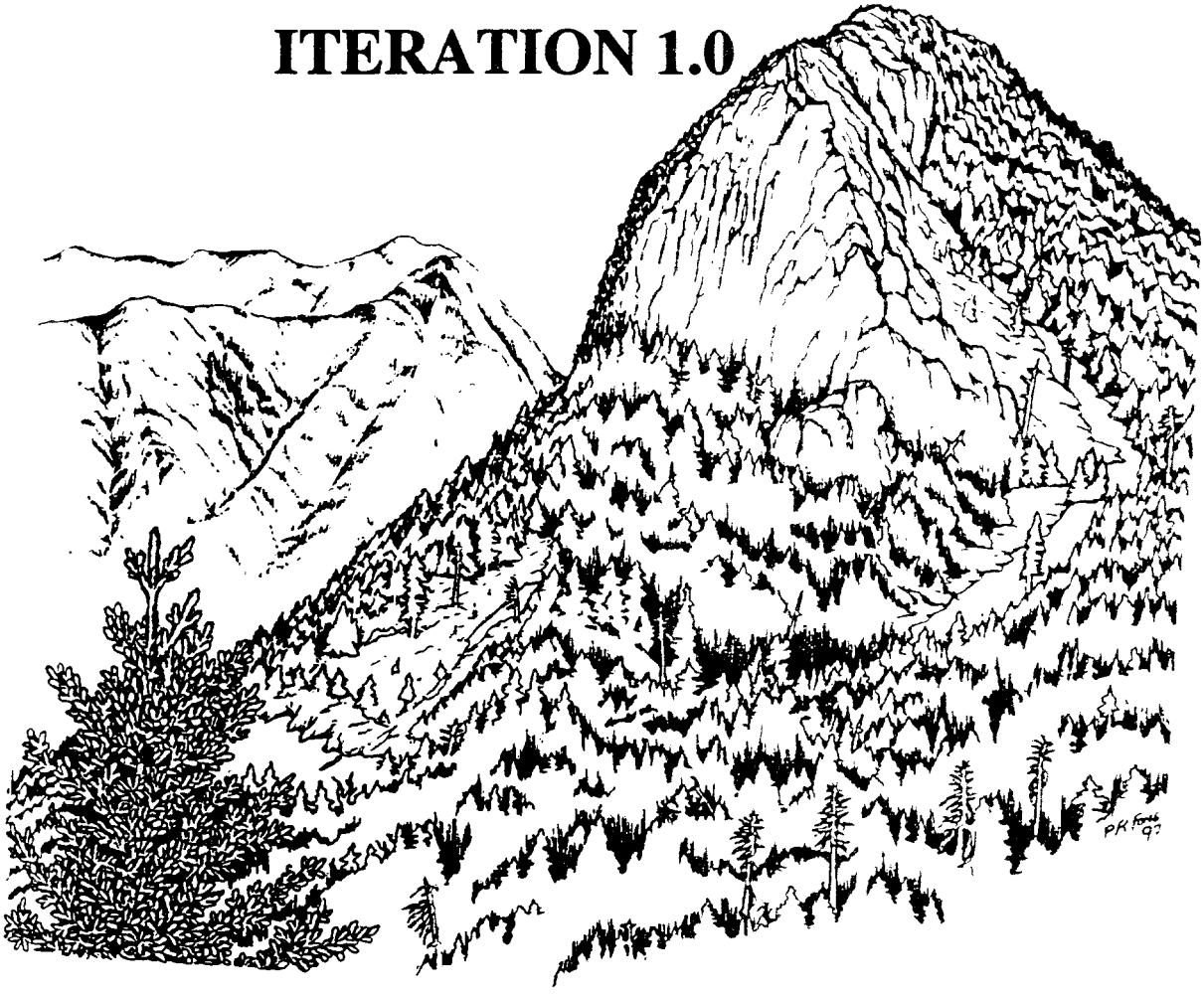
United States
Department
of Agriculture

Forest Service
Pacific
Northwest
Region

1997

COLLIER CREEK WATERSHED ANALYSIS

ITERATION 1.0



I have read this analysis and find it meets the Standards and Guidelines for watershed analysis required by The Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (April 1994).

