Rogue North watershed.

Sixth-field Watershed	Acres	Native Surface	Rock Surface	Paved Surface	Unclassified Surface	All Roads	Road Density (mi/mi^2)
RW01 Rogue - Whiskey	11,212	5.8	21.7	5.2	12.5	45.2	2.6
RW02 Rogue - Howard	2,971	0.7	0.5	0.0	1.3	2.5	0.5
RW03 Rogue - Big Windy	5,447	0.0	1.7	0.0	4.7	6.4	0.8
RW04 Rogue - Horseshoe Bend	4,726	0.4	2.9	0.0	3.7	7.0	0.9
RW05 Kelsey	11,546	19.4	24.6	9.1	8.5	61.6	3.4
RW06 Rogue - Missouri	6,235	0.1	17.6	0.0	10.2	27.9	2.9
RW07 Mule	19,556	3.8	68.8	3.9	9.1	85.6	4.7*
Totals:	61,693	30.2	137.7	18.2	50.0	236.2	2.5

*According to the information displayed in Table 8, Mule Creek has a road density of 2.8 miles of road per square mile. This information is somewhat misleading because of the 8,000 acre wilderness area which also lies within the HUC 6 watershed and was included in the analysis. When the wilderness acres are removed from the analysis area, the road density in Mule Creek increases to 4.7 miles of road per square mile, which elevates it to having the highest road density within the Wild Rogue North watershed.

Road information has been analyzed at the sixth-field watershed level in an effort to determine the areas of greatest management concern, those being upper Mule Creek and upper Kelsey Creek drainages due to the increased impact from past logging activities and high road density. Most harvest activities within this area occurred between the 1960s and late 1980s. Over time, some of the roads that were built in conjunction with these sales have deteriorated through slumping and lack of adequate road maintenance. Many of them are natural surface and short, "dead-end" roads, only providing access to landings.

Figure 3. Road surface categories, Wild Rogue North watershed



In recent years, many of the roads in upper Mule Creek have been gated, which helps reduce motor vehicle use (Map 10). The gates also reduce maintenance needs due to problems which can arise from inappropriate use during periods of wet weather, such as increased erosion and sediment delivery, and problems which occur through heavy and prolonged use. Due to concerns regarding the high road density and the overall condition of roads in Mule Creek, an extensive inventory was conducted in recent years to determine culvert condition and replace failing culverts within the drainage. One culvert was determined to be a barrier to fish passage and was removed but not replaced. All other culverts that needed replacement were on non fish-bearing streams.

While fish passage is not a large issue in the Wild Rogue North watershed, sedimentation is still a concern in some problem areas, such as the lower reaches of Mule Creek, because this stream is an important refuge area for both resident and anadromous fish.

In addition to the continuous, small scale influx of sediment into streams, plugged culverts and ditch lines have resulted in several washed out roads and numerous mass failures. These are somewhat episodic but can contribute large amounts of sediment to streams. In recent years, as timber sales have declined and budgets have diminished, road maintenance on federal lands has been greatly reduced. Water dips can help to minimize road damage from erosion that results from storm runoff and other drainage problems. However, they are most often improperly installed and do not function as desired. While this concept has been gaining popularity in recent years, water dips have rarely been used in past road construction projects and thus do not occur very often within the watershed.

Another important factor in determining sediment production is the proximity of roads to streams. A ridge-top road usually contributes much less sediment to streams than a road running right next to a stream for a long distance. In this watershed, of approximately 59.4 miles of fish streams, only 4.3 miles (7 percent) are within 400 feet of a road (Table 9). In other words, there

are not many fish streams in the watershed that have a road in close proximity.

There are 2.1 miles of road that are within 200 feet of fish-bearing streams. This equates to about 3 percent of the total road miles within the watershed that are in close proximity to fisheries streams and thereby are potentially greater sources of sediment (Table 9). Although there are some instances where roads cross fish-bearing streams, two of these crossings on Whiskey Creek and one on lower Mule Creek are bridges. These crossings have not affected the in-stream channel structure and processes which would have occurred if culverts had been utilized during road construction.

Within the Wild Rogue North watershed, 14 percent of all streams are within 200 feet of a road. Most of these crossings occur in the northern half of the watershed, primarily crossing first or second order headwater streams. A unique quality of the Wild Rogue North watershed is the lack of valley bottom roads. Typically, roads running parallel to streams are constructed within riparian zones, contributing sediment to the adjacent stream and reducing riparian habitat quality and removing sources of large woody debris for streams. The relative scarcity of these situations in this watershed has allowed much of the aquatic and riparian habitat to remain in a relatively pristine and natural condition.

Table 9. Proximity of roads to streams in the Wild Rogue North watershed.

Sixth-field Watershed	Miles of Road	Miles of Streams	Miles of Fish Streams	Miles of Streams Within 200' of roads	Miles of Fish Streams Within 400' of roads	Miles of Fish Streams Within 200' of roads
RW01 Rogue - Whiskey	45.1	128.4	10.4	17.4	2.2	1.3
RW02 Rogue - Howard	2.5	23.6	6.1	0.8	0.0	0.0
RW03 Rogue - Big Windy	6.4	61.6	2.6	0.9	0.0	0.0
RW04 Rogue - Horseshoe	6.9	39.4	6.2	0.3	0.0	0.0
RW05 Kelsey	61.6	113.6	11.1	21.7	0.1	0.0
RW06 Rogue - Missouri	28.0	63.1	8.1	10.0	0.3	0.2
RW07 Mule	86.8	181.1	14.8	32.9	1.7	0.6
Totals	237.3	610.8	59.3	84.0	4.3	2.1

Landslides and Areas of Instability

Due to the nature and interaction of the geology, topography, climate and associated hydrologic processes within the basin, landslides and events of mass wasting are a common occurrence and probably have been for tens of thousands of years. There are several large areas across the landscape which are believed to be ancient slump blocks and are displayed in Map 2. Landslide areas are also found below Bald Ridge, and throughout Mule Creek, East Fork Mule Creek, Slide Creek, Kelsey Creek, upper Whiskey Creek and Marial.

In addition, numerous localized, naturally occurring small slides have been documented along nearly every other stream within the watershed by ODFW stream survey crews. Field notes and photos from 1970 and 1998 indicate that in most cases there have been several small slides which either partially block the channel or deliver sediment and debris into the stream. These conditions and the recurrence of such events may partially explain the higher than expected levels of embeddedness in stream substrates found in macroinvertebrate data. As these small slides delivered sediment into stream channels, the fine particles may have settled into the interstitial spaces between gravels and solidified. Rock falls ranging from five to thirty feet high as well as debris dams and bedrock barriers occur along most reaches. These conditions have resulted in natural barriers to fish passage and most likely have isolated fish populations.

Sandstone-derived soils are the only known sensitive soils within the watershed and are found on ridge tops. These soils are infertile and moderately erodible.

There are extensive areas of rocky outcrops and talus slopes in the western portion of the analysis area, mostly in the Wild Rogue Wilderness area within the Mule Creek drainage, East Fork Kelsey Creek, and the eastern portion of the Whiskey Creek basin.

The Medford District RMP states that "non-suitable woodlands, including areas of unstable soils and all landslide prone areas are identified as being unsuitable for timber harvest and have been withdrawn from management actions. In addition, other surface-disturbing activities will be prohibited unless they are adequately mitigated in order to maintain site productivity and protect water quality." Although there is no good inventory of active landslide sites in the watershed, information will be gathered on a project basis. Such conditions may create management constraints in the future, especially for road construction and timber harvest.

Mining

The discovery of gold in the Rogue River Canyon and its tributaries led to the initial settlement of the watershed by miners and their families. Exploration of the area occurred between 1850 and 1900. Substantial gold deposits were discovered along Whiskey Creek, Mule Creek and the point bars along the Rogue River. Most of the other large tributary streams were also explored, but the underlying sandstone of the Dothan Formation between Mule Creek and Whiskey Creek does not exhibit the characteristics necessary for gold deposition, thus they were not disturbed by

mining activities except along the lower sections where they flow into the Rogue River.

While there were a few families who settled and made their homes in the canyon, the miners were generally solitary individuals, many of whom only stayed during the summer months to mine. During the Depression Era in the 1930s more people traveled to this area in hopes of finding enough gold to support themselves until the economy improved.

There are two recorded instances of large hydraulic mining operations and many placer mines along the gravel bars and terraces of the Rogue River. Small hydraulic mining operations ran between 1890-1910 (Purdom 1977). In the 1890s two men attempted to build a flume along lower Mule Creek. However, within two years the claim was sold after they were unable to make the operation profitable. This method was used at the mouth of Mule Creek again in 1905, with reports of a small individually owned operation that utilized four drive giants. This type of mining decreased after 1906 and was replaced by placer mining. Runoff and silt loads were more extensive prior to 1920 and then sharply declined.

Numerous other mining claims and cabins were established along the Rogue River and the lower reaches of many tributaries at the beginning of the century. Larger commercial operations were established on Whiskey Creek and Mule Creek. During the early 1900s, a 20-foot splash dam was constructed on Whiskey Creek, which altered the stream channel characteristics and caused severe damage to the lower reaches of Whiskey Creek. When the water was released, it flushed most of the downed wood and large boulders out of the system for the benefit and ease of mining the channel. This practice may account for the current lack of instream wood, large boulders and the wide, shallow nature of the stream.

Along with the mining activities and the establishment of Marial near the mouth of Mule Creek, resources were also extracted farther up the drainage. The Red River Mining and Milling Company was a large mining/milling operation that began in 1906 and lasted for six years. During that time, a sawmill was built at the East Fork Mule Creek and a 3½-mile long flume was constructed in order to transport lumber from the East Fork Mule Creek down to Marial. The flume and trestle were later partially destroyed by a flood and the rest of it was dismantled in 1934 (Atwood 1978 pp. 99-113).

The discovery of placer gold also prompted the search for lode deposits. There were several lode mines within the Mule Creek sub-watershed, all of which were located to the west of Mule Creek. The Red Hill Mine was probably the largest, which was near Marial on Upper Mule Creek. Many other lode mines were located along Whiskey Creek and the West Fork Mule Creek (See Historic Mining Section). These were operational around the turn of the century and most were abandoned around 1910. With the onset of World War II, gold production within the watershed virtually ceased and the remaining mines were closed down due to manpower restrictions.

Today, there are only a handful of operational mines within the watershed, mainly on Whiskey Creek. The Benton Mine is the only commercial mine that is still open and there are several

individuals with mining claims on BLM lands. The effects of the past have largely healed since the most destructive disturbance activities occurred nearly one hundred years ago and were concentrated within certain areas of the watershed. Damage to riparian areas as a result of instream mining and associated work, such as burning and clearing lands on mining claims, now show signs of recovery. While the visible signs of early settlement have faded, the effects of the past may still be evident to a lesser degree within the lower reaches of Mule and Whiskey Creeks. The area's historic uses may partially explain the high amounts of substrate embeddedness that were found in the macroinvertebrate studies in these two streams. However, even if this is the case and the instream water quality has deviated slightly from the natural condition as a result of the historical use patterns, future conditions are predicted to continue to improve.

Fire and Riparian Areas

Fire is a common disturbance agent within the watershed and has affected the upland and riparian landscapes by altering both the vegetative composition and distribution, as well as the large woody debris component. Fire records from the past sixty years indicate that burns have occurred on Cowley Creek, Copsey Creek, Bunker Creek and most recently, west of Quail Creek. Numerous lightning strikes have also been documented; most of these sites are scattered across the watershed and occur near ridge tops.

The frequency of fire and its effects on stream and riparian habitat have also changed as the climate fluctuated. Fire severity had varying levels of impact over time. High intensity fires would have been more common during dry periods when drought conditions were predominant and probably consumed sources of large wood for stream channels. Conversely, the amount of large wood in streams was probably higher during mesic periods because rainfall was greater, trees were not as stressed, and stream flows were elevated. Additionally, saturated soils may have increased the potential for large trees to fall into streams through wind throw.

The relatively low levels of key pieces of large woody debris (according to NMFS recommended values) is most likely a result of historic fire patterns. Fire scars have been documented along many of the stream reaches that have been surveyed by ODFW, indicating that riparian areas have burned in the past.

Denuded ground which results from high intensity fire may be more prone to landslides as tree roots decompose and no longer hold the soils. Increased incidence of landslides following stand replacement fires (Reneau and Dietrich 1990) during xeric periods may have delivered larger quantities of wood and sediment to streams. Water temperatures also probably increased in response to loss of riparian canopy.

The Quail Creek fire (1970) is the most recent occurrence of a large wildfire in the watershed. Quail Creek is not known to contain fish, however the fire extended into several riparian zones and affected water quality and aquatic habitat. After the fire, the timber was salvaged and the burned area was replanted, thus accelerating revegetation and reducing the potential increase in

landslide activity. Due to fire suppression and restoration efforts, the effects on riparian and uplands were most likely less severe than had the area been allowed to burn and recover unaided.

Fisheries Resources

The Wild Rogue North watershed contains approximately 611 miles of streams. These streams flow in a southerly direction through steep and mountainous canyons, eventually draining into the Rogue River Canyon. The stream density is relatively high due to the steep, dissected terrain. Once entering the Rogue River, the stream flow changes to a westward direction, continuing until it reaches the Pacific Ocean.

The Rogue River basin produces the largest population of wild anadromous salmonids in Oregon. Along with providing spawning and rearing habitat for numerous other fish species, the river is also a major migration corridor for anadromous fish. Although there is limited available spawning habitat within the Wild Rogue North watershed, the section of the Rogue River running through it is an important link to fisheries habitat farther upstream (USDI 1999).

Fisheries streams in the Wild Rogue North watershed (Map 11) include:

Rogue River	Russian Creek
Mule Creek	West Fork Mule Creek
Kelsey Creek	Bunker Creek
East Fork Kelsey Creek	Ditch Creek
Slide Creek	Booze Creek
Whiskey Creek	East Fork Whiskey Creek
West Fork Whiskey Creek	

The National Marine Fisheries Service (NMFS) has been reviewing the population status of fish species throughout western Oregon to determine whether individual stocks warrant listing as threatened or endangered under the Endangered Species Act. Current status of species in the Wild Rogue North watershed include:

Southern Oregon/Northern California coho salmon	- Threatened
Southern Oregon & Northern California Chinook	- Does not warrant listing
Klamath Mountain Province Steelhead	- Candidate
Oregon Coast Cutthroat	- Under status review

Approximately 20 species of game and non-game fish inhabit this area (Table 10). The Wild Rogue North watershed provides approximately 59.4 miles of fish habitat, including 29.0 miles of habitat for coho salmon, 21.0 miles for chinook salmon and 41.8 miles for steelhead trout. Resident cutthroat trout occupy 59.4 miles (Table 11 and Map 11). Searun cutthroat are not believed to inhabit the Rogue River or streams within the watershed. Spring chinook, summer

steelhead, white sturgeon and American shad use the Rogue River for migration, spawning and/or rearing but are not found within the smaller tributaries. Several species of sculpin and Pacific lamprey have the same distribution as salmonids within the watershed. Non-game species such as speckled dace, redside shiner and Klamath small-scale sucker also inhabit the Rogue River or the extreme lower reaches of major tributaries. Warm water species such as sunfish are also present but in very low numbers because they are better suited to ponds and quiet water habitat.

The number of anadromous fish that historically spawned in the watershed is unknown. Present habitat conditions and fish production in most streams are probably near their potential because streams within the watershed are still relatively undisturbed. Although there are currently no human-caused barriers limiting fish distribution and access to potential spawning habitats, there are several natural factors that act as barriers and contribute to unfavorable spawning conditions. Low summer flows, high channel gradients, a lack of spawning gravel, numerous stream-side landslides and bedrock falls limit the distribution and habitat suitability. In the lower gradient reaches on most streams, near their confluence with the Rogue River, spawning gravels range from 10-20 percent (ODFW surveys, 1998-1999), well below the NMFS recommendation of >35 percent in a properly functioning stream. In addition, off-site factors such as ocean survival, sport and commercial fishing probably limit spawning escapement.

No streams in the watershed are stocked with hatchery fish. Additionally, there are no natural or constructed ponds that would provide suitable habitat to support introduced populations for sport fishing. If steelhead are listed as Threatened/Endangered at some point in the future, ODFW may restrict recreational fishing within this segment of the Rogue River in order to protect juvenile and adult steelhead and salmon.

Spring chinook salmon begin migrating into the Rogue River during mid-March and the major run occurs during June. Spawning occurs from September through mid-November upstream of Gold Ray Dam (near the town of Gold Hill) with the majority of fish remaining in the Rogue River to spawn.

The fall chinook run begins mid-July and continues into October. Spawning occurs in lower Mule Creek and in limited areas of the Rogue River in the canyon from September to late December. Fall chinook fry emerge between late February and May and start moving downstream to the Pacific Ocean where they will live 2-6 years before returning to spawn.

Coho salmon enter the mouth of the Rogue River in mid-September and slowly travel upstream to tributaries containing spawning habitat primarily upstream of the Wild Rogue North watershed. About 50 percent of the run originates from Cole M. Rivers Hatchery at Lost Creek Lake. Spawning and rearing occurs primarily in the river and tributaries. Fry emerge between late March and early June and most juveniles spend about 15 months in their natal stream. The out-migration to the Rogue River and onward to the ocean occurs during May through early July. Coho will spend 2-3 years in the ocean before returning to spawn.

Winter steelhead enter the river November through March with spawning occurring from March to June. Adult steelhead on their first spawning run have spent 1-2 years in the ocean. Fingerlings in tributary streams will move up and down stream into deeper pools of water as stream flow diminishes during the summer. Most of the winter steelhead juveniles emigrate to the ocean during late spring after two years of residence in freshwater.

Summer steelhead enter the river at three different times each year. Early-run adults enter the river in May, June and July; half-pounders enter in August and September; late-run adults enter in August to October. Juvenile summer steelhead start migrating back downstream, entering the ocean between April and June, remaining there for 3-5 months before making their first upstream migration.

Resident rainbow and cutthroat trout move up and downstream, sometimes staying in the same pool or area of water throughout their life if the habitat conditions are sufficient. Resident adult trout residing in the river may move into tributaries and travel upstream to spawn during February, March and April, before returning to the river.

Out of approximately 611 miles of streams in the watershed, only about 60 miles, or 10 percent of all streams in the watershed are fish-bearing. This limited distribution is due to the numerous natural barriers along most of the major tributary streams. Resident fish found in the upper stream reaches are most likely isolated populations due to the barriers caused by landslide debris, bedrock falls and very low stream flows. While the majority of streams are small first or second order channels and do not directly support fish, they do drain into the larger, fish-bearing channels and directly affect the overall water quality of the watershed.

Table 10. Fish species found within the Wild Rogue North watershed.

Family	Common Name	Anadromous	Resident	Native	Exotic
SALMON					
	Chinook	x		x	
	Coho	x		x	
TROUT					
	Cutthroat		x	x	
	Rainbow		x	x	
	Steelhead	x		x	
SUNFISH					
	Smallmouth Bass		x		x
SUCKERS					
	Klammath Small-scale		x	x	
MINNOW/CARP					
	Umpqua Squawfish		x		x
	Speckled Dace		x	x	
	Redside Shiner		x		x
	Goldfish		x		x
	Carp		x		x
SCULPIN					
	Coast Range Sculpin		x	x	
	Reticulate Sculpin		x	x	
OTHER					
	Pacific Lamprey	x		x	
	American Shad	x			x
	Green Sturgeon	x		x	
	White Sturgeon	x		x	
	Brown Bullhead Catfish		x		x
	Threespine Stickleback		x	x	

Table 11. Miles of Anadromous and Resident Salmonid Fish Habitat in the Wild Rogue North watershed.

Stream	Coho	Chinook	Steelhead	Cutthroat
Rogue River	20.0	20.0	20.0	20.0
Alder Creek	-	-	0.8	-
Bronco Creek	-	-	*0.5*	-
Booze Creek	-	-	0.5	-
Bunker Creek	-	-	1.3	1.3
Ditch Creek	-	-	0.4	-
Kelsey Creek	-	-	*1.5*	*7.9*
E. Fork Kelsey	-	-	-	*1.3*
Meadow Creek	-	-	-	-
Mule Creek	*6.5*	*1.0*	*6.5*	*6.5*
W. Fork Mule Creek		-	*1.5*	*3.1*
N. Fork Mule Creek	-	-	*2.0*	*2.5*
E. Fork Mule Creek	-	-	*1.8*	*2.8*
Arrasta Fk. Mule	-	-	-	-
Quail Creek	-	-	-	-
Russian Creek	-	-	0.4	-
Slide Creek	-	-	-	-
E. Fork Whiskey	-	-	*0.8*	*1.5*
W. Fork Whiskey	-	-	*1.3*	*2.8*
Lower Whiskey Creek	*2.5*	-	*2.5*	*2.5*
Total	29.0	21.0	41.8	59.4

***Note: Underlined values are estimates only as GIS fish distribution data are incomplete.

Fish Habitat Condition

Streams in the watershed have some of the best water quality in the Medford District because of their remote location, geology and hydraulic character. Nearly 33,000 acres are unroaded and have not been managed for timber harvest. As a result, most riparian zones are over 80 years old, intact and properly functioning. Although a large portion of the Wild Rogue North watershed has remained in excellent condition over time, it is not entirely free of human impacts.

Most of the mining activity in the area focused on point bars along the Rogue River and at confluences where major tributaries enter the river, primarily Whiskey and Mule Creeks. Due to the geology of the area and lack of gold in the Dothan Formation, streams in the middle of the watershed between these two drainages were not mined and rarely entered. On the watershed scale, disturbance and sedimentation which resulted from mining were generally concentrated along the Rogue River. Consequently, there was little or no impact to the watershed above the river corridor. Areas that were disturbed by mining activities between 1850-1930s are now well vegetated and have minimal water quality concerns.

There has been extensive timber harvest and road construction in the Mule Creek basin and to a lesser extent in East Fork Kelsey Creek. Harvest has disturbed riparian habitat along small, non-fishery headwater streams by removing future sources of downed large woody debris and reducing structural diversity. Future consequences of this activity may be accelerated erosion of sediment from roads to streams and down-cutting of small, steep stream channels. Aquatic macroinvertebrate inventories of upper main stem Mule Creek and its tributaries have been conducted since 1993. The results of those inventories indicate that sediment may be limiting aquatic productivity in some locations. The most likely source of that increased sedimentation is the high road density in that area. With the exception of upper Mule Creek and upper Kelsey Creek, all other HUC 6 sub-watersheds within the Wild Rogue North watershed have few roads or are unroaded and have not been significantly influenced by human activities.

Kelsey, Whiskey and Mule Creeks are the primary fish-bearing streams in the watershed. Streams drop quickly to the Rogue River through steep, narrow, bedrock canyons. These conditions tend to provide cool, well-oxygenated water as a result of the north-south orientation of most drainages. Naturally high velocity flows in these streams during the wet season, especially in their middle and lower reaches, prevent formation of many suitable spawning areas, limit the area that is available for juvenile salmonids to escape high water velocity and prevent accumulation of large woody debris, an important component of quality fish habitat. High velocities may largely prevent periphyton and aquatic insects from colonizing rock surfaces and thus may negatively affect fish production.

Key pieces of large woody debris (i.e., large pieces, at least 0.6 m x 10 m) are important influences on the hydrologic dynamics of streams and instream fisheries habitat. Large pieces of down wood contribute organic materials to the stream and associated aquatic and terrestrial invertebrates, assist in the formation of scour pools, slow down high water velocities and can

provide instream shade and cover for fish.

The recommended amount of LWD in the Klamath Province is three key pieces per 100 meters of stream (ODFW 1996). The ODFW surveys (1998) found that Booze, East Fork Whiskey, West Fork Whiskey and main stem Whiskey Creeks are below this recommended level (Table 14). These streams ranged from 0.7 to 1.9 key pieces per 100 meters and were the highest values recorded in the watershed. This is particularly significant since riparian zones along West Fork Whiskey Creek were noted by the survey crews to be outstanding examples of contiguous older riparian forest in an undisturbed condition. The ODFW stream survey data strongly indicate that the abundance of LWD in this watershed is naturally lower than their current standard for streams in southern Oregon. This is supported by data from other watersheds; similar stream surveys in the undisturbed Bobby Creek Research Natural Area, located north of this watershed, found fewer than two key pieces per 100 meters of stream (USDI BLM 1997). Thus, it appears that stream standards established by ODFW may not necessarily apply to southwest Oregon or the Klamath Province. The data used to develop their standard were collected throughout western Oregon; conditions further north probably skew the data to higher large woody debris levels. At this time, the ODFW standards are the best available, but it appears that they should be refined to reflect the conditions that more accurately represent the natural conditions in southwest Oregon. Because of the vegetation, climate and fire frequency, stream survey data indicate a more realistic standard for watersheds in southwest Oregon should be 1.5 - 2 key pieces per 100 meters of stream.

Streams in this watershed, especially Mule and Kelsey creeks, provide cool water in the Rogue River, creating a thermal refuge for adult and juvenile salmon and steelhead during summer

Tables 12 and 13 describe the general condition of fish habitat in each sub-watershed, along with perceived causes for degraded habitat. Detailed information on the condition of key components of fish habitat (i.e. flow, water temperature, large woody debris, pool depth and instream cover) has been collected on the eastern half of the watershed between Whiskey Creek and Kelsey Creek in 1998 by ODFW. Surveys on the remaining streams to the west between Kelsey Creek and Mule Creek should be completed in the fall of 1999.

Overall, most streams are functioning properly in relation to their potential. Several of the larger streams have channel gradients between 16-23 percent. Such steep slopes are natural limitations to fish distribution and available habitat. Channels with slopes in this range do not provide spawning areas. In the case of Booze, Bronco, Meadow and Russian Creeks, it is unlikely that these streams ever supported fish upstream of the stream mouth. The table also shows that naturally occurring barriers to fish passage have been documented in nearly every stream.

Despite the low values for both road density and the percentage of habitat units with erosion, the percentages of gravel are quite low (Table 14). With the exception of Mule and Whiskey Creeks, the amount of sediment reaching the streams is relatively low, yet macroinvertebrate and substrate data indicates that the existing conditions are below desired levels. Given existing knowledge of the watershed, the large unroaded area and abundance of riparian areas, this lack of gravel appears to be a part of the natural condition. The constricted canyons and steep gradients which cause high stream velocities, infrequent pieces of large woody debris, along with the history of high winter flows may periodically flush small gravels out of the tributary systems into the Rogue River.

Table 12. Fish Habitat Condition - Wild Rogue North watershed.

Stream	Condition[1]	Suspected Factors Limiting Fish Distribution and Potential Stream Productivity[2]
Booze Creek	G/F	N
Bunker Creek	G	N
Bronco Creek	G	G, N
Ditch Creek	G	N
Kelsey Creek	G	N
North Fork Kelsey Creek	G	
East Fork Kelsey Creek	G/F	N,T
Mule Creek	G/F	N, T, M
Arrasta Fork Mule Creek	G	
West Fork Mule Creek	E	
East Fork Mule Creek	F	T
Quail Creek	G	
Russian Creek	F	G, N
Whiskey Creek (lower)	F	M
East Fork Whiskey Creek	G	M
West Fork Whiskey Creek	G	

[1] E = Excellent G = Good F = Fair P = Poor

[2] G = Gradient
N = Natural barrier (Rock or bedrock falls)
M = Historical or current placer mining
R = Road location
T = Timber harvest-related (i.e., timber harvest near streams, soil erosion from roads or from tractor logging)

Table 13. Stream habitat rating for the Wild Rogue North watershed (ratings are based on values in Table 14).

Stream	Max Water Temp	Aquatic Insect	Gravel %	Fish Barriers	% Habitat Units with	Floodplain	Refugia	Width:Depth Ratio	Pool Quality	Off Channel Habitat	LWD[2]	Pool Frequency	Pool Habitat Area	Residual Pool Depth	Gradient	Road Density/Location	Riparian Habitat	ECA [3]	CA [3]	Peak/Base Flows	Overall Rating
Booze Creek			FAR	x	FAR	PF	PF	PF	NPF	PF	PF	NPF	NPF	n/a	steep		PF	PF	PF	PF	FAR
Bronco Creek			NPF	x	FAR	PF	PF	PF	NPF	PF	NPF	NPF	NPF	FAR	steep	PF	PF	PF	PF	PF	PF
Bunker Creek			FAR	x	PF	PF	PF	PF	FAR	PF	NPF	PF	FAR	PF	PF	PF	PF	PF	PF	PF	PF
Ditch Creek				x		PF											PF	PF	PF	PF	PF
E. Fork Kelsey				x		PF				PF					steep		FAR	FAR			PF
Kelsey Creek				x		PF	PF			PF					steep		PF	PF	PF	PF	PF
Mule Creek	FAR	FAR		x		PF	PF			PF							PF	PF	PF	PF	PF
N. Fork Mule	PF	FAR				PF	PF			PF					steep		PF	PF	PF	PF	PF
W. Fork Mule	PF[1]	FAR				PF	PF			PF							PF	PF	PF	PF	PF
E. Fork Mule						FAR	PF			PF						NPF	FAR	FAR	FAR		FAR
Rogue River	PF [1]						PF									PF		PF			PF
Russian Creek			NPF	x	NPF			PF	NPF	PF	NPF	NPF	NPF	NPF	steep		PF	PF	PF	PF	FAR
Slide Creek																		PF			
E. Fork Whiskey	PF [1]	NPF	FAR	x	PF			PF	PF	PF	PF	FAR	FAR	NPF	PF	PF	PF	PF	PF	PF	PF
W. Fork Whiskey	PF [1]	PF	FAR	x	PF	PF	PF	PF	FAR	PF	NPF	FAR	FAR	FAR	PF	PF	PF	PF	PF	PF	PF
			FAR		PF	PF	PF	PF	NPF	PF	FAR	NPF	FAR	NPF	PF		PF	PF	PF	PF	
Whiskey Creek		NPF	FAR		FAR			FAR	FAR	PF	NPF	PF	PF	FAR	FAR		FAR	PF	PF	PF	
			FAR		PF			PF	FAR	PF	NPF	FAR	FAR	PF	PF		FAR	PF	PF	PF	FAR
			FAR		PF			PF	FAR	PF	FAR	FAR	FAR	PF	PF		FAR	FAR	PF	PF	

[1]Natural conditions, even though water temperatures exceed state standards.

[2] LWD ratings are based on revised standard of at least 1.5- 2 key pieces per 100 m, not ODFW standard of at least 3 key pieces per 100m.

[3] Equivalent Clearcut Area (ECA) and Compacted Area (CA)

PF = Proper Functioning Condition
FAR = Functioning, at risk
NFP = Not Properly Functioning
x = Barriers Present
Blank cells indicate that no data were available

Table 14. Raw value matrix for determining stream habitat rating for the Wild Rogue North watershed. Explanations of matrix determinations are given in Appendix B.

Stream	Temperature	Aquatic Insect Habitat	Gravel %	Fish Barriers	% Habitat Units w/	Floodplain	Refugi	Width:Depth Ratio	Pool Quality	Off Channel Habitat	LWD	Pool Frequency	Pool Habitat Area	Residual Pool Depth	Gradient	Road Density/Loc.	Riparian Habitat	ECA[3] (%)	CA[3] (%)	Peak/Base Flows	Total Score
Booze			16	x	13	Professional Judgement	Professional Judgement	8.1	0	Professional Judgement	1.9	0	0	n/a	15.9		Professional Judgement		#5	Professional Judgement	73%
Bronco			10	x	13			5.9	0		0.4	27.1	6	0.69	23.2	.8			#5		81%
Bunker			17	x	7			11.5	1.3		0.2	7.5	23	0.97	8.2	.4		0.3	0.2		90%
Ditch				x															#5		
E. Fork Kelsey				x											steep						88%
Kelsey				x											steep				#5		100%
Mule Creek	66.8	med.		x															#5		
N. Fork Mule	60	med.													steep				#5		
W. Fork Mule	66.1	med.														3.3			#5		
E. Fork Mule																4.9		14.5	3.3		
Rogue River	76															PF					
Russian			10	x	26			6.6	0		0.6	88.4	1	0.55	23.2	1.5		2.9	0.7		62%
Slide																					
E. Fork Whiskey	68	low	18	x	4			10.6	3.5		1.8	14.7	14	0.55	6	1.1		1.1	0.6		87%
W. Fork Whiskey	67.3	med.	16	x	1			10.5	1.8		0.7	14.8	13	0.78	5.2	1.6		6.2	1		79%
			19		4			8.2	0		1.1	21	10	0.53	9.2	-		-	-		
Whiskey	68.4	low	18		12			12.5	0		0	7.2	35	0.62	4.3				#5		
			15		6			8.6	1.5		0.2	17.1	13	1.05	5.9				#5		67%
			21		2			9.1	1.2		1.1	13.7	26	0.96	3.6				#5		

[1]Natural conditions, even though water temperatures exceed state standards.

[2] LWD ratings are based on revised standard of at least 1.5- 2 key pieces per 100 m, not ODFW standard of at least 3 key pieces per 100m.

[3] Equivalent Clearcut Area (ECA) and Compacted Area (CA) data are limited. The values in the table are for streams within only one seventh-field watershed.

Total score for each sub-watershed:
80-100% of potential points - Good (Properly Functioning)

60-80% " " - Fair (Functioning at Risk)
<60% " " - Poor (Not Properly Functioning)

x = Barriers Present
Blank cells indicate that no data were available

Habitat Improvement Activities and Monitoring

Other than removing a culvert that was blocking fish passage on North Fork Mule Creek, there have been no aquatic habitat improvement projects within the watershed.

A monitoring program for macroinvertebrates was conducted in 1992 and again in 1997 at several locations within the Mule and Whiskey Creek drainages (Table 15). The intent was to sample aquatic macroinvertebrates to obtain baseline information and then repeat sampling of the original sites at five year intervals to determine trends. Most of the sampling locations have only been visited twice, so any determinations based on trend are preliminary.

Table 15. Summary of macroinvertebrate data on monitored streams within the Wild Rogue North watershed, 1992-1997.

Stream	Habitat Type / Quality of Biotic Integrity			
	Erosional	Marginal	Detritus	Embeddedness
Mule Creek	low	low	low	moderate/high
W. Fork Mule Creek	mod	mod	low	
North Fork Mule Creek	mod	low	high	high
Whiskey Creek	low	low	low	
E. Fork Whiskey Creek	mod	low	mod	high
W. Fork Whiskey Creek	mod	low	low	moderate

The overall conditions in both subwatersheds were better at locations higher in the drainage compared to samples taken near the mouth. Four out of the six sites have moderate to highly embedded substrate, a condition which is undesirable spawning habitat, limits macroinvertebrate distributions and perhaps reduces available food sources for fish and other aquatic organisms. The data from most sites show that long-lived taxa richness for all three habitat types is high, indicating that flow is perennial and that disturbance to substrates is low.

Based upon the available information, biotic integrity is not as good as would be expected given the nature of the watershed. At locations on both streams, the 1997 conditions had declined slightly since the site had been previously sampled. This may be attributable to flooding that occurred in the area during 1996. A variety of factors such as climatic variations, sampling during drought years and recent flood events may have influenced macroinvertebrate population data. Two years of data is insufficient to make any solid conclusions regarding the overall quality of the watershed by using these results as indicators, however over time they will be useful for future analysis.

Aquatic Conservation Strategy

Aside from the specific elements covered under this heading, the general trend has been that restrictions within the Forest Plan have greatly contributed to reducing impacts on the aquatic system. These include wide Riparian Reserves on all streams, including intermittent channels, green tree retention on harvest units, restrictions on new road construction and requirements for 100-year flood capacity for road crossing structures. Best management practices in the RMP (Appendix D of the RMP) also help to reduce impacts and in some cases actually restore conditions to 'Properly Functioning'.

Roads

Road densities are important since roads result in more rapid runoff and increase ground water interception. In essence, each mile of ditched road becomes a mile of first-order intermittent stream.

The National Marine Fisheries Service has set a target of two miles of road per square mile for proper functioning condition. Road densities above three miles per square mile are considered to be not functioning properly by NMFS. Four out of seven of the sixth-field subwatersheds have road densities above the two mile per square mile target. Mule Creek and Kelsey Creek exceed three miles per square mile. However, road densities are not distributed evenly throughout these two HUC 6 drainages. The south portion of Kelsey Creek and the West Fork of Mule Creek (including the Wilderness Area) contain large unroaded areas. There are high road densities and areas heavily impacted by timber harvest, concentrated in the northern half of each watershed.

Only about 14 percent of all streams within the Wild Rogue North watershed have a road within 200' and there are even fewer locations where a road crosses a stream.

In-stream Flows

The movement of water through a watershed is greatly influenced by the vegetative cover. The extent of vegetative cover can be estimated by seral stage classification. Early seral stage stands located in the transient snow zone function as openings subject to earlier and faster snow melt, often resulting in surface runoff. During rain or snow events, older seral stage stands are likely to have reduced overland flows, as compared to younger stands and openings (Jones & Grant, 1996). This is attributable to less snow pack accumulating under the forest canopy which helps moderate fluctuations in water flow rates within the streams.