SIGNED Michael Frazier DATE 10/30/97

District Ranger
Gold Beach Ranger District
Siskiyou National Forest

Cover - Collier Butte with the Big Craggies in the background
Illustration by Paula R. Fong from a photograph taken by Kristiaan Stuart

TABLE OF CONTENTS

Title	Page
Introduction	1
Key Findings	4
Aquatic Ecosystem Narrative	6
Terrestrial Ecosystem Narrative	21
Social Aspects Narrative	40
Literature Cited	54
Interdisciplinary Team Members	56

LIST OF TABLES

Table	Title	Page
Table 1.	Management Areas and Acreage in the Watershed	1
Table 2.	Miles of Fish Distribution	16
Table 3.	Special Wildlife Sites	25
Table 4.	Spotted Owl, Pileated Woodpecker, and Pine Marten Habitat	29
Table 5.	Elk Habitat Type in 1993	31
Table 6.	Acres Harvested in Five-Year Periods	46
Table 7.	Road Assessment	52

Introduction

The Collier Creek Watershed Analysis, Version 1.0, was initiated to obtain and document information on the aquatic, terrestrial and social resources of the watershed. The information gathered and analyzed will be used to guide future resource management. It will also be used to ensure Aquatic Conservation Strategy Objectives and other Standards and Guidelines contained in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD, 1994) will be met.

The watershed analysis was completed by an interdisciplinary team using the six step process outlined in *Ecosystem Analysis at the Watershed Scale (Version 2.2, August 1995).* The watershed analysis has the following components: the aquatic ecosystem, the terrestrial ecosystem, and the social aspects of the watershed. These components are separated in the watershed analysis report; however, in the analysis process they are very much interrelated.

Collier Creek Watershed

The Collier Creek watershed is approximately 22,878 acres and is managed by the Siskiyou National Forest (Figure 1, Vicinity Map). Most of the watershed is in Curry County, while a small portion of the eastern part of the watershed lies in Josephine County. The watershed is approximately 20 air miles east of Gold Beach, Oregon and the Pacific Ocean. Vehicle access from Gold Beach is via Forest Service (FS) Roads 33 (Agness Road), 3318, 3680 and 1376.

The Siskiyou Land and Resource Management Plan (Siskiyou LRMP, 1989) as amended by the ROD, 1994, allocated the watershed into a variety of management areas (Table 1 and Figure 2). These documents provide information and overall resource management direction for the watershed. Although the Collier Creek watershed is not a Key Watershed (ROD, B-18), it is an important tributary to the lower Illinois River, as are Lawson, Indigo and Silver Creek watersheds. A large percentage of the watershed (72 percent) is in the Kalmiopsis Wilderness. Another 23 percent is allocated to Late-Successional Reserve (LSR), and with the Lawson and Horse Sign watersheds, comprise the southwestern corner of the Fish Hook/Galice LSR. The Southwest Oregon LSR Assessment provides more specific information and resource management direction for this LSR.