The transient snow zone (TSZ) covers approximately 28,900 acres in this watershed (Map 34). Although nearly one third of the watershed is within the transient snow zone, it does not pose a large concern in comparison to adjacent watersheds and the amount of openings within the TSZ is within the range of natural variation. The solid block ownership allows BLM to guide most management activities within the area. In other watersheds, this is typically not the case since

non-federal, private and O&C lands are usually interspersed in a checkerboard pattern. There are no communities within or directly downstream of the Wild Rogue North watershed, so urban and residential flooding risks that result from rain on snow events are small. Presently, the high levels of reserved lands, both wilderness and late-successional habitat do not have many large openings created by clearcuts. Given the inaccessibility and low site potential of many other areas, it is unlikely that any new large openings will occur in these areas with the exception of wildfire.

There are no water withdrawals in the watershed to affect the natural flow regime or timing patterns. However, road densities near four miles/mile^2 at several areas in upper Mule Creek and East Fork Kelsey Creek probably have altered the duration and timing of localized runoff rates during storm events in those locations.

Floodplains

Floods in the Wild Rogue North watershed have not been a major disturbance agent, despite the fact that much of the watershed is within the transient snow zone. Undeveloped forest areas have held back rapid runoff causing little flooding, although high scour marks indicate that most streams do carry large volumes of fast moving water during winter storms. Typically these are flashy events with water levels rising very quickly in a short period of time. The steepness of most channels and the rocky, shallow nature of the soils do not allow for flood plain development on major tributaries. The absence of a wide, unconfined valley bottoms within the watershed does not allow for typical characteristics such as terracing or large, flat areas of deposition that result from flood plain development to the extent it is present upstream in the Rogue Valley or at Agness, which is about twenty miles downstream.

BLM records indicate some flooding occurred in 1946 and larger floods in 1955, 1964 and 1974 when flooding washed out culverts in the Trappers Trap area of Kelsey Creek and a few other smaller culverts. This may have been caused by inadequately sized or partially blocked culverts which were not able to accommodate the rapid increase of water volume. In 1974 Mule Creek also flooded up to the steps of the Rogue River Ranch.

While flooding in the tributary streams within the watershed is not a major disturbance agent, and does not pose a significant threat to private property or economic loss in downstream communities, the Rogue River has had numerous large scale events that have been recorded during the past 100 years. Reports indicate that flood events along the Rogue River in 1861, 1890, 1927, 1955, and 1964 were exceptionally devastating (Atwood, 1978). During the 1964 flood, the river level rose to over 55 feet above the normal bank-full stage about a mile below Grave Creek, at the eastern (upstream) end of the watershed. Reports on the 1974 flood mention that the river washed out a portion of the trail in the Mule Creek Canyon which is more than eighty feet above normal levels (Purdom, 1977). While Mule Creek Canyon lies outside and to the southwest of the analysis area, it is important to recognize the massive volume of water and the capabilities of this segment of the Rogue River system.

Although flooding does occur periodically, impacts from a major event along the Rogue River today are minimized due to the upstream presence of the Lost Creek Dam on the Rogue River and the Applegate Dam on the Applegate river. These dams control discharge patterns in the Rogue River and should be able to reduce the impacts of 100-year flood events. In addition to these dams, there are numerous smaller dams throughout the Rogue Valley which assist in regulating flows. As a result, the river may never again flood to the same extent as it did in 1964.

Distribution, Diversity and Connectivity of Watershed Features

The relatively undisturbed nature of the landscape features maintain the conditions necessary to promote healthy aquatic systems within this area. Connectivity through riparian reserves is very good, with over 70 percent of reserves exhibiting late successional characteristics. The major perennial streams are not crossed by roads and only 14 percent of all streams have a road within 200 feet. There are no culverts impeding fish passage and no other man-made barriers limiting movement of aquatic organisms throughout the watershed. Terrestrial habitat along streams is also well connected for the same reasons.

The two areas of greatest concern with regard to connectivity and diversity are in Upper Mule Creek and in East Fork Kelsey Creek, where there are high road densities and heavily harvested lands. Along with increased potential drainage problems, roads have fragmented the landscape and caused substantial sedimentation.

On a regional scale, the section of the Rogue River that flows along the southern boundary of this watershed connects the Middle Rogue Basin with the Lower Rogue Basin, which drains into the Pacific Ocean. This section of the river is an important migration corridor for anadromous fish seeking up and downstream passage throughout the river system. Downstream, connectivity appears to be adequate, with the Wild and Scenic section of the Rogue River and the Wild Rogue Wilderness Area ensuring no disruption. Upstream, the link is more disjointed but is still in moderately good condition. Above the Grave Creek bridge, there is a major road along the southern side of the river and the town of Galice is approximately 10 miles upstream. There has been more timber harvest in this area, but this stretch of the river is designated a Scenic and Recreational river so limited development is permitted.

Physical Integrity of the Aquatic System

Field examinations of the streams in this watershed indicate that stream banks are generally stable and in good condition. There are some instances of down-cutting along a few of the smaller streams, particularly in the Ditch and Quail Creek drainages, but this is considered to be within the natural condition since these areas have not been logged or otherwise disturbed.

The most evident stream bank disturbance is found in the lower Mule Creek area where extensive mining occurred during the late 1800s and early 1900s. For a brief period, large hydraulic "giants" were used near the mouth of the Mule Creek to wash away the soils and gravels along the stream banks to extract gold. In most of these areas, the riparian and stream-side vegetation has recovered to a naturally functioning condition. However, effects from past disturbance are still visible in the channel geomorphology as evidenced by stream beds that are eroded to bedrock and large deposits of rock tailings along the flood plain.

Sediment Regime

Map 2 shows areas that are high potential sources for sedimentation resulting from erosion. Surface disturbance by road building and tractor logging as well as natural processes such as landslides and mantle creep pose a potential for stream sedimentation. The majority of the non-federal lands have been heavily logged on steep ground, resulting in exposed soil and compaction. This results in reduced infiltration, more runoff, and subsequent erosion.

While the amount of lands in non-federal ownership are relatively small in this watershed, they still contribute to downstream effects and need to be considered. Industrial and private lands have a very high potential for contributing sediment to streams. The Oregon Forest Practices Act does not protect streams from temperature and sediment increase as well as the requirements on federal lands. Division 640 of the Act calls for leaving only 30-40 conifers, 8-11" dbh, for every 1,000 feet of fisheries stream, within 20 feet of the stream; non-fisheries streams receive even less protection and shading. The buffer widths may be variable, however, there does not appear to be enough of a filter zone to adequately reduce sediment loading.

Water Quality

The current water quality conditions in the watershed are discussed earlier in this section. The major factor identified by DEQ is temperature. Sediment is also a concern.

Riparian

The conditions of riparian zones directly affect the water quality and stream habitat conditions for fish and other aquatic organisms (Hicks et al, 1991). If riparian areas are well vegetated, they serve as effective sediment filtering zones. Riparian zones occupied by mature or old growth stands enhance stream habitat conditions by shading the stream channel, providing large woody debris, regulating peak discharge and maintaining soil moisture. First and second order streams and associated riparian habitat which comprise the vast majority of all stream miles in the watershed, are often in better condition than larger fish-bearing streams since their watersheds are considerably smaller and their integrity is influenced by activities on fewer ownerships. Stream and riparian habitats in natural (unmanaged) condition are common, except in the upper reaches of Mule Creek and East Fork Kelsey Creek. However, these habitats are limited to unroaded and unharvested first and second order watersheds that are often separated from similar adjacent

habitats by areas that have been extensively disturbed by logging and road building.

Riparian habitat in older forests, which occurs almost exclusively on public lands, provides the greatest structural diversity of all seral stages and supports a great variety of plant and wildlife species and has an important influence on the quality of stream habitat. Virtually all known riparian habitat is associated with streams. Over 80 percent of the wildlife species believed to occur in the watershed are dependent upon riparian habitat to varying degrees.

Riparian Reserves comprise approximately 26,900 acres of BLM land, which amounts to roughly 44 percent of BLM administered land within the Wild Rogue North watershed. Currently, about 75 percent (20,150 acres) of the Riparian Reserves on federal lands are greater than 80 years of age (Table 16 and Map 12). Of the total 26,900 acres, about 9,583 acres, (35 percent) are within GFMA lands and the remaining 17,300 acres, (65 percent) fall within the LSR boundary. This discrepancy should be noted in order to avoid confusion between Riparian Reserve acres in the seral stage table presented in the commodities section of this document and in Table 16.

About 65 percent of the Riparian Reserves are within the LSR, providing connectivity throughout the lower half of the watershed. The remaining 35 percent is scattered throughout the GFMA lands, increasing connectivity throughout the watershed as well as creating dispersal points leading to adjacent watersheds to the north and northeast. With about 75 percent of the Riparian Reserves in the Wild Rogue North watershed greater than 80 years of age, the majority of these areas are in proper functioning condition and will continue to be since they are protected from future timber harvest under the Northwest Forest Plan. This means that riparian connectivity throughout the watershed is very high, a benefit not only to the aquatic organisms and processes but also to terrestrial plants and animals that use these areas as travel corridors.

Stream surveys from Mule Creek indicate that the majority of streams investigated are perennial and properly functioning. Riparian and upland vegetation were typically either old growth or young, even aged stands between twenty and thirty years old. Some riparian areas were found to be crowded with young understory firs and observers recommended the areas be thinned to provide canopy openings which would greatly increase fir regeneration and improve riparian habitats. Riparian Reserves in the 0-40 year age classes are concentrated in the upper reaches of the Mule Creek and Kelsey Creek subwatersheds (Map 12). Of the approximately 3,700 acres of riparian stands in the 0-40 year age classes, these acres comprise 14 percent of the total riparian reserve acres and only 3 percent of riparian zones along fish-bearing streams are younger than 40 years (Table 16 and 17).

When these areas were harvested decades ago, there were no established federal guidelines to protect riparian areas. Consequently, in the absence of riparian buffers, timber from the riparian areas along streams was removed. Over the past several decades, conifer seedlings and other plant species have revegetated these areas.

Table 17. Acres of Riparian Reserves by seral stage, Wild Rogue North drainages.

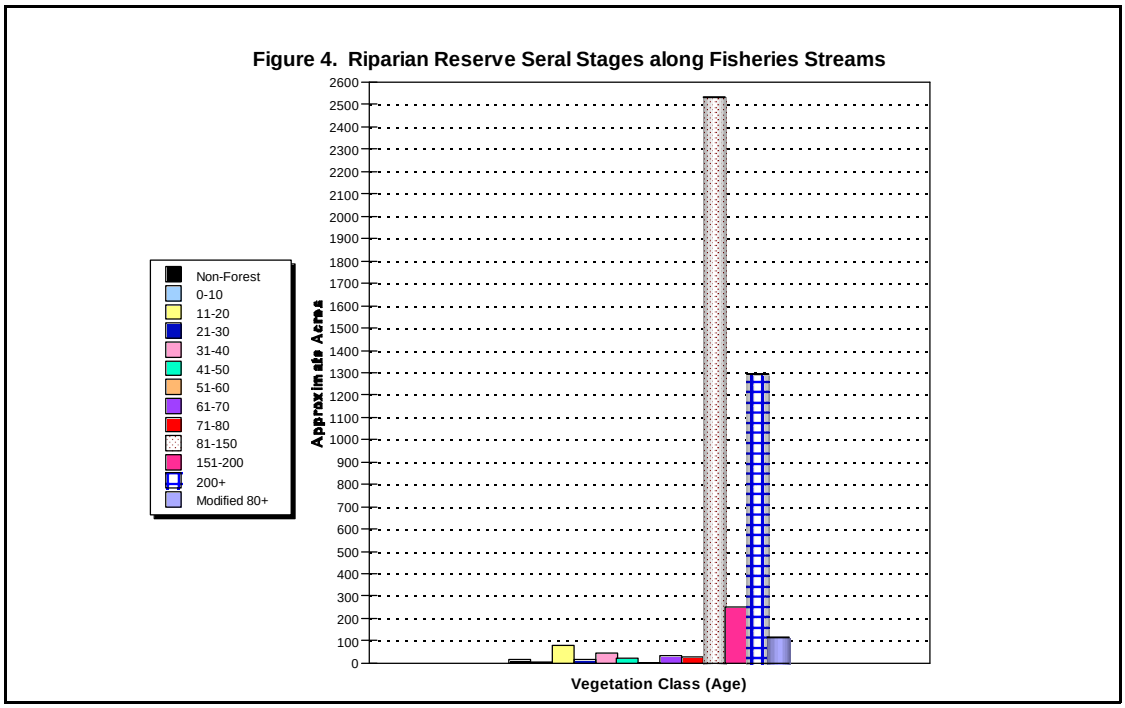
	Wild Rogue North Total	Sixth-field watersheds						
		Rogue - Whiskey	Rogue - Howard	Rogue - Big Windy	Rogue - Horseshoe Bend	Kelsey	Rogue - Missouri	Mule
Non Forest	298	76	4	2	3	1	3	208
0-10 years	754	120	13	0	0	354	101	166
11-20 “	815	64	0	0	0	97	48	605
21-30 “	779	40	0	0	0	158	152	429
31-40 “	1,353	56	1	93	0	590	13	600
41-50 “	369	0	0	164	23	146	5	30
51-60 “	47	18	0	0	22	8	0	0
61-70 “	266	41	0	2	27	105	6	83
71-80 “	369	231	0	0	0	60	0	77
81-150 “	10,825	1,683	548	1,014	1,508	1,820	1,384	2,867
151-200"	2,734	1,189	433	626	39	215	71	160
201+ “	6,588	1,455	114	924	115	1,142	362	2,476
81+ Modified	1,675	475	28	0	0	300	45	826
Unknown	19	18	0	0	0	1	1	0
Total	26,890	5,466	1,141	2,825	1,737	4,997	2,191	8,527

Table 18. Riparian Reserve seral stages along fish streams, Wild Rogue North watershed.

Vegetation Class (Age)	Acres	Percent of the watershed
Non-Forest	19	0
0-10	3	0
11-20	79	2
21-30	16	0
31-40	44	1
41-50	22	0
51-60	0	0
61-70	36	1
71-80	27	1
81-150	2,534	57
151-200	251	6
200+	1,293	29
Modified 80+	112	3
Total	4,438	100

About 92 percent (4,080 acres) of the 4,438 acres of Riparian Reserves along fish-bearing streams on BLM administered lands are greater than 80 years of age. Most of the riparian areas along fish streams have remained in their natural condition and are properly functioning. The small acreage found in the younger vegetation classes (Table 17, Figure 4) along fisheries streams indicate that most of the past timber harvest in riparian areas that occurred prior to the implementation of the Northwest Forest Plan was adjacent to smaller, non fish-bearing tributary streams higher in the watershed.

Figure 4. Riparian Reserve Seral Stages along Fisheries Streams



The majority of riparian areas within the watershed have had very little or no disturbance. Historic mining activity most likely impacted riparian zones near the lower sections of Mule and Whiskey Creeks and some locations along the Rogue River. However, most of this activity occurred well over 30 years ago, the time frame necessary for recovery. The lack of valley bottom roads, the absence of human caused barriers and the presence of higher levels of large woody debris as compared to most other watersheds within the Glendale Resource Area indicate that the late-successional Riparian Reserves, particularly within the LSR, are properly functioning and in excellent condition.

At this time, a general inventory of stream classification for the Wild Rogue North watershed has not been conducted due to limitations in time, work force, budget and the potentially hazardous nature of several drainages. It is likely that virtually all of the third-order streams are perennial,

and that 25-50 percent of the second order streams are also perennial. It is also quite likely that many of the streams identified as first order are merely draws with no channel, so they would not be classified as streams at all. Conversely, there are probably intermittent streams, and even some perennial streams, which are not currently mapped as streams at all.

There is no inventory of riparian or stream habitat condition for this watershed aside from isolated, project specific areas and the upper sections of Mule Creek where existing roads allowed access to riparian survey crews in 1996. Riparian condition ratings are based upon the extent and quality of existing riparian vegetation adjacent to the stream, average tree age/size within the riparian zones, and erosional characteristics of each stream reach. The major factors with the potential to influence riparian condition include stream bank stability, clearcuts and roads. Stream habitat condition (discussed in the Fish Section) is based on the riparian condition, as well as subjective evaluations of stream bank stability, amount of disturbance, influence of roads and other sources of sediments, total sediment loads, effects of sensitive soil areas and other factors. Existing evidence suggests that most stream reaches were in good condition with minimal, if any, problem areas (BLM Mule Creek Surveys, 1996).

Literature Cited - Hydrology/Fisheries

Adams, Paul W., Flint, Alan L., and Fredriksen, Richard L., 1991, Long-term patterns in soil moisture and revegetation after a clearcut of a Douglas-fir forest, *in* Oregon, Forest Ecology and Management, 41 (1991) Pages 249-263, Elsevier Science Publishers B.V., Amsterdam

Atwood, Kay, 1978, Illahe - A story of settlement in the Rogue River Canyon, Gandee Printing Center, Medford Oregon.

Doyle, P. F., 1991, Documented autumnal stream flow increase without measurable precipitation, Water Resources Bulletin, Vol. 27, No. 6, December 1991

Hicks, Brendan J., Beschta, Robert L., and Harr, R. Dennis, 1991, Long-term changes in stream flow following logging in western Oregon and associated fisheries implications, Water Resources Bulletin, Vol. 27, No. 2, April 1991.

Jones, J.A. and G. E. Grant. 1996. Peak flow responses to clear-cutting and roads in small and large basins, western Cascades, Oregon, Water Resources Research, Vol. 32, No. 4, Pages 959-974, April 1996

Oregon Department of Environmental Quality, 1999, 303d listings, http://waterquality.deq.state.or.us/wq/303dlist/303dpage.htm

Oregon Department of Environmental Quality. 1992. Oregon Administrative Rules, Chapter 340, Division 41, Rogue Basin. Portland, OR.

Purdom William B., May 1977, Guide to the Geology and Lore of the Wild Reach of the Rogue River Oregon, Bulletin No. 22 of the Museum of Natural History University of Oregon , Eugene Oregon

Rivers Cole M., November 1991, District Fish Biologist (deceased) Oregon State Game Commission 1963: Rogue River Fisheries: History and Development of the Rogue River Basin as Related to its Fishery Prior to 1941, Volume 1.

USDI, Bureau of Land Management. 1995. Medford District Record of Decision and Resource Management Plan. Medford, OR.

USDI, Bureau of Land Management. 1997. West Fork Cow Creek Watershed Analysis. Medford, OR.

USDI, Bureau of Land Management. 1999. Grave Creek Watershed Analysis. Medford, OR.

B. Forest Management

Vegetation Associations and Communities

Plant communities in the Wild Rogue North watershed are representative of the diversity encountered in the Klamath Mountains Province. The geologic and geographic features, in addition to climatic conditions, greatly influence the development of soils and vegetation. The mountainous terrain accentuates the watershed diversity. Extensive erosion and stream hydrology has created steep canyons. Topographic features influence the natural disturbance patterns. Fire has disturbed the watershed frequently and has played an important role in the development of existing plant communities. In the last several decades, timber management has altered portions of the watershed significantly.

Historic vegetation patterns or reference conditions refers to the conditions that existed prior to European-American modification. Examples of significant European modification include clearing for settlement and agriculture, timber harvesting, mining, grazing, and fire suppression.

Potential natural vegetation in the Wild Rogue North watershed was mapped on three levels (Table 18 and Map 13). The series is the broadest category and is determined by the most abundant reproducing tree species in the understory of late-successional stands; often, this is the most shade-tolerant species present. Plant associations are fine scale divisions based on the indicator species present in late-successional stands. These associations are aggregated into plant association groups, which is intermediate between series and associations, to ease interpretation. The plant associations used were described by Atzet et. al. (1996). More detailed descriptions of these classifications are presented in Appendix A.

Table 18. Plant series within the Wild Rogue North watershed.

Plant Series	Acres	Percent of the Watershed
Tanoak	48,905	79
Douglas-fir	10,652	17
White Fir	140	0.2
Western Hemlock	410	0.7
Oregon White Oak	108	0.2
Shrubfields (Canyon Live Oak)	1,314	2
TOTAL	61,529	100

A major feature of the vegetation in this watershed is the evergreen hardwoods and shrubs which resprout after disturbance, persist in the stand, and constitute a major part of the climax association. In the early seral stage, grass and forbs are sparse. Plant communities are dominated by resprouting tanoak, madrone, chinquapin, or other evergreen hardwoods and shrubs. Varnishleaf ceanothus is locally dominant on wetter sites and canyon live oak is prevalent on dry sites. Conifer species of the late-seral stage include Douglas-fir, white fir, sugar pine, ponderosa pine, grand fir, incense cedar, western red cedar, western hemlock, Port-Orford cedar, and pacific yew. Jeffrey pine is often present on the serpentine soils. Understory vegetation in the late seral stage may include tanoak, rhododendron and salal.

The Mule Creek sub-watershed has small areas of white fir and western hemlock, situated predominately in the cooler north-facing micro-sites. The Oregon white oak series is found in scattered locations, on particularly dry, south-facing sites. Shrubfields with canyon live oak are found on very rocky sites.

The Douglas-fir series is found at low elevations near the Rogue River, on sites that are apparently too dry for tanoak. The Douglas-fir series is also found at high elevation, above the tanoak series.

Smaller vegetation communities associated with riparian areas, meadows, rock outcrops, rock cliffs, or talus slopes occur within the defined major plant grouping. Meadow habitat is very limited in this watershed. Sites dominated by rock are common within the wilderness area and the Rogue River canyon. Riparian areas are extensive throughout the watershed.

Forested riparian zones are generally more complex than adjoining plant communities. The diversity of vegetation includes plants submerged in water to species common in upland plant communities. Annual and perennial plants and shrubs, as well as tree species mix, are likely to be more diverse in forested riparian habitats than adjacent upland forests. Bigleaf maple, red alder, willow, and vine maple are more common in riparian areas.

The majority of the Wild Rogue North watershed is an older forest, a combination of mature and old growth stands. Acres of age classes within the watershed are presented in Table 19 and Map 14. Approximately 32 percent of BLM acres in this watershed are older than 150 years.

Table 19. Seral stage distribution on BLM land by land use allocation, Wild Rogue North watershed.

Seral Stage or Structural class	Owl core & LSR	Rec Sites / River Corridor	TPCC Withdrawn in Matrix & Connectivity	Riparian Reserves		Connectivity Blocks	Available GFMA	Total Watershed
Non Forest	149	296	69	0		0	5	519
0-10 yrs 2	466	0	14	524		0	739	1,743
11- 20 yrs 3	324	1	11	688		32	605	1,661
21-30 yrs 4	505	10	7	468		9	338	1,337
31-40 yrs 5	277	0	61	1,194		65	916	2,513
41-50 yrs 6	510	16	10	143		0	62	741
51-60 yrs 7	135	12	7	19		0	23	196
61-70 yrs 8	217	86	0	108		0	259	670
71-80 yrs 9	42	2	0	332		0	334	710
81-150 yrs 10	11,615	9,501	1,251	1,250		0	1,836	25,453
151-200 yrs 11	2,703	436	633	1,025		36	904	5,737
200+ yrs 12	5,541	1,126	1,130	2,611		387	2,049	12,844
Older Modified 80+ yrs 13	1,006	2	108	1,221		0	1,188	3,525
Totals	23,490	11,488	3,301	9,583		529	9,258	57,649
% of BLM lands	41	20	6	17		1	16	100

Aerial photos taken in 1953 present a picture of how the watershed appeared before logging, road construction and fire suppression. There were large, contiguous areas of late-successional forest in the East Fork and Arrasta Forks of Mule Creek. In Kelsey Creek and West Fork Mule Creek there was a distinct mosaic of older conifer forest stands on north slopes and along draws, intermixed with hardwood stands or young conifer stands, most likely the result of fires and site conditions. The meadow areas, such as Big Meadows and Bald Ridge, were larger than at present, which indicates that conifers have substantially invaded these meadows. There was one major slide evident along the East Fork Mule Creek.

While this is merely a snapshot of one point in time, it is quite possible these conditions were fairly typical of the watershed over the last 200-400 years. The mosaic conditions of stands in the Kelsey Creek and West Fork Mule Creek watersheds were due to repeated fires, combined with rocky areas, hot aspects, and shallow soils. The relatively large expanse of contiguous conifer forest in Arrasta Fork Mule Creek, with only scattered openings in the west portion of this drainage, probably represent close to the maximum development of older conifer forests for this area. While fires burned through this drainage in the past, most were probably of relatively low intensity during the 1800s and 1900s. It is likely that conditions in this watershed varied considerably during the past 300 - 3,000 years and would show a shifting pattern of openings and forest.

Successional Processes and Patterns

Successional patterns within the Wild Rogue North watershed are quite diverse. Extremes are represented by the low elevation, south slopes and shallow soil areas along the Rogue River, compared with the high elevation, more mesic conditions along the upper reaches near Anaktuvuk Saddle. Special cases of successional patterns occur on rocky outcrops and in meadows.

Following a stand replacement fire or other intense disturbance, conifer development is dependent on seed sources, while many of the shrubs and hardwoods regenerate through vigorous crown sprouting. There is little grass/forb seral stage development as seen in the Cascades or Coast Range. Areas of dense shrubs or hardwoods with few conifers may result from repeated intense fires, as seen along the Rogue River and within the wilderness area.

Given adequate seed source and growing conditions conifers tend to dominate the site and shade out hardwoods and shrubs. The amount of time it takes for this to occur varies, based on seed source, soil, moisture, aspect and other factors, but generally ranges from 15 to 45 years. During this period, the stand is vulnerable to another burn since the fuels are often continuous. However, as the conifer stands grow, shading and self pruning of limbs gradually reduces the risk of intense fire events.

The hardwood and shrub components increase in response to openings caused by conifer mortality. This process generally begins to occur after about 100 years. On low elevation, harsh sites, conifers may never dominate. Hardwoods and shrubs may persist throughout the early and mid-seral stages.

Eventually fires will occur in the watershed. If the fire is intense, the stand will be reset to the original resprouting shrub/hardwood stage. Frequently the result is an underburn, or the creation of small canopy openings as individual conifers or small groups are killed. This stimulates more resprouting of hardwoods and shrubs, as well as providing seed beds for conifer seeds. As a result, a mosaic of age and structure classes develop. As the stand grows older, repeated underburns and patchy intense burns create a very complex mixture of large super-dominant conifers. These conifers occur over several canopy layers of smaller conifers, hardwoods and shrubs. This situation is common in the middle elevation ranges of the watershed.

The upper reaches of the watershed are characterized by large areas of fairly homogeneous stands of single canopy-layer Douglas-fir forests, which are approximately 200 years old. In this area it appears that while light underburns may have occurred in the past several decades, the relatively fire-resistant Douglas-fir trees have persisted. The canopy has not been opened from these underburns, although there are areas open from timber harvest. The same basic successional patterns appear to be operating as on lower sites, but the high rainfall and deep soils help to considerably extend the time frame.

The causes of development of the Big Meadows, Bald Ridge and other meadows within the watershed are unknown. It is likely that these openings were first created by repeated fires, perhaps man-caused. They may also be a result of wildfire and gophers. It is evident that Douglas-fir has been encroaching on these meadows in the past 40-50 years.

Disturbance Characteristics and Patterns

The most important natural disturbance agents in this watershed are fire, insects, diseases, wind and landslides. Of these, it is clear that fire is the most significant. Since the early 1900s, fire suppression has altered these natural disturbance patterns. In the last several decades, logging and road building have become the most important disturbance agents, especially in the Mule Creek and Kelsey Creek drainages.

Fire

Fire History

Natural fires in the watershed most frequently begin in mid-summer and can continue to burn until autumn rains fall in November, so they often cover large areas. These fires are rarely of uniform, high intensity. When they do occur, the high intensity burns increase the likelihood of

severe erosion, since the vegetation and organic matter can be removed, leaving the soils vulnerable to water erosion.
Most fires are characterized by patchy, mosaic patterns, with areas of intense fire and complete crown kill mixed with areas of low intensity underburns, where only occasional trees or small patches of overstory trees are killed. Repeated, high intensity fires are revealed by the absence of older conifers on some sites dominated by hardwoods. Evidence of low intensity fires is seen in virtually all older conifer stands.
South-facing slopes experience a higher intensity of fire disturbance than north-facing slopes. Large conifers generally have a patchy distribution, compared to the north slopes, which often have a more continuous canopy of larger coniferous trees. This is particularly noticeable on the south-facing slopes in the southeastern part of the watershed, where precipitation is 35-45 inches per year.

Fire records indicate ignitions occurred throughout the watershed (Map 15). One of the larger fires in the 1900s include the Quail Creek fire (2,800 acres in 1970). Lightning is the most common source of ignition in this watershed. Due to the low summer precipitation and increased lightning frequency, July, August and September are the months of greatest ignition activity.

Native Americans were a significant source of ignition in this watershed prior to European settlement. Burning was done by Native Americans to encourage the resprouting of tan oak and to control pest populations. This practice also cleared the ground under the trees, which made hunting and seed and acorn gathering easier. They also burned along ridge tops to maintain travel corridors and openings for production of hazel and beargrass, which were used for basket material, one or two years after a site was burned. Big Meadows was one of the most significant meadows maintained by the Native Americans. Agee (1993) indicates that some experts believe that burning by natives probably complemented natural ignition from lightning strikes, rather than drastically altering the natural fire patterns.

Miners routinely burned areas along the Rogue River in the early 1900s in order to open ground for mining or to burn other miners out in order to take their claim.

Fire frequency and fire return intervals vary between areas depending on stand characteristics, weather and topography. In the watershed, it appears that fires were probably more frequent and more intense in the hot, low elevation areas along the Rogue River than along the upper ridges where conditions were cooler and more moist. While fire frequencies varied a great deal, it is likely that the fire return interval for this watershed was on the order of 30-80 years (Agee 1993). The watershed experienced significant fires (500 acres or more) about every 20 years.

Fire is directly linked with other disturbance factors. In conifer forests there are frequent post-fire insect attacks. Scorched trees are more likely to be successfully attacked by bark beetles and other insects. Crown scorch at levels about 50 percent is associated with 20 percent or more mortality by western pine beetle in mature trees; younger trees can survive more than 75 percent

scorch with about 25 percent mortality. Insects are most likely to attack when growth rates decline due to fire damage.

Fire Suppression and Management

In the 1870s, the inland fires of the Rogue Canyon could be seen by ships passing in the coastal waters at least 20 miles away. Effective suppression efforts did not occur in the Wild Rogue North watershed until after World War II when roads were constructed to provide access for fire suppression.

Fire control has reduced the occurrence and the number of acres burned. Some vegetation manipulations, such as slash burning, are designed to reduce the spread of wild fires and to reduce fire intensity. Other management practices, such as pre-commercial thinning, increase the accumulation of fuels, as well as the resulting risk of intense fires. There are approximately 1,250 acres of clearcuts in the watershed which have been pre-commercially thinned.

Current fire management still involves suppression of wildfire, both human-caused and natural ignitions. However, fire management has taken on several new directions that concentrate on fire prevention. Forested areas that are harvested usually receive some "prescribed fire treatment", ranging from broadcast burns to hand-piling excess woody material that can not be sold for firewood, followed by burning the piles. Prescribed burning is a multi-purpose tool used for removal of logging slash and control of vegetation in harvest units, which improves reforestation planting and success, while reducing the likelihood of a catastrophic fire.

Current Fuels Characteristics

Three factors were used to assess fuels and the potential for fires:

Fuel hazard - the capability of fuels to carry a fire
Fire risk - the probability of ignition
Value - the relative potential for resource loss from a fire.

Fuel hazards were analyzed based on fuel models of different vegetation types. The highest hazard was related to brushy, light fuels and ladder fuels (Map 16).

There were several aspects of high fire risk, including: ridge tops, where the probability of lightning strikes are highest, the major access roads which receive the most vehicle use, the Rogue River corridor, and the areas with private residences. All of these areas have a high potential for fire ignitions and are displayed on Map 17.

The following areas were considered high value:

- spotted owl core areas,
- the LSR,
- private residences,
- Tucker Flat campground and
- Ninemile communication site.

The Rogue River is available for helicopters to dip water for fire suppression. Other water sources in the watershed are shown on Map 17.

Forest/Ecological Health

Ecological health is defined as "the state of an ecosystem in which processes and functions are adequate to maintain the diversity of biotic communities commensurate with those initially found there" (FEMAT 1993).

One of the most notable forest ecological processes which can serve as an indicator of forest health is widespread tree mortality. Healthy forests are able to remain productive and resilient over time in the face of natural stresses such as fire, disease, insect attack, drought and climatic changes which result in tree mortality. A dynamic forest ecosystem is able to retain its basic character throughout many generations. However, stand characteristics and ecological processes will fluctuate over a range of natural variability (see section on Natural Disturbances and successional patterns). When management practices result in ecosystem components being pushed outside of the range of natural variability there is an increased risk of a decline in forest resiliency.

The major forest health concerns in the Wild Rogue North watershed include:

- overstocked stands, resulting from active fire suppression over the past 75 years,
- partial-cutting, which has created many stands with scattered large overstory conifers and a dense understory of tanoak and other hardwoods and brush.
-clearcutting, which often created even-age stands of conifers, often with different species composition than natural stands.
- noxious weeds and other non-native invasive species,
- Port-Orford-cedar root rot, *Phytophthora lateralis*, and
-White pine blister rust, *Cronartium ribicola*.

<u>Overstocked stands</u>

Stand structure in many areas in the watershed indicate that the widely spaced, large conifers probably grew in relatively open conditions. Fire suppression has allowed numerous pole-size Douglas-fir and hardwoods to grow underneath these large conifers in some stands, often creating very dense stands. Large pines in these stands are often dead or dying, with little or no reproduction in the vicinity. This type of strand structure are ripe for large, intense fires and mortality during drought conditions, often meaning the loss of pine species from the stands.

Partial-cutting

Understory vegetation response after partial cutting has frequently resulted in a shift toward higher densities of evergreen brush and hardwood species, especially tan oak. This increases the risk of creating a less productive forest, which differs in species composition and/or habitat value. This scenario has occurred in partial cut stands located in Mule Creek and East Fork Mule Creek.

Even-age conifer plantations ,

Clearcutting creates young, even-aged Douglas-fir plantations which remain susceptible to catastrophic fire disturbance for several decades. In addition, clearcutting in southwest Oregon forests are less successful in regenerating, because of higher temperatures and drier sites, than in northwest Oregon. Clearcut acreage in the Mule Creek, East Fork Mule Creek, and North Fork Kelsey Creek compartments create the potential for rapidly spreading, large scale fires. In addition, the reduction of biological diversity due to the conversion of old growth stands into Douglas-fir plantations increases susceptibility to insects and disease.

The Quail Creek fire of 1970, which was located on both sides of the Rogue River, in the western half of watershed, consumed 2,800 acres of old- growth Douglas-fir. Approximately 690 acres in this burn area was planted with ponderosa pine or Douglas fir in 1972 and 1974. Nearly 500 acres was planted to grass. In order to shift species dominance on this site from pine to mixed conifer, so that the species composition would be more representative of a natural stand, the Douglas fir that have seeded-in could be released, by removing some of the pine that is commercially viable. This plan may take 30-40 years to accomplish as some of the pine are gradually removed to make room for Douglas fir.

Noxious weeds and other non-native invasive species ,

Noxious weeds are plants that originated in another area, typically Asia or Europe. They can displace native plant species. In their original ecosystem, these weeds are not problems because they evolved with natural controls such as insect predators, fungi, and other competing plants, but these control agents are not present in North American ecosystems.

Noxious weeds may affect the structure of ecosystems by altering the composition of plant communities. They can do this by producing abundant seed, having fast growth rates, and exploiting the entire soil profile for water and nutrients. The soil can be damaged by noxious weed populations by lowering the amount of organic matter and available nitrogen. Some weeds can even cause the soil temperature changes to be more extreme than normal. Noxious weeds may reduce soil nutrient availability. Taprooted weeds may reduce water infiltration because they do not have the dense, fine root stems of grasses, which contribute organic matter and enhance soil structure (Sheley & Petroff, 1999).

Weeds are spread in many ways, including road building, logging, recreation activities, waterways, animals, weed-contaminated hay and wind. Noxious weeds prefer disturbed sites, where they can out-compete the native community.

A roadside inventory for noxious weeds in the Medford District was conducted from 1996 to 1998. In addition, noxious weeds have been reported during timber sale unit surveys for special status plants. Eight species of noxious weeds have been found in the watershed (Map 18): Canada thistle, meadow knapweed, scotch broom, Spanish broom, purple loosestrife, yellow starthistle, Klamath weed and tansy ragwort. Most of the inventoried weeds are growing along road sides.
To help control the invasion of non-native weeds the BLM uses biological controls, hand pulling, grazing, fire and spot application of approved herbicide (EA # Or-110-98-14). Preventive measures to help reduce the spread of weeds include washing heavy equipment, blading roads toward an infected area and washing the undercarriage of BLM fleet vehicles.

To date the only biological control agents (beneficial insects) that have been released in the watershed by the Oregon Department of Agriculture are *Eustenopus villosus* and *Urophora sirunaseva*. These insects attack yellow starthistle. Other insects have been released outside the watershed for tansy ragwort and may have migrated into the watershed.

Yellow starthistle is found by the Grave Creek boat landing and the Rogue River trail. It was introduced to North America from the Mediterranean region of Europe. The thistles are sharp and walking through them can be painful. They also cause a nervous disorder in horses that leads to death. A small population along the Rogue river trail was hand-picked in 1998. Two types of insects which feed upon yellow starthistle have recently been released.

Purple loosestrife was introduced into North America from Europe in the early 1800s as horticultural stock and as a contaminant of ship ballast. It can spread in wet environments rapidly. There are substantial populations of this weed in the Rogue River canyon.