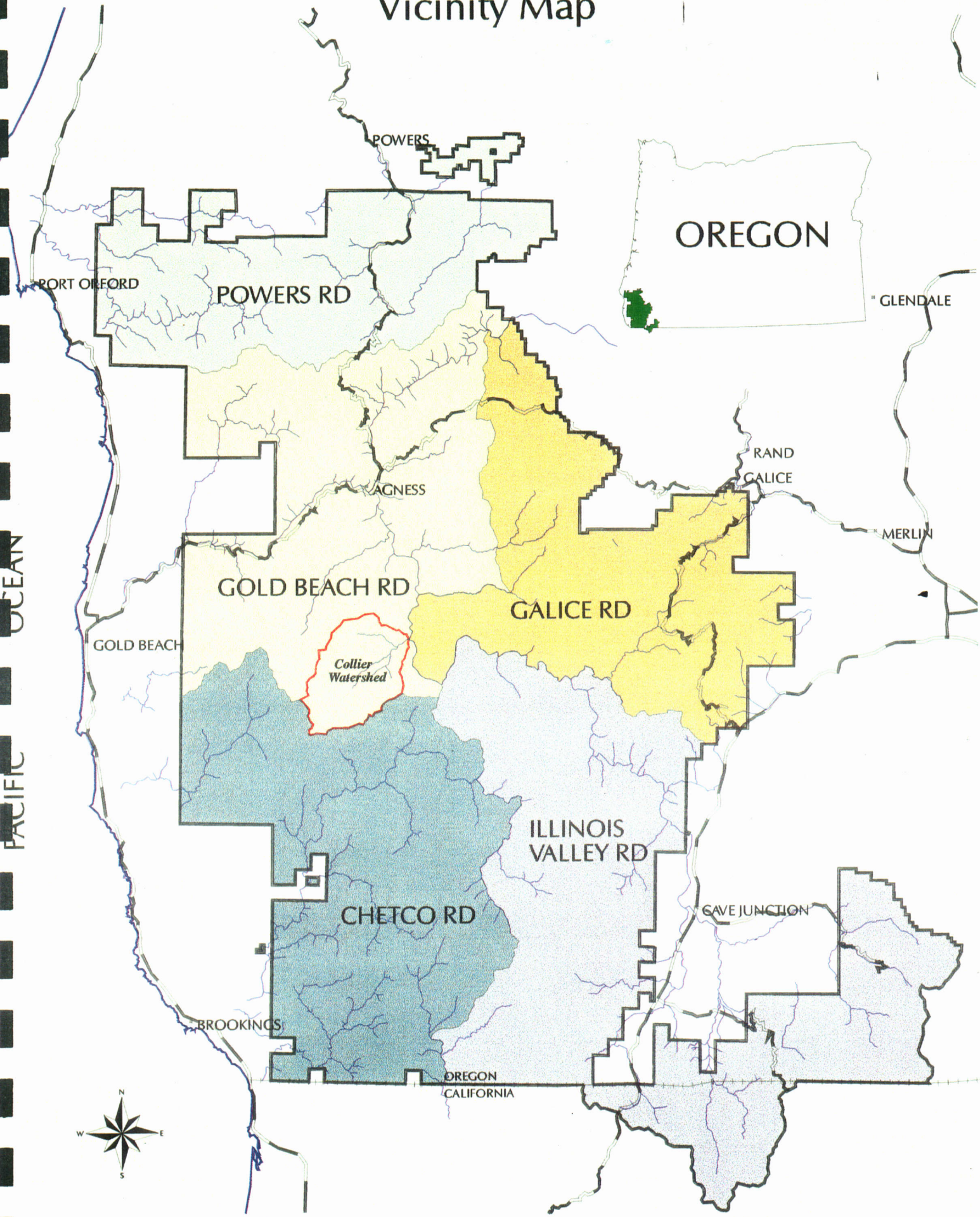
There is overlap of Management Areas. For example, land allocated to Backcountry Recreation can also be Late-Successional Reserve. Land allocations shown (Table 1 and Figure 2) are the most restrictive.

Table 1. Management Areas and Acreage in the Watershed. (See Figure 2)