Klamath weed, or St. John's wort, is native to North Africa, Europe and parts of Asia. The major reasons for the plant's introduction into foreign countries was cultivation for medical purposes and ornamental use. Today, it is so widespread in the watershed and surrounding areas that it is considered established and is not inventoried.

Canada thistle is native to southeast Europe and Asia. It was introduced to Canada by early settlers, probably as a contaminant of crop seeds. It infests every county of Oregon. There are 28 inventoried sites in the watershed, all along roadsides.

Meadow knapweed is native to Europe and is now common from British Columbia to northern California. There are three known sites of meadow knapweed in the watershed, all along roadsides.

Scotch broom is native to Europe and is currently widespread in Oregon, where it was originally introduced as an ornamental. There are five known sites along roads in the watershed.

Spanish broom has been found at 16 sites in the watershed, all along roads, except two found along the Rogue River.

Tansy ragwort is a native to Europe. It was first reported around North American sea ports in the early 1900s, indicating it was probably introduced as a contaminant of soil used as ships' ballast. The plant is toxic to cattle and horses. There are 34 inventoried sites along roads in the watershed. The biological control, cinibar moth, has been released in areas outside of the watershed.

Port-Orford-cedar root rot,

Port-Orford cedar root disease, caused by *Phytophthora lateralis*, is an introduced pathogen and is a threat to Port-Orford cedar throughout its range. The disease is spread by root contact between infected trees, by waterborne spores, or by resting spores found in soil on vehicles and equipment. It is most commonly found in riparian areas that contain Port-Orford cedar. In this watershed, Port Orford Cedar is limited to the extreme western and northwestern edges (Map 19), primarily in the Mule Creek drainage in T 32S, R 10W. Just to the west, on US Forest Service lands on the Glendale to Powers road, extensive mortality of Port Orford cedar has occurred in the late 1990s. Evidence of mortality was also observed in the northwest portion of the Wilderness Area, but there are also apparently healthy stands of Port Orford cedar in this area.

White pine blister rust, *Cronartium ribicola*

This disease is an important stem canker disease of sugar pine in the watershed. Infection often results in tree mortality. This introduced pathogen completes its life cycle on these pines with *Ribes* species as the alternative host. It is common in this watershed to find large, recently dead sugar pines on ridges. It is unclear whether blister rust is the dominant cause. Other factors, such as the extended drought conditions in the 1980s or the heavy stocking of younger Douglas-fir trees occurring as a result of fire suppression also may be significant contributing factors. Most likely it is a combination of these factors. In any event, blister rust and Douglas-fir stocking appears to be prohibiting the regeneration of sugar pine in many areas of the watershed.

Black stain, *Ceratocystis wageneri* , is a vascular wilt that causes mortality of infected trees. Most mortality occurs in Douglas-fir stands younger than 30 years old. Incidence of the disease appears to be highly associated with site disturbance such as road building, logging, and skid trails. The disease can spread to surrounding trees by root contact. Insects are involved in the long distance spread of the disease.

Air Quality

There are three designated air quality areas, as defined by Oregon Department of Environmental Quality, which may affect management within the Wild Rogue North watershed. The Kalmiopsis Wilderness has been designated a Class 1, smoke- sensitive area. This area is located approximately 21 miles southwest of the watershed. Regulations prohibit smoke from prescribed burning from entering the Kalmiopsis between July 4 and Labor Day. The Wild Rogue Wilderness Area is a Class 2 smoke-sensitive area. The Grants Pass non-attainment area is 30 miles southeast. The Medford/Ashland non-attainment area is 56 miles east-southeast of the watershed and generally is not a factor in management.

Timber Products

Partial-cutting was common in roaded areas of the watershed. A relatively light partial cut or salvage entry was a typical harvest practice, particularly in East Fork Kelsey Creek and Quail Creek drainages. In these stands approximately 1/3 of the volume and most of the large snags were removed in the 1970s. These stands are now dominated by large conifers with a single, undifferentiated understory layer of brush and conifer saplings. Heavier partial cuts, similar to a shelterwood harvest, occurred in East Fork Mule Creek, Mule Creek, and a few other places. These stands consist of widely scattered overstory conifers with an understory varying from patches of conifer reproduction and brush, to a mixture of predominantly hardwood trees and brush with limited distribution of conifer seedlings and saplings.

More discrete patches were created within the older forested stands, through clearcutting which began in the 1950s and reached their peak in the 1980s. A pattern of rectangular shaped openings connected by a network of roads has been created in Mule, East Fork Mule, North Fork Kelsey, and Ditch Creeks. Recent timber sales are shown on Map 20.

The primary forest product in the Wild Rogue North watershed is large merchantable timber from unmanaged or previously entered stands. Of the timber harvested in the last fifty years, much has been large timber, using regeneration, overstory removal, or selection harvests. It is expected that trees harvested in the near future will be of similar sizes, but it is also expected that commercial thinnings will provide a greater proportion of timber volume than it does today.

Non-federal land represents only approximately four percent of this watershed. All of the old-growth timber on private and state land has been cut. Recent harvest on private land has consisted of smaller trees left in previously logged lands, and of second or third growth stands. State of Oregon lands have also had most of their larger trees harvested.

On BLM lands, timber productivity and management is closely tied to natural plant series (see discussion in the Characterization section) and site productivity. Site Class is a relative measure of the land's ability to grow timber and has a number scale from the best Site Class of 1 to the lowest Site Class of 7.

Productivity in the watershed ranges from relatively low productivity (site classes 4 & 5 in the east and in the Wilderness Area) to higher site quality in Mule Creek (site class 3 and 4). The higher productivity in Mule Creek is due to higher levels of precipitation and soils more conducive to timber production. There are isolated patches of Site 2 land identified in the BLM inventory, but the accuracy of this data is suspect. The main limiting factors for site class differences in this watershed are precipitation and soil depth. Soil depth is affected by steepness of slopes. The precipitation ranges from 40" on the eastern side of the watershed to 118" on the western part. The sites with the lowest productivity, or which pose other reforestation hazards have been withdrawn from intensive timber management (Table 19 and Map 21).

Lower site class areas typically are more difficult to reforest with conifers after harvest. Low site class areas with south and southwest facing aspects are very difficult to reforest. With the high precipitation of the area, pioneer brush species often invade such sites. This causes added difficulty and expense in later years to promote conifer growth.

The Northwest Forest Plan (NFP) and the Medford District Resource Management Plan (RMP) guide BLM management in this watershed. They establish land use allocations which allow for programmed timber harvest in some areas and restricts timber harvest activities in others. Matrix lands, where timber harvest is a primary objective, includes General Forest Management Areas (GFMA) and Connectivity/Diversity Blocks.

There are approximately 9,253 acres of GFMA lands that are available for intensive forest management in the watershed (Table 19 and Map 22). This represents 16 percent of the BLM land, a relatively small portion of the watershed.

Timber harvest typically leaves a portion of the potential timber commodity standing. Under the RMP, regeneration harvest would not be planned for stands less than 100 years old and would generally not occur in stands less than 120 years old in the first decade of the plan, before 2005 (RMP p. 189). The RMP also directs that regeneration harvests on GFMA lands retain a minimum of 6 - 8 standing green trees per acre, as well as snags and coarse woody debris for wildlife, fish and soil purposes. This could amount to 5,000 board feet per acre or more being left. Historically, a portion of this material would have been harvested and removed.

The other watersheds in the Glendale RA are more completely roaded than the Wild Rogue North watershed. There is a significant portion of the Wild Rogue North watershed that remains unroaded at this time. This is partly a legacy of the consideration of the area for wilderness designation. This area was deemed not suitable for wilderness in 1980, however, no significant timber harvest, road building or road maintenance have occurred in this area. There is relatively low site class in this area, and as a result, the number and average size of the conifers is lower than elsewhere in the watershed.

Projections and Sustainability

In recent years, there has been much discussion regarding the "sustainability" of various commodities on federal lands, particularly timber. It is important to know how the BLM determines its Allowable Sale Quantity (ASQ), and how it affects the Wild Rogue North watershed. The ASQ is the level of timber harvest, including salvage, that the BLM calculates can be removed from its timberland each year on a sustainable basis. These calculations include increases in growth over the life of the timber stand as a result of intensive forest management practices, such as planting, brushing, and thinning. ASQ calculations are done for a "Master Unit," which are based primarily on county lines. The Wild Rogue North watershed is included in the Josephine Master Unit, which makes up approximately half the Medford District's land base. The calculations are based on permanent inventory and growth plots located throughout each Master Unit.

The BLM does not generate its inventory or projections of the Allowable Sale Quantity by HUC 5 or HUC 6 watersheds. Acres actually cut in a given year may be chosen from anywhere within the Master Unit and are not expected to be proportionately produced by any watershed within it. There is no requirement to harvest a given amount of acres or volume each decade from the Wild Rogue North watershed. Currently, there is an ASQ of about 13.5 million board feet from the entire Glendale Resource Area. The Wild Rogue North watershed comprises about one quarter of the Glendale Resource Area.

How should a "sustainable harvest " of timber commodities on General Forest Management Area lands in the Wild Rogue North watershed be considered? It would not include harvest from lands in Riparian Reserves, spotted owl core areas, Late-successional Reserves, TPCC withdrawn areas, or recreation sites. In the Wild Rogue North watershed, the land outside of all reserves, available for planned timber harvest is 9,253 acres.

There are 529 acres of Connectivity/Diversity Blocks in the Wild Rogue North watershed. In the RMP, timber harvest is permitted in Connectivity Blocks, however, special considerations are made to retain late successional characteristics here. For example, at least 25-30 percent of each block are to be maintained in late-successional conditions. This is done to provide blocks of land to provide connections between Late-successional Reserves. Also, at least 12 - 18 green trees per acre are to be retained when doing regeneration harvest in these blocks. Potential harvest amounts, therefore, are less than from other GFMA lands. Low site lands in this watershed often have only slightly more than 18 green trees per acre, before any harvest, so there may be a large restriction on potential harvest in Connectivity Blocks. For that reason, any harvest that may be made here in the future is not included into the projected timber harvest in this document.

Assuming a hypothetical 100-year rotation age on the 9,253 acres of General Forest Management Area (GFMA) lands outside of reserves (Table 19), an evenly distributed harvest on BLM lands in the watershed can be projected to result in approximately 925 acres of regeneration harvest per decade. This is a greatly simplified analysis, since productivity varies greatly between locations,

but it is a useful aid in assessing relative timber availability and future projections of impacts. It is important to keep in mind that annual harvest levels are not determined based on individual watersheds. As a result, the actual harvest levels in this watershed for any period may be much higher or lower than these projections.

Another method of estimating how much a "sustainable harvest" might be in the future, is to use Table 20. This table shows that for GFMA lands outside of reserves, 1,344 acres occur in the 0-20 year age group and 1,254 acres are in the 21-40 year age group. It also indicates that harvest acres have been increasing in recent decades. The primary agent creating these age groups in the last forty years has been timber harvest. However, harvested acreage is still reasonably close to the projected 925 acres/decade. The balance of Table 20 shows how projected harvests in the future would alter the seral stages of GFMA lands. It should be noted that the ages and seral stages of all other reserve lands in the Wild Rogue North watershed will continue to age and develop under this projection.

Table 20 uses the current seral stage acres as a starting point to project one scenario of what age classes might be harvested in the next 100 years. There are a few assumptions in this table:

- Newly harvested land will be primarily from the oldest age groups and from areas previously entered for partial cut harvest.
- Commercial thins are not present in this table as they are not as significant a disturbing agent as regeneration harvests are.
- An average of 925 acres is harvested per decade.

Table 20. Acres of General Forest Management Area outside reserves, Wild Rogue North watershed.

Year	2000	2020	2040	2060	2080	2100
0-20 yr	1,344	1,850	1,850	1,850	1,850	1,853
21-40 yr	1,254	1,344	1,850	1,850	1,850	1,850
41-60 yr	85	1,254	1,344	1,850	1,850	1,850
61-80 yr	593	85	1,254	1,344	1,850	1,850
81-150 yr	1,836	1,904	1,445	1,666	1,823	1,850
151-200 yr	904	1,067	757	693	30	0
200+ yr	2,049	1,073	753	0	0	0
81-200 yr Modified	1,188	676	0	0	0	0
TOTALS	9,253	9,253	9,253	9,253	9,253	9,253

There are 528 acres of land in GFMA lands that, for various reasons, are non-forest and are not capable of growing

marketable timber. Those numbers are not included in these calculations.

Table 20 projects one scenario of seral stages on BLM land in the next 100 years. Some conclusions from this data projection include:

-By the year 2040, all modified (partially harvested acres) will have been harvested.
-By the year 2040, older stand classes will have been reduced to 25 percent of Year 2000 levels.
-By the year 2060 the remaining old growth stands (200+ years old) will have been harvested, representing 22 percent of the available GFMA stands.
-By 2080, less than one percent of older classes (> 150 years) will still remain.
-By 2100, an even seral stage distribution will have been achieved, with seral stages of 0-100 years.

It appears possible from this projection that the BLM could maintain a harvest of an average of 925 acres per decade in this watershed while maintaining standards and guidelines as stated in the Medford District RMP. In addition, older aged stands would increase in designated reserves.

Assuming a range of 5,000 to 15,000 board feet per acre of timber, the above scenario projects a range of 4.5 to 13.5 million board feet per decade could be produced in the Wild Rogue North watershed. Because timber volumes vary widely based on productivity and management, volume projections into the future are highly speculative.

Table 21 projects seral stages on all allocations on public land in the watershed. It was assumed that BLM would harvest an average of 925 acres per decade. An allowance was made in this projection for disturbance (e.g. fire) in the reserve areas of 500 acres each decade.

This projection shows a significant shift to seral stages older than 150 years for the watershed as a whole, as BLM reserves recover from past logging. This is a feature of the Northwest Forest Plan that intends that Riparian Reserves and other reserves to remain uncut for this period.

Prompt planting of timber sale units is key to achieving successful reforestation. This approach helps seedlings become established before other vegetation can dominate a site. The delay between the sale of timber and successful reforestation is termed the regeneration period. Average regeneration period ranges from 3-4 years. Proper site preparation (i.e. prescribed burning of timber slash and natural shrub vegetation, as well as fertilization and shade carding on hot dry sites) is critical for proper reforestation. Improved genetics and the partial shading provided by current harvest methods has improved the survivability of seedlings. However, harsher sites (i.e., south aspects and rockier soils) will be more difficult to regenerate.

Table 21. Comparison of BLM seral stage acres after 100 years assuming a 925 acre harvest per decade and a one percent loss per decade of reserve due to disturbance, Wild Rogue North watershed.

Year 2000				Year 2100			
SERAL STAGE	GFMA IN BASE OUTSIDE RESERVE	BLM RESERVES	TOTALS	SERAL STAGE	GFMA IN BASE OUTSIDE RESERVE	BLM RESERVES	TOTALS
0-20 yr	1,344	2,579	3,923	0-20 yr	1,853	1,000	2,853
21-40 yr	1,254	2,596	3,850	21-40 yr	1,850	1,000	2,850
41-60 yr	85	852	937	41-60 yr	1,850	1,000	2,850
61-80 yr	593	787	1,380	61-80 yr	1,850	1,000	2,850
81-150 yr	1,836	23,617	25,453	81-100 yr	1,850	1,000	2,850
				100-150 yr	0	4,501	4,501
151-200 yr	904	4,833	5,737	151-200 yr	0	6,335	6,335
200+ yr	2,049	10,795	12,844	200+ yr	0	30,423	30,423
81-200 yr Modified	1,188	2,337	3,525	81-200 yr Modified	0	2,137	2,137
TOTALS	9,253	48,396	57,649	TOTALS	9,253	48,396	57,649

Limitations to Sustainability

The NFP places numerous limitations on which lands the BLM may offer timber for sale which are not taken into account in these projections and may not be accounted for in the Trim-Plus growth and yield modeling used in setting the Allowable Sale Quantity (ASQ) in the RMP. The model assumed approximately 50 percent of the potential GFMA would be taken up in Riparian Reserves. The actual, estimated deduction for Riparian Reserves in this watershed is very close to the model at 49 percent. However, deductions for Survey and Manage species protection measures were not factored into the modeling at the time. Harvest levels are being reduced due to the management practices to protect survey and management species (Table 22). The actual volume loss is difficult to estimate, due to the variety of species being protected and the locations and degree of these protective measures.

Table 22. Restrictions and constraints to timber harvest, Wild Rogue North watershed

Land Allocation Type	Acres	% of total WA	Timber Harvest Restrictions
1. Owl Core Area & LSR	23,490	40.7	Within the Owl Core, only activities that improve Spotted Owl Habitat. Within the LSR, no trees over 80 years old, and restricted to thinnings that benefit late successional characteristics
2. Recreation Sites	23	0.1	No harvest except for removal of hazard trees
3. River Corridor & Wilderness	11,465	19.9	No harvest
4. TPCC withdrawn	3,301	5.7	No harvest; withdrawn due to rocky soils, fragile slopes, high water tables and other factors.
5. Riparian Reserves	9,583	16.6	Some selective cuts or thinnings for the purpose of improving riparian and late-successional habitat.
6. Connectivity Blocks	529	1.0	Harvest is permitted, leaving: 25 - 30 % in late successional condition; a minimum of 12 to 18 trees per acre.
7. Available GFMA	9,258	16.0	Harvest is permitted, leaving a minimum of 6 to 8 trees per acre; a minimum of 120 linear feet of large (16") woody debris
Totals	57,649	100	

Special Forest Products

In the NFP, there are guidelines for the harvest of Special Forest Products (SFP). With fewer traditional forest-related jobs now compared with a decade ago, some workers have converted to working with SFPs as an alternative occupation, full or part time. For this reason, there is a slightly greater demand for SFPs, which is expected to continue in years to come.

Compared to other watersheds in the Glendale Resource Area, there is less demand and harvest in the Wild Rogue North watershed. Primarily, this is due to the remote character and unroaded portions of the drainage, rather than a lack of SFP resources. Distances to markets have profound effects on the profit margins of gatherers. When market conditions are profitable these barriers are less consequential.

The harvest and management of SFPs has not adversely affected the management of other resources, with the possible exception of decorative boughs (see discussion under that heading). As demand and harvests increase those interactions will need to be monitored.

Firewood

The Wild Rogue North watershed has several hardwood species, including pacific madrone, golden chinkapin, black oak, or tanoak that the public desires for firewood. In the past there have been some sales of these trees and conifers for firewood, primarily from log decks. The numbers and amounts of permits have been smaller than watersheds to the east. The great distances to travel both for home use and commercial buyers have made it economically difficult for buyers to feel it is worthwhile.

Management direction in the RMP has resulted in a lower supply and fewer sales of firewood from this area than prior to the RMP. This is a result of fewer timber sales creating slash and fewer new road systems being constructed. When new road systems are constructed, easy access to firewood is created adjacent to those roads. This trend in low firewood supplies from these historical sources are likely to continue in the near future.

Recent Resource Area planning efforts are moving in a direction of new supply sources and new means of firewood harvest. This has resulted in sales specifically for firewood and poles, including in areas planned for timber harvest. An increase in these types of sales will help offset supply losses from historical sources.

Other Wood Products:

In recent years there have been increases in demand for hardwood burls for decorative woodwork uses. Trees containing burls have large boles and are very old. When large trees are cut for their root burl it leaves a cavity in the soil, similar to a blow-down tree. Most often the bole of the tree remains on site as large woody material. Care must be taken not to over-harvest these trees, since they are limited in numbers and are difficult to replace. The high values paid for high quality burls make it worthwhile for individual burls to be sought. As wood industries change, it is likely that niche markets such as burl harvest will continue.

Sales of posts and poles, less than 8" dbh, occur in this watershed and will likely increase as supplies of merchantable timber in larger sizes becomes more scarce. New sales planned specifically for posts and poles will allow the demand to be met.

Other sales of specialty wood are rare and have not been increasing in recent years.

Decorative Trees Boughs:

Demand for incense cedar and pine boughs in the Wild Rogue North watershed has increased only slightly in recent years. It is expected this trend will continue. Supplies across the watershed have been adequate to meet these slow increases.

Demand for Port Orford cedar (POC) boughs has increased in recent years. However, there is considerable concern about the fungus causing root rot in POC trees. Most POC in the Wild Rogue North watershed occurs in the far western portion of the watershed, in the Mule Creek drainage. Root rot has been documented within the Wild Rogue Wilderness area and is widespread on Forest Service lands just west of this watershed. Management measures to prevent the spread of the fungus may seriously restrict sales of decorative boughs.

Demand for branches from manzanita species is increasing. Increased monitoring will be needed for this species.

Christmas Trees: The current low level of demand should continue.

Beargrass: Beargrass is present in this watershed in commercial quantities. There have been recent harvests in the Whisky Creek drainage. The largest harvest levels to date for beargrass in the Glendale Resource Area occurred in this watershed in 1998 and 1999. Harvest demand will likely continue and may increase in the Wild Rogue North watershed.

Mushrooms: Demand and sales in this watershed have always been low and will likely continue.

Pacific Yew: Demand and sales in this watershed have always been low and will likely continue.

Other Products: Sales of evergreen broadleaf species (e.g. salal, grape) has had slow and steady growth and should continue.

Literature Cited

USDA and USDI. 1993. Forest ecosystem management: an ecological, economic, and social assessment. Report of the Forest Ecosystem Management Assessment Team. Portland, OR.

USDI, Bureau of Land Management. 1999. Grave Creek watershed analysis. Medford, OR. .

Bureau of Land Management. 1994. Medford District Proposed Resource Management Plan/Environmental Impact Statement. Medford, OR.

C. Terrestrial Vegetation and Habitats

Late Successional Habitat and Special-Status Species

Current and Historic Conditions

Late successional habitat issues are highly significant within this watershed, primarily due to the large, solid block BLM-ownership, high proportion of late successional habitat, and special emphasis in the Northwest Forest Plan and the Medford District Resource Management Plan.

The current distribution of late-successional habitat has been influenced by natural vegetative development, land ownership patterns, the effects of commercial forest harvest practices, and fire exclusion. Due in part to limited road access, steep slopes, and many drainages, this watershed has had limited human entry and disturbance since European settlement, resulting in a low percentage of managed stands. The areas entered in recent years for commercial wood products include Kelsey, Whiskey, and Mule Creeks. This area has a substantial fire history; many smaller fires have occurred, plus several large, stand-replacement fires, including one very large event, in 1868 (USDA 1938).

This watershed is largely contiguous federal ownership, including many large old-growth patches, with only three areas with distinct openings resulting from timber harvest (Map 23). All major drainages, including the previously entered drainages of Kelsey, Whiskey, and Mule Creeks, as well as the Rogue River, contain significant amounts of old-growth habitat.

Within this watershed, late-successional forest habitat is considered to include conifer forest stands greater than 80 years old, comprising both mature and old-growth seral stages. Together these later seral stages comprise approximately 44,033 acres, and represent about 76 percent of the BLM ownership within the watershed.

Over time, mature (i.e., 80 years plus) forested habitats acquire additional characteristics which lead to more complex and older forests. Unique forest attributes may be found at different ages, indicating it may be valuable to identify age classes within the watershed at additional scales, including 80-150 years, 150-200 years, and greater than 200 years. For example, at eighty years a forest will not have the complexity or diversity characteristic of an older forest. Structural characteristics of late-successional habitat typically include older trees, multilayered canopies, large snags and downed wood, and deep forest litter and soil (Ruggiero et al, 1991). At around 150 years, forests enter a transition stage which more closely typifies an old-growth condition: canopy gaps develop within the forest as a result of the death of some large trees, and understory trees form multiple canopy layers, with a subsequent accumulation of large woody debris (FEMAT, 1993). Disturbances, including insects, disease, wind, and fire also contribute to patchy openings.

Later mature (150-200 years) and old-growth habitats (200 years plus) on BLM lands within the watershed comprise approximately 18,580 acres, or about 32 percent, while younger mature (80-150 years) habitat accounts for 25,452 acres, or 44 percent of the BLM lands within the watershed. These figures need to be assessed cautiously, primarily because of uncertain and limited data.

Also, some stands, particularly those in the Mule and Whiskey Creek drainages, have had selective harvest of overstory trees, resulting in reduced amounts of large overstory with an advanced size class of understory conifers or hardwoods, or multi-layered canopies under the scattered large overstory. These modified stands include approximately 3,595 acres, or about six percent of the BLM lands within the watershed. For the purpose of late-successional habitat analysis, these acres were not included, since they have usually been modified to such an extent that they are no longer functional as late-successional habitat, with large areas of open understory.

A limitation to interpreting this data involves delineation of the 150-year plus forest age class. This information was available only in limited areas, primarily because vegetative plot information was collected principally in areas intended for future timber harvest. Because a substantial portion of this watershed was not readily accessible, many areas did not receive detailed vegetative inventories, and in those locations 150 years and older age classes were not defined.

An additional analysis was performed using aerial photographs to assess suitable habitat for northern spotted owls. Habitat which qualified as Class 1 (nesting/roosting/foraging habitat) or Class 2 (roosting/foraging habitat) were considered "suitable" habitat for northern spotted owls (Map 24). While this analysis only includes BLM lands, it may be used as another indicator of the amount of late-successional habitat within the watershed. This analysis indicates 38,010 acres, or approximately 66 percent of BLM lands, qualify as suitable owl habitat. These stands also probably contain late-successional habitat conditions for other species.

Even using the lower of the two late-successional analysis calculations, showing 66 percent of the BLM lands within the Wild Rogue North watershed classified as late-successional habitat, this watershed is substantially above the NFP standard and guide of maintaining 15 percent late-successional forest in fifth-field watersheds.

Approximately 50 percent of the watershed, generally in the southern one-half of the analysis area, is included within the larger Fishhook/Galice Late-Successional Reserve (# RO-258). The Southwest Oregon LSR assessment (1995) indicates that approximately 60 percent of this LSR is currently late-successional habitat, which approaches the desired amount of 70 percent.

From the standpoint of connectivity, the Southwest Oregon LSR assessment also notes an important function of this LSR is to provide an east/west older forest link which connects the coastal mountains across the Rogue Valley to the Rogue-Umpqua divide. The BLM portion of the Fishhook/Galice LSR abuts the Siskiyou National Forest's portion on its southern boundary. Portions of this LSR are outside of the watershed analysis area; the total size of this LSR is almost 83,000 acres, with only 13 percent of that acreage currently in managed stands. The LSR assessment notes this is the central LSR on the Siskiyou National Forest, and with the large solid-block ownership of the BLM in this area, as well as the abundance of late-successional habitat, it is significant as a source population habitat for a wide variety of species.

Connectivity from this watershed to the west involves the Northwest Coast LSR, which is thought to contain many linkages of older forest habitat, including linkages with the Rogue River (USDA/USDI, 1995). The Grave Creek watershed lies immediately east of this watershed, consisting of a pattern of checkerboard public-private ownership in which late-successional habitat is substantially reduced, making connectivity problematic. Similar ownership and seral conditions also occur in the West Fork Cow Creek and Middle Cow Creek watersheds to the north of the Wild Rogue North watershed, again providing barriers to connectivity.

Late-successional habitat within this watershed appears to be well distributed. Even where previous timber harvest has occurred, there are bands of older forest remaining, including along Whiskey, Kelsey and Mule Creeks. Although a portion of the area around Mule Creek was heavily logged, a band of old-growth habitat occurs both along the main stem Mule Creek, as well as around East Fork Mule Creek, varying from 1/16 mi. wide in T32S, R9W, sec. 29 to generally 1/4 mi. wide or greater in its remaining portions. Kelsey Creek also provides mature forest habitat along its length, although a portion of Kelsey Creek appears to traverse through naturally young forest in T33S, R9W, sec. 2. Whiskey Creek also contains old-growth bands along most of its length, and provides mature habitat in areas where old-growth is not present.

Slope aspect significantly affects forest composition and structure within the watershed. South slopes tend to be drier, burn more intensely, and develop differently, in part as a response to fire. Fires frequently burn in a mosaic pattern, resulting in variable-sized openings, and stands with

diverse canopies and species mixtures, often including both hardwoods and conifers of a variety of age classes. North aspects tend to support more homogeneous, continuous conifer stands, dominated by Douglas-fir, often with a component of tanoak, madrone, and additional conifers.

The many deeply incised drainages of this watershed also provide significant amounts of additional late seral and riparian habitat, generally with more complex plant communities than adjoining habitats. For example, riparian areas may include a higher proportion of deciduous trees, including bigleaf maple and red alder, as well as a greater willow component, more annuals and perennials, and additional special status plant species.

Abundant snags and coarse woody debris, characteristic of late-successional forests, do not appear to meet RMP standards in portions of the watershed. However, extensive inventory data is lacking. It is suspected that snags and coarse woody debris may be below standards in some areas which have been entered for commercial wood products, including past salvage operations. In other areas, for example in entered portions of East Fork Kelsey, Quail and Mule Creeks, partial cutting was implemented, resulting in stands which are frequently deficit in large snags and downed wood. In other locations with a high component of live oak and madrone, low levels of snags and coarse woody debris may be a reflection of natural conditions.

With the reduced harvest in recent years in this watershed, combined with greater fire suppression efforts and reduced salvage operations in the LSR, the trend will likely be increasing amounts of snags and large woody debris.

Late-successional habitat and natural disturbances

Late-successional habitat in this watershed is strongly influenced by fire. In the Klamath Province, fire is the most important agent of disturbance (Atzet and Martin 1991) and is the most common agent of change on the adjacent Siskiyou National Forest (USDA and USDI, 1995). As described earlier, a very large fire burned for many weeks during the summer of 1868.

The Douglas-fir and tanoak plant associations are the dominant plant associations in the late-successional reserve portion of this watershed. In Douglas-fir-dominated landscapes, with stands which occur on warmer, drier sites with moderately shallow soils, biomass and litter production are high. The open canopies which develop, particularly on south aspects, allow tree regeneration and shrubs to form fuel ladders. Historically, these areas burned more frequently, reducing these ladder fuels and the potential for larger, stand-replacing fires. Due to recent fire suppression, the accumulation of ladder fuels currently poses a greater threat than was historically present. For example, Atzet and Martin (1991) found that controlling fire in Douglas-fir forests has contributed to reducing fire disturbance by over twice the historical average, resulting in significantly greater risks of stand-replacement fires.

Historically, many of the fires in this region were low intensity, patchy burns, rather than stand-replacement events. Occasional, large stand-replacement fires did occur, with resulting changes

in forest composition. Stand-replacement fires in this watershed allowed hardwoods to resprout and initially dominate the site until conifers, regenerated from seeds, took over and shaded out the hardwoods. In times when Douglas-firs did not have good seed years, hardwood sprouting would dominate, resulting in some stands with large tree form hardwoods such as tanoak.

In addition to increased fire risks as a result of suppression efforts, timber harvest in East Fork Kelsey and Quail Creeks utilized a partial cut technique, which resulted in stands with widely scattered overstory trees, with an understory of brush and small conifers and hardwoods. This practice has led to substantially greater risks of increased fire spread and intensity developing into stand replacement fires, due in large part to the significantly greater brush component currently present in these stands. Additionally, clearcutting in Mule Creek, East Fork Mule Creek, and North Fork Kelsey Creek has created additional risks of stand replacement fires.
The Late-successional Reserve, especially in some lower elevation areas, developed overstocked stands with many younger trees. This overstocking level and drought conditions have increased the water stress on older overstory trees. In high fire risk areas with a large proportion of pine or fir, it is suspected bark beetles have been killing trees at an increased rate. High stocking levels have also increased fuel loading, especially in the plant associations which historically had frequent low and moderate intensity fires. With fire suppression, the current fuel loading will now support large, intense fires, putting older forest habitats at greater risk to stand replacement fire.

Fires also maintained meadows and oak savannas by killing invading trees. As a result of fire suppression, these unique wildlife habitats have been substantially reduced as conifers encroach on the meadows.

Forest diseases do not appear to be affecting large areas within the Wild Rogue North watershed. However, with fire suppression increasing the number of stems per acre, moisture stress has also increased, with subsequent increases of pine beetles, especially in drought periods.

Other natural disturbances, including windthrow, especially near ridges, and blackstain fungus, create natural openings of various sizes and shapes.

Past management of habitats

Previous management in this watershed has focused on commercial wood product extraction. These activities have not dominated this watershed, largely due to limited access, as well as steep slopes and highly incised and numerous drainages. Commercial harvest has primarily occurred in Mule, Whiskey, Kelsey, and Quail Creeks. Harvest has largely been characterized by partial cutting and clearcutting, with a subsequent reduction in both coarse woody debris and snags. Salvage entries into the Mule Creek drainage have also affected ecological processes and reduced habitat for species associated with snags and coarse woody debris. Large woody debris has been recognized as critical to the structure and function of healthy forest stream ecosystems (Harmon

et al. 1986, Sedell et al. 1988). They are equally important to a wide variety of forest-dwelling species, including black bears (BLM 1994, ODFW 1987), as well as wood rats and flying squirrels, principal prey species of the threatened northern spotted owl (Levy 1997). Similarly, the reduction in snag densities in harvested areas can have profound influences on a wide variety of species, including many species which utilize cavities for rearing and resting. Cavities are thermally buffered and secure. Direction from the Northwest Forest Plan (USDA and USDI, 1994) provides guidance and indications of the importance of snags to a wide variety of cavity-nesting birds, including white-headed woodpecker, black-backed woodpecker, pygmy nuthatch, and flammulated owl. Snags are further utilized by a wide variety of additional wildlife species, including red tree voles, bats, shrews, bears, spiders, slugs, wasps, and invertebrates (Hunter 1988). Thus the effects of timber harvest, where there have been significant reductions in the number of snags and large woody debris, may have substantial impacts on wildlife species.

There has been very little actual field sampling of snag and coarse woody debris levels in this watershed. The only available data comes from the Cold Mule timber sale in Mule Creek, where five units, totaling fifty acres, or one-tenth of one per cent of the watershed, were sampled. Pre-project implementation monitoring indicated adequate snag levels on the five sampled units, ranging from 2.1-5.1 per acre. However, coarse woody debris levels ranged between 128-360 linear feet per acre on half of the sampled area, and had no coarse woody debris on the other half of the sampled area. Again, given the extremely small sample size, little inference can be drawn. However, a field review of snag and coarse woody debris conditions in East Fork Kelsey Creek and Kelsey Creek also indicated low levels of coarse woody debris.

Management practices on the few private parcels in the watershed are typically clearcutting, with little or no available late-successional habitat.

Source population habitat

Thousands of species are dependent upon late-successional forests for their continued survival, including a very broad range of vertebrates, invertebrates, fungi, and molluscs (FEMAT 1993). For many species, large blocks of unfragmented habitat are especially important for survival because they provide habitat buffered from manipulated areas.

The adverse impacts to wildlife which accompany forest fragmentation and edge effects result in quantitative and qualitative habitat losses, increased risk of predation, and increased competition between interior and edge species (Noss and Cooperrider 1994, Lemhkuhl and Ruggiero 1991).

The need for large areas of unfragmented landscapes, and the subsequent consequences of habitat fragmentation, has been documented for a broad range of species, including many forest interior bird species, and large mammals such as the cougar. For example, there is evidence of inbreeding as a result of increasingly isolated habitat for the remaining cougar population in Florida (USFWS 1987). This watershed is considered by ODFW to have a substantial cougar population (ODFW 1987).

Population declines have been reported for almost one-third of all neotropical migrant land birds (Rappole and McDonald 1994). Among the explanations for these declines is the belief that an area effect occurs, in which certain interior-dwelling bird species fail to breed because the available breeding habitat is too small. Larger habitat blocks therefore may provide an important habitat function in serving as a "source" for breeding birds, where there is enough suitable habitat to recruit new individuals into the population faster than individuals are lost. The analysis area is dominated by large blocks of mature or old-growth forested habitat. The majority of this watershed is intact, comprised of interior mature forested stands. However, according to the Southwest Oregon LSR assessment (1995), many of these interior patches are smaller, particularly in the tanoak plant series, where the Galice LSR exhibited an average older patch size of 250 acres, compared to a 900-acre average older patch size in the North Chetco LSR, and a 650-acre average older plant size in the Silver LSR.

Forest fragmentation is usually a product of many forces, including human activities such as clearcutting, and stochastic events such as fire. There is substantial literature on the effects of forest fragmentation in eastern North America (Forman et al 1976, Whitcomb et al 1981). In the western U.S., studies by Newmark (1987) suggest that isolation and small-area effects have been the cause of local extirpation for 43 percent of the medium and large mammal species in National Parks. Fragmentation effects are also believed to contribute to land bird declines because of the susceptibility of forest edges to penetration by corvids, small mammalian predators, and brown-headed cowbirds, a nest parasite which lays its eggs in a host nest, and subsequently has its young reared by the host rather than the host's own species. Brown-headed cowbird densities are thought to be highest among forest edges (Brittingham and Temple 1983), although effects of brown-headed cowbirds in this watershed are unknown.

Pacific Northwest forests are recognized as centers for endemic forest birds, with seven notable endemics, including three species strongly associated with old-growth forests, the hairy woodpecker, Pacific slope flycatcher, and brown creeper (Ralph et. al. 1991). Carey et. al. (1991) found that many additional bird species, including pileated woodpeckers, red-breasted sapsuckers, red-breasted nuthatches, and Vaux's swift, are more common in mature and old-growth habitats, although those habitats may be preferred rather than mandatory. They concluded that stand area, primarily a function of fragmentation, is an important influence on bird abundance.