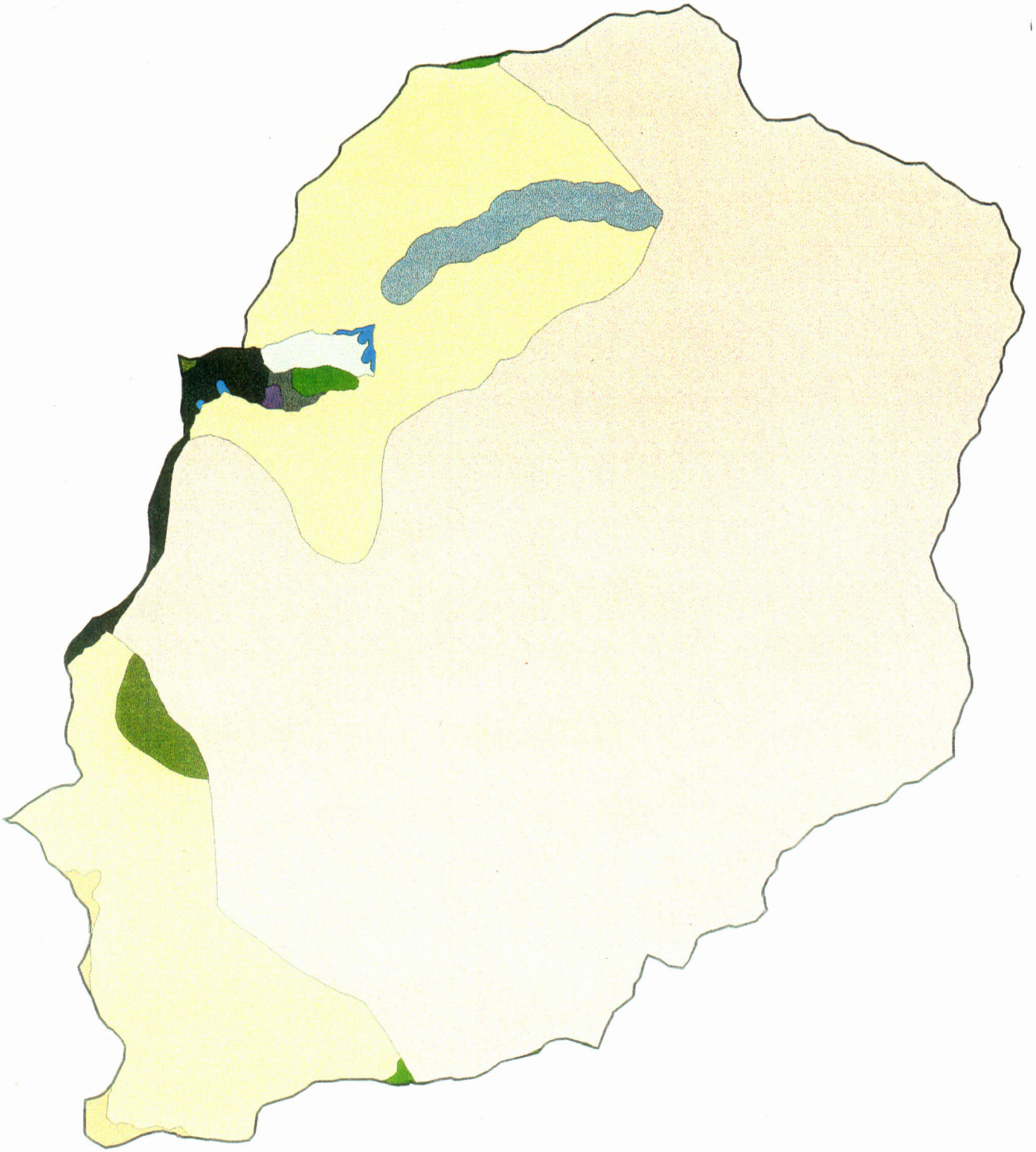
Allocations	Management Areas	Acres	Percentages
Wilderness	1	16,556	72
Botanical	4	75	<1
Unique Interest	5	170	1
Backcountry Recreation	6	103	<1
Supplemental Resource	7	347	2
Late Successional Reserve	8	5,238	23
Special Wildlife Sites	9	13	<1
Riparian Reserves	11	24	<1
Retention Visual	12	218	1
Partial Retention Visual	13	29	<1
Matrix	14	105	<1
Total National Forest Land		**22,878**	**100**

Figure 1

COLLIER WATERSHED
Vicinity Map



COLLIER WATERSHED
Management Areas



- *1 - WILDERNESS*
- *4 - BOTANICAL*
- *5 - UNIQUE INTEREST*
- *6 - BACKCOUNTRY RECREATION*
- *7 - SUPPLEMENTAL RESOURCE*
- *8 - LATE SERAL RESERVES*
- *9 - SPECIAL WILDLIFE SITE*
- *11 - RIPARIAN RESERVES*
- *12 - RETENTION VISUAL*
- *13 - PARTIAL RETENTION VISUAL*
- *14 - MATRIX*

October 31, 1997

Key Findings

The **water clarity** in Collier Creek is excellent, similar to other streams in the area. **Sediment production** in the mainstem is primarily a function of natural processes, streambank erosion and landslides. Sediment production from human activities include past road construction, timber harvest, and mining. The effects are minimal in comparison with natural processes and are generally localized to small, tributary streams.