Many large intact blocks of mature and old-growth habitat exist within the watershed, with old growth patches ranging from 20 acres to over 2,000 acres of continuous habitat. The extent of mature and old-growth in this watershed is so widely distributed that it may be more meaningful to consider the entire watershed as a large "block" of interior forest, with some minor fragmentation effects occurring in portions of the Wild Rogue Wilderness, East Fork Mule Creek, and Kelsey Creek. The north and northeast sectors of the watershed have the greatest habitat fragmentation. Within the watershed of approximately 97 square miles, only about 22 square miles have a majority of their area in early seral stages, with eight of these concentrated in the vicinity of Mule Creek, four around North Kelsey Creek, and two around Whiskey Creek.

Connectivity with adjoining watersheds

Connectivity facilitates movement and genetic exchange between or among species. Connectivity is particularly important for certain furbearers, such as fisher and marten (USDA and USDI, 1994), and species such as the northern spotted owl, which depends on high levels of canopy closure to successfully move between habitats without becoming a victim of predators such as great-horned owls or red-tailed hawks (Forsman 1984). Movement of spotted owls between large areas with multiple pairs is thought to be crucial to long-term population viability (Thomas et al. 1990).

As previously described, this watershed is thought to be currently providing significant source population habitat. In fact, when the surrounding landscape is assessed, it is apparent that this watershed, with an extensive mature and old-growth component, is critical to providing many source populations to adjacent areas which have been previously harvested on both public and private land. Therefore this area may actually have a greater importance in its function for immigration into the area rather than emigration from the area. 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.

The connection to the Rogue-Umpqua divide and the Galesville LSR is chiefly accomplished through the Grave Creek watershed, which lies directly to the east from the eastern boundary of the late-successional reserve, and to the northeast through the Middle Cow Creek watershed. The late-seral habitat connection from the late-successional reserve into matrix lands within the Wild Rogue North watershed largely occurs along upper Whiskey Creek, and in T33S, R8W sections 11,12,13, and 14. These sections currently contain approximately 25 percent old-growth, 25 percent later mature (150-200 yrs.), 30 percent mature, 15 percent pole, and 5 percent early and mid-seral forested habitat (Map 23).

An additional analysis of this area was conducted for the northern spotted owl critical habitat unit, CHU #65, which lies within the northern GFMA land allocation (Map 25). This analysis indicates that within this critical habitat unit of approximately 9,630 acres, there are a total of 3,093 acres in Riparian Reserves, 317 acres in owl cores, 2 acres in late-successional reserve, and 1,984 acres in TPCC withdrawn lands, for a total of 5,396 acres, or 56 percent of the CHU being unavailable for planned timber harvest. An additional 3,235 acres are currently available for harvest, or 44 percent.

Therefore, it appears that animals which depend upon late-successional habitat to successfully migrate and interbreed with other populations beyond this watershed can move in a generally east-northeast direction through well-connected late-successional habitats of the LSR and matrix.

Once species depart this watershed to the east, they encounter the Grave Creek watershed. In the Grave Creek watershed, east-west connectivity is difficult because of timer harvest on private and federal lands. The Grave Creek Watershed Analysis (1999) identified this problem and recommended special consideration be given to connectivity, especially within approximately one mile of the northern boundary of the watershed, in order to encourage species movement between provinces (USDI 1999). This connection to the Wild Rogue North watershed is bordered in the Grave Creek watershed by T33S, R8W, sections 1 and 12, with a lesser priority on sections 13, 24, and 25. A field review of this connection indicated the best available habitat was currently located in section 13 of Grave Creek and section 14 of the Wild Rogue North watershed. These immediately adjacent sections provide some late-successional habitat which will encourage movement. However, due to the checkerboard ownership throughout the Grave Creek watershed, commodity priorities, and prior extensive commercial harvest, connectivity through the Rogue Valley to the Rogue-Umpqua divide and the Galesville LSR, is tenuous.

The Middle Cow Creek watershed analysis also identified an east-west connection, accomplished in this watershed from the Wild Rogue North watershed along its southern boundary (USDI 1998). In this area, the watershed analysis recommends at least 30 percent of each section should be maintained in a late seral condition. This connection to the Wild Rogue North watershed is bordered in the Middle Cow Creek watershed by T32S, R8W, sections 1,2,3, and 4. These sections are comprised of approximately 70 percent mature and old-growth habitats, so the extreme southern sector of the Middle Cow watershed connection is adequate. However, this area is checkerboarded with private land, including some large private land ownerships between the western and the eastern sectors, including the community of Glendale and the I-5 corridor, making east-west connectivity problematic. Connections to the north are also checkerboarded and include some heavily harvested private ownerships.

The area immediately adjoining the analysis area to the south and southwest is a solid block of Siskiyou National Forest, and is within a Late-successional Reserve land allocation. This habitat is the Fish Hook/Galice LSR (#RO-258), the central and largest LSR on Siskiyou National Forest. Since only activities which are compatible with the maintenance or enhancement of Late-successional Reserves will be implemented in these areas, it is expected this large habitat block, which essentially functions as an extension of the interior forested habitats which dominate this watershed, will persist.

The area to the west of the analysis area, from the Wild Rogue Wilderness, includes the Northwest Coast Late-successional Reserve within the Siskiyou National Forest. Mature forest dominates approximately 30 percent of the Wild Rogue Wilderness. Existing information suggests the Wilderness probably provides some connection to the adjoining Northwest Coast LSR, which is managed for late seral conditions, and currently has many linkages of older forest habitat (USDA and USDI 1995). As a result, connectivity to the west is likely to remain functional.

There are also two connectivity blocks within the Wild Rogue North watershed, located in T 32S, R 9W, section 17, and T 33S, R 8W, section 9. Section 17 is currently functional for late-seral connectivity, with approximately 60 percent of habitat within this block in old-growth. Section 9 is also currently functional for connectivity, with approximately 80 percent of the section in mature or old-growth condition.

Special status species and habitats

Special status species include several classifications, among which are:

- Federally listed Threatened, Endangered, and Candidate species which are listed or considered for listing under the Endangered Species Act (Table 24).

- Protection Buffer and Survey and Manage Species, which include those species identified in the Northwest Forest Plan and the Medford District RMP as needing special consideration due to their association with late-successional habitat (Tables 23 and 25).

- Species of Concern, which include species which were formerly listed as Candidate species.

- Bureau Sensitive species, those species which BLM considers to be of concern and which may have the potential to become federally listed.

- Bureau Assessment species, those species considered as important to monitor and manage to prevent elevation of status to a higher level of concern

- Species identified by the state of Oregon as warranting special attention, either through listing under the Oregon Endangered Species Act, or identified as an Oregon Special Status Species

- Neotropical Migratory Landbirds, those bird species which winter south of the Tropic of Cancer and breed in North America, many of which are in decline (Table 28).

Special Status Plant Species

Table 23 lists the special status plant species known to occur within the Wild Rogue North watershed.

Table 23. Special Status, and Survey and Manage Plants in the Wild Rogue North watershed.

Species Common Name	Status	Habitat	Number of Sightings	Average plants per sighting
Allium bolanderi var. *mirabile* ALBOM Potato-bulb bolander's onion	Bureau Watch	Rocky clay soils, including serpentine; forest openings.	1	500
Allotropa virgata ALVI2 Sugar stick	Survey and Manage, Strategy 2	Coniferous forest, old-growth associated.	10	19
Asarum caudatum var. *novum* ASCA50 White-flowered ginger	Bureau Tracking	Coniferous forest, often riparian.	5	500
Bensoniella oregana BEOR Bensonia	Sensitive, S&M Strategy 2	Stream edges, moist meadows, often old-growth associated.	19	180
Lewisia cotyledon var. *howellii* LECOH2 Howell's lewisia	Bureau Sensitive	Rock outcrops, rocky open areas, sometimes on serpentine.	2	3
Sedum moranii SEMO5 Rogue River stonecrop	Bureau Sensitive	Serpentine rock outcrops in full sun.	2	3

The sites these species occupy are generally small, covering only one to a few acres. More sites undoubtedly occur, and will be found with continued surveys. Protection is currently required for the Bureau Sensitive and Assessment species, and the Survey and Manage strategy 2 species. Tracking and Watch species are tracked only for review purposes. The *Lewisia cotyledon* var. *howellii* site near Marial was originally reported by Morton Peck in 1917.

No surveys have been conducted in the Wild Rogue North watershed for survey and manage non-vascular plants (lichens, bryophytes and fungi). Several species have been found on the Glendale RA, and are expected in the Wild Rogue North watershed. Species requiring surveys before ground-disturbing activities include Survey and Manage Strategy 2 and Protection Buffer Species. Of these species that require surveys, those that have been found on the Glendale RA include the fungi *Otidea leporina*, *Otidea onotica* and *Sarcosoma mexicana*, the liverwort *Ptilidium californicum*, and the mosses *Buxbaumia viridis* and *Ulota megalospora*.

Special status wildlife species and habitats

Tables 24 - 28 list the wildlife species in these categories and their status in the watershed.

Species which are thought to have substantial impacts on management activities are discussed in greater detail in this section. The Oregon Department of Fish and Wildlife (1993) notes that the relatively small Klamath Province supports the highest number of vertebrate species of any Province in Oregon. There are at least 60 potential sensitive species in the watershed.

Table 24. Federal Endangered, Threatened and Candidate Species - Wild Rogue North watershed.

Common Name	Scientific Name	Status	Presence/ Inventory	Habitat	Monitoring
Marbled murrelet	*Brachyramphus marmoratus*	FT,ST	U/3	Y	Y
Northern spotted owl	*Strix occidentalis caurina*	FT,ST	D/3	Y	Y
Bald eagle	*Haliaeetus leucocephalus*	FT,ST	D/3	Y	Y
Coho salmon	*Oncorhynchus kisutch*	FT,SC	D/3	Y	Y
Steelhead trout	*Oncorhynchus mykiss*	FC,SV	D/3	Y	Y

Legend follows Table 28.

Table 25. Protection Buffer/Survey and Manage Species - Wild Rogue North watershed

Common Name	Scientific Name	Status	Presence/ Inventory	Habitat	Monitoring
Del Norte salamander	*Plethodon elongatus*	PB,SM,SoC,SV	D/3	Y	Y
White-headed woodpecker	*Picoides albolarvatus*	PB	U/N	Y	N
Black-backed woodpecker	*Picoides pubescens*	PB	U/N	Y	N
Flammulated owl	*Otus flammeolus*	PB	U/N	Y	N
Great gray owl	*Strix nebulosa*	PB	S/3	Y	Y
Red tree vole	*Aborimus pomo*	SM	D/3	Y	Y
Blue-grey tail-dropper slug	*Prophysaon coeruleum*	SM	D/3	Y	U
Papillose tail-dropper slug	*Prophysaon dubium*	SM	D/3	Y	U
Oregon shoulderband snail	*Helminthoglypta hertelini*	SM	S/3	Y	N
Chace sideband	*Monadenia chaceana*	SM	S/3	Y	N
Oregon megomphix	*Megophix hemphilli*	SM	U/3	U	N

Table 26. Potential Vertebrate Special Status Species - Wild Rogue Northwatershed.

Common Name	Scientific Name	Status	Presence/ Inventory	Habitat	Monitoring
White-footed vole	*Phenacomys albipes*	XC,BT	U/N	U	N
Western gray squirrel	*Sciurus griseus*	SU,BT	U/N	U	N
Fisher	*Martes pennanti*	XC,BS,SC	S/N	Y	N
American Marten	*Martes americana*	SV	S/N	Y	N
Wolverine	*Gulo gulo luteus*	XC,ST	U/N	U	N
Canada lynx	*Lynx canadensis*	FP	U	U	N
Ringtail	*Bassariscus astutus*	SU,BT	U/N	Y	N
Townsend's big-eared bat	*Corynorhinus townsendii*	BS,SC	Y/3	Y	N
Fringed myotis	*Myotis thysanodes*	XC,SV,BT	S/3	Y	N
Yuma myotis	*Myotis yumanensis*	XC,BT	U/3	Y	N
Long-eared myotis	*Myotis evotis*	XC,BT	U/3	Y	N
Long-legged myotis	*Myotis volans*	XC,BT	U/3	Y	N
Silver-haired bat	*Lasionycteris noctivagans*	SU,BT	U/3	Y	N
Pacific pallid bat	*Antrozous pallidus*	SV,BT	U/3	Y	N
Brazilian free-tailed bat	*Tadarida brasiliensis*	BA	S/3	Y	N
Dusky Canada goose	*Branta canadensis occidentalis*	BT	S/N	Y	N
Harlequin duck	*Histrionicus histrionicus*	XC,SU,BA	D/N	Y	N

Common Name	Scientific Name	Status	Presence/ Inventory	Habitat	Monitoring
Northern goshawk	*Accipiter gentilis*	XC,SC,BS	S/2	Y	Y
Swainson's hawk	*Buteo swainsoni*	SV,BT	U/N	Y	N
Ferruginous hawk	*Buteo regalis*	XC,BS	U/N	Y	N
American peregrine falcon	*Falco peregrinus anatum*	SE	D/3	Y	Y
Forster's tern	*Sterna forsteri*	BT	S/N	Y	N
Black tern	*Chlidonias niger*	XC,BT	U/N	Y	N
Yellow-billed cuckoo	*Coccyzus americanus*	BS	S/N	Y	N
Allen's hummingbird	*Selasphorus sasin*	BT	S/N	Y	N
Acorn woodpecker	*Melanerpes formicivorus*	BT	S/N	Y	N
Williamson's sapsucker	*Sphyrapicus thyroideus*	BT	S/N	Y	N
Pileated woodpecker	*Dryocopus pileatus*	BT	D/N	Y	N
Olive-sided flycatcher	*Contopus cooperi*	XC,BT	S/N	Y	N
Willow flycatcher	*Empidonax trailii brewsteri*	XC,BT	S/N	Y	N
Black phoebe	*Sayornis nigricolis*	BT	S/N	Y	N
Purple martin	*Progne subis*	SC,BS	S/N	Y	N
Bank swallow	*Riparia riparia*	SU	S/N	Y	N
Western bluebird	*Sialia mexicana*	SV,BT	S/N	Y	N
Foothills yellow-legged frog	*Rana boylii*	XC,SV,BT	S/N	Y	N

Common Name	Scientific Name	Status	Presence/ Inventory	Habitat	Monitoring
Northern red-legged frog	*Rana aurora aurora*	XC,SU,BT	S/N	Y	N
Tailed frog	*Ascaphus truei*	XC,BT	S/N	Y	N
Western toad	*Bufo boreas*	SV,BT	S/N	Y	N
Siskiyou mountains salamander	*Plethodon stormi*	XC,BA	S/N	Y	N
Clouded salamander	*Aneides ferreus*	SU,BT	S/2	Y	N
Southern torrent salamander	*Rhyacotriton variegatus*	XC,SV,BT	S/2	Y	N
Black salamander	*Aneides flavipunctatus*	SP,BA	S/2	Y	N
Western pond turtle	*Clemmys marmorata*	XC,BS,SC	D/3	Y	N
Sharp-tailed snake	*Contia tenuis*	SV,BT	S/N	Y	N
California mountain kingsnake	*Lampropeltis zonata*	SV,BT	S/N	Y	N
Common kingsnake	*Lampropeltis getulus*	SV,BT	S/N	Y	N
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	XC,BT	S/N	Y	N

Table 27. Potential Invertebrate Special Status Species - Wild Rogue North watershed.

Common Name	Status	Presence/ Inventory	Habitat	Monitoring
Denning's agapetus caddisfly	XC,BT	U/N	U	N
Green Springs Mountain farulan caddisfly	XC,BT	U/N	U	N
O' brien rhyacophilan caddisfly	XC,BS	U/N	U	N
Siskiyou caddisfly	XC,BT	U/N	U	N
Clatsop philosascan caddisfly	XC,BT	S/N	U	N
Cooley's acalypta lace bug	BT	S/N	U	N
Gray-blue butterfly	BT	S/N	U	N
Western sulpher butterfly	BT	S/N	U	N
Rural skipper butterfly	BT	S/N	U	N
Mardon skipper butterfly	XC,BA	S/N	U	N
Coronis fritillary butterfly	BA	S/N	U	N
Siskiyou chloealtis grasshopper	XC,BT	S/N	U	N
Franklin's bumblebee	XC,BS	S/N	U	N
Klamath rim pebblesnail	BS	S/N	U	N
Nerite pebblesnail	BS	S/N	U	N
Mountain peaclam	XC,BS	S/N	U	N

Table 28. Potential Neotropical Migratory Landbirds - Wild Rogue North 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

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.

Legend for Tables 24 - 28.

Status:
FE- Federal Endangered
FT- Federal Threatened
FP- Federal Proposed
FC- Federal Candidate
XC-Former Federal Candidate
SM- Survey and Manage
PB- Protection Buffer
BA-Bureau Assessment
BS- Bureau Sensitive
BT-Bureau Tracking
SE-State Endangered
ST- State Threatened
SC- State Critical
SV- State Vulnerable
SP- State Peripheral or Naturally Rare
SU- State Undetermined Status

Presence:
D- Documented
S- Suspected
U- Uncertain
A- Absent

Habitat:
N - Habitat is not present
Y - Habitat is present
U - Habitat is uncertain

Inventory:
N-No surveys done
1- Literature search only
2- One field search only
3- Limited surveys done
4- Protocol completed

Monitoring:
N-None planned or complete
U-More info. needed
NA- Not Applicable
Y- Currently being monitored

Additional Legend Clarification:

The categories of FE, FT, FP, FC, ST, SE, BS, BA, and BT are mutually exclusive. Hence, if a species is a federal candidate or state listed as endangered or threatened, it is not also Bureau sensitive.

Oregon State Status SC (State Critical): Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species which are at risk throughout their range, and some disjunct populations.

Oregon State Status SV (State Vulnerable): Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases the population is sustainable and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.

Oregon State Status SP (State Peripheral/Naturally Rare): Peripheral species refer to those whose Oregon populations are on the edge of their range. Naturally rare species are those which had low population numbers historically in Oregon because of naturally limiting factors. Maintaining the status quo for the habitats and populations of these species is a minimum requirement. Disjunct populations of several species which occur in Oregon should not be confused with peripheral species.

Oregon State Status SU (Undetermined Status): Species for which status is unclear. Species may be susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical, or vulnerable status, but scientific study will be required before a judgment can be made.

Bureau Status BS (Bureau Sensitive): Species that could easily become endangered or extinct in a state. Bureau Sensitive species are restricted in range and have natural or human-caused threats to survival. Bureau Sensitive species are not FE, FT, FP, FC, SE, or ST, but are eligible for federal or state listing or candidate status. Thus species that are Oregon state critical or Oregon Natural Heritage Program List 1 are considered Bureau Sensitive species. Bureau Sensitive species are designated by the State Director and are typically tiered to the state wildlife agencies' designations. The BLM 6840 Manual specifies policy which requires any Bureau action will not contribute to the need to list any of these species (i.e. equivalent to policy applied to federal candidate species). All anadromous fish species, unless federally listed, proposed, or candidate, are under review and are considered Bureau Sensitive until status is determined.

Bureau Status BA (Bureau Assessment): Species which are not presently eligible for official federal or state status but are of concern in Oregon may, at a minimum, need protection or mitigation in BLM activities. These species will be considered as a level of special status species

separate from Bureau Sensitive, and are referred to as Bureau Assessment (BA) species.

Bureau Status BT (Bureau Tracking): Species which need an early warning to prevent becoming listed as threatened or endangered in the future. It is encouraged that occurrence data is collected on these species for which more information is needed to determine status within the state or which no longer need active management.

All status information is based upon the draft guidelines from the May, 1999 edition of the BLM Oregon/Washington Special Status Species Database.

Special status habitats within this watershed include critical habitat for the northern spotted owl and marbled murrelet.

Critical habitat for the northern spotted owl is a legal designation under the Endangered Species Act (ESA). It was designated in January 1992, defined in Section 3(5)(A) of the ESA as those areas which provide the physical and biological features that are "essential to the conservation of the species" and "which may require special management considerations or protection." [(16 U.S.C. 1532 (5)(A)]. The Fish and Wildlife Service determined that the primary constituent elements to the conservation of the spotted owl were those physical and biological features that support nesting, roosting, foraging, and dispersal (USDI 1992). The Service's Biological Opinion on the Northwest Forest Plan (Appendix G in the FSEIS) was that destruction or adverse modification of critical habitat would not occur. However, the analysis supporting this opinion was done at a scale covering the entire range of the spotted owl, and the opinion notes that a more localized analysis should occur to ensure that the LSRs and other reserve areas are meeting the needs of the Critical Habitat network.

This watershed includes northern spotted owl Critical Habitat Units (CHUs) #OR-65 and OR-67 (Map 25). OR-65 consists of approximately 22,850 acres, located in the eastern 1/3 of the watershed. It was designated because it provides two inter-provincial links: from the Klamath Mountains Province to the Western Cascades Province, and from the Klamath Mountains Province north to the Coast Ranges Province (USDA and USDI 1996). It was also established because it provides a core area of suitable habitat to help augment the severely fragmented Rogue-Umpqua portion of the I-5 Area of Concern. It is important to note that while most of this critical habitat unit overlaps Late-successional Reserve, almost the entire northeastern portion of this watershed, outside of Late-successional Reserve, but within the matrix land allocation, is also designated northern spotted owl critical habitat. Specifically, this area includes T 32S, R 9W, sections 1, 12, and 13; and T 33S, R 8W, sections 4, 5, 6, 7, 8, 9 and 14.

Critical Habitat Unit #OR-67 consists of approximately 6,330 acres, and is located in the northwest part of the watershed, immediately east of the Wilderness, with two additional small sections at the western boundary of the watershed (Map 25). It was established because it provides a link from the Klamath Mountains Province to the southern end of the Oregon Coast Ranges Province.

Critical habitat for the marbled murrelet includes CHU# OR-07-F. Portions of the watershed are considered critical marbled murrelet habitat because they occur within 35 miles from the coast (See additional discussion under marbled murrelet section). The CHU lies entirely within, and includes most of, the Late-successional Reserve within the watershed (Map 23).

Large areas of cliff and rock outcrop habitat occur within the wilderness and along the Rogue River. These areas provide potential habitat for many unique wildlife species, including the peregrine falcon, and the golden eagle. There is currently one known peregrine falcon eyrie in the southeast sector of the watershed. There is one known golden eagle nest in cliff habitat along the Rogue River (USDA/USDI 1995).

There is historical information which indicates that in the late 1800s and early 1900s, elk and deer were abundant in the vicinity of Illahe (USDA 1938), frequently harvested not only for meat, but also for hides. However, this report also cited information which indicated that hide hunters were driven from the area by the early settlers, who depended upon elk and deer for food. Bald Ridge and Ninemile were cited in this report as historical locations where elk had occurred.

Several meadows in the watershed provide habitat for elk. Big Meadows is a 70-acre opening in private ownership located near the divide between East Fork Mule Creek and the Rogue River. Two smaller meadows also occur in this area. One, known as Bald Ridge, is primarily owned by Superior Lumber Co. A second small meadow is located on a ridge between Quail Creek and Ditch Creek. These meadows are characterized by large erosion gullies and slump fractures. Two additional small meadows occur near the north edge of Anaktuvuk Saddle. The Mule Creek area was identified as a priority for elk management in cooperation with the Oregon Department of Fish and Wildlife (ODFW). This drainage was analyzed for elk habitat suitability using the Wisdom elk model (Wisdom et al 1985), which assesses habitat effectiveness indices. The analysis indicated spacing, forage, and road density were all very low, while the cover index was a bit higher. That information led to efforts in the late 1980s and early 1990s to increase available forage through burning and seeding clearcuts. In addition, a major road management plan was instituted, resulting in motor vehicle road closures on approximately 43 miles of road. Prior to the road closures, the Mule Creek drainage had an open road density of 4.6 miles of road per square mile. Following road closures, the open road density dropped to 1.8 miles of road per square mile, close to the ODFW recommendations of no more than 1.6 miles of road per square mile for elk management. Following road closure, 500 native brush and shrub seedlings were planted along closed road beds and cut banks to improve foraging opportunities.

Habitat for snag-dependent wildlife species, including woodpeckers, nuthatches, and small mammals and furbearers, has been substantially reduced in the Mule Creek drainage by clearcutting and salvage entries. However, in unentered portions of the watershed, abundant snag habitats provide significant benefits to many animal populations, including furbearers such as marten and fisher.

American martens, a member of the weasel family, are considered to be indicator species of old-growth habitats in Oregon, where they are closely tied to large quantities of standing and downed snags and coarse woody debris, often near streams (Jones and Raphael 1990). They select dense cover extending above the snow, and in winter they utilize tunnels to access the area below snow level. With high amounts of snags, extensive riparian systems, and generally acceptable levels of coarse woody debris in most of this watershed, marten populations are expected to do well. They have been documented in the late-successional reserves of southwestern Oregon (USDA/USDI 1995). Fishers, also a medium-sized member of the weasel family, are a rare carnivore associated with dense, mature, and old-growth forest stands (Powell 1982), and adults are associated with large habitat blocks. Fishers are known to use riparian areas as travel corridors in both winter and summer (Jones 1991). Resting sites in California have been found to be associated with snags and abundant downed logs (Buck et al. 1983), and natal sites have been found in cavities of live or dead trees (Banci 1989). Fisher observations have been reported near the watershed. The unfragmented nature of the majority of the watershed suggests this area may support a fisher population.

Canada lynx, a rare cat primarily located in eastern Washington, the northern Rocky Mountains, Canada, and Alaska, have historically been reported to occur in this area, according to local trappers (M. Schnoes, pers. comm.). While it is unknown if any relict population continues to occur in this area, recent hair collections in central Oregon suggest a remote possibility that this species can persist in this watershed. There is at least one confirmed documentation of snowshoe hare in the southern portion (Grants Pass Resource Area)of this watershed, in the vicinity of Bear Camp (F.Craig, Siskiyou NF, pers. comm.). The snowshoe hare is a primary prey species of the Canada lynx. The NFP (1994) described three primary components for lynx, including foraging habitat which would support snowshoe hares, generally in younger pine stands; denning sites in old-growth fir and spruce, usually less than 5 acres; and dispersal/travel corridors with variable vegetative composition and structure.

Ringtails, an uncommon cat-sized nocturnal mammal, are known to occur in southwest Oregon, with the Klamath Province identified as their center of abundance in the state (ODFW 1993). Ringtails are a cat-sized, nocturnal mammal with unique climbing abilities which permit it to climb up or down vertical rock faces. They are almost certain to occur within the watershed, considering the ringtail's association with tanoak and areas with cliffs or other rock terrain near rivers.

This watershed lies within the Pacific Flyway, utilized by a wide variety of migratory birds. Waterfowl are likely to occur along the Rogue River, including species of concern such as the Harlequin duck, which uses fast-flowing water, and additional waterfowl, including the common merganser and common goldeneye. Numerous man-made ponds throughout the watershed also provide limited waterfowl loafing habitat.

Black bears are believed to be relatively abundant throughout the analysis area, primarily due to

large blocks of undisturbed habitat, proximity to the Rogue River, and large areas with low road densities. Bear were evidently abundant in the watershed at the turn of the century, according to an interview with Wallace Rondeau, who lived in the area in the early 1900s (Shaffer 1983). According to the Oregon Dept. of Fish and Wildlife (M. Wolfer, pers. comm.), black bear densities in the analysis area probably exceed one per square mile. A 1987 report (ODFW) notes that the heaviest bear densities in the state occur in southwestern Oregon. All lands within one mile of the river are closed to black bear hunting.

Mountain lions are thought to be common in the analysis area. An historic report by Siskiyou NF refers to a large cougar population in the watershed (USDA 1925) and sightings have been increasing.

Northwestern pond turtles, a species of concern, have not been observed using the watershed's small ponds, but are frequently observed along many sections of the Rogue River, where there are slow-moving river sections. Pond turtles were petitioned for listing under ESA in 1992 but to date have not been listed. Among the reasons cited for pond turtle declines have been wetland losses, water diversions, droughts, and migration barriers, including roads and train tracks. They can travel up to 500 m into the forest in the fall to overwinter in the duff and also bask. They use upland habitat adjacent to open water for nesting, usually on south aspects for thermal regulation. It has been theorized that northwestern pond turtle populations are becoming more male biased because when female pond turtles travel to uplands on south aspects for nesting, they are in danger of traffic injuries along roads and train tracks which parallel the north side of creeks.

Tailed frogs, a species of concern, have been located in the watershed. This amphibian species, thought to be confined to turbulent streams in late-successional forest, is considered to be a potential ESA listed species, with very low recruitment rates compared to other frogs, as well as a longer generation time. It has avoided competition with other frogs by adapting to the rocky, swift-moving streams of the Pacific Northwest, the only place where it now survives. Tailed frogs are known to disappear from streams within logged areas, thought to be a result of logging-induced higher water temperatures and increased siltation (Nussbaum et al, 1983).

Northern Spotted Owls

Northern spotted owls are a federally threatened species identified for protection in the NFP through a system of Late-successional Reserves (LSRs). The LSRs are designed to provide late seral forested ecosystems which will support the life requisites for this species, known to nest in mature and old-growth forests with high levels of canopy closure.

Thirteen northern spotted owl activity centers are known within the watershed, including one site, Sergeant Beno, located along Meadow Creek and found after the ROD for the NFP was signed. The amount of suitable habitat within the 1.3 mile home range of known owl activity centers is displayed in Table 29. Twelve of the thirteen northern spotted owl home ranges are currently above the "take" threshold of 1,336 acres of suitable habitat within the home range; this is

another indication that high quality late-successional habitat exists in many parts of this watershed. The Quail Creek activity center is the only activity center in the watershed below the "take" threshold. While inventories have been thorough in Whiskey and East Fork Mule Creeks, many other areas in the watershed have been inadequately surveyed.

Table 29. Northern Spotted Owl Activity Center Sites within the Wild Rogue North watershed.

Site Name	Site Number	Legal Location	Suitable Habitat Acres within 1.3 mi.
Far Out Mule	3391	32S-10W-S35	2,577
Quail Creek	0938	33S-10W-S1	1,229
Mule West	0929	32S-10W-S25	2,099
Mule Creek	0904A	32S-9W-S30	2,263
Ditch Hole	0961	33S-9W-S8	2,084
KCNA	3280	32S-9W-S26	1,826
Kelsey's Demise	2069	33S-9W-S1	2,205
Cool Springs	3283	33S-8W-S9	2,746
One 4 All	2619	33S-8W-S14	2,628
Rushin Rogue	2621	33S-8W-S29	2,861
Small Shot	2014	33S-8W-S21	2,679
Whiskey Creek	2013	33S-8W-S26	2,350
Sargent Beno	Post-ROD, located 7/99	33S-9W-S14	1,518

Northern spotted owl habitat on BLM lands has been assessed using aerial photographs. Suitable habitat includes spotted owl nesting, roosting and foraging habitat, which is rated Class 1, and roosting and foraging habitat, which is rated as Class 2. Approximately 38,010 acres, or 66 percent of BLM lands within the watershed meet Class 1 and 2 (suitable) criteria (Map 24). An examination of the distribution of this habitat indicates a wide, well-distributed pattern of suitable habitat across the watershed, with noticeable gaps present only in the Mule, Kelsey, East Fork Kelsey and Whiskey Creeks areas.

Stands along Mule and Whiskey Creeks have an extensive logging history, and currently consist of many small habitat patches between clearcuts, with stringers along the streams. However, there appears to be adequate dispersal habitat even along the more heavily harvested creeks.

Land allocations in the NFP and the Medford District RMP, including LSRs, Riparian Reserves. and Critical Habitat Units are expected to provide sufficient habitat for survival and recovery of northern spotted owls. As described earlier, Critical Habitat Units were established to provide blocks of suitable habitat, as well as linkages to the Western Cascades and Coast Range provinces. The thirteen known northern spotted owl activity centers in the watershed, as well as large blocks of mature and old-growth habitats and numerous Riparian Reserves, suggest this area will serve both as a source population for this threatened species, as well as providing dispersal habitat to the Grave Creek watershed to the east, and the Middle Fork and West Forks of the Cow Creek watersheds to the north.

Bald Eagles

Bald Eagles are a Threatened species and have recently been proposed for de-listing. Suitable bald eagle habitat in the watershed occurs primarily along the Rogue River and many of the side drainages, including Whiskey and Kelsey Creeks. There is one active nest within a few miles of the confluence of the Rogue River and Whiskey Creek. Preferred nesting habitat usually consists of older forests near water, with minimal human disturbance.

Marbled Murrelets

Marbled murrelets, a federally threatened species, use inland forested sites for nesting, traveling 24-47 miles inland, or occasionally farther, in search of suitable nest sites (Paton and Ralph 1990). Unusual for seabirds, marbled murrelets nest exclusively in trees, typically on the top of a large limb or other broad surface, such as thick moss, in late successional and old-growth forests within flight distance of the marine environment (USDA/USDI 1993). Marbled murrelets are thought to occur within fifty miles of the coast, and their potential range includes the entire watershed. The FEMAT report (USDA/USDI 1993) identified two zones of murrelet habitat based on observed use and expected occupancy, with the primary zone 0-35 miles inland from the coast. A second zone encompasses areas east of Zone 1, between 35-50 miles from the marine environment (Map 23). Zone 2 (35-50 miles inland) includes approximately the eastern one-half of the watershed. In coastal Oregon, Zone 2 is typified by relatively low numbers of murrelet sightings.

In Southwest Oregon, no murrelets have been discovered in Zone 2 (Dillingham et al 1993, L. Webb, pers. comm.). Within the primary zone, marbled murrelets typically are associated with old-growth stands within the western hemlock vegetative community, much of which is actually climax to tanoak. Since Zone 1 includes areas within 35 miles of the coast, the western one-half of the watershed lies within this boundary and within marbled murrelet critical habitat. However, the nearest known sighting of a marbled murrelet is outside the watershed boundary,

approximately 1.5 miles north of the northwest boundary, in the Coquille River watershed. Since 1995, there have been 305 survey visits for marbled murrelets within the watershed, with no confirmed detections. Moreover, studies by Siskiyou National Forest strongly suggest that in this part of southern Oregon, murrelets typically do not fly beyond the first major coastal ridge, about 12 miles from the coast, south of the Elk/Coquille drainages (Dillingham et. al. 1993).

Great Gray Owls

Great gray owls are a NFP protection buffer species, uncommon and associated with conifer forest adjacent to meadows. Although this bird species has not been definitively located within the watershed, suitable meadow habitat does exist within the analysis area. A confirmed sighting of this owl has been noted in the Eden Valley area west of the watershed, and additional known locations are present throughout the Medford District. While there was an unconfirmed detection of this species near Big Meadow in the mid-1990's, this meadow complex was surveyed to protocol in 1998 and 1999, with no detections of great gray owls.

Del Norte Salamanders

Del Norte salamanders are relatively rare amphibians, with a restricted geographic distribution. They have been described as associates of old-growth forest conditions, and are also associated with rocky substrates, where there is enough canopy closure to retain sufficient moisture to meet their needs (FEMAT 1993). Del Norte salamanders are identified as a protection buffer species in the NFP, with known sites designated as managed late-successional areas. They have been found in the Mule Creek watershed (Map 26), and based on soil information and vegetative characteristics, it is suspected that they are widely distributed across the watershed.

Red Tree Voles

The red tree vole, a survey and manage species, is an arboreal rodent that spends most of its time in the canopy of Douglas-fir trees (USDA/USDI 1994). It is thought that the species has a very limited dispersal capability, and poor connectivity of populations between LSRs. Red tree voles generally occur in forested stands older than 40 years, with old-growth appearing to provide optimum habitat because of its function both as a climatic buffer and with its high water-holding capacity which maximizes food availability and free water (Gillesberg and Carey 1991). Limited surveys for this species have been conducted within the watershed, primarily in the area of the Cold Mule timber sale (Map 26). Currently it is estimated that 38,010 acres of suitable red tree vole habitat is present within the watershed.

Molluscs (terrestrial and aquatic)

Two species of slugs, the blue-grey tail-dropper (*Prophysaon coeruloeum*) and the papillose tail-dropper (*Prophysaon dubium*), designated as Category 2 Survey and Manage species, have been found in the watershed (Map 26). These species have been found to be widely distributed in

southwest Oregon, and have been discovered in relatively large numbers since surveys began in 1998. As of October, 1999, there were 933 known locations of the blue-grey tail-dropper in the Glendale Resource Area, and 235 locations of the papillose tail-dropper. Since this watershed has had few surveys, the distribution and abundance the these species in the watershed are unknown. There is abundant suitable habitat present, including extensive moist conifer forests, preferred by the blue-gray tail-dropper, and large areas of hardwoods utilized by the papillose tail-dropper. It is suspected both these species have a broad distribution in this watershed.

Three other Survey and Manage mollusc species are suspected to occur in the watershed, including the Oregon shoulderband snail, the Oregon megomphix snail, and the Chace sideband snail. While the Oregon shoulderband snail frequents rocky areas, it is not dependent on that habitat. The other previously mentioned mollusc species occupy moist conifer and conifer/hardwood forest habitats.

Some specimens of Oregon tight coil, *Pristiloma arcticum*, have been found immediately north of the analysis area in an adjacent watershed, but to date these specimens have not been identified as the subspecies listed as a Survey and Manage species (*Pristiloma arcticum crateris*). It is unlikely that these tiny snails are the same subspecies since this watershed is outside the suspected range of the Survey and Manage subspecies. Identification is extremely difficult, and results are pending.

There are no Survey and Manage aquatic mollusc species known or suspected to occur within the watershed.

Neotropical Migratory Landbirds

An array of neotropical migratory land birds inhabit the Wild Rogue North watershed during the breeding season or use its habitats during migration. Data from several long-term surveys including Breeding Bird Surveys, Breeding Bird Census, Winter Population studies and Christmas Bird Counts indicate that many of these species are experiencing precipitous population declines, including many interior forest birds which utilize mature and old-growth forest habitat (DeSante and Barton 1994).

Studies conducted on the Medford District have found this group of bird species constitutes 42-47 percent of the breeding species in the lower elevation Douglas-fir dominated forest (Janes 1993). It is important to also point out that many of these species use more than one habitat type.

Non-native species

Several non-native species have become established in the watershed. These species sometimes directly compete with native animals for food, water, cover and shelter. Bull frogs compete and consume native frogs and young western pond turtles. Opossums compete with native striped skunks and raccoons. Brown-headed cowbirds and starlings parasitize native bird nests. Wild

turkeys have been introduced into the watershed by ODFW and are now thought to be successfully established there. They are known to occur in the Bald Ridge area and may compete with native wildlife species for acorns.

Special or Unique Habitats - Meadows, cliffs, springs, etc:

Special or unique habitats may account for a small amount of the total land base, but they are disproportionately significant as wildlife habitats. Each unique habitat often supports at least one species which is highly adapted to it, and often concentrates and supports a unique animal complex. Unique habitats are often highly fragile areas, usually where little can be done to improve them, while they can be easily adversely affected or destroyed by habitat alteration or removal, with subsequent loss of important wildlife habitat. Cliffs, caves, and springs are generally recognized as characteristic of these types of habitats. In this watershed, meadows are also very uncommon, and therefore fall in this category.

There are a few areas of meadow habitat located within the watershed unit. Two small meadows are located near the north edge near Anaktuvuk Saddle. These are in federal ownership and have been burned to improve forage conditions. Big Meadows is a large (70 acres) meadow located near the divide between East Fork Mule Creek and the Rogue River. This area is privately owned and there are several small meadows in the vicinity. This meadow could benefit from some active management such as burning, seeding, bracken fern eradication and tree removal to reduce encroachment. Gates were placed on roads into the meadow area to reduce motor vehicle traffic.

There are two other meadows near the Big Meadows area. One is called Bald Ridge and is mostly owned by Superior Lumber Co. They have expressed interest in exchanging this property. This meadow is characterized by large erosion gullies and slump fractures. The other is a similar ridge between Quail Creek and Ditch Creek.

While cave habitat is extremely limited in this watershed, older forest habitats can be a critical resource for a wide variety of bats for both day roosts and feeding. Studies in the Oregon Coast and Washington Cascade ranges have noted significantly higher detection rates in old-growth compared to young stands (Thomas and West 1991). There are also mine adits which provide suitable habitat for fringed myotis and Townsend's big-eared bats, both species of concern. This watershed contains a known site for the Townsend's big-eared bat at the Benton Mine, T33S, R8W, sec. 27, where several of these bats were detected in 1993. The Trade Dollar Mine, T33S, R8W, sec. 23, was surveyed in 1994, with no confirmed detections. Large snags in the watershed provide additional suitable roosting habitat for fringed myotis and other bat species.

There are widely scattered springs, as well as several man-made ponds and pump chances throughout the watershed which provide habitat for waterfowl, reptiles, amphibians, and invertebrates. Fire protection, road maintenance, and timber activities may adversely affect these water sources, and managers therefore need to be aware of the potential adverse affects of such activities on these unique habitats.

There are numerous cliffs along the Rogue River, as well as in the Wilderness Area, which provide cliff habitat which may support small populations of species such as the peregrine falcon and golden eagle.

Literature Cited

Atzet, T. and R. Martin. 1991. Natural disturbance regimes in the Klamath Province. Proc. Of Symp. on Biodiversity of NW California. Santa Rosa, CA.

Banci, V.A. 1989. A fisher management strategy for British Columbia. Wildlife Bulleting No. B-63. Victoria:Min. Of Envir. 117 p.

Brittingham, M.C. and S.A. Temple. 1983. Have cowbirds caused forest songbirds to decline? BioScience 33:31-35.

Buck, S., Mullis, C., and A. Mossman. 1983. Final report: Corral Bottom - Hayfork Bally fisher study. Six Rivers and Shasta-Trinity National Forests, CA. 136 p.

Bureau of Land Management. 1994. Medford District Proposed Resource Management Plan/Environmental Impact Statement. Medford, OR.

Carey, A.B., M.M. Hardt, S.P. Horton, and B.L. Biswell. 1991. Spring bird communities in the Oregon coast range. IN: Wildlife and vegetation of unmanaged douglas-fir forests. U.S.D.A. Forest Service, Pacific Northwest Research Station. Gen. Tech. Rpt. PNW-GTR-285.

DeSante, D. F. and K. M. Burton. 1994. 1994 MAPS Manual Instructions for the establishment and monitoring of stations as part of the Monitoring Avian Productivity and Survivorship program. The Institute for Bird Populations, Point Reyes Station, CA.

Dillingham,C.P., R.G. Miller, and L.O. Webb. 1993. Marbled murrelet distribution in the Siskiyou National Forest of southwestern Oregon. Southwest Naturalist 76:33-39.

Forest Ecosystem Management Assessment Team. 1993. Terrestrial forest ecosystem assessment. pps. IV-29-30. In Forest Ecosystem Management: an ecological, economic, and social assessment. Report of the forest ecosystem management assessment team, Portland, OR..

Forman, R.T.T., A.E. Galli, and C.F. Leck. 1976. Forest size and avian diversity in New Jersey woodlots with some land use implications. Oecologia 26:1-8.

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. Wildl. Monog. 87:1-64.

Gillesberg, A. and A.B. Carey. 1991. Red tree voles in the Oregon Coast range. IN: Wildlife and vegetation of unmanaged douglas-fir forests. U.S.D.A., Forest Service, Pacific Northwest Research Station, Gen. Tech. Rpt. PNW-GTR-285.

Harmon, M.E. et al. 1986. Ecology of coarse woody debris in temperate ecosystems. Advances in Ecological Research 15:133-302.

Hunter, M.L. 1988. Wildlife, forests, and forestry, Principles of managing forests for biological diversity. Prentice Hall, Englewood Cliffs, NJ.

Janes, S.W. 1993. Neotropical migrant bird studies. Unpublished Report, Medford District, BLM.

Jones, J.L. 1991. Habitat use of fisher in northcentral Idaho. Moscow: Univ. of Idaho. Thesis. 147 pp.

Jones, L.L.C and M.G. Raphael. 1990. Ecology and management of marten in fragmented habitats of the Pacific Northwest. Prog. Rept: Fiscal Yr. 1990. For. Sci. Lab., U.S.D.A. Forest Service, Olympia, WA. 44 p.

Lehmkuhl, J.F. and Ruggiero, L.F. 1991. Forest fragmentation in the Pacific Northwest and its potential effects on wildlife: competition, function, and structure of old-growth Douglas-fir forests. USDA-Forest Service. Gen. Tech. Rept. PNW-GTR-285. IN: Wildlife and vegetation of unmanaged Douglas-fir forests. pp. 35-46.

Levy, S. 1997. The owl and the squirrel. Calif. Acad. of Sci. 50(1):14-21.

Newmark, W.D. 1987. A land-bridge island perspective on mammalian extinctions in western North American parks. Nature. 325:430-432.

Noss, R.F. and A.Y. Cooperrider. 1994. Saving nature's legacy: protecting and restoring biodiversity. Island Press. 416 p.

Nussbaun, R.A., E.D. Brodic, Jr., and R.M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. Univ. Press of Idaho, Moscow, ID. 322 p.

Oregon Dept. of Fish and Wildlife. 1993. Oregon wildlife diversity plan. Portland, OR. 413 pp.

Oregon Dept. of Fish and Wildlife. 1987. Oregon black bear management plan. Portland, OR. 26 pp.

Oregon Dept. of Fish and Wildlife. 1987. Oregon cougar management plan. Portland, OR. 23 pp.

Paton, P.W.C., and C.J. Ralph. 1988. Status of the marbled murrelet in North America: with special emphasis on California, Oregon, and Washington. U.S. Fish and Wildlife Service, Biol. Rep. 88(30). 19 pp.

Powell, R.A. 1982. The fisher: life history, ecology, and behavior. Univ. Of Minn. Press, Minneapolis, MN. 217 pp.

Ralph, C.J., P.W.C. Paton, and C.A. Taylor. 1991. Habitat association patterns of breeding birds and small mammals in douglas-fir/hardwood stands in northwestern California and southwestern Oregon. IN Wildlife and vegetation of unmanaged douglas-fir forests. U.S.D.A. Forest Service. Pacific Northwest Experiment Station. Gen. Tech. Rep. PNW-GTR-285.

Rappole, J.H. and M.V. McDonald. 1994. Cause and effect in population declines of migratory birds. Auk 111(3):652-660.

Ruggiero, L.F., K.B. Aubrey, A.B. Carey, and M.H. Huff. 1991. Wildlife and vegetation of unmanaged Douglas-fir forests. Gen. Tech. Rep. PNW-GTR-285. USDA Forest Service, PNW Research Station, Portland, OR. 533p.

Shaffer, S. 1983. Interview with Wallace Rondeau. Siskiyou National Forest historical files.

Sedell, J.R.,P.A. Bisson, F.J. Swanson, and S.V. Gregory. 1988. What we know about large trees that fall into streams and rivers. IN Maser, C. Tarrant, R.F., Trappe, M. and J.F. Franklin, tech. Eds. 1988. From the forest to the sea, a story of fallen trees. USDA Forest Service. PNW Forest and Range Experiment Station. Gen. Tech. Rep. PNW-GTR-229. Portland, OR.

Thomas, D.W. and S.D. West. 1989. Sampling methods for bats. Gen. Tech. Rep. PNW-243, Portland, OR: U.S. D.A., Forest Service, Pacific Northwest Research Station. 20 p.

Thomas, J.W., E.D. Forsman, J.B. Lint, 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. U.S. Dept. Of Agriculture, Forest Service, and U.S. Dept. Of interior, Fish and Wildlife Service, Bureau of Land Management, and National Park Service. Portland, OR. 427 pp.

USDA. 1925. Yearly report of Siskiyou National Forest. USDA Forest Service, Grants Pass, OR.

USDA. 1938. Historical study data, Siskiyou National Forest. USDA Forest Service, Grants Pass, OR.

USDI, Fish and Wildlife Service. 1987. Florida panther recovery plan. Florida panther Interagency Comm. Atlanta, GA. 75 pp.

USDI. 1992. Endangered and threatened wildlife and plants; determination of critical habitat for the northern spotted owl. Federal Register Vol. 57, No. 10:1796-1838. January 15, 1992.

USDA and USDI. 1993. Forest ecosystem management: an ecological, economic, and social assessment. Report of the Forest Ecosystem Management Assessment Team. Portland, OR.

USDA and USDI. 1994. Record of Decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl. Portland, OR.

USDA, Forest Service and USDI, Bureau of Land Management. 1995. Southwest Oregon late-successional reserve assessment. Medford and Grants Pass, OR. 150 p.

USDA, Forest Service and USDI, Bureau of Land Management. 1996. Rogue River/South Coast biological assessment. Medford and Grants Pass, OR. 51 pp.

USDI, Bureau of Land Management. 1998. Middle Cow Creek watershed analysis. Medford, OR. 106 pp.

USDI, Bureau of Land Management. 1999. Grave Creek watershed analysis. Medford, OR. 165 pp.

Whitcomb, R.F., J.F. Lynch, M.K. Klimkiewicz and others. 1981. Effects of forest fragmentation on avifauna of the Eastern deciduous forest. IN: Burgess, R.L., and D.M. Sharpe, eds. Forest island dynamics in man-dominated landscapes. New York: Springer-Verlag:124-205.

Wisdom, M.J. et al. 1986. A model to evaluate elk habitat in western Oregon. Pub. No. R6-F&WL-216-1986. Forest Service, Pacific Northwest Region, Portland, OR. 36 pp.

D. Roads and Developments

Prehistoric and Historic Travel

Prehistoric travel routes in the Wild Rogue North basin were generally trails along subbasin divides. Ridge top trails existed from Mule Creek to Big Meadows to Nine Mile, from Whiskey Creek up the divide between the forks to Mt. Reuben, Nine Mile, Jacob Weil Spring, and Cold Springs. These trails, used by local Indians, appear to have followed established elk trails. The main prehistoric trail inland along the Rogue River was on the south bank (Siskiyou N.F. 1938).

Trail use within the watershed began to increase with the arrival of the early settlers. Military personnel also used these trails during the Rogue River Indian Wars. Miners and homesteaders who arrived after 1851 extended and expanded the trail system, eventually establishing packing routes that connected the Marial Post Office, Mule Creek area homesteads, and miners' diggings with the Agness-Illahe area to the southwest, Elk Valley to the northwest, Camas Valley to the north, the rail station at West Fork to the northeast, and Galice to the southeast. The trail from Marial toward Galice followed the north bank of the Rogue River. Early settlers forded the Rogue River to transfer livestock and goods to the other side. A suspension foot bridge was constructed over the river near Rainie Falls. There was a packing bridge across Mule Creek in the early 1900s. Packers and other foot travelers also used low water crossings on Mule Creek and elsewhere. Regular mail delivery along trails was accomplished on foot and by pack animals from 1878 until around 1937 (Atwood, 1978).

Siskiyou National Forest personnel improved trails in the watershed beginning in 1909. During the 1930s, the Civilian Conservation Corps (CCC) restored and expanded the trail system north of the Rogue River (Siskiyou N.F., 1938) and converted some trails into roads. The roads that became the Grave Creek to Marial Back Country Byway were converted for vehicle travel by the CCC, which completed that work in 1936 (BLM, October 1992). Other roads were constructed for fire control access as well as easier access for forest rangers, miners, and homesteading residents.

By 1969, BLM workers had used some of the ridge top roads as unimproved access routes. In 1969 BLM employed State of Oregon workers to bulldoze some of the ridge top roads to allow easier passage of vehicles (Pine, 1999, pers. com.). At this time, many roads had informal names, but were not numbered or considered system roads.

Beginning in the late 1930s, new roads were constructed in the Mule Creek basin in conjunction with timber sales. The land east of the West Fork of Mule Creek was extensively roaded during the 1960s and 1970s.

In 1978 and 1979 a Wilderness Unit Inventory (WUI) was completed within the watershed, specifically an area called Unit 11-16 (Zane Grey area). The purpose of the inventory was to determine if reviewed areas qualified for consideration as wilderness under the Wilderness Act of

1964. Criteria for consideration as a wilderness designation included existence of a roadless landscape characterization. The area was eliminated for consideration as a wilderness in November of 1980. Oregon and California (O&C) land was excluded from consideration, including roadless or withdrawn O&C lands. The remaining areas were to be 5,000 acres or larger and possess wilderness characteristics described in the Wilderness Act of 1964. Human-made structures and signs of human use, such as mining waste and debris, bridge abutments, a barge, buildings and a steel superstructure of a bridge, were located in the remaining unit and could not be removed by "hand labor or natural means." Much of the Zane Grey roadless area was determined to be productive forest land and was excluded, resulting in small, isolated parcels some as small as 1/10 mile in width. These parcels did not meet size requirements or provide solitude when considering the proximity of adjacent timber lands.

After the WUI process was completed, many of the non-system roads were converted into system roads and given road numbers. Some of these roads were reconstructed and rocked.

Current Road Conditions

Overview

Most roads in the watershed are presently in fair to good condition. There are a total of 237 miles of system roads within the Wild Rogue North watershed and the distribution across the landscape is quite variable (Tables 8 and 30, Map 9). While large portions of the watershed are unroaded, areas in upper Mule Creek and the headwaters of Kelsey Creek both have extensive road systems. There are some roads in the watershed that have erosion and slumping problems, however the majority of these are not major arterial roads and do not receive heavy use. Some early travel ways that were improved into roads or constructed as a means of entry for fire suppression and timber harvest years ago are now vegetated and are no longer able to be driven.

For the purpose of this analysis, the following definitions are used to describe the various transportation features within the watershed:

- **System Road:** A constructed road that has a road number, a recorded history, an assigned road maintenance level, and management objectives.
- **Non-System Road:** A constructed road that has no road number, no recorded history, no assigned maintenance level, no management objectives.
- **Way:** Wheel track made only by the passage of vehicles; non-constructed.
- **Trail:** A travel way for foot traffic.

Table 30. Overview of road miles within the Wild Rogue North watershed.

Type	Vegetated[1] (miles)	Non-Vegetated[2] (miles)
System Roads	2.3	237.1
Non-System Roads	4.5	4.0
Ways	unknown	0.5
Trails	unknown	52.0

[1] Roads that are no longer driveable due to vegetation but still have intact road beds.

[2] Roads and trails that are currently open and easily accessible to vehicles and/or foot traffic.

Most of the roads in the watershed were constructed for one of three reasons - access to private lands, to provide initial entry for timber sale planning, or for fire suppression. Some ridge-top roads were originally constructed as a preventive measure for fuel breaks and for fire suppression access in order to move people and equipment into an area if a fire were to start. Other roads were quickly constructed in direct response to a fire ignition, as a part of the fire suppression activities.

There is a wide variation in the current condition of roads in the watershed. In some cases, the road is frequently traveled, regularly maintained and repaired and is easily located on maps and aerial photographs; there is no question that these features are roads. These are generally "system roads" which means that the BLM has road records for that road. At the other extreme are sites where only minor side-cutting was done (i.e. on ridge tops), the surface is dominated by sapling trees and brush, the original soil compaction has largely been ameliorated through natural processes of frost heaving and actions by animals and plants, and they are difficult to locate on maps or aerial photographs. There are many examples in between these two extremes.

Road maintenance funding, often attached to timber sale levels, has been declining in recent years. Maintenance of roads, especially non-arterial roads, has been substantially reduced as a result. Several of the roads in this watershed have not been maintained and as a result are in various stages of deterioration, most often being overgrown by brush, hardwoods or conifers and in some cases having slid out as a result of landslides. Many local, "dead end" roads have received only minimal maintenance in recent years.

Maintained Roads

The primary transportation routes in the watershed are Road 33-8-26 (Whiskey Creek Road), Road 32-7-19.3 (Dutch Henry Road), Road 34-8-1 (Mount Reuben Road), Road 32-8-31 (Kelsey-Mule Road), Road 32-9-14.2 (Marial Road), and Road 32-9-31 (Bruin Road).

Several of these roads receive frequent use since certain segments are designated as recreational routes, including the Grave Creek to Marial Back Country Byway, National Back Country Byway, and the Glendale to Powers Bicycle Route. The majority of system roads within the watershed generally receive minimal use and are used primarily by BLM personnel, hunters, rafters, other recreationists and the private landowners.

Lower Kelsey Creek and the smaller Rogue frontal drainages have relatively few maintained roads. Of the existing roadbeds, a majority are located along ridge tops. The roads leading into the lower Kelsey and Whiskey drainages access private lands.

Due to the remote location of the area, the large percentage of lands within the transient snow zone (above 2,500 ft.), and the high levels of precipitation that accumulate during the winter months, many roads are not open year-round. Typically, only roads in the lower elevations of the watershed remain free of snow and are accessible during the winter months. Access to the rest of the watershed is not possible or severely limited for several months out of the year.

Unmaintained Roads

There are also a number of unmaintained non-system roads in the area. Some of these roads were documented in the late 1970s investigations regarding the proposed Zane Grey Roadless Area. Some of these roads now are system roads: Road 2 (33-8-7), Road 3 (33-8-26.1), Road 4 (33-8-27), and Road 5 (33-8-21).

Field inventories were conducted by the watershed analysis team during the summer of 1999 to verify the presence, extent and condition of these roads. A summary of this inventory is presented in Appendix H. Some of these have become so overgrown with vegetation that they are no longer able to be driven (Table 30). Most of these vegetated roads are in the eastern half of the watershed between Kelsey and Whiskey Creeks.

Within the watershed, there is only one known example of what is termed a "way." It is located on private land and used primarily to access the landowner's property along the Rogue River.

Areas of Concern

Roads in the northern section of both the East Fork Mule Creek and Kelsey Creek drainages are of concern due to high road densities, unstable soils, steep slopes and previous drainage problems caused by erosion and slump activity. Although East Fork Mule Creek has a higher road density, a large percentage of these roads are rocked or paved. Kelsey Creek has a higher concentration of natural surface roads, which generally have greater erosional problems and contribute more sediment to streams.

East Fork Mule Creek

The East Fork Mule Creek drainage, which lies east of the wilderness boundary, is well-roaded for commodity access. The majority of the Mule Creek roads were constructed during the 1960s and 1970s for hauling timber and are a series of roughly parallel midslope roads with numerous stream crossings. Most of the roads in this area are gravel surfaced and are regularly maintained, although some have slumping and other stability problems which are generally due to the subsurface geologic structure. Some of these roads also access private lands at Marial, Big Meadows, and in the Ditch Creek area.

Over the past several years, various projects have been implemented in order to improve the existing conditions within the drainage. During 1996 and 1997, inventories were conducted on road and culvert conditions in the sub-watershed. In 1999, deteriorated culverts that were found during the inventory process were replaced under two timber sales, Cold Mule and Mule's Brew. Approximately one mile of road was decommissioned in this area during 1998. Additionally, 43 miles of roads in the Mule Creek sub-watershed have been gated to protect elk and other resources.

Kelsey Creek

Portions of upper Kelsey Creek, especially in the East Fork, have also been heavily roaded for logging. These roads generally have native surface materials, and are positioned near stream crossings and mid-slope (Map 9). A couple of these roads run parallel to the headwaters of Kelsey Creek and are within Riparian Reserves.

Private Land Access

There are existing roads to all private lands within the watershed, many of these land parcels are also accessible by more than one road. Many of the sections of the watershed are encumbered by reciprocal right-of-way agreements, which are legal agreements that allow private landowners to construct and use roads over lands belonging to other parties, or in this case over BLM lands (Map 9).

A majority of the watershed is subject to reciprocal right-of-way agreements, even in areas that do not access private lands (Table 31). Reciprocal right-of-way agreement number 605 accesses much of the unroaded area in the Whiskey Creek subbasin, non-adjacent to private lands. Portions of the lands covered under the 605 agreement were lands considered in the Zane Grey roadless area proposal. The reason behind this is that at one time this area had been parceled out in a checkerboard ownership. Many of these sections belonged to the Robert Dollar Timber Company who in turn sold their holdings to Superior Lumber. Decades ago, land exchanges occurred and land ownership was redistributed into the present day solid block ownership pattern. The right-of-way agreements were never revoked or amended, which is why the presently unroaded area contains access agreements.

Table 31. Reciprocal Road Right-of-Way Agreements in the Wild Rogue North watershed.

Agreements by Location		
Location	**Involved Party**	**Agreement Number**
T. 31 S., R 9 W. **Road:** 31-9-35	Larry Brown Timber	870
T. 32 S., R 8 W. Sec 30	Superior Lumber	605
T. 32 S., R 8 W. Secs 31, 32	Roseburg Resources	605A
T. 32 S., R 8 W. Secs 31	Roseburg Resources	700
T. 32 S., R 8 W. **Roads**: 32-8-31, 32-8-24	Larry Brown Timber	870
T. 32 S., R 9 W. Secs 13-35	Superior Lumber	605
T. 32 S., R 9 W. **Road:** 32-9-14.2	Larry Brown Timber	870
T. 32 S., R 10 W. Secs 11-14, 22-28, 33-36	Superior Lumber	605
T. 33 S., R 8 W. Secs 6-8, 17-20, 26-30	Superior Lumber	605
T. 33 S., R 9 W.. Sec. 7	K & C Lumber	441
T. 33 S., R 9 W. Secs 1-16, 18, 22-26, 35, 36	Superior Lumber	605
T. 33 S., R 10 W. Secs 1-3, 10-12	Superior Lumber	605
T. 34 S., R 8 W. **Road:** 34-8-1	Larry Brown Timber	870

Other Considerations

Access to existing roads can be restricted in a variety of ways, depending on the intended level of future use. A gate can preclude road use, yet allow access for administrative, fire and maintenance needs. A road closed by a permanent fixture such as an earthen berm precludes access, but may become a liability when the road template, especially drainage, is not maintained. Roads may be decommissioned, where the road is outsloped, culverts removed, water bars constructed, the roadbed is deeply ripped and seeded, and the road entrance permanently barricaded. Road decommissioning is generally the preferred method for economically and permanently closing a road. A decommissioned road remains on the landscape as a minor interruption to the near-surface ground water and overland flow. Roads are sometimes obliterated, or recontoured, where the road template is completely deconstructed and the previously-existing land contours are reestablished. The recontouring of an existing road is generally very expensive. The table in Appendix L lists roads that have been recognized as candidates for some level of restriction.

Rock quarries are developed primarily for the production of aggregate rock for road surfacing. There are eight developed quarries within the watershed, ranging in size from under an acre to about four acres. There are also three quarry sites that are in a state of natural reclamation. These sites will probably never be utilized again due to depletions in available rock quantities, VRM issues or other developmental difficulties.

Calvert airstrip is located at the north edge of the watershed. This airstrip is adequate for small plane use, but is closed to the public except for emergency landings. Calvert airstrip is also adequate for use by helicopters and is often used for fires and field reconnaissance flights.

Literature Cited

Siskiyou National Forest. "Historical Study Data", January 1938. From notes of L. J. Cooper, Siskiyou National Forest.

Atwood, Kay. Illahe: The Story of Settlement in the Rogue River Canyon. Kay Atwood, Ashland, Oregon, 1978.

Pine, Arlene, 1999. Personal communication regarding BLM activities in Rogue River drainage.

Bureau of Land Management, October 1992. Grave Creek to Marial Back Country Byway Management/Interpretive Plan.

Unroaded Area

Timber management activities has resulted in an extensive road network in some parts of the watershed; East Fork Mule Creek is one example. There are other areas where there are relatively few roads for a variety of reasons. The Wild Rogue Wilderness area in the western portion of the watershed is an area of approximately 8,000 acres which only has one road. There are two other areas where roads are relatively scarce: the upper Whiskey Creek drainage, consisting of approximately 7,040 acres and the area along the Rogue River, including Quail, Ditch, Kelsey, Meadow, Russian and Bronco Creeks, consisting of approximately 25,700 acres. For the purpose of this document, these two areas have been named the Whiskey Creek and the Russian-Quail unroaded areas (Map 27).

For this analysis, the largest contiguous area without a major through-road was designated. There are several parcels of private lands adjacent to these areas, including some residences (Map 27). These private parcels and roads that receive regular use were "cherry-stemmed" around and border the boundary of the designated areas. Roads within the area which dead-end and rarely receive use were generally included. Some of the more important aspects of the two areas are summarized in Table 32.

Road Values

Many questions arise as to the general nature, associated values and what constitutes an unroaded area. There are various interpretations as to what features qualify as roads and these are subjective and often controversial.

The values attached to roads often vary depending upon the interest and perspective of the user. People to whom vehicular access is an important aspect of land use feel strongly that roads should remain open. Some recreationists, hunters, miners, and timber users prefer that the landscape be roaded and that roads be open for use. Vehicle access is also an important part of logging. Even when helicopters are used for yarding, landings and roads are needed to haul logs from the sale area. A transportation system that accesses much of the landscape is preferred by people wishing to access timber. Access to control wildfire is also a concern to both members of the public and land managers.

There are privately-held lands within the watershed, and most landowners prefer to have their lands easily accessed by well-maintained roads. Some privately-owned parcels have residences on the land while other parcels are managed as timber lands or mines.

Other interests would like these areas to remain in their current condition or become completely unroaded. Some individuals would like to see less human intrusion into forest lands, and prefer fewer roads to reduce ease of human access. One approach is to gate or otherwise close roads to motorized traffic to protect wildlife, forest, and recreation values, but keep the roads in place for fire suppression or land management access. Another is to decommission or obliterate roads to

protect soils, aquatic habitats, fisheries values, and other resources.

Table 32. Characteristics of major unroaded areas within the Wild Rogue North watershed.

		Unroaded Areas	
		Whiskey Creek (acres)	**Russian-Quail (acres)**
General			
	Total Area	7,040	25,700
Vegetation			
	Non-forest	0	1
	Early-mid seral (0-80 years)	873	2,580
	Mature seral (80-200 years)	3,188	17,458
	Old-growth (200+ years)	2,270	5,068
	Plant Series		
Wildlife			
	Fish streams	4.6 (miles)	15.8 (miles)
	Spotted owl habitat	5,464	19,800
Roads			
	"Trails" -including old road beds	1.4 (miles)	20.0 (miles)
Land Allocations			
	Late-successional Reserve	1,580	15,337
	GFMA and connectivity blocks	8,131	7,557
	Congressional Designated Reserves	0	2,757
Other Designations			
	Net GFMA and C/D Blocks (Outside Reserves)	1,943	2,832
	VRM Class 1	0	2,681
	VRM Class 2	218	11,100

The reasons associated with the differing perspectives of each interest group are valid and should be considered when land management decisions are being planned. These two areas are unique on many levels including but not limited to the historical, cultural, recreational, biotic and physical resources. Because of the intrinsic value of many resources in combination with the rugged nature of terrain in these areas, the lack of access in the event of a large scale, catastrophic fire is a significant concern. Under the proper environmental conditions, response time and the ability to position people and equipment within these areas could be delayed. Therefore, it may be advisable to retain certain pre-existing roads and access routes on the landscape which could prevent many resources from being severely impacted or altogether destroyed in the event of a large scale, catastrophic fire.

It should be noted that a similar unroaded area occurs on the south side of the Rogue River, in the Windy and Howard Creeks area, but was not examined in this analysis.

E. Recreation

Rogue National Wild and Scenic River

The Rogue River was one of the original eight rivers included in the congressionally designated Wild and Scenic Rivers Act of 1968. Under this Act, 84 miles of the Rogue were assigned one of three designations according to the level of development along the river: Recreation, Scenic, and Wild. These designated areas are jointly managed by the USDA Forest Service (Siskiyou National Forest, Gold Beach Ranger District), and the USDI Bureau of Land Management (Medford District, Grants Pass Resource Area). The Bureau of Land Management administers the 47 miles of Rogue River corridor from the confluence of the Applegate River to Marial. This portion of river is divided into two sections: the Hellgate Recreation Area (above Grave Creek) and the Rogue River Wild Section. The remaining 37 miles is managed by the Forest Service and covers the area from Marial to Lobster Creek.

Limited vehicle access is available to the river corridor, at the Rogue River Ranch and to the Marial lodge. No launch or take out facilities are available at either location.

The Rogue River Wild Section, from Grave Creek to Foster Bar, may be traveled as a 35-mile raft trip with only one point of entry and exit. Trips typically take three to four days; a maximum of seven days are allowed. The Wild section is rated a Class III+ rafting experience, and contains some Class IV rapids and one Class V. From May 15 through October 15, use in the Wild section is restricted by permit to 120 people per day. Half the use is allotted to commercial outfitters and half to private boaters. Rogue River Noncommercial Float Permits are allocated through a lottery process during the early part of each new calendar year (Table 33).

Table 33. Visitor use levels of the Wild and Scenic section of the Rogue River.

Visitor floating use of the Wild section of the Rogue:				
Year	**Floaters, Private**	**Floaters, Commercial**	**Total Number of Floaters**	**Number of Commercial Permits**
1973	1,002	3,340	4,342	46
1980	4,931	4,640	9,571	46
1990	5,552	5,202	10,754	46
1997	7,728	6,091	13,819	46
1998	7,470	6,096	13,566	46

The revenue from commercial river fees in 1998 totaled $ 139,428.

There are seven river rafting guiding, equipment rental, and shuttle services that offer rafting-related services. Many of these services are based out of Merlin, Oregon, with others based out of Grants Pass and Agness.

The BLM section of the Wild Rogue River is 20 miles long. Management activities in the area within one-quarter mile, north and south, of the Wild section of the Rogue are covered by the Recreation Area Management Plan for the Rogue River Wild Section (Bureau of Land Management, 1983). The USDA Forest Service manages an additional 37 miles of the Rogue River that are designated Wild, Recreational, or Scenic.

The 41 mile Rogue River trail follows the river along the north bank of the Rogue, from Grave Creek Bridge to Foster Bar. It is designated as part of the National Recreational Trail System. The portion of the Rogue River Trail passing through the watershed is 22 miles long. The trail continues on through U.S. Forest Service land to Agness, Oregon.

Campsites near the north bank along Rogue River Trail within the watershed include:

Sanderson's Home site	Rainie Falls, north
Whiskey Creek (2 sites)	Big Slide
Tyee	Horseshoe Bend
Lower Horseshoe	Meadow Creek
Kelsey Creek	Quail Creek
Mule Creek, east	Mule Creek, west

Many of these sites have toilet facilities; most sites are minimally developed. There are

preliminary plans to remove toilets and require campers to pack out waste. Many of the sites are in areas of historic significance (prehistory and mining eras).

Wild Rogue Wilderness

The watershed contains a portion of the Wild Rogue Wilderness. This wilderness is managed by the Siskiyou National Forest. In 1993, solicitors in Washington, D.C., decided that management of the Wild Rogue Wilderness was congressionally assigned to the Forest Service. The area is also contiguous with Panther Ridge, an historic area.

The West Fork Mule Creek Trail crosses the wilderness, and is connected by the Buck Point Trail to the Panther Ridge Trail system on Powers Ranger District of the Siskiyou National Forest.

Grave Creek to Marial Back Country Byway

The Grave Creek to Marial National Back Country Byway consists of paved or graveled road, one to one-and-a-half lanes wide. The road surface is suitable for passenger cars, though rough in some areas. The road is designed for slow speed travel and has many tight, blind curves. The area through which most of the Byway passes is classified as high intensity forest management land, and the roads often experience log haul activity. Byway signs are used to mark the route at the major intersections, and along the route on some of the longer stretches. An entry kiosk is located along the byway above Grave Creek landing. This interpretive kiosk also provides map orientation and safety information.

The Glendale to Powers Bicycle Route goes through the watershed. Parts of the bike route follow the National Back Country Byway, which takes advantage of the scenic views. The route is bounded by vegetative communities of various ages, including several good examples of old-growth forests. Portions of the route follow along the ridge dividing the Rogue and Umpqua River drainages, which provides extensive views of the surrounding area.

Currently the Tucker Flat Recreation Area at Marial, on road 39-9-14.2, is the only developed campground in the watershed. This recreation site offers vault toilets, a water source, several picnic tables and camp sites. The water source at Tucker Flat has been improved, but the water is not potable due to non-fecal coliform bacteria counts. The location of Tucker Flat Campground serves as a trail head into the Wild Rogue Wilderness Area via the West Fork Mule Creek Trail.

Other sites along the byway have been used by the public as camping areas. Many of these sites were built as landings for timber sales. Ninemile Spring and Ninemile Saddle experience some day use recreation.

Two popular overlooks exist within three miles of the start of the byway. Whisky Creek Overlook is on a short improved spur road, approximately 3.5 miles from the Grave Creek boat landing, and offers a view of the wild portion of the Rogue River canyon. Rainie Falls overlook is also a popular pull out on the Mt. Reuben road, about 1.5 miles from the Grave Creek boat landing.

Trails

The Rogue River National Recreation Trail is a well-maintained trail along the north bank of the river. It can be accessed at the Grave Creek Landing. There is also a trail head at Marial from which one may hike upstream 24 miles to Grave Creek or downstream 30 miles to Foster Bar. Many people use Marial and Tucker Flat as a place for restocking supplies on extended hikes. This trail was developed by miners and used as a pack trail to and from the Galice area. The portion of the trail within the watershed experiences high use in the summer months. During winter and spring the trail is occasionally closed by landslides and /or high water from river flooding.

The Kelsey Historic Pack Trail may be accessed from the Rogue River Trail at Quail Creek and Winkle Bar. This currently unmaintained trail was historically used by miners for transporting goods and supplies. Some of the northern portion of the Kelsey Trail route was converted to road in 1936 by the Civilian Conservation Corps (CCC).

The West Fork of Mule Creek Trail may be accessed from the Marial and Tucker Flat area. The trail is one of the few developed access points into the Wild Rogue Wilderness Area. Historically the trail followed a ridge line to Eden Valley and was used by homesteaders and miners for packing supplies. This trail now connects to Buck Prairie Trail in the Siskiyou National Forest. A portion of this trail was maintained by the Forest Service until 1987. The Forest Service returned management to the BLM at that time. A BLM trail maintenance and reconstruction contract was completed in 1992 in this area, opening the trail to the Buck Point trail head.

Facilities

Marial lodge, privately-owned, accommodates visitors with reservations made well in advance during the summer months. Gasoline or other supplies are not available to the public at this location.

The Rogue River Ranch National Historic Site near Marial has a care-taker present and is open from May to October for day use. The site has a museum with many historical buildings and artifacts on site.

Other Recreational Opportunities Within the Watershed

Recreational, cultural, historic, and other special use areas in the watershed (Map 28) include:

Hanging Rock (T)	Mt. Bolivar (R)
Wild Rogue Wilderness (R)	Jacob Weil Spring (C)
Rogue River Wild & Scenic River (R)	Big Meadows (C)
Zane Grey cabin (private land) (C)	Buck Point Trail (R)
Whiskey Road route to Oregon coast (SB)	Cold Springs Campsite (R)
Kelsey Historic Pack Trail (not maintained) (C)	Ditch Creek © & R)
Tucker Flat and Tucker Flat Campground © & R)	Marial Lodge (R)
West Fork Mule Creek Trail © & R)	Trappers Camp (C)
Glendale to Powers Bicycle Route (R)	Bald Ridge (R)
Ninemile and Ninemile Springs © & R)	Buck Point Trail (R)
Whiskey Creek Cabin* (C)	Rogue River Ranch* (C)

C= cultural site R=recreation site
SB=Scenic Byway T=trail

* Listed on the National Register of Historic Places and the sites have archeological digs.

In the Recreational Opportunity Spectrum, this watershed would be classified "roaded natural", having few invasions by humans other than timber harvesting and related activities. Some of the opportunities available in the watershed include: fishing, swimming, rafting activities, hiking, camping, picnicking, sightseeing, wildlife viewing (e.g. elk, bear, songbirds, raptors), nature and botanical study, photography, and hunting upland birds and big game.

Visual Resource Management

BLM lands are classified into visual resource management (VRM) classes which dictate the size and kind of management activities that can occur in an area. The Wild Rogue River Corridor is classified as VRM Class I (Map 29). This Class allows no visually disturbing activities within 1/4 mile of the river. Outside of this corridor, VRM classification changes to Class II, where visible from the river and Class IV, where screened from the river. Class II allows for limited disturbance that blends with the natural environment, but which does not attract the attention of the casual observer. Class IV is the least restrictive of all classes and allows for large areas to appear disturbed (40 acres) and in stark contrast to the surrounding environment. Timber harvest and the associated road systems are the most frequent visual disturbances within this area.

From the Wild portion of the river corridor, there are no road cuts or harvest units visible when looking to the north. Much of the river corridor is narrow and little can be seen beyond the 1/4 mile corridor. A casual observer can see far into the Kelsey Creek drainage when traveling the straight section of the river looking to the northwest.

Literature Cited

Recreation Area Management Plan for the Rogue River Wild Section, USDI, BLM, 1983

V. Synthesis and Interpretation

A. Hydrology/Fisheries

Aquatic Conservation Strategy

The intent of the aquatic conservation strategy (ACS) is to restore and maintain the ecological health of watersheds and the aquatic ecosystems on public lands. The strategy is a framework for managing federal lands and was designed to provide a scientific basis for protecting aquatic ecosystems and to enable planning for sustainable resource management. There are four principal components to the ACS: analysis of watershed conditions and hydrologic function, Riparian Reserves, delineation of key watersheds and watershed restoration.

Adherence to the ACS objectives affect many other management activities on federal lands. Road construction, timber harvest, fire management, and recreational opportunities are all affected by this strategy, usually by restricting or preventing such activities from occurring in riparian areas. This has reduced the land available for timber extraction and reduces opportunities to provide transportation system expansions to extract timber. The ACS also restricts development of potential recreation sites near streams.

Hydrologic Effects

The climatic patterns and the geomorphic nature of the Wild Rogue North watershed result in high flows, usually caused by short duration, high intensity precipitation events. The steep slopes and lack of deep soils cause flashy, fast runoff rates. Dams upstream on the Rogue River currently control major flooding events on the main stem of the river. This may be desirable to landowners and urban areas located within the flood plain both above and below the Wild Rogue North watershed, but over time it will no doubt alter the ecological processes historically characteristic of this river system. In the absence of periodic flooding, rock debris flushed into the river channel by local floods and small scale landslides will not be removed. Debris dams and rapids may grow larger, and perhaps become impassible over time. In addition, silt accumulations in the upper tributaries may not be adequately flushed from the river system.

Generally, most streams in the watershed are properly functioning and in good condition. There are several areas where past management activities have damaged riparian habitat both by clearcutting along smaller streams and partial-cutting along larger ones. However, these activities occurred several decades ago and under the current Aquatic Conservation Strategy guidelines in the Northwest Forest Plan, these lands are expected to improve.

Roads

There are 3 seventh-field watersheds of concern in upper Mule Creek and one in East Fork Kelsey Creek due to high road densities and increased drainage density due to ditch lines. The high road densities in these areas have most likely caused increased peak flows and higher levels of sedimentation, and might also have caused peak flows to occur more rapidly following storms.

Compaction from roads, particularly the high concentrations of roads in these two areas, reduces the amount of productive forest land and increases precipitation runoff which leads to erosion.

While roads may have detrimental effects on the landscape, the impacts in this watershed are minimal compared to adjacent watersheds. The large unroaded areas enhance upland and riparian habitat by limiting sediment transport, retaining vegetative cover and improving shade. Additionally, due to the relatively undisturbed nature of the unroaded area, flow regimes and runoff rates in these areas have remained in good condition and within the range of natural variation.

Riparian Habitats and Large Woody Debris

Given the large percentage of Riparian Reserves and adjacent upland areas within the LSR, existing late-successional characteristics should be maintained into the future. Connectivity across the watershed via riparian corridors appears to be quite functional and also provides access to adjacent watersheds. Large woody debris is probably close to the natural potential. The LSR status further ensures protection and future woody debris recruitment.

Fisheries Values

The fish production capability in the northern half of the watershed is probably within the natural range of variability; there are few human-caused sources of sediment due to the low road density in most parts of the watershed and nearly 75 percent of the Riparian Reserve acres are in late-successional condition. In addition, there are no valley bottom roads and no stream crossings that impede fish passage to upstream habitats.

Current management direction for Riparian Reserves, road building, and road maintenance on federal land serve to enhance the protection of the riparian zones, as well as unstable areas that could result in sedimentation into fish streams. In spite of the ongoing efforts to improve and maintain existing conditions, three natural factors may limit stream productivity to a minor extent: bands of serpentine soils, high water temperatures and low summer flow in tributaries. Serpentine soils, which are less productive than many other soil types, border portions of Mule Creek and Whiskey Creek. Serpentenite may limit the amount of shade, tree diameter and density and therefore the size and amount of wood that enters streams. Roads and sources of sediment on non-federal lands will continue to be problematic. Occasionally, episodic pulses of sediment will occur through new disturbance of lands and the occasional large storms and natural

disturbance events such as mass failure. Current RMP management direction will produce properly functioning riparian zones on federal lands in the long term.

B. Terrestrial Vegetation and Habitats

Fire and Fuels

Return intervals for catastrophic fires in the Wild Rogue North watershed have been greatly increased by fire suppression, which began around the turn of the century. Historic lightning fire data within this watershed indicate that fires ranged from less than an acre to more than 21,000 acres. With fire suppression came an increase in dense vegetation in young and mature forest stands. The density of this vegetation has created ladder fuels, which have the potential to carry fire into forest canopies, increasing the risk of severe fire behavior. These types of fires make wildland fire suppression efforts difficult. The overall health of the forest has also been greatly compromised by this dense vegetation, due to the competition with trees for soil moisture.

Three factors were used to analyze fire management decisions: hazard, risk and value. These factors are used to evaluate and set priorities for treatments while giving consideration to other management opportunities, such as wildlife habitat enhancement. Areas where all three factors were rated as high were deemed highest priority for fuels treatments.

The Wild Rogue North watershed is primarily composed of BLM lands with small blocks of non-federal lands. The hazards and risks of these non-federal lands are difficult to determine because they are not under the control of the BLM. These lands will be considered "high hazard, and high risk" because of the presence of potential ignition sources and the light flashy fuels.

In this watershed there are few instances were all three rating factors are "high." These include areas that received recent pre-commercial thinning (PCT) or brushing adjacent to well traveled roads, owl core areas, Critical Habitat Units (CHU) and areas within the Late-successional Reserve (LSR) bordering non-federal lands. These are considered the highest priority for treatment (Map 30).

The second priority for treatment include areas where high risk and high value overlap.
In this watershed, these areas consist of spotted owl core areas, critical habitat units (CHU), lands adjacent to highly traveled roads and heavily used recreation areas such as the Rogue River corridor, the back country byway and developed campgrounds. These areas are similar to the number one priority rating with the lack of recent PCT, brushing or other management activities which create heavy slash loading.

The third priority for fuels treatment is where there are PCT, brushing and other management activities not adjacent to well-traveled roads or near owl core areas and CHUs. This priority level may also include recreation use areas. The areas that have received PCT treatments exhibit a

higher short-term hazard than unthinned stands of similar size and age. Generally, different stands are pre-commercially thinned each year creating new areas of high priority for hazard reduction treatments. PCT stands will fall from high priority for treatment as slash breaks down and decomposes, generally after the first three years. A recommendation for treatment should be made after PCT is accomplished and the fuel loading and fire hazard are identified.

It appears that the trend in future wildfire occurrence is for more intense fires than have occurred in the past. The levels of fuel loading and lack of access to large portions of this watershed are major factors which will determine how large a fire will grow before suppression actions can be taken.

Late-successional Habitat/Species

Late-successional habitat has been influenced by both natural succession and disturbances. As described earlier, fire has been an important agent of disturbance in the Klamath Province. In this watershed, fires have largely been patchy in nature, resulting in areas with great vegetative diversity. As a result of longer fire return intervals caused by improved fire suppression efforts, there has been a buildup of ladder fuels, with some stand overstocking, and a subsequent increased risk of stand-replacement fires. This risk is further heightened by the presence of plantations, notably in Whiskey and East Fork Kelsey Creeks. In areas of prior partial overstory removal, there has been a large increase in the brush understory, with a corresponding increase in fire risk, again in East Fork Kelsey Creek and also in Quail Creek. The risk of catastrophic, stand-replacement fire in this watershed is significant because of the importance of the Late-successional Reserve in this watershed, and its critical connectivity through the Whiskey Creek area in the northeastern sector in GFMA lands, into the Grave Creek watershed and through the Rogue Valley, linking populations to the Galesville LSR.

Riparian Reserves, including Mule, East Fork Kelsey and Whiskey Creeks are currently lacking mature and old growth conditions where plantations now exist.

Late-successional habitat is in generally good condition throughout this watershed. As a whole, the Fishhook/Galice LSR, which includes the southern one-half of the watershed, is also in good condition. There are several interior forest blocks of more than three hundred acres, including some blocks of late-successional habitat larger than 1,000 acres. Past timber harvest has primarily been concentrated in Whiskey, Kelsey, and Mule Creeks. In those areas, while there have been impacts along the drainages, there continue to be bands of mature forest. It appears the trend is for late-successional habitat to continue to improve, since there are many mature stands throughout the watershed which will continue to develop late-successional and old-growth characteristics.

Because the inventory data indicate that late-successional habitat is both extensive and largely in good condition throughout the watershed, there is not a compelling need to aggressively thin stands to enhance late-successional conditions. Also, because the area is, in effect, currently

acting as a large block of interior forest habitat, extensive regeneration harvest would fragment and adversely affect the function of this forest as an important interior forest habitat area.

The current lack of roads in the watershed, with the exception of the Mule Creek and East Fork Kelsey drainages, contribute to minimizing disturbance to many wildlife species, both from a landscape perspective, as well as from ambient noise.

The large amount of late-successional habitat in the watershed appears to have positive interactions on recreational use, attracting those users who seek solitude and visual qualities associated with large trees characteristic of late-successional forests. Because the recreational use is largely limited to the Rogue River corridor, there are few human disturbance effects on wildlife.

Although survey data is limited, data from the Cold Mule timber sale and other field observations indicate that coarse woody debris levels are deficient in several areas of the watershed. In some areas this is possibly due to past commercial harvest and salvage. In others, it may be an indication that these relatively low levels are a natural condition. Low levels of coarse woody debris result in adverse impacts to a wide array of wildlife species, as well as fish. Given the large percentage of the watershed in LSR, Wilderness and Riparian Reserves, coarse woody debris should increase over time.

Connectivity was identified as an important issue in this watershed. The East Fork of Mule Creek provides connections to the Bobby Creek Research Natural Area, and Whiskey Creek serves as a connector from the LSR in a northeast direction, towards the Grave Creek watershed. This connection is very important because it traverses GFMA lands and northern spotted owl Critical Habitat as it connects populations moving between the Fishhook/Galice LSR and the Galesville LSR. Northern spotted owl Critical Habitat on GFMA lands was identified as a significant concern given that its intent is to provide suitable owl habitat and also facilitate dispersal. Based on existing information, the condition of this Critical Habitat Unit (#OR-65) is currently highly functional with approximately 80 percent of its forest in 80-year old or older stands. With approximately 56 percent of its area not available for harvest, the trend will probably be stable, with a substantial late-successional component maintained within the CHU.

C. Roads and Developments

Existing Roads

Most of the roads in this watershed are concentrated in the Mule Creek drainage and the upper parts of the Kelsey Creek drainage. The trend in these areas is most likely not to increase the number of roads, since the area is fully roaded for timber management. Some roads may be decommissioned. In other parts of the watershed, additional road construction is likely, although the extent of road construction largely depends on management decisions involving fire management, timber harvest, unroaded areas and other values.

Unroaded Areas

The values associated with large, unroaded areas are generally intangible, subjective qualities, and are difficult to quantify. They also vary considerably between people. Management of unroaded areas is currently a highly visible issue for the US Forest Service and BLM at the national scale.

Some of the values associated with large, unroaded areas identified during the scoping process for this watershed analysis included:

- aesthetics
- solitude
- undeveloped recreational opportunities
- wildlife - especially wide-ranging species such as carnivores
- fisheries
- water quality
- intrinsic value of having wild, undeveloped places.

In discussions of unroaded areas, the question of official Wilderness Area designation under the Wilderness Act of 1964 frequently arises. Portions of this area were examined for potential wilderness designation in 1979. The BLM recommended that none of the area be designated as wilderness largely because much the land was commercial Oregon and California (O&C) forest land, which was excluded from consideration for wilderness designation under Washington Office, BLM guidance in the Wilderness Inventory Handbook (September 27, 1978) and Oregon State Office guidance in Instruction Memorandum No. OR-77-361, Change 3, dated June 27, 1978. See Appendix G for more details on the history of this process. This decision does not preclude the area from being re-examined in the future.

Since that decision, the situation has changed in many ways. The definition regarding which lands are considered commercial forest lands was re-examined in the field in the early 1980s using the Timber Production Capability Classification (TPCC), which withdrew lands from the commercial timber land base if they had very low productivity or were on unstable slopes (see Timber section of the Current Conditions for more information). In addition, the Northwest

Forest Plan and the Medford District RMP designated part of the unroaded areas as Late-successional Reserve (LSR) and other parts as General Forest Management Area (GFMA) lands. The latter category constitute those lands to be managed for commercial timber harvest, but it is unclear if that is the same use of the term "commercial forest land" in the 1978 guidance.

The watershed analysis team did a preliminary review of the current conditions of the unroaded areas in this watershed. There was consensus that part of the watershed may meet all or part of the four criteria for wilderness consideration:

- the imprint of man's work should be substantially unnoticeable,
- the area should provide outstanding opportunities for solitude or primitive recreation,
- the area should be at least 5,000 acres,
- the area should contain ecological, geological or other features of scientific, educational, scenic or historical value.

It should be emphasized that the review for this watershed analysis does not qualify as a legitimate wilderness area inventory, but represents the opinions of the ID team with the limited information available and it does not address the question of commercial forest land and the BLM exclusion. It does indicate that portions of the watershed do have some of the same values for which wilderness areas are designated and for which people find large, unroaded areas important.

The most important impacts on the unroaded areas in this watershed come from:

- the existing roads which bound the areas and which enter into the areas,
- fuels management and fire suppression,
- recreational use of the Rogue River, and
- private lands, especially those with residences.

Obviously the presence of roads conflicts with many of the values of an unroaded area, but in this case it is not always black and white. Some of the old road beds within the boundaries of the unroaded area were constructed and used and then abandoned (Map 9). Portions of these roads currently do not receive any motor vehicle use because they are overgrown with trees and brush and are not maintained or repaired. In this condition, they do not meet the definition of roads used in conjunction with wilderness designation and they may not conflict with many of the values of unroaded areas. Many of these overgrown roads remain highly compacted, so they still conflict with fisheries and water quality values, but most of the roads in the unroaded portions of this watershed are located on ridge tops and do not contribute sediment to streams, nor intercept surface or subsurface flows, so the impacts are minimal.

Other roads which extend into the unroaded areas are clear of vegetation are and receive some motor vehicle use, although the amount of use is low. These roads create a source of disturbance, provide opportunities for introduction of noxious plant species, create barriers for

some wildlife species such as molluscs, increase likelihood for poaching and disturbance to wildlife and generally pose an elevated fire risk from people using the roads during dry conditions. Some people feel that the presence of a road into an unroaded area destroys the solitude and value of that unroaded area; others consider a light use road as a narrow corridor, or "cherry stem" into the unroaded area, leaving the surrounding area's values intact. Conversely, the open roads allow recreational access to the areas, allow more effective fire suppression efforts, and allow more effective management of past harvest units.

Fuels and fire suppression have had several impacts on these unroaded areas. Many roads were constructed specifically to attack past wild fires or to provide control access for future fires. Many of these have since become overgrown as described above, but still affect the character of the area. The Quail Creek fire, the Ranch fire and others were large fires which burned in recent decades. It is likely that if the area had a higher road density, these fires could have been suppressed more quickly, resulting in large areas not being burned over. However, fire suppression has been effective in this area and the vast majority of the lightning-caused fires have been limited to extremely small acreage. This has resulted in changes to the characteristics of the vegetation, most notably an increase in brush and small Douglas-fir trees which would otherwise have been killed by periodic ground fires (see Fire section in Current Conditions).

Recreational use of the Rogue River for boating and hiking is very high during the spring, summer and early fall, but the effects on the unroaded area are generally restricted to the area immediately adjacent to the river. Very little use extends up the slope because of the extremely steep and rugged nature of this country. It is important to remember, however, that in this case, the Rogue River corridor bisects a much larger unroaded area which extends south into the Grants Pass Resource Area, which is outside the scope of this watershed analysis.

Visual Resource Management (VRM) does affect a larger part of the unroaded area.
VRM Class 1, the congressionally-designated Rogue Wild and Scenic River Corridor within this watershed, is the most sensitive and restrictive requiring “preservation of the existing character of landscapes.” Eight percent of the unroaded areas is within VRM Class 1. VRM Class 2, the area seen from the Rogue River outside of the 1/4 corridor in the watershed, requires retention of the existing character of landscapes and limits actions to those which do not attract the attention of the casual observer. Approximately 35 percent of the unroaded areas is within VRM Class 2.

Finally, many people would feel that some of the values of the unroaded areas are compromised to some degree by the presence of the private lands, especially in the western portion of the Russian Quail area. Most of these lands have been cleared, changing the plant and animal communities in the vicinity. Some have residences which increase disturbance to wildlife. The roads into these areas have been kept open and are being used regularly, also creating some level of disturbance and erosion. The extent of these impacts are generally quite small in this instance. The greatest recent impact is probably the commercial logging which has occurred in the late 1990s on some of the parcels.

The future management of these relatively unroaded areas is at a crossroads. Public interest in maintaining existing large, unroaded areas has grown in the last two decades. Much of the unroaded areas (52 percent) was designated as a Late-successional Reserve in the RMP where management direction to promote late-successional forest habitat complements many of the values placed on unroaded areas. Fire suppression and plant succession may be rapidly increasing the risk of losing large areas of late-successional habitat to stand-replacing fires. There are 4,775 acres of GFMA lands outside reserves within the unroaded areas (15 percent of the GFMA lands in the watershed). As more restrictions are placed on timber harvest throughout the Medford District, pressure to harvest timber in these unroaded areas will increase.

D. Recreation

Forest management has the potential to conflict with recreational uses, largely through timber hauling. The bike route might eventually result in greater restrictions on forest management, along a 10-mile stretch of road within the watershed. Timber hauling also damages the roads. However, roads for logging often create recreational access.

VRM restrictions are minimal within the GFMA lands; there are less than 200 acres of VRM II. Most of the VRM I and II lands are within the LSR. There are no additional VRM concerns as viewed from the Wild Rogue Wilderness Area.

Numerous recreational opportunities within the unroaded area could be developed, including: building new hiking and bicycling trails and improving the existing trails, developing new scenic overlooks, and enhancing existing overlooks with benches or interpretive signs.

Since fishing along the Rogue River is a major recreational use, in recreation and fisheries management directly affect each other along the river corridor. Most dispersed recreation sites are not along fish bearing streams. Recreational mining within the watershed is very limited and has little effect on fish habitat.

The trend of increased recreational use in this watershed is indicated by an increase in visitor days for rafters on the Rogue River. The bike route will probably continue to receive more use as it becomes known to more cyclists. The Scenic Byway will continue to see more travelers as other areas get more crowded and people seek a less traveled route. As other wilderness areas continue to see heavier use, the Wild Rogue Wilderness Area will likely become more popular, resulting in further development, such as an improved trail system.

E. Forest Management

There are several activities occurring in this watershed which affect how timber and special forest products are harvested. The NFP and the RMP provide management direction for commodity production on the lands of this watershed. They designate over 9,000 acres of the approximately 57,000 that BLM manages as GFMA lands, where timber production is a primary goal.

Some of the land, particularly in Mule Creek, is moderate to good site class for timber productivity. There are also several moderate site class areas in the Whiskey and Kelsey Creek drainages that produce large amounts of timber, particularly with active silvicultural techniques such as thinning and fertilization.

In Mule Creek, a substantial amount of timber has been removed. Many areas here are in plantations that are growing well. In the remaining older stands there are high levels of snags and large woody debris as the stands are quite old and some decadence is present. There have been fewer timber sales in Whiskey and Kelsey Creek but there have been pioneer sales that set up the framework of the existing road systems. These systems were designed under previous planning regimes. Snags and dead wood are less common south of the Marial Road.

A great deal of standing timber and salvage remains to be harvested in the Wild Rogue North watershed, with at least a moderate chance of future timber establishment after harvest. The over 9,000 acres of GFMA land currently available for harvest, therefore, is quite capable of timber production.

Late-Successional Habitat and Commodities

The most significant interaction with commodity management occurs with late-successional habitat values. There is a large percentage of land in the watershed that is formally directed to be managed as late-successional habitat, including:

- the Wild Rogue Wilderness is Congressionally reserved and unavailable for commodity management including salvage harvest.
- the Wild and Scenic Rogue River corridor is also Congressionally designated and timber harvest is prohibited.
- the large amounts of Late-successional Reserve (LSR) , where the priority under the RMP is to maintain or improve late-successional habitat. This entails no planned harvest of trees over approximately 80-years old and leaving most salvageable material throughout the reserve unless disturbances over 10 acres occur.
- Riparian Reserves which, over time, will develop late-successional characteristics. Protection of fish habitat and hydrologic values here will restrict harvests.
- many acres throughout the watershed are withdrawn from intensive timber management using the TPCC system due to low site productivity.

There are additional GFMA lands that may have timber management restricted for other resources, including:

- two Critical Habitat Units (CHU) for the northern spotted owl occur in the watershed. This designation has the potential to restrict timber harvest, but to date, has not caused significant harvest reductions.
- two sections are designated as Connectivity Blocks in the RMP, which restricts the amounts of harvest.
- protection measures for managing Survey and Manage species under the RMP call for restrictions in timber harvest. While this is not to protect acres as late-successional habitat per se, the net effect is often similar in that attributes of late-successional habitat will occur with a lighter harvest and less disturbance.

All these factors create difficulty for commodity extraction and subsequent reforestation. The cumulative effects of these restrictions stands in stark contrast to the idea of commodity production as it was in this watershed a decade ago.

In the Timber Harvest Current Conditions section, it was projected that an average of 925 acres might be harvested per decade in this watershed, although the reader should recall how harvest projections are based on Master Units, not watersheds. With the of restrictions discussed above, the rate of harvest will likely be considerably lower than this projection.

There are few opportunities for commercial thinning in the watershed. Fires have produced stands that did not re-vegetate as uniform stands with high numbers of trees per acre which would need thinning and most existing clearcuts are relatively young and have not grown into sizes suitable for commercial thinning.

The increasing trend for late-successional habitat in the watershed will probably continue. Future timber harvests will not overly degrade habitat as the amount to be harvested will be small under any timber harvest regime.

Hydrology, Fish, and Commodities

In the Current Conditions section, it was noted that a high percentage of streams in the watershed are functioning well, hydrologically. This is primarily due to the lack of road building and timber harvest in the recent past.

However, slumping has occurred in the lower portions of the drainages where the least harvest has occurred and where the least amount of land will be available for harvest. Slumping has also been observed in upper Mule Creek and Kelsey Creek. In addition, there are highly managed and cut areas in the Mule, Whiskey, and Kelsey Creek drainages that have caused sedimentation and removal of riparian vegetation. In Mule Creek, recovery has been quicker and many riparian areas are beginning to recover, due to higher site class in this area.

With the RMP allocations and management directions, the acreage harvested in this watershed will be a relatively small portion of this watershed and will most likely not add substantial new damage to its hydrologic values. Most of the land available for harvest is located in the headwaters of creeks, where road building is the most secure and where the least amount of slumping occurs.

There are temperature limited streams in the watershed, but it is not thought that over-cutting in the riparian area is the reason for those conditions. Rather, it is the geography of the Rogue River itself and other streams that naturally produce the higher stream temperatures, which has led to the designation by the State of Oregon DEQ.

For similar reasons, fish habitat is in relatively good condition in this watershed. There are a few areas adjacent to past timber sales where riparian areas have been adversely affected. Under the ACS, restrictions on future cutting in these areas will adequately protect these areas. There are high levels of large down woody material that has not been harvested as salvage in the riparian areas of the Mule Creek drainage that adds quality to riparian habitat. This situation will continue under the ACS. There is less large down woody material in the rest of the drainage, particularly at the lowest elevations. Commodity harvest here has been minimal and it is thought that the lack of natural stocking and past fires may account for the lower levels of large woody debris in those areas.

The trend for hydrologic values and fish habitat in the near future appears to be one that will retain high resource value and at least adequate habitat. Future timber harvests will be relatively small and recovery of past disturbances will continue.

Fire and Commodities

The watershed has been subjected to a fire major disturbance approximately every 20-40 years. There was a major fire in this watershed on the south side of the Rogue River in 1987 and another in the Quail Creek tributary of Rogue River in 1970. There is a long history of lightning strikes in the watershed. Fire protection efforts in this century have reduced or delayed large scale disturbances in the watershed but have also led to a buildup of fuels that could lend themselves to catastrophic fires in drought years.

Fire and commodity harvest have a strong interaction in this watershed and throughout several adjacent watersheds. In areas of harvest, prescribed fire is the most common and practical form of site preparation. It reduces short term fire hazard from dead slash and makes tree planting sites accessible. Broadcast burning of harvested sites is getting more rare as efforts are made to save advance regeneration by concentrating fuel in small hand or machine piles to be burned under controlled conditions. Any of these methods reduce hazard, however, and allow for quicker establishment of new timber stands on GFMA areas.

Most of the land where fuels buildup and ladder fuels occur in areas designated as reserves (e.g. LSR, Riparian Reserves, Wilderness, Rogue River corridor, recreation sites). These designations comprise over 80 percent of the watershed. The restrictions in the RMP limit site preparation activities on these lands and lead to increased risk of catastrophic fire, perhaps to a level higher than at any time in the last 100 years. Lack of prescribed burning in the watershed may contribute to losses in quality of late-successional habitat and Riparian Reserves.

Timber salvage, in the form of merchantable timber, has many more restrictions in this watershed for the same reasons as other timber sales. Salvage efforts in the past removed large fuels that in times of wildfire would lead to a more complete incineration of an area. While these materials are essential to many forms of wildlife, if undue buildup of these materials occur, the potential fire hazard also increases. Areas in Mule Creek, where large amounts of snags now occur, may have an increased fire hazard as a result of excessive fuel loading.

While commodity harvest also contributes to fire hazard reduction, in recent years fiscal allocations for fire hazard reduction have been allocated separately from timber sales. It is a very expensive activity and funds are limited.

Unroaded Areas and Commodities

There are large tracts of unroaded acres in this watershed, totaling 32,000 acres, over half the watershed (Map 27). Land allocations include LSR, GFMA, Connectivity Blocks, and Riparian Reserves. A large portion of the unroaded GFMA land is designated Critical Habitat for the northern spotted owl. This area underwent a Wilderness designation review in 1979; the decision at the time was to not propose the area for Wilderness designation.

This area remains the least disturbed by humans in the watershed and the Resource Area. There is considerable late-successional habitat present and it is functioning well at this time. It provides a bridge of connectivity to other LSRs and also provides a link of late-successional habitat between coastal areas and the Cascades.

There are 15,700 acres of GFMA land within the unroaded areas that are currently part of Medford District ASQ calculations. It is estimated that between 100 and 200 million board feet of timber occurs in the GFMA lands in the unroaded area, or approximately three percent of the Medford District's standing inventory of timber, a large quantity of timber.

Harvesting this timber would disrupt the connectivity of late-successional habitat (See Late-successional habitat discussion in the Synthesis section), which could have far reaching consequences on many species associated with late-successional habitat.

If this area is not harvested, the result would be the loss of potential jobs. Not building some roads for access to timber sales and fire hazard reduction would result in poorer fire protection and the higher potential for catastrophic fire in an area known to have areas of high fuel loading, a history of lightning strikes, and ladder fuels.

There are many restrictions on timber management in this watershed as discussed above. Table 34 summarizes the restrictions and presents the estimated level of impact on the timber commodities.

Table 34. Potential future restrictions on timber availability on GFMA lands in the Wild Rogue North watershed.

Type of restriction on timber availability	Estimated reduction of GFMA availability within the watershed
Potential unroaded areas	High
Access/riparian blind leads, etc	High
Molluscs - protection buffers	Medium-High
Del Norte Salamander - retain 60-80 percent canopy around talus	Medium-High
Red Tree Voles	Medium
Mosses and Fungus	Low-Medium
Sedimentation-Unstable areas	Low
Visual Resource Management	Low
Uneconomical/Unfeasible (UE/UF)	Low
Non-vascular plants	Low
New owl sites/CHU	Low
Recreation/Wildlife/Late-successional retention	Low
Coarse Woody Debris and snags	Low
Watershed parameters (compaction, transient snow zone, ECA, etc.	None
Raptors and other Special Status Species	None
Potential fish listing as T/E	None
Total Potential Reduction	**Medium-High**

High	=	constrains virtually all proposed timber harvest units
Medium-High	=	constrains many proposed harvest units
Medium	=	constrains some proposed harvest units
Low-Medium	=	constrains proposed harvest units occasionally
Low	=	constrains proposed harvest units rarely
None	=	no effect anticipated in future harvest units

If these projections are accurate, it may indicate that the actual levels of timber harvest available in this watershed may be considerably less than those projected in the ASQ modeling and the projections above. In the long term, a reduction in the ASQ may be called for as further reviews are completed.

At the present time, it appears the watershed has not been "over-cut" based on the acreage available for timber harvest. Additional restrictions on timber harvests in this watershed may put pressure for increased timber harvest in other watersheds in the Resource Area, since the ASQ is determined on a Master Unit basis. Deferring harvest in the Wild Rogue North watershed implies that the volume would be made up elsewhere.

VI. Recommendations

Management recommendations are presented here based on the analyses in this document. First a long-term landscape design is described and presented in Map 31. Following this is a discussion and map showing priority management actions for the next 10-20 years (Map 32). Finally, specific recommendations for individual issues are presented.

It should be stressed that these recommendations are not to be considered management decisions. They are intended as recommendations to be considered for future management actions and may help frame the context for developing future projects. They should not be viewed by the public, BLM staff or managers as a commitment or as binding on future management. Watershed analysis is clearly not a decision document. Actual implementation decisions need to be developed through the NEPA process using this watershed analysis, public input and other information and considerations.

A. Projected Long-Term Landscape Design

The primary factor shaping the long-term landscape design for the Wild Rogue North watershed is the land use allocations in the RMP and the Northwest Forest Plan (Map 7). This watershed analysis did not develop significant departures from, or modifications to, these allocations.

The projected long-term landscape design is presented in Map 31. This map shows the general vegetative condition expected to be present in the watershed 100 years from the present.

There are eight categories of vegetation conditions and land uses based on the projected management in this watershed:

Private lands,
State lands,
Federal lands
Wilderness Area
Late-successional habitat,
Connectivity/Diversity Blocks,
Lands withdrawn from intensive timber management due to biological limitations,
General Forest Management Area (GFMA), and
GFMA where connectivity is an added consideration.

These categories are briefly described here.

Private lands: It is assumed these lands will continue to be intensively managed for timber and for residential purposes. In the future, forest stands will be 0-40 years old. Only very limited areas will exist in an older condition.

State Lands: It is assumed that these lands will continue to be intensively managed for timber, but on a slightly longer rotation than industry lands. Only very limited areas will exist in stands older than 60 years old.

Federal lands

Wilderness Area: This area will remain in its current condition except where natural disturbances such as wildfire changes the vegetation.

Late-successional forest habitat: This category includes several land allocations where late-successional habitat is a direct management objective (e.g. spotted owl core areas and Riparian Reserves). Virtually all the late-successional forest habitat will occur on BLM land.

Lands withdrawn from intensive timber management due to biological or physical limitations (TPCC): These lands will generally resemble conditions in the late-successional category. There is no direction to manage these lands for late-successional habitat, but they are not to be managed for timber either, so they will generally develop into late-successional conditions on their own. A sub-set of this category will naturally remain in a non-forested or relatively open, brushy condition due to their rocky soils or low productivity. These are especially abundant on south slopes in lower elevations.

Connectivity/Diversity Blocks: In this allocation the blocks will consist of at least 25-30 percent late-successional habitat. The rest will contain lands similar to those found in the northern GFMA, but with higher levels of large legacy trees retained.

General Forest Management Area (GFMA): These lands have intensive timber management as a primary objective. They are prescribed for a rotation length of 100 years. The result will be a mosaic of stands between 0 and 100 years old distributed relatively evenly within the watershed, with each age class in approximately even proportions. Large structure legacies (green trees, large snags and coarse woody debris) will be retained on these lands.

GFMA lands where connectivity is to be emphasized: These lands were identified as important to provide connectivity for late-successional species between the large Fish Hook/Galice LSR and the LSRs to the east. In this area, the landscape would be managed to maintain 50 percent of the land in a late-successional condition. This would be done through harvest scheduling.

B. Short-Term (10-20 years) Landscape Recommendations

Map 32 displays the priority management recommendations for federal lands over the next two decades based on this watershed analysis and the desired long term conditions.

Plantations resulting from past timber harvest are located throughout the watershed. Management in these stands should focus on maintaining conifer stands, promoting their growth and developing habitat conditions. The specific prescriptions will vary, based on the land allocation in which the plantation occurs.

Modified older stands have been partial cut in the past and may not be fully stocked. Management in these stands should promote establishment of fully stocked conifer stands.

Stands 40-80 years old should be examined as a high priority for **commercial thin treatments**.

The highest priority fuels management areas should be treated to reduce fire hazard and the risk of wildfire.

Several roads should be decommissioned to reduce sedimentation, habitat fragmentation and disturbance to wildlife.

Port Orford cedar areas should be managed to prevent the spread of the root rot disease into uninfected stands, and out of infected stands.

C. Recommendations for Key Issues

1. Hydrology/Fisheries

Roads which access critical wildlife habitat areas or pose substantial sedimentation threat to streams should be gated, and if not necessary for immediate forest management activities could be barricaded. Where roads are no longer necessary or are in severe disrepair, they should be decommissioned. Due to the high road densities in upper Mule Creek and East Fork Kelsey Creek, effort should be made to reduce open road densities in the watershed through decommissioning, barricading and gating. Specific road closure recommendations considered under this watershed analysis are included in Appendix L and shown on Map 33.

New roads should be constructed along ridges as much as possible to reduce sedimentation in streams. Roads constructed along ridges also reduce side hill road castings, which can reduce site productivity or take more land out of production.

Any future road construction should avoid creating valley bottom roads. Avoid new road placement in areas of instability, steep slopes. Minimize road placement at stream crossings and utilize properly installed and sized water dips as a secondary means of providing drainage in the event of culvert failure. Future management actions should strive to maintain or improve existing road conditions within the watershed.

Inspect roads during storm/flood events to assure proper drainage and to detect new problems such as plugged culverts, recent mass wasting, etc. Periodically conduct regular road inspections to determine existing road conditions, detect a need for new drainage improvements as problems arise and conduct proper road maintenance on a regular basis.

Riparian Reserves should be protected and enhanced where necessary to improve habitat conditions both for aquatic species and species associated with late-successional terrestrial habitat.

The most effective, long-term approach for restoring habitat complexity and productivity is through riparian restoration, protection and ensuring that all activities within and outside the riparian area are conducted in accordance with Aquatic Conservation Strategy objectives. Potential activities include creating openings in dense alder stands and under planting with shade tolerant conifers, thinning stands of conifer saplings, thinning around conifers in dense hardwood patches and falling large alders and conifers into streams to create pools and spawning areas.

Determine through the interdisciplinary team process whether the large number of acres of seral stage acres in the 30-40 yr. age class within riparian reserves, particularly those that are concentrated within upper Mule Creek and East Fork Kelsey Creek, could benefit from riparian enhancement.

If there are riparian areas with heavy fuel loadings, analyze whether the use of fuels reduction to lessen the potential damage from wildfire would retard attainment of ACS objectives.

Where there is supporting water temperature data for the water quality limited streams on BLM lands, submit the information to Oregon DEQ and recommend that these stream reaches be removed from the 303d listing. At this time, it appears that West Fork Mule Creek, Kelsey Creek and Whiskey Creeks should be removed from the 303d list because their elevated water temperatures are due to natural conditions, not human causes.

2. Terrestrial Vegetation and Habitats

Fire and Fuels Management:

In the areas where all rating factors are high, treatments are recommended to reduce the rating in at least two factors (risk and hazard). This would be accomplished through density management, brushing/piling and burning, underburning.

In older stands, treatments should be conducted to reduce competing vegetation and ladder fuels, remove accumulation of small diameter, dead fuels and improve the vigor of existing stands. This could be accomplished in some cases by removing the intermediate canopy through commercial thinning. This action would remove ladder fuels and competing young conifers, improve forest health and reduce the risk of crown fires. This may or may not be a commercially viable option, based on the value of material removed and the cost of the removal.

Mechanical fuel treatments should also be done along well traveled roads.

New water sources in the upper portions of the watershed (i.e., more than two miles from the Rogue River) should be developed to help with fire suppression. Sites suitable for supplying helicopters with water are a priority.

Late-successional Habitat/Species

Given the importance of the Late-successional Reserve, a primary recommendation is to provide for the continued maintenance of this area, especially protection from catastrophic fire. This may involve proposed treatments around the perimeter of the LSR to reduce the risk of stand-replacement fires.

An additional primary recommendation is to continue to assure connectivity between the Fishhook/Galice LSR and the Galesville LSR through GFMA lands in this watershed, with a focus on maintaining late-successional and mature habitats in T33S, R8W, sections 11 and 14.

Adequate murrelet surveys have been conducted to indicate that this species does not use this watershed. Project clearance surveys should not be required beyond 10 km east of the hemlock vegetation zone.

To provide connectivity in the aforementioned areas, as well as into the Bobby Creek RNA, Riparian Reserves along Whiskey Creek and East Fork Mule Creek should be managed to enhance late-successional characteristics, including accelerating growth in plantations adjacent to Mule Creek.

When planning regeneration harvests in older stands, priority should be given to minimizing additional fragmentation of large blocks of interior habitat.

Develop a comprehensive fire plan to address and protect the important resource values associated with both the LSR and the connectivity corridor to the northeast of the LSR.

Develop a comprehensive transportation plan to address the unroaded area and potential impacts to wildlife.

Implement road decommissioning to reduce wildlife disturbance impacts (Appendix L).

To increase the amount of coarse woody debris in this watershed (pending inventories which verify a lack of this material), leave large woody material in adequate quantities to meet RMP guidelines, including considering leaving recent blow down that is cull, and maintaining additional snags above RMP levels for future coarse woody debris recruitment.

Consider maintaining all or a portion of the existing unroaded area in an unroaded condition to minimize adverse disturbance effects to wildlife.

Pursue land acquisition opportunities with landowners in the vicinity of Big Meadow and Bald Ridge for the purpose of enhancing elk habitat.

Enhance elk populations by improving forage, through use of burning regeneration harvest units, meadows, seeding skid roads, and decommissioning additional roads in the Mule Creek drainage.

Retain or enhance ponds and pump chances for use by native reptiles, amphibians, bats, waterfowl, and invertebrates.

3. Roads and Developments

A detailed transportation management plan should be developed for this watershed.

Roads should be gated or decommissioned if the action would meet the objectives for that area. Detailed recommendations are presented in Appendix L.

Some portion of the watershed should be managed to maintain the values of large, unroaded areas (e.g., aesthetics, solitude, undeveloped recreational opportunities, wildlife -- especially wide-ranging species such as carnivores -- fisheries, water quality, and the intrinsic value of having wild, undeveloped places). This should involve maintaining largely undisturbed conditions, but maintaining the option for road construction and other treatments to prevent catastrophic fires. Some areas of GFMA lands may require new roads for management and others may be managed by excluding new roads and decommissioning others.

The watershed analysis team did not develop a consensus recommendation for designation of the unroaded areas, although several scenarios were examined. Some of these are presented here to indicate some potential management direction which may be developed and analyzed more fully:

a. Manage the LSR as an unroaded area; develop roads as needed in the GFMA.

b. Modify the LSR boundary, then manage the revised LSR as an unroaded area.

c. Manage only the Whiskey Creek area as an unroaded area.

d. Manage only the Russian Quail area as an unroaded area.

e. Manage Critical Habitat for spotted owls as an unroaded area.

f. Manage entire areas designated on Map 27 as unroaded areas.

g. Manage VRM Class 1 and 2 lands as unroaded areas.

h. Designate portion (s) of the unroaded area as a Research Natural Area (RNA) or Area of Critical Environmental Concern (ACEC).

Decisions on management direction for these unroaded areas should consider the effects on the unroaded area and LSR south of the river.

The overgrown road beds within the unroaded area should be abandoned, rather than decommissioned. They are already generally stable and decommissioning them would do more harm than good.

Review and amend reciprocal right-of-way agreements that may no longer be appropriate (particularly #605).

Update the GIS data for roads to more accurately reflect current conditions.

The Marble Gap quarry, a site along the Back Country Byway that has bands of ribbon chert and is naturally reclaiming itself, should be designated a geologic point of interest on the route.

4. Recreation

Timber management has potential conflicts with recreational users, including visual impacts and timber hauling. Warning signs should be placed along haul routes during active logging operations to give notice to recreational users, as well as others using the roads.

VRM restrictions are minimal within the GFMA land (less than 200 acres of VRM II), however, special precautions need to be taken when applying forest management practices on these areas to stay in compliance with VRM restrictions.

A map of gated roads should be made available for sightseers and bicyclists for the area.

There are opportunities for interpretive displays on geology, history and other themes throughout the watershed. One is the historic nature of the Cold Springs area, which is in an old growth stand where an old Civilian Conservation Corps (CCC) camp once existed. This potential recreation site is near the Glendale to Powers Bicycle Recreation Area. The bike route could easily be tied into the Cold Springs area, so that the cyclists could observe stands of old-growth forest. The geology of the area, visible along road cuts on the byway route, could be communicated through interpretive displays or driving tour brochures. A brochure on mine adits and safety could be developed. Interpretation of the area's history could include mining and homesteading, historical fires and their management, timber and fuels management and reforestation. Ecological interpretation could include seral stages and associated plant and animal species, and ecosystems. Self guided driving tour brochures could be developed for interpretation within the watershed.

Opportunities exist to reestablish much of this historic ridge-top trail system to offer hikers and historians a link with the past.

Where Road 1 enters the LSR (T. 33 S., R. 9 W., Section 24) there is a landing, beyond which the road becomes vegetated. The vegetated segment of the road extends approximately 5,000 feet beyond the landing. This existing roadbed offers scenic views of the Rogue River (Horseshoe Bend area). The roadway offers an opportunity to develop a hiking/biking trail into the LSR, with viewing areas of the Rogue River. Extending the trail a few hundred feet beyond the end of the existing road to a large rock outcrop, would offer additional scenic views of the river corridor, both east, west and south.

Another trail system has been proposed in the Mule Creek drainage as part of the road closure plan for protecting wildlife in the area. Graveled roads which have been gated or decommissioned, may be maintained as trails. Several primitive camping sites along the roads could be developed.

The ID team for the Hey Mr. Wilson timber sale, proposed designating approximately 150 acres of land around the Cold Springs area as a formal recreation site. This area should be examined for such designation and appropriate management direction given.

5. Forest Management

Continue to plan for timber sales in the Wild Rogue North watershed within the guidelines of the RMP. Use the adaptive management process of the NFP to monitor the effects of harvests and revise prescriptions and treatments as necessary to meet objectives.

Develop an integrated timber harvest plan as a tool to achieve late-successional habitat enhancement.

A review of the LSR and the unroaded area should be conducted to evaluate the potential for revisions to LSR boundaries, since the current straight lines do not help achieve objectives for either late-successional habitat or timber management.

Use intensive silvicultural techniques such as thinning and fertilization to accelerate growth rates of trees to meet the objectives of all land allocations. These silvicultural projects include: fertilization, pre-commercial thinning, reduction of competing vegetation and seedling protection.

Use commodity harvests of timber and small poles in the watershed to reduce fire hazard and risk. Expand the role of prescribed fire to reduce fire hazard and risk to help preserve the existing timber commodity and non-timber resources.

When habitat improvement treatments are conducted within reserves, commercial products can be removed if objectives are met and if the action is allowed in the Late-successional Reserve Assessment.

Stand regeneration will be more difficult due to the canopy retention levels required for habitat protection measures and because of the restrictions in prescribed burning operations. Alternate treatment prescriptions should be considered that allow for habitat protection, while allowing for proper forest management techniques to be applied to the land, in order to reestablish stands and to reduce fire hazards.

Prescribed fire to reduce fire hazard and risk should be used to help preserve the existing timber commodity and non-timber resources.

Special forest products

Coordinate the harvest of SFPs with the harvest of timber commodities through the NEPA process. Initiate SFP projects that work in tandem with timber commodity harvests and benefit the presence and future management of SFPs and timber.

Seek out contracting methods that facilitate cost effective extraction of SFPs.

Reach out to local residents and traditional buyers to expand the attractiveness of the SFP commodities in this watershed and to provide employment alternatives for displaced forest workers.

6. Other Recommendations

This watershed analysis should be integrated with others in the Resource Area and throughout the Medford District to assess conditions and develop recommendations at larger scales.

Consider purchasing blocks of private land within the watershed where feasible. Several of the blocks have been recently harvested and now would be an opportune time for the government economically, as well as being a good time to establish future stands of timber.

Develop a plan to keep the relatively small populations of noxious and invasive weeds in check or possibly eradicate them. This could include more insect releases, spraying or manual removal, or some combination of methods. Since the yellow star thistle population is so small, it is a high priority for eradication.

The scotch broom sites should be checked to see if the plant has spread into harvest units.

Land allocations should be re-examined to better meet the objectives of all allocations and designations; the arbitrary straight lines of LSR boundaries create difficulties in managing both the LSR and the adjacent GFMA lands.

VII. Data Gaps and Monitoring Needs

A. Hydrology/Fisheries

The upper limits of fish distribution by species are currently unknown. With the implementation of the RMP, all fish-bearing streams and associated riparian areas receive protection. While this effort is not a high priority since these streams are already protected, it would be beneficial to know the distribution patterns more precisely.

Continue monitoring water temperature in order to determine the upper extent of elevated temperatures within each 303d listed stream. This would also be beneficial by showing the range of daily water temperatures and the duration that they exceed 64 ^{o}F in all fishery streams during summer.

Continue to sample macroinvertebrates as a means of monitoring changes in water quality over time. Monitor population characteristics of fish and other aquatic life (including macroinvertebrates) in several representative subwatersheds throughout the watershed to track response of aquatic animal communities to projects that are implemented, to document their recovery as degraded habitat recovers and to track population fluctuations in watersheds with no management activity.

Collect detailed information to establish a baseline for measuring effects of land management activities on aquatic resources on-site, as well as cumulative effects across a landscape. Surveys should be repeated at 10 - 15 year intervals and more frequently if a major hydrologic event or projects cause major alterations in stream condition.

Identify source and flow characteristics of each GIS stream reach (intermittent or perennial).

Sedimentation rates, causes and trends are a major concern to aquatic environments, but there is little hard data available and sampling methods are not standardized. While the effects from sedimentation are not a current problem within the watershed, new sampling techniques should be examined as they become available in order to improve existing information.

B. Terrestrial Vegetation and Habitats

Fire and Fuels Management:

Conduct post treatment surveys and monitoring of the short-term and long-term effects of fuels treatments.

Conduct ground truthing to obtain fuels data for the entire watershed.

Develop GIS data on historic fires, including intensity, resources lost and other considerations.

Late-successional Habitat/Species

Update and refine the vegetation and habitat conditions in the Forest Operations Inventory data base.

Track treatments and accomplishments using GIS.

There is a lack of baseline data on snag abundance. Surveys should be conducted to obtain information on snag densities in major plant associations.

There is a lack of baseline data on quantities of coarse woody debris. Surveys should be conducted to obtain information on amounts of coarse woody debris in major plant associations.

There is a need to inventory marbled murrelets to confirm either presence or absence in this watershed, particularly in Zone 1 (0-35 miles from the coast).

Determine whether the Rogue River functions as a barrier to wildlife movement.

There is a need to more fully inventory special habitat features, including meadows, springs, cliffs, and caves.

Evaluate potentially suitable sites of bald eagle and goshawk to assess occupancy status and distribution.

Conduct inventories to ascertain the status of late-successional species, including furbearers, special status, and Survey and Manage species. This may include an inventory program using remote camera stations to document the presence of furbearers and other mammals. Additional inventory programs should also be considered for these species groups, including snow-track surveys, track-plate surveys, and pitfall trapping.

Initiate an inventory program with carpet-fiber posts and bait to assist in determining presence or absence of Canada lynx.

Initiate a point-count inventory program to identify bird species composition and abundance.

Survey the area for adits and shafts for wildlife (bats), safety and cultural resources

Update noxious weed inventories to include known locations of purple loose strife and yellow starthistle, as well as additional locations of all species identified in the future.

C. Roads and Developments

A thorough inventory of current road conditions, unknown surface types and culvert characteristics should be conducted to identify future improvement projects, decommissioning opportunities and maintenance priorities.

Update the GIS road data to accurately reflect the current conditions.

Determine and track the maintenance needs of pump chances and ponds.

Inventory and monitor gates and barricades to determine effectiveness and identify maintenance needs.

D. Recreation

Determine recreational use levels and the types of recreational use of the watershed.

E. Forest Management

Verify vegetation mapping using ground reconnaissance.

Obtain better information on timber volumes, fuels, species composition, canopy closures, etc.

Use comprehensive inventory procedures across the watershed to accurately measure the existing timber commodity and to more accurately project what timber commodities will be present in future decades.

Determine the effects of timber harvest and other management treatments on Survey and Manage species. Obtain better information on Survey and Manage species occurrence.

Obtain more reliable TPCC information on reforestation problems and productivity issues.

Inventory Port Orford cedar and POC root rot. Develop management strategy to minimize the spread of POC root rot within the watershed and between this and other watersheds.

Gather information on insect and disease problems in the watershed.

Determine coarse woody debris levels throughout the watershed.

Determine trends in pine occurrence and mortality and other aspects of forest health.

Inventory across the watershed to accurately measure the existing SFP commodities and to more accurately project future conditions of those commodities.

Appendices

for the

Wild Rogue North Watershed Analysis

Appendix A. Potential Natural Vegetation in the Wild Rogue North Watershed

Potential natural vegetation in the Glendale RA portion of the watershed was mapped on three levels. The series is determined by the most abundant reproducing tree in the understory of late-successional stands. Often, this is the most shade-tolerant species present. Plant associations are fine scale divisions based on the indicator species present in late-successional stands. These associations are further aggregated into plant association groups, to ease interpretation. Plant association groups are italicized below. The plant associations used are described in Atzet et al. (1996). This book gives more detailed information on species composition.

A series is an aggregation of plant associations with the same climax species dominant. The tanoak series, for example, consists of plant associations in which tanoak is the climax dominant, i.e., tanoak is the most abundant tree in old, undisturbed stands. The series and plant association defines the potential natural vegetation that would exist on the site at the climax stage of plant succession, or the theoretical end point of succession where neither the plant composition nor stand structure changes. Net productivity in terms of biomass production is considered to be zero (Atzet and Wheeler, 1984).

The following plant series listed were identified and mapped within the WA: Douglas-fir (*Pseudotsuga menziesii*), Western Hemlock (*Tsuga heterophylla*), White Oak (*Quercus garryana*), White Fir (*Abies concolor*), Canyon Live Oak (*Quercus chrysolepis*) and Tanoak (*Lithocarpus densiflorus*). Site productivity in terms of basal area per acre is described for each series. Basal area is defined as the area of the cross section of a tree stem near its base, generally at breast height, 4.5 feet above the ground and inclusive of bark (USDI, 1994). See the map titled "Wild Rogue Plant Associations" for the approximate locations of the plant series within the WA.

The following basal area production rates are on a per acre basis. Basal area in a plant series is not limited to the tree species that series is named after. For example, basal area in the Douglas-fir series can be from Douglas-fir, madrone, sugar pine, or any other tree species present on the site. Basal area is used as a relative measure of site productivity. For example, an area that can support 200 feet of basal area is more productive than an area that can support 100 feet of basal area.

Tanoak Series 48,905 acres

Tanoak's range is limited to southwest Oregon and northwest California. Frost, drought and fire limit its survival and ability to compete. In the last 50 years lack of fire has enhanced tanoak's competitive status (Atzet, 1996). The average basal area in this series is 262 (Atzet and Wheeler, 1984). Tanoak is predominately associated with sedimentary parent rock. In southwest Oregon the mean fire return interval in the Tanoak Series was 90 years (Atzet and Martin, 1991). All of the plant associations in the tanoak series within the Wild Rogue North watershed have Douglas-fir codominant; Douglas-fir is nearly as abundant as tanoak in old-growth, late-successional or climax stands.

Tanoak-Douglas-fir, dry 35,638 acres

Tanoak-Douglas-fir-canyon live oak/dwarf Oregon grape 13,031 acres

This association was widespread and diverse. Included were stands with canyon live oak, sometimes with salal, and stands with neither canyon live oak nor salal, but having dwarf Oregon grape. It was one of the most abundant associations. It is similar to and intergrades with the tanoak-Douglas-fir/salal-dwarf Oregon grape association, which is always without canyon live oak, and always with salal. Slight aspect differences on adjacent sites may change the vegetation between the two associations.

Tanoak-Douglas-fir-canyon live oak/poison oak 22,607 acres

The driest tanoak sites supported this association, which was the most abundant association. This association was distinguished by its lack of salal, rhododendron and dwarf Oregon grape. Hairy honeysuckle, whipplevine and creeping snowberry were common. Poison oak was not always present, particularly at higher elevations or on shadier sites. Canyon live oak was likewise sometimes absent. The association was mostly found on south and west facing slopes, and large expanses on relatively uniform south slopes above the Rogue River were found. Dry lower slopes in the Rogue River Canyon (for example, near the mouth of Quail Creek) had inclusions of Douglas-fir-canyon live oak/poison oak, Douglas-fir/dry shrub, and Oregon white oak/hedgehog dogtail. These inclusions were not mapped due to access problems, and because they did not correlate well with soil polygons.

Tanoak-Douglas-fir, moist 12,463 acres

Tanoak-Douglas-fir/salal-rhododendron 5,055 acres

Wetter portions of the watershed supported this association, mostly on north slopes. Salal and rhododendron were always abundant. Dwarf Oregon grape was less abundant. The vegetation was often very dense.

Tanoak-Douglas-fir/salal-evergreen huckleberry 1,797 acres

This association was found on north slopes at lower elevations. It was distinguished by the dominance of salal and huckleberry. Dwarf Oregon grape was less abundant.

Tanoak-Douglas-fir/salal-dwarf Oregon grape 5,611 acres

This association had little or no rhododendron or evergreen huckleberry, and was the most widespread of the wetter tanoak associations. The association was scattered in much of the watershed.

Tanoak with white fir and/or Sadler's oak, cool site 804 acres

Tanoak-chinquapin/salal-Sadler's oak 804 acres

This association is restricted in area, occurring on moist, fairly high elevation sites in the western portion of the watershed. Tanoak, chinquapin, salal, Sadler's oak, Douglas-fir, and rhododendron are all abundant. Canyon live oak is common on rockier sites on sunnier aspects. Sadler's oak continues up slope from the tanoak series, into Douglas-fir/salal-rhododendron sites. A new Douglas-fir association, based on the presence of Sadler's oak, could potentially be defined. Sadler's oak is a unique shrub endemic to the Klamath Ranges.

Douglas-fir Series 10,652 acres

Douglas-fir is the most common tree species in southwestern Oregon. Sites within the Douglas-fir series average 254 square feet basal area (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 mean fire return interval in the Douglas-fir Series in southwest Oregon is 30 years (Atzet and Martin, 1991). The wetter, high elevation sites with salal and rhododendron are probably much less fire-prone.

Douglas-fir on ultramafics 127 acres

Douglas-fir-incense cedar 127 acres

This association was highly variable in both canopy cover and species composition. The drier sites were similar in composition to those described in Atzet et al. (1996), having Jeffrey pine, rock fern and fescue. Open areas sometimes included buck brush. Canyon live oak and poison oak were also sometimes present. Denser closed forest areas included incense cedar, Douglas-fir, tanoak, and California coffeeberry.

Douglas-fir with salal and/or sword fern, cool 4,856 acres

Douglas-fir/salal-rhododendron 4,856 acres

Only the highest elevations supported this association. Salal and rhododendron were always abundant. Dwarf Oregon grape was less abundant. Canyon live oak was sometimes present. Some sites may have been the Douglas-fir-chinquapin/dwarf Oregon grape type, which is developed on rockier sites, and has relatively more sugar pine, chinquapin and canyon live oak, and somewhat less salal and rhododendron. Sugar pine, in particular, is most abundant on rocky sandstone sites. The difference between the two associations is subtle, and the dividing point is unclear, so possible Douglas-fir-chinquapin/dwarf Oregon grape sites were not mapped. Within the Douglas-fir/salal-rhododendron areas were also some rocky Douglas-fir-canyon live oak/dwarf Oregon grape inclusions. Sadler's oak was common over fairly large areas in the Douglas-fir/salal-rhododendron association, up slope and adjacent to areas mapped as Tanoak-chinquapin/salal-Sadler's oak.

Douglas-fir-canyon live oak, hot and dry 5,669 acres

Douglas-fir-canyon live oak/poison oak 3,857 acres

This association occurred on rocky, dry sites. Canyon live oak was often abundant, and reached its greatest stature in this type. Poison oak was often absent from the higher elevation sites, but hairy honeysuckle was more consistently present. Many of these sites are probably not feasible for commercial timber harvest, due to slow growth and problems in regenerating the stands. Well-developed old-growth stands had an open canopy of large Douglas-fir, and a somewhat dense lower canopy of canyon live oak. The rockiest inclusions, including bluffs overlooking the Rogue River, could be classed as the canyon live oak type, mentioned below.

Douglas-fir-canyon live oak/dwarf Oregon grape 1,812 acres

Like the previous association, this type was often found on rocky sites. It is wetter, occurs at higher elevations, and has dwarf Oregon grape. Moist inclusions sometimes had salal or rhododendron. Sites that had some salal and also canyon live oak were classed with this type, rather than the Douglas-fir/salal-dwarf Oregon grape association, which has little or no canyon live oak. Canyon live oak is often smaller and less abundant than in the Douglas-fir-canyon live oak/poison oak type.

Western Hemlock Series 410 acres

Western Hemlock Series is present on relatively few acres within the watershed. This series grows in cool, moderate environments where moisture stress occurs late in the growing season (Atzet and McCrimmon, 1990). Evapotranspiration demands are low. The average basal area for this series is 295 square feet. The fire regime is one of infrequent, high intensity fires.

Western hemlock, rhododendron 318 acres

Western hemlock/rhododendron-salal 318 acres

This association was found on wet north slopes in the Mule Creek drainage. Salal and rhododendron formed a dense shrub layer.

Western hemlock, maritime influence 92 acres

Western hemlock/rhododendron-dwarf Oregon grape 92 acres

This association occurs on the far western portion of the watershed, on mostly north slopes, where western hemlock and Port Orford cedar spill over from the Coquille River watershed. The association includes western hemlock, Douglas-fir, tanoak, Port Orford cedar, rhododendron, salal, dwarf Oregon grape, and Sadler's oak.

White Fir Series 140 acres

The white fir series includes areas with both white fir and grand fir; these species are lumped in Atzet et al. (1996). These species grade into one another over a large area. Variation with environment has been reported, with more grand fir characteristics in warmer, wetter environments, and more white fir characteristics in cooler, drier environments (Zobel 1973). Physiological characteristics vary along with morphology (Zobel 1974, 1975). The Oregon firs in this species complex appear to be either grand fir, or grand/white intermediates (Donald Zobel, personal communication). No pure populations of white fir have been recorded in Oregon, although some trees within intermediate populations may not show grand fir characteristics. In Oregon, it is conventional to call intermediate trees "white fir," to distinguish from typical grand fir (Donald Zobel, personal communication). Within the Wild Rogue North watershed, most of these trees are grand fir.

White fir series are also considered productive with basal area averaging over 341 square feet (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 8 inches. Moreover, the tolerant nature of white fir which allows branches to survive close to the ground, makes lower crown a ladder to the upper

crown (Atzet and Wheeler, 1982). Due to the success of fire suppression efforts over the last 70 years, white fir occupancy has increased.

White fir with western hemlock, moist sites 140 acres

White fir/salal-dwarf Oregon grape 140 acres

North slopes near Big Meadows supported this association. Tanoak was found, along with grand fir and Douglas-fir. Salal produced a fairly dense shrub layer.

Oregon White Oak Series 108 acres

The Oregon White Oak Series occurs at mostly low elevations and is characterized by shallow soils. Although Oregon white oak is usually considered a xeric species, it also commonly occurs in very moist locations - on flood plains, heavy clay soils, and on river terraces. On better sites, white oak is out competed by species that grow faster and taller (Stein, 1990). Average basal area is 46 square feet. 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). Fire events in this series are 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.

Oregon white oak, grasses 108 acres

Oregon white oak/hedgehog dogtail 108 acres

Two areas were mapped as this association. A dry, rocky patch near Anaktuvuk Saddle had patches of Oregon white oak, with canyon live oak, greenleaf manzanita, and bitter cherry. Douglas-fir was found on the edges. The driest areas were open fields of hedgehog dogtail, Lemmon's needle grass, *Eriogonum nudum*, and *Marah oregana*. Big Meadows was the other area mapped as this type. It had Oregon white oak, hedgehog dogtail, Lemmon's needle grass, and California oat grass. The dry central portion was an open meadow with these grasses. Much of the area had dry, gravelly soil and rock outcrops. Douglas-fir invasion on the edges produced areas of Douglas-fir/dry shrub association, with white oak in the understory. Douglas-fir invasion appeared inhibited by droughty soils and possibly gophers. Douglas-fir was actively invading the moister fields that had much bracken fern. The driest areas are probably too dry for any future Douglas-fir invasion.

Shrubfields 1314 acres

Canyon Live Oak 1314 acres

Canyon live oak 1314 acres

These open areas, developed on dry, rocky sites, had scattered canyon live oak, but little or no Douglas-fir overstory. Besides canyon live oak, box-leaf silk-tassel was often present. Madrone, Douglas-fir and tanoak were found mostly on the edges. The lowest elevations included buck brush, poison oak, and California laurel. Greenleaf manzanita was abundant at the highest elevations, e.g., Mount Bolivar. These sites were developed on the rock outcrop - orthents complex map unit, mostly in the Wild Rogue Wilderness. This association was related to the Douglas-fir - canyon live oak/poison oak type, but was open and shrubby, without a Douglas-fir overstory. This plant association is not described in Atzet et al. (1996).

Limitations in the Mapping Techniques and Effects of Disturbance

Due to the time allowed, and the mapping scale used, small variations were not mapped. These variations include rocky areas, riparian areas, canyon bottoms, and some ridge top variations. In general, most variations smaller than the size of the county soil map polygons were not mapped.

The plant association is the closest fit from Atzet et al. (1996), but the actual map unit will not always be the same as the book description. Vegetation which fell outside the range described in Atzet et al. (1996) was found; especially prominent cases are noted above.

Some large areas were heavily affected by disturbance; potential natural vegetation was difficult to discern. Intensive clearcutting, site preparation, herbicide use and dense plantations had often affected the understory vegetation. Where the vegetation was early successional, the potential was assumed to be the same as types on similar soils and aspects within the local area. This assumption may lead to errors.

Recent clearcuts generally included the indicator species, and were identifiable to plant association. None of the indicator species appeared to be highly restricted to late-successional forest. Older clearcut sites, however, that had been subjected to greater disturbance and perhaps shading in dense plantations, often lost their indicator species.

Management Implications

Historical fire frequencies may be determined as a related to plant association. This knowledge may then be used to determine desirable prescribed fire regimes. Timber productivity is also related to plant association. Plant associations might also be used to determine the potential for wildlife habitat. Finally, plant associations may be useful in determining potential areas for

Research Natural Area designation, providing a system of Research Natural Areas covering representative vegetation types.

References

Atzet, Thomas A. and Lisa A. McCrimmon, 1990. "Preliminary Plant Associations of the Southern Oregon Cascade Mountain Province

Atzet, T., D.E. White, L.A. McCrimmon, P.A. Martinez, P.R. Fong and V.D. Randall. 1996. Field Guide to the Forested Plant Associations of Southwestern Oregon. USDA-Forest Service, Pacific Northwest Region, Technical Paper R6-NR-ECOL-TP-17-96.

Atzet, T., and D. Wheeler, 1984. "Preliminary Plant Associations of the Siskiyou Mountain Province". U. S. Department of Agriculture, Forest Service, Siskiyou National Forest, P.O. Box 440, Grants Pass, OR 97526.

Stein, William I., 1990. Quercus garryana Doug. ex Hook,: Oregon white oak. In: Burns, Russell M.; Honkala, Barbara H., tech. coords. Silvics of North America: Volume 2, Hardwoods. Ag. Handbook 654. Washington, DC: Forest Service, U.S. Department of Agriculture: 650-660.

USDA and USDI, 1994. Record of Decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl, Portland, OR.

Zobel, D. 1973. Local variation in intergrading Abies grandis-Abies concolor populations in the central Oregon cascades: needle morphology and periderm color. Bot. Gaz. 134:209-220.

Zobel, D. 1974. Local variation in intergrading Abies grandis-Abies concolor populations in the central Oregon cascades. II. stomatal reaction to moisture stress. Bot. Gaz. 135:200-210.

Zobel, D. 1975. Local variation in intergrading Abies grandis-Abies concolor populations in the central Oregon cascades. III. timing of growth and stomatal characteristics in relation to the environment. Bot. Gaz. 136:63-71.

Appendix B. Methodology For Stream Habitat Rating

For NMFS consultation and development of Aquatic Conservation Strategy consistency document: Analyze the data for a representation of low gradient (3 percent or less) reach in unconstrained or less-constrained stream channels in sixth field subwatersheds throughout the fifth field watershed.

For Watershed Analysis: Analyze all ODFW reaches on every stream (high and low gradients) that ODFW has surveyed.

Proper functioning condition ratings are related to the amount of human disturbance. All factors in an unmanaged watershed, regardless of their state of recovery in the absence of human influence should be rated Properly Functioning.

Maximum Water Temperature :
Based on data collected by the Resource Area June to October since 1993; data on file. 64 EF or lower for "Good" condition is based on State criteria for 303(d) water quality - limited streams and NMFS Matrix for Klamath Mt. Province. Based on 7-day moving average of daily maximum water temperature.

# 64EF	=	4 = PF
65-70E	=	2 = FAR
>70E	=	0 = NPF

Habitat Integrity Rating For Aquatic Insects (Sediment on NMFS Matrix):
Reports on file. Based upon macroinvertebrate reports from Bob Wisseman. Although the rating considers many factors, crevice space (embeddedness) is primary.

Very High/High	=	4 = PF
Moderate	=	3 = FAR
Low	=	2 = NPF
Severe	=	1 = NPF

Substrate: Use percent gravel in riffles (which are by definition low gradient)

>35%	= PF
15-35%	= FAR
<15%	= NPF

PLUS
Consider embeddedness/insect habitat integrity rating

The percentage of gravel is reduced one rating if the Habitat Integrity Rating (HIR) is low or severe. Sometimes Wisseman addresses embeddedness and sometimes not). E.g. 35 percent is Properly Functioning but downgraded to Functional At Risk if there is substrate embeddedness or if the HIR is low or severe. Also, if there is reference to moderate abundance of sediment tolerant species.

Barriers To Fish Movement (human related):
Derived from Table ___ of this watershed analysis.

None	=	4	= PF
One or more located high in the watershed	=	3	= FAR
Several throughout the watershed	=	2	= NPF
One or more near the mouth or main stem	=	0	= NPF

Large Woody Debris (Minimum size of a key piece is 0.6m x 10m)
Data source is ODFW stream survey data. Score is dependent on how close the amount of LWD is to the ODFW benchmark for "Good" condition.

$2 key pieces per 100 meters	=	2
1-2 " " "	=	1
<1 " " "	=	0

After considering all available data for the Rogue Canyon streams (5/11/99) and Bobby Creek (all of which are the least impacted fisheries streams and watersheds in Glendale RA and perhaps the Medford District), more than two key pieces of large wood per 100 meters is probably as good as it gets, given the high fire frequency in this region. This rating is different than the ODFW and NMFS Matrix for the Klamath Province.

Pool Habitat by Area:
Percentage of all habitat types in **dammed, backwater and scour** pools. Percentages were summed based on ODFW stream survey data.

>35%	=	3	= PF
10 to 35%	=	2	= FAR
<10%	=	1	= NPF

Pool Quality:

a) Number of complex pools per km of stream surveyed by ODFW. Rating based on ODFW benchmark.

>2.5 per km	=	4
1-2.4 per km	=	2
<1 per km	=	0

AND

b) Residual pool depth

Less than or equal to 3 percent (low gradient):

$.5m	=	4	= PF
0.2 to 0.4m	=	2	= FAR
<0.2m	=	0	= NPF

Greater than 3 percent gradient:

$1.0m	=	4	= PF
0.6-0.9m	=	2	= FAR
#0.5m	=	0	= NPF

There can be good or reasonably good residual pool depth but no large wood to form complex pools; Downgrade the rating accordingly.

ODFW stream survey data for Rogue Canyon streams and Bobby Creek show that the number of complex pools/km and the amount of key pieces of LWD/100m is highly variable at any given density of riparian hardwoods, all conifers, or for conifers >20" dbh near streams. The fact remains that fish streams in the Rogue Canyon, which are relatively pristine have far higher concentrations of LWD and complex pools than anywhere else in the resource area on matrix lands.

Off-Channel Habitat:

Alcoves, side channels, LWD on low gradient streams (<3 percent). Streams greater than 3 percent are usually rated as "Good" because higher gradient streams typically do not have alcoves and side channels. Historic mining or road proximity would lower the rating, especially on low gradient reaches/streams. Points/rating depends on how far existing conditions deviate from projected pre-settlement conditions.

Good	=	3
Fair	=	2
Poor	=	1

The factor is rated as Properly Functioning on stream reaches >3 percent where the riparian reserve has not been logged or roaded, but FAR or NPF where riparian reserves have been highly disturbed.

Refugia:
Quality aquatic habitat in the watershed or subwatershed that serves as a gene pool to repopulate adjacent streams in the event that habitat is lost through human-related or natural events.

Good = 3
Fair = 2
Poor = 1

Width : Depth Ratio :
Rating based on ODFW stream survey data and suggested NMFS benchmarks. An indicator of excessive peak flows or physical alteration.

Stream Gradient	Rosgen Channel Type	Ratio Considered "Good"
4 - 10%	A	<12
2 - 4%	B	12-30
< 2%	C	12-30

The score/rating for this factor represents how far the average ratio for the stream or stream reach (lower, middle, upper) deviates from the NMFS benchmark.

Well within the expected range: 3 points
Somewhat outside the expected range: 2 points
Well outside the expected range: 0 points

There is a great deal of natural variability that is dependant on geology, soil type, rainfall characteristics, etc. It is questionable whether NMFS benchmarks can/should be applied only on the basis of stream gradient. Score has been designed to allow for W:D ratios that are somewhat outside the expected range in order to allow for natural variability.

Percent Habitat Units With Erosion:
For ODFW stream surveys conducted up to and including 1997, the rating is based on the percentage of habitat units surveyed with active bank erosion -- not the percentage of the total stream bank length that is eroding. However, the way it is recorded does give an indication of stream bank stability. Beginning in 1998 ODFW reported the percentage lineal distance of both streambanks in the reach that are actively eroding.

<10% unstable = 4 = PF
10-25% unstable= 2 = FAR
>25% unstable = 1 = NPF

Flood plain Connectivity:
Since most streams in the watershed are Rosgen A and B channels, there are few riparian terraces that could be inundated during peak flow. Unless there is channelization, stream bank rip rapping, a road or historic mining next to or within A and B channels, most are considered properly functioning. The degree of development (agricultural land, homes, roads, railroads, historic mining, etc.) determines the rating. A road next to an A or B channel is potentially less damaging than a road or other development on a C channel.

At potential	=	3	= PF
Moderate impacts	=	2	= FAR
Highly impacted	=	1	= NPF

Score for each stream is based on field observations, but not data.

Road Density and Location (Disturbance History):
Road density information was derived from Watershed Analysis. Road location derived from aerial photos and field knowledge. Threshold/benchmark for road density is based on NMFS matrix. Rating points can be affected by road density and location (i.e. valley bottom vs. Mid-slope or ridge top).

#2 miles per square mile	=	4	= PF
2-3 " " " "	=	3	= FAR or NPF depending on location
3-4 " " " "	=	2	= FAR or NPF depending on location
>4 " " " "	=	1	= NPF

Riparian Habitat Integrity:
High rating dependant on riparian reserve being in mature/old growth condition with no or few roads adjacent to fish habitat benchmark per NMFS matrix.

Riparian Reserve at least 80 percent intact (no/minimal historic or or recent harvest, roads or significant mining) with conifers of any age, as long as the stand shows no stumps and it is naturally regenerated (historic wildfire)	=	3	= PF
Riparian Reserve disjunct (60-80 percent intact) with some valley bottom roads, extensive mining or logging	=	2	= FAR
Riparian Reserves have been considerably cut and are in second growth, mining and valley bottom roads common	=	1	= NPF

The NMFS matrix requires that riparian forest be mature or old growth. This is certainly appropriate for managed watersheds but may not be for watersheds with no/minimal historic or current human activity such as logging, agriculture or mining.

Equivalent Clearcut Area (Disturbance History):
ECA value for each subwatershed is on file.

None/Low	#15%	=	3
Moderate	16-25%	=	2
High	26-50%	=	1
Extreme	>50%	=	0

Compaction (Disturbance History):
Compaction value for each subwatershed is on file.

Low	#5%	=	2
High	>5%	=	1

Peak/Base Flows:
Are generally going to be AT RISK if road density exceeds 4 miles per square mile of road, which converts to about a 25 percent increase in drainage density.

Total Score For Each Subwatershed:
Only factors with known values were considered in the final determination, so each stream was rated individually based upon the amount of information currently available on that drainage. All factors were given equal weight when determining a total score. That is, riparian condition was not considered more important than road density or large woody debris. Many factors are inter-related and some may in fact be more important than others for determining stream health. However, weighting several factors that seem to be of primary importance may be imposing a personal bias on the procedure.

80-100% of potential points	=	Good (Properly Functioning)
60-80% " " "	=	Fair (Functioning At Risk)
<60% " " "	=	Poor (Not Properly Functioning)

Appendix C. Water Quality Monitoring Locations, Wild Rogue North Watershed.

Water Temperature

Site Code	Stream Name	Location	Year Monitored						
			1993	1994	1995	1996	1997	1998	1999
MUAN	Mule Creek above North Fork Mule Creek	T: 32S R:09W S: 29 SW NE					x		
MULE	Mule Creek above Rogue River confluence (at Tucker Flat Campground)	T: 33S R:10W S: 09 SW NE		x	x	x	x		
MUNF	North Fork Mule Creek @ confluence with Mule Creek	T: 32S R:09W S: 29 SW NW					x		
MULW	West Fork Mule Creek above confluence with Mule Creek	T: 33S R: 10W S: 04 NE NW				x	x		
WISK	Whiskey Creek @ Rogue River confluence	T: 33S R: 08W S: 34 NE SW		x	x	x	x	x	x
WSK2	West Fork Whiskey Creek @ road 33-8-26 crossing	T: 33S R: 08W S: 22 SW NE						x	x
WSK3	East Fork Whiskey Creek about 200' downstream of road 33-8-26 crossing	T: 33S R: 08W S: 22 center						x	x

Macroinvertebrate Biomonitoring

Stream Name	Site Code	Location				Site Description	Year								
		Twnshp	Rng	Sec	Qtr Qtr		91	92	93	94	95	96	97	98	99
Mule Creek	MULE	33S	10W	09	NE NE	Near mouth at rd. 32-9-31 (Marial road bridge near Tucker Flat)			x				x	Pending	Results
Mule Creek	MUAN	32S	09W	29	SE NW	Above North Fork Mule Creek							x		
Mule Creek, N. Fk.	MUNF	32S	09W	29	SE NW	At confluence with Mule Creek							x		
Mule Creek, W. Fk.	MULW	33S	10W	03	SW SW	At mouth						x			
Whiskey Creek	WISK	33S	08W	34	SE NW	At mouth						x			
Whiskey Cr, E. Fk.	WSKE	33S	08W	22	NW SE	Above confluence with W. Fork, 100m above road 33-8-26 bridge		x					x		
Whiskey Cr, W. Fk.	WSKW	33S	08W	22	NW SE	Above road 33-8-26 near confluence with East Fork	x						x		

Appendix D. Water temperature monitoring sites within the Wild Rogue North watershed

Maximum Water Temperatures in Monitored Streams within the Wild Rogue North (Temperature value is the 7-day moving average of daily maximum temperatures in degrees F)							
Location	**Agency**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Mule Creek @ Rogue River	BLM	~	68.4	65.6	67.1	66.3	~
Mule Creek above North Fork Mule Creek	BLM	~	~	~	~	58.6	~
North Fork Mule Creek @ mouth	BLM	~	~	~	~	60.0	~
W. Fk Mule Cr. above confl. w/ mainstem	BLM	~	~	66.5	65.7	~	~
Rogue River - Wild Rogue	SNF	~	77.6	74.3	~	~	~
Rogue River @ Agness	SNF	70.9	78.7	75.1	~	75.4	~
Whiskey Cr. above confluence w/ Rogue	BLM	~	69.9	67.5	68.9	67.0	68.7
West Fk. Whiskey Creek	BLM	~	~	~	~	~	67.3
East Fk. Whiskey Creek	BLM	~	~	~	~	~	68.0

Total Days Maximum Water Temperatures in Monitored Streams within the Wild Rogue North Exceeded 64EF (Temperature value is the 7-day moving average of daily maximum temperatures in degrees F)						
Stream / Location	**Year**					
	1994	**1995**	**1996**	**1997**	**199**	**199**
Mule Creek @ Rogue River	32	20	23	37	~	~
Mule Creek above N. Fk. Mule Creek	~	~	~	0	~	~
North Fork Mule Creek @ confluence w/	~	~	~	0	~	~
West Fk Mule Creek above confl. w/ Mule	~	13	33	~	~	~
Whiskey Creek above confluence w/ Rogue	43	34	35	41	54	~*
West Fk. Whiskey Creek	~	~	~	~	33	~*
East Fk. Whiskey Creek	~	~	~	~	48	~*

* Data not yet available for the 1999 sites.

Appendix E. Stream and Fish Surveys, Wild Rogue North Watershed

Oregon State Game Commission : Fish Habitat Stream Surveys 1970

Streams Surveyed:
Mule Creek
Slide Creek
Ditch Creek
Kelsey Creek
Meadow Creek
Bunker Creek
Russian Creek
Booze Creek
Whiskey Creek
Other streams in watershed south of Rogue River on Grants Pass

ODFW/BLM Aquatic Inventories Project Physical Habitat Surveys : Rogue River Canyon 1998

Streams surveyed: (includes photos of unique features such as stream/riparian/fish barriers/slides
Bunker Creek and key pieces of LWD counts, riparian vegetation, comments on stream
Russian Creek corridor, fish observed, etc.)
Bronco Creek
Booze Creek
Whiskey

ODFW/BLM Aquatic Inventories Project Physical Habitat Surveys : Rogue River Canyon 1999 (in progress this summer)

Kelsey - Mule

BLM Riparian/Stream Surveys 1996

Mule Creek - where road access was available
- BLM culvert survey of Mule Creek drainage

Benthic Invertebrate Biomonitoring in the BLM Medford District - (multiple sites)
prepared by: Aquatic Biology Associates, Inc.
3490 NW Deer Run Road
Corvallis, OR 97330

Mule Creek - Marial bridge - 1993,1997
West Fork Mule Creek - 1996
Mule above North Fork - 1997
North Fork Mule at mouth - 1997
Whiskey at mouth - 1996
East Fork Whiskey Creek - 1992, 1997
West Fork Whiskey Creek - 1997

BLM - Water temperature monitoring

Whiskey Creek - 1994-1999
East Fork Whiskey Creek - 1998, 1999
West Fork Whiskey Creek - 1998, 1999

Mule Creek at Tucker Flat - 1994-1997
North Fork Mule Creek - 1997
Mule Creek above North Fork - 1997
West Fork Mule Creek - 1996-1997

USGS - Current Data Sites for Oregon (web page) Stream Gaging and Flood Forecasting
http://oregon.usgs.gov/rt-cgi/gen_tbl_pg

Appendix F. Range of Natural Variability

Paleoclimatological evidence from fossil and pollen data taken from lake and ocean sediments throughout the Northwest indicates that since 20,000 years before present (BP) up to present, climate and vegetation have changed (Whitlock 1992). Climate change associated with the recession of glacial ice sheets resulted in plant associations shifting on the landscape as a result of the environmental conditions. No 1,000-year period in the last 20,000 years was the same in climate or vegetation. Vegetative communities changed with changing environmental conditions, such as extended periods of cold dry to periods of warm wet. Present day vegetative communities did not become established until approximately 3,000 years ago and have continued to shift in location and range even during this time period.

Reneau and Dietrich (1990) describes studies of colluvial deposits of hill slopes and discovered that landslides tended to occur during dry periods, presumably due to more frequent fires and or intense rainstorms. These events were dated to 10,000 years BP up to 4,000 years BP. This suggests mass movement activity has shaped present day topography and continues to be a change agent. Volcanic activity, earthquakes, landslides and floods have, and will, change the present day landscape.

Tree ring data dating from the 1600s to present day indicated periods of wet and dry conditions. Drought periods lasting up to 25 years have occurred during this time frame. Fire frequency was high during the periods of drought. Data from Graumlich (1987) indicates that the period of l910 to l935 was a drought period which corresponds to the age of many of the natural stands that are now between 50 and 80 years of age. This suggests that fire is an important agent of vegetative landscape change in the Klamath Province.
Human activities described by Boyd (1986) indicate that present day landscapes are not the same as they were 200 to 300 years ago. Native Americans in the valley regions used fire and other agricultural practices to control their environment for hunting and food gathering. Low lands and traditional hunting sites along ridges were burned repeatedly resulting in open understory conditions that favored vegetation adapted to frequent ground fires such as pine and oak. During European settlement of the western valleys in the mid-1800s, burning stopped and vegetative communities began to change. Fire frequency has declined since the period of active fire suppression (Taylor and Skinner 1994). Current day fire suppression activities continue to be a cause of plant community change across the landscape.

Wills and Stuart (1994) noted that pre-settlement landscapes on Douglas fir/hardwood forest in Northern California were a matrix of various aged forests. The Klamath Province, in which their study was done, includes all of the Rogue Basin and the Cow Creek basin of the Umpqua River, areas that are much more like Northern California than the regions to the north. This suggests that the region did not have continuous forests of old growth. Other studies indicate that late seral forests comprised 43 to 71 percent of the landscape (Ripple 1994).

The Glendale Resource Area queried Forest Operations Inventory data to obtain the extent of naturally generated stands between the age of 46 and 86 years, which corresponded to a 25 year drought period that lasted from 1910-1935. Forests of this age class, which are thought to be of fire origin, comprised about 10 percent of the forest on federal land. It was assumed that non-federal land had approximately the same percentage. Openings within the forest included valley bottoms, accounting for 10 percent of the RA, and rock outcrop, natural meadows and serpentine effect areas, which accounted for another 5 percent. Postulating unequal distribution, openings within the forest canopy would have ranged between 15 and 25 percent at any given time. Entire seventh field watersheds (60 to 600 acres) would have been in completely open condition as a result of fire, as evidenced by fires in 1987 and l995. The denudation of the landscape by miners and earlier by Native Americans could have resulted in more than 25 percent of the area being in an open condition in the early part of this century.

The distribution and abundance of aquatic species and characteristics of stream habitat in the Rogue and Umpqua River basins have responded to changing climate for millennia. The extent that climate changes in the Rogue and South Umpqua basins have affected habitat and aquatic species has probably varied considerably depending on each species habitat and life history requirements. Spencer (1991) provides a model for how climate has affected streams, aquatic species and indigenous peoples in the Rogue basin and Klamath Province over the last 13,000 years.

During recent geologic times, climate in the Klamath Province has shifted between mesic and xeric eight times over the last 13,000 years (Spencer 1991). Approximately 13,000 to 10,000 years ago when permanent glaciers and snow fields were in retreat, major floods caused by meltwater resulted in large scale mass wasting, unstable stream channels and extreme stream sedimentation. Depositional material may have created partial or total barriers to fish migration. This rapid shift to a drier climate after mesic conditions that had existed for at least the previous 60,000 years undoubtedly had dramatic consequences for fluvial ecology of the Rogue and Umpqua River basins. Many streams changed from perennial to intermittent. Stream flow decreased, as did the amount and extent of riparian vegetation. Water temperatures increased in response to lower flow and less steam shading.

As climate continued to warm and permanent snow field disappeared, summer peak flow from annual snow melt was replaced by a winter-spring peak originating primarily from rainfall. Salmon stocks migrating and spawning in the winter were enhanced; stocks dependent on a spring-summer peak, if they existed, were depressed or extirpated as the region entered a very xeric period 7000 years ago. Dramatic shifts in character of aquatic habitat during this time undoubtedly caused major changes in abundance, distribution and composition of aquatic communities.

Shifting of climate from xeric to mesic conditions about 4000 years ago resulted in an expanded network of perennial streams, higher stream flow, more riparian vegetation and cooler water temperatures and better spawning and rearing conditions for salmonids. Aquatic and riparian systems have continued to fluctuate and to affect suitability for various aquatic and riparian plant and animal species in response to climate change.

Animal species and populations have probably changed in response to environmental variation during the last 20,000 years. In addition, hunting pressure and habitat modification has most likely caused local shifts in species abundance and distribution. For instance early trappers found beaver to be abundant in local streams in the early 1800s (Boyd 1987). But it did not take long for the beaver to be trapped out. Without beaver dams, low gradient stream channels and associated riparian zones experienced major and rapid changes which resulted in conditions that are typical today in some streams (e.g. vertical streambanks, disconnecting the stream from its flood plain). Ground water levels would have dropped and resulted in lower summer flow and presumably higher water temperatures.

The frequency of fire and its effects on stream and riparian habitat also changed as climate fluctuated. The amount of large wood in streams was probably higher during mesic than during xeric periods because trees were larger and higher stream flows undercut stream banks; saturated soils may have increased the potential for large trees to fall into streams through windthrow. Conversely, fire probably consumed sources of large wood for stream channels during xeric periods. But increased incidence of landslides following stand replacement fires (Reneau and Dietrich 1990) during xeric times may have delivered large quantities of wood and sediment to streams. Water temperatures probably increased in response to loss of riparian canopy.

Considering the dynamic nature of climate and its complex effects on streams and riparian habitat, it is questionable whether aquatic systems have ever been in "pristine" condition.

Table 22 summarizes some of the important watershed elements in comparison with a range of natural variability (RNV). The precise relationships are often very uncertain because we have so little data on pre-historic conditions. Most of the relationships are based on professional judgment and on observed ecological processes.

Range of Natural Variability References

Found at: http://www.lic.wisc.edu/gla/refer.htm

Albert, D.A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rept. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 250 p.

Alverson, W.S.; Waller, D.M.; Solheim, S.L. 1988. Forests too deer: edge effects in northern Wisconsin. Conservation Biology 2(4):348-358. Alverson, W.S., W. Kuhlman, and D.M. Waller. 1994. Wild Forests: Conservation Biology and Public Policy. Island Press, Wash. DC. 300 pp.

Bailey, R.G. 1995. Description of the ecoregions of the United States. Second Edition revised and expanded (first edition 1980). Misc. publication No. 1391 (rev.). Washington, DC: U.S. Department of Agriculture, Forest Service. 108 p.

Bourdo, E.A. Jr. 1956. A review of the General Land Office Survey and of its use in quantitative studies of former forests. Ecology 37:754-768.

Bourdo, E.A. Jr. 1983. The forest the settlers saw. Pp. 3-6. In: Flader, S.L., ed. The Great Lakes Forest: An Environmental and Social History. Minneapolis, MN: University of Minnesota Press. 336 pp.

Canham, C.D.; Loucks, O.L. 1984. Catastrophic windthrow in the presettlement forests of Wisconsin. Ecology 65(3):803-809.

Cottam, G. 1949. The phytosociology of an oak woods in southwestern Wisconsin. Ecology 30: 271-287.

Cottam, G.; Curtis, J.T. 1956. The use of distance measures in phytosociological sampling. Ecology 37:451-460.

Crow, T.R. 1991. Landscape ecology: the big picture approach to resource management. Pp.55-65. In: Decker, D.J.; Krasny, M.E.; Goff, G.R.; Smith, C.R.; Gross, D.W., eds. Challenges in the conservation of biological resources: a practitioner's guide. Boulder, CO: Westview Press.

Curtis, J.T. 1959. The Vegetation of Wisconsin: An Ordination of Plant Communities. Madison, WI: The University of Wisconsin Press. 657 pp.

Davis, M.B.; Sugita, S.; Calcote, R.R.; Ferrari, J.B.; Frelich, L.E. 1993. Historical development of alternate communities in a hemlock-hardwood forest in northern Michigan, U.S.A. Pp. 19-39. In: Edwards, P.J.; May, R.M.; Webb, N.R., eds. Large-Scale Ecology and Conservation Biology: The 35th Symposium of the British Ecological Society with the Society for Conservation Biology. University of Southampton. Boston, MA: Blackwell Scientific.

ECOMAP. 1993. National hierarchical framework of ecological units. Washington, DC: U.S. Department of Agriculture, Forest Service.

Frelich, L.E. 1995. Old forest in the Lake States today and before European settlement. Natural Areas Journal 15:157-167.

Frelich, L.E., and C.G. Lorimer. 1991. Natural disturbance regimes in hemlock-hardwood forests of the Upper Great Lakes Region. Ecological Monographs 61(2):159-162.

Graumlich, L.J.; Davis, M.B. 1993. Holocene variation in spatial scales of vegetation pattern in the upper Great Lakes. Ecology 74(3):826-839.

Grimm, E.C. 1984. Fire and other factors controlling the Big Woods vegetation of Minnesota in the mid-nineteenth century. Ecological Monographs 54:291-311.

Host, G.E.; Polzer, P.L.; Mladenoff, D.J.; White, M.A.; Crow, T.R. 1996. A quantitative approach to developing regional ecosystem classifications. Ecological Applications 6(2):608-618.

Jordan, J.K.; Padley, E.A.; Cleland, D.T.; Gates, J.A.; Hoppe, D.J.; Kempf, L.S.; Leuelling, B.; Seleen, K.L.; Shadis, D.A.; Silbernagel, J. 1996. Landtype Associations: Origin, Concepts, Mapping, and Application in the Lake States National Forests. Review Draft, 11/26/96. To be published as Gen. Tech. Rept., U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station.

Loucks, O.L. 1970. Evolution of diversity, efficiency and community stability. American Zoologist 10:17-25.

Loucks, O.L. 1983. New light on the changing forest. Pp 17-32. In: Flader, S.L., ed. The Great Lakes Forest: An Environmental and Social History. Minneapolis, MN: University of Minnesota Press. 336 p.

O'Neill, R.V.; Krummel, J.R.; Gardner, R.H.; Sugihara, G.; Jackson, B.; DeAngelis, D.L.; Milne, B.T.; Turner, M.G.; Zygmunt, B.; Christensen, S.W.; Dale, V.H.; Graham, R.L. 1988. Indices of landscape pattern. Landscape Ecology1(3):153-162.

Rowe, J.S. 1984. Understanding forest landscapes: what you conceive is what you get. Vancouver, BC: The Leslie L. Schaffer Forestry Lecture Series in Forest Science. 13 p.

Rowe, J.S. 1991. Forests as landscape ecosystems: implications for their regionalization and classification. Presented at the Symposium on Ecological Land Classification: Applications to Identify the Productive Potential of Southern Forests. January 7-9; Charlotte, NC.

Runkle, J.R. 1982. Patterns of disturbance in some old-growth mesic forests of eastern North America. Ecology 63(5):1533-1546.

Salt, G.W. 1979. A comment on the use of the term emergent properties. American Naturalist. 113:145-161.

Stearns, F.W. 1949. Ninety years of change in the northern hardwoods forest in Wisconsin. Ecology 30: 350-358.

Swanson, F.J.; Kratz, T.K.; Caine, N.; Woodmansee, R.G. 1988. Landform effects on ecosystem pattern and processes. Bioscience. 38:92-98.

Turner, M.G. 1989. Landscape ecology: the effect of pattern on process. Annual Review of Ecology and Systematics 20:171-197.

Turner, M.G. 1990. Spatial and temporal analysis of landscape patterns. Landscape Ecology 4(1):21-30.

Urban, D.L.; O'Neill, R.V.; Shugart, H.H., Jr. 1987. Landscape ecology: a hierarchical perspective can help scientists understand spatial patterns. BioScience 37(2):119-127.

Webb, T., III; Bartlein, P.J.; Harrison, S.P.; Anderson, K.H. 1993. Vegetation, lake levels, and climate in eastern North America for the past 18,000 years. Pp. 415-467. In: Wright, H.E, Jr..; Kutzbach, J.E.; Webb, T., III; Ruddiman, W.F.; Street-Perrot, F.A.; Bartlein, P.J., eds. Global Climates since the Last Glacial Maximum. Minneapolis, MN: University of Minnesota Press.

Whitney, G.G. 1986. Relation of Michigan's presettlement pine forests to substrate and disturbance history. Ecology 67(6):1548-1559.

Whitney, G.G. 1987. An ecological history of the Great Lakes forest of Michigan. Journal of Ecology 75:667-684.

Appendix G. Zane Grey Wilderness Information

- Last entry in the file was the IBLA 81-626 decision against the Oregon Wilderness Coalition dated February 22, 1983.

S The S.O. announced the elimination of the area for consideration as a wilderness November 14, 1980. Reasons cited were as follows:

  S The guidelines for reviewing the area at the time, based on FLPMA of '76, stated that O&C land had to be excluded from consideration even if it was roadless or TPCC withdrawn at the time and that the remaining areas had to be 5,000 acres or larger and possess wilderness characteristics described in the wilderness Act of '64. Much of the roadless area was determined to be productive forest land resulting in small, isolated parcels some as small as 1/10 mile in width, which did not meet size requirements or provide solitude when you considered that the adjacent area could be harvested at any time.

  S Man-made structures and signs of human use, such as mining waste and debris, bridge abutments, a barge, buildings and a steel superstructure of a bridge, were located in the remaining unit and could not be removed by "hand labor or natural means".

S Justification for the appeal was " Appellant argues primarily that the unit boundaries were improperly drawn because BLM excluded commercial and noncommercial adjacent revested O&C lands. Appellant contends that if these lands had not been excluded from the unit, the present highly irregular border wold be avoided. Appellant urges that at least those O&C lands BLM deems unprofitable should be included in the wilderness study being conducted pursuant to section 603(a) of FLPMA."

S BLM said section 701(b) of FLPMA required the removal of commercial timber management lands, " timberlands shall be managed for permanent forest production with a view toward a permanent timber supply, watershed protection, local economic stability, and recreation." The files states that " There are two large and several small areas of commercial timber inside and surrounded by the unit."

S The area called the Zane Grey occupied both sides of the wild section of the river and was fairly large. It was divided into four separate units because of the timber land exclusion with all but one dropped due to size. The remaining area, 11-16, was labeled as the Zane Grey. The map that I found in the file displayed jeep roads and also has some proposed roads in the Whiskey Creek drainage, most of which was not considered in the study area because of the presence of the Whiskey Creek Road. Many of the jeep roads are now impassable and almost invisible on current aerial photos. Most of the proposed roads in Whiskey Creek were not built.

S Much of the area reviewed on the south side of the river was burned in 1987 and probably has "cat" roads all through it.

Appendix H. Listing of roads reviewed for the Zane Grey Wilderness Review Inventory and present day (1999) conditions

Roads north of the Rogue River that were reviewed during the Zane Grey wilderness review inventory			
Road Number	**Date Constructed**	**Uses**	**Description**
1	1958	Administrative Fire Control	Reopened & extended in 1972;
2	1960	Administrative Blister Rust Control Timber Management Fire Protection	Planned improvement with timber sales to the east.
3	1964	Logging Road Fire Control	
4	1946	Whiskey Cr. Cabin Access Fire Control	Whiskey Creek Jeep Road;
5	1960	Administrative Blister Rust Control Timber Management Fire Protection	Reopened in 1972;
6	1960	Administrative Blister Rust Control Timber Management Fire Protection	Russian Ridge Jeep Road;
7	1960s	Private Property Access	
8	Prior to 1948	Private Property Access	

Roads north of the Rogue River that were reviewed during 1999 watershed analysis field inventory	
Road Number	**Description**
1	The road is able to be driven to the landing near section 13/24 border. At this point, the last ½ mile of the road becomes vegetated and the gradient increases considerably.
1a	Can only drive ~100' before the road becomes very steep and overgrown.
2	The road in section 8 is in good condition. It becomes more confined in section 17 and there are several places where small vegetation is present in the road bed, but it is still passable. Barricades have been vandalized, allowing public access.
3	The road bed is generally intact, several trees down on road, two areas where drainage problems have caused severe erosion to the road bed..
4	Road is able to be driven, in good condition and recently re-rocked.
5	Spur road that leads to a landing; Barricade is open.
5a	Old road bed, becomes vegetated at about ½ mile; Road prism has been narrowed by talus.
6	Road is in fair condition for a couple of miles before it becomes overgrown; Several down trees.
7	Road is open, accesses private land.
8	Road was open five years ago; Accesses private land.
15	Road is open for the first mile, some small vegetation beginning to encroach on the roadbed. After two miles, it becomes overgrown.
16	Road is open for approximately one mile.
17	Road leads to old mine shaft; Becomes overgrown with 6' conifers at about 1 mile, some erosion problems at stream crossings.
18	Benton Mine Road - impassible due to severe erosion consisting of 6-7' gullies where water has channelized down the road.
19	Roadbed visible from aerial view. Very old haul road with 30-40 year old trees growing in the center of it.

Appendix I. Historic Mining information - Wild Rogue North watershed.

Highlights of some of the larger gold mines in the watershed (Gold and Silver in Oregon, DOGAMI, Bulletin No. 61, 1968):

Benton Mine T33S R8W Sec. 22,23,26 & 27. Discovered in 1893 and by 1905 had 5,000 feet of underground workings. Ore is on quartz fissure veins with in faults and fractures in quartz diorite. The mine was shut down from 1905 to 1934. When the price of gold was increased, it reopened in 1934 with a cyanide plant an additional 5,000 feet of workings. In 1941 this mine had the largest payroll in Josephine county. This mine is on patented land and is still in operation off and on.

Ajax Mine T33S R8W Sec. 36. Historic lode mine in a shear zone of quartz and pyrite in greenstone country rock. Had about 3,000 feet of workings.

Gold Bug Mine T338 R8W Sec. 33. Lode mine with two shafts and adits following a shear sone in greenstone containing quartz, calcite, pyrite, chalcopyrite and free gold. There was about 700 feet of workings. Production from late 1800's to early 1900's. A steam powered five-stamp mill was used for production.

J.C.L. Mine T33S R8W Sec. 35. Historic lode mine with about 3,000 feet of workings. Country rock is greenstone and gabbro, gold occurred free in sheared quartz lenses. Gold was recovered by stamp mill and amalgamation.

Reno Mine T33S R8W Sec. 34. This smaller lode mine had about 850 feet of workings following a quartz vein in gabbro near serpentine. A 15-ton mill was installed in the 1930's. The mine was operated with little production up until 1964.

Marigold (Tina H) Mine T32S R10W Sec. 33. This lode mine was located in 1902 and had 450 feet of underground workings. Free gold was mined from quartz veins in chloritic country rock. Had a water powered two-stamp mill.

Mammoth Mine T33S R10W Sec 3 & 4. This lode mine had 350 feet of workings and poor recovery of the gold during production at a arrasta near Mule Creek below the mine. Some ore was processed in the Tina H. stamp mill. Quartz vein 3 inches to 2 feet thick in metagabbro country rock.

Paradise Mine T32S R10W Sec. 27. This lode mine was reached by 4 ½ miles of steep trail. It had about 300 feet of underground workings. Was probably in operation in the early 1900's.

Red River Gold Mining Co. Placer mine in T32S R10W Sec 9 & 10. This hydraulic operation worked the bench gravel on the west side of Mule Creek (near the mouth) and NW side of the Rogue River. Water was supplied by a $80,000 flume. Several acres were mined in the late 1800's and early 1900's. Floods of later years have obliterated practically all evidence of the mining activity.

Battle Bar T33S R9W Sec. 17. This was a small placer mine operation on terrace gravel before 1940.

Appendix J. Mining Claim Information

An inventory, utilizing the February 1999, mining claim microfiche prepared by the BLM Oregon State Office, revealed that there are forty- one mining claims currently existing within the watershed. The majority of the claims are lode claims located in the eastern portion of the watershed in T. 33 S., R. 8 W. The remaining seven are placer claims that are primarily located on Whiskey Creek. The rights of mining claimants on unpatented claims are outlined in Appendix K.

In the past there were over one hundred claims in the watershed, but many claimants dropped their claims from the mid 1980s to early 1990s. This drop in claims was probably due to the new annual maintenance fee of $100 dollars due for each claim after 1993.

There is no inventory of existing and abandoned mine adits (an opening in a hill side) or shafts (a hole in the ground) within the watershed. If the cultural survey is funded for the Wild Rogue EIS area, the abandoned mines will be a part of that survey. Another possibility was to survey for abandoned adits is with the Abandoned Mine Lands Fund (1010) and relate the survey to safety and possible bat habitat.

On the lands administered by the BLM there are three levels of operations that may occur. The lowest level of operations is considered 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. There is no administrative review of these types of operations. In fact, individuals mining at the casual use level are not required to notify the BLM of their activities. The number of casual users in this category are not known.

The most common level of operations involve activities above casual use and below a disturbance level of five acres. This level of operations requires the claimant/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. This level of activities is not considered a Federal action and no administrative review or approval of mining notices occurs.

There are two mining notices that have been submitted for operations at the location of the BLM-administered lands within the watershed. The notices have been filed for placer operations and are located in T33S R8W Sections 15 and 26.

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

- **S** Proposed operations that may exceed the disturbance level of five acres;
- **S** 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
- **S** 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 where applicable:

-- The State Department of Environmental Quality monitors and permits dredging activities and activities where settling ponds are used.

S The 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.

S The Department of State Lands permits in stream activities where the removal, or displacement, of 50 cubic yards of material is anticipated and where the movement of a stream channel is planned.

S The Department of Fish and Wildlife (ODFW) monitors turbid discharges from mined sites. ODFW also recommends preferred dredging periods for operations within anadromous fish bearing streams. ODFW also approves variances for operations outside the preferred work periods where applicable.

No plan of operations has been filed within the watershed.

There is no mining allowed within the 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 Oregon Department of Fish and Wildlife.

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 reviewed in a manner similar to a plan of operations since this determination is a Federal action covered by NEPA. No occupancy may occur until the proposed occupancy is reviewed and written permission is issued by the authorized officer. There is one mining claim occupancy within the watershed at this time. It is located in T33S R8W Section 15. This occupancy is on an unpatented mining claim filed by Randy Mack, who has a mining notice filed for activities on his claim.

Surface Uses of a Mining Claim

In some instances the mining claimant has surface rights on the BLM administered lands. These are usually claims that were filed before August 1955 and determined to have a valid discovery. The claimants in these cases have the same rights as mining claimants without surface rights, however, they have the right to eliminate public access across that area where they have surface rights. There are four claims within the watershed where the claimants have surface rights. Those claims are located in T. 33 S., R. 8 W., sections 27 and 34. Those claims are lode claims and are located on, or adjacent to, Whiskey Creek. A further explanation of surface rights is outlined in Appendix K.

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 shows in general that the Rogue Formation (primarily the western and eastern end of the watershed) is rated as moderate and the Dothan Formation (most of the rest of the watershed) is rated as low for metallic mineral development. The sandstones of the Dothan Formation rarely have mineral deposits. However the Rogue Formation is thought to represent an island arc system. These volcanic rocks contain massive sulfide deposits of volcano genic origin (the "black smokers" of present day). Gold-quartz vein occurrences could be the hydrothermal feeder systems of these deposits.

The lands are rated as low for coal and geothermal resources.

The watershed is rated as low for oil and gas, except the north east area of the watershed is rated as moderate for the presence of oil and gas. No leases for oil or gas have taken place here and the probability of this occurring is low. If a lease was ever pursued in this remote country all NEPA requirements would need to be followed.

Appendix K. Lands/Realty

The land pattern of BLM ownership within the watershed is primarily a solid block of BLM ownership. There are a few private in holdings that resulted most likely from mineral patents or entries under the homestead acts.

Rights-of-way issued to private landowners include 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 a few road ROW's for non commercial ingress and egress purposes and a buried fiber optic line along the backcountry byway running between the Siskiyou National Forest to the west and the Grave Creek bridge at the southeastern portion of the watershed.

There is a right-of-way to the BLM for the use and maintenance of Calvert Airstrip. This ROW is for a strip 125 feet each side of the center of the runway.

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 at the location of the Rogue River corridor within the wild section of the Rogue River in the watershed. One withdrawal is the withdrawal that was in place when Congress designated the Rogue River a wild and scenic river. This withdrawal segregates the lands from entry under most land laws, and the general mining laws. The other withdrawal that has existed since the late 1950s 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.

Timber Management on Mineral Patent Lands

There are two parcels of private land within the watershed where mineral patents were issued with BLM retaining the rights to cut timber. Those are described below with the extent of the BLM timber management rights outlined:

a. T. 33 S., R. 8 W., sections 22 and 27 (MS 954). This is a 5 acre parcel. Patent number 1206322. The timber on the date of the patent (March 9, 1960) and thereafter growing is property of the United States with the right to manage and dispose of the timber as provided by law.

b. T. 33 S., R. 8 W., sections 22 and 23 (MS 929). This is a 21 acre parcel. Patent number 1195248. The timber on the patented parcel in lot 1 of section 23 (only in this location within the patented parcel) is reserved to the United States with the right of the purchaser of the timber to enter upon the land and to cut and remove the timber. The timber on the remainder of the parcel is the property of the private landowner.

Appendix L. Road segments recommended for decommissioning

ID No.	Road Number	Proposed Action	Priority	Length (miles)	Road Control	Comments
	33-8-26.1	Fully Decommission	High			! Western 1/4 mile has several erosion problems ! Within LSR boundary ! Private land has other access route
	33-8-23 (Road #18)	Fully Decommission	High			! In T33 R8 Sec.23, road connects 34-8-1 & 33-8-26, other access available. ! Severe erosion problems, spur road/skid road to the north naturally revegetating.
	Road #18b	Abandon	Low			! Road naturally revegetated, no access if road #18 is removed.
	Road #18c	Repair	High			! Fix culvert, outslope, add water dips.
	32-8-24	Fully Decommission or Install Gate	High			! Slump on road with 20-30 yr trees in roadbed. ! Road bed vegetated at least ½ mile. Spring/ willows growing in roadbed past 1st major drainage. ! Overstocked 30-40 yr. old stands.

ID No.	Road Number	Proposed Action	Priority	Length (miles)	Road Control	Comments
	32-9-13	Fully Decommission	High			! Upper ½-1 mile parallels Kelsey Cr, within riparian management area. ! Lower 1-2 miles in unstable area, two landslides present. ! Plugged culvert causing road damage during high flows - erosion 18" wide by 12" deep, tension cracks in roadbed (moving downhill).
	32-8-30	Fully Decommission	Medium			! Past private (state?) boundary
	32-9-14	Fully Decommission	Medium			! Lower ½ mile within riparian reserve, parallels stream ! Natural surface
	33-8-21	Install Gate	Medium			
	33-8-7	Barricade	Medium			! Parallels 33-8-26
	Road # 6	Install Gate (see 33-8-21 gate)	Medium			! In T33 R08 Sec. 20/30 ! Limit access but allow for fire suppression
	Road #6b	Earth berm	Medium			! "Tank Trap" at junction with roads #5 & #6.
	Road #6c	Partial Decommission	Medium			! Rip and replant ~2500'
	33-8-11.1	Gate	Low			! Limit access but allow for fire suppression ! Natural Surface

ID No.	Road Number	Proposed Action	Priority	Length (miles)	Road Control	Comments
	Road # 15	Install Gate	Low			! In T33 R08 Sec.10/15 ! Limit access but allow for fire suppression ! Natural Surface
	Road #1& #1A	Install Gate	Low			! In T33 R08 Sec.07/18 ! Limit access but allow for fire suppression ! Natural Surface
	Spur in 33-08-28	Fully Decommission	Low			! Spur road in T33 R08 Sec. 28 ! Within LSR boundary
	32-9-24.2	Fully Decommission /Abandon				! Ditch problem @ 1/10th mile. Water runs down roadbed. ! Overgrown @ ½ mile.

Appendix M. Glossary and Acronyms

ASQ	Allowable Sale Quantity
BLM	Bureau of Land Management
CHU	Critical Habitat Unit
CWD	Coarse Woody Debris
ECA	Equivalent Clear-cut Area
GFMA	General Forest Management Area
GIS	Geographic Information System
HUC	Hydrologic Unit Code
LSR	Late-successional Reserve
LWD	Large Woody Debris
NEPA	National Environmental Policy Act
NGFMA	Northern General Forest Management Area
NMFS	National Marine Fisheries Service
NFP	Northwest Forest Plan
ODFW	Oregon Department of Fish and Wildlife
PSQ	Probable Sale Quantity
RIA	Rural Interface Area
RMP	Resource Management Plan
ROD	Record of Decision
SGFMA	Southern General Forest Management Area
TPCC	Timber Productivity and Capability Classification
USFWS	US Fish and Wildlife Service
VRM	Visual Resource Management
WUI	Wilderness Unit Inventory

The terms Coarse Woody Debris, Large Woody Material and Large Down Wood are used interchangeably.

Decay Class 1 down wood has intact bark, twigs are still present, texture is still intact.

Decay Class 2 down wood has bark still intact, twigs are absent, texture is intact to partly soft.