The Collier Creek mainstem has **warmer than optimum summer stream temperatures**, which is a natural condition characteristic of streams of comparable size in the western Siskiyous.

Collier Creek provides **high quality habitat for anadromous salmonids**. All fish in Collier Creek are "wild" populations. Although Collier Creek is an important producer of salmonids, the production numbers appear to be similar to other lower Illinois tributaries.

Although the watershed has a lower percentage of **late successional forest** (40 percent, about 9,065 acres) than adjacent Lawson watershed, it is largely unfragmented and supports a healthy population of dependent wildlife.

Early-successional habitat, important to deer, elk, and approximately 100 other species, is well represented in the watershed, largely a result of the recent Silver Fire and habitats on ultramafic soils. Approximately 26 percent of the watershed is in pioneer habitat types, a higher percentage than in adjacent Lawson or Quosatana drainages. However, very little of the early successional habitat is in permanent meadow or prairie habitats. Forage in the ultramafic areas is of lower quality. A relatively large herd of about 25 elk is present in the watershed. The **meadow habitat** in the watershed is approximately 10 acres, a large component of which is native grasses.

Collier watershed has a wide variety of **sensitive plants** located primarily at higher elevations on ultramafic rocks. Portions of two botanical areas, Sour Game and Big Craggies, are located in the watershed. The watershed also hosts rare species such as *Kalmiopsis leachiana, Picea breweriana, Arabis aculeolata, and Lewisia cotyledon*. One of the largest populations of *Lillium vollmeri* on the Gold Beach Ranger District is located at Sourdough Camp.

Noxious weed populations in the watershed are much less widespread than in other watersheds. Monitoring, early detection and quick removal can maintain this status.

Five-needle pines occur primarily in the northeast portion of the watershed and along the west and southwest edges of the watershed (Collier Ridge). The **blister rust disease** associated with these pines is extensive in the watershed but not to the extent of the adjacent Lawson watershed.

Port-Orford-cedar in the Collier watershed, along with Lawson, Mislatnah, and Windy Creek watersheds, are relatively undiseased in comparison to Port-Orford-cedar areas to the north. The watershed contains a fairly large amount of uninfested Port-Orford-cedar and a relatively small amount of road mileage. All roads in the watershed except Road 3680 have existing or proposed year-around or seasonal closures for Port-Orford-cedar protection.

Fire occurrence was widespread during the early part of the twentieth century. The largest fires burned in what is now the Kalmiopsis Wilderness, while a smaller fire burned near the Game Lake area. Historically, lightning fire starts have accounted for about one-half of all fires and about three-quarters of the total acres burned. Fire suppression has been effective for the past 65 years, with the exception of the Silver fire in 1987 which burned 4000 acres in the watershed. The Southwest Oregon LSR Assessment indicates prescribed fire is an appropriate management tool, and may provide a benefit to certain areas within the watershed.

AQUATIC ECOSYSTEM NARRATIVE

GEOLOGIC CHARACTERIZATION

Lithology

The Collier watershed is composed of the following lithologic (rock) units; Dothan formation, ultramafic, intrusive igneous and metasedimentary rocks (Figure 3, Soil Depth/Parent Material).

The Dothan formation consists of graywacke (sandstone with a clayey matrix) and mudstone with subordinate chert, andestic breccia, pillow basalt, minor conglomerate and occasional limestone lenses in the graywacke-mudstone sequence. The graywacke is normally quite fractured and penetrated by small quartz and occasional calcite veinlets (Ramp, 1977). These rocks are Jurassic in age (approximately 145 to 135 million years old). On steeper slopes Dothan sandstones tend to form rockier and thinner soils than Dothan mudstones. Predominantly mudstone units are often masked by dominantly sandstone colluvial soils (Ferraro, 1991). Soils on Dothan volcanics are generally thin and rocky or gravelly.. The Dothan formation is correlative and continuous with the Franciscan formation of California (Ramp, 1997). There are small volcanic units within the Dothan formation that characteristically form outcrops and talus slopes.

The ultramafic rocks include partially serpentinized peridotite and pyroxenite, and serpentinite where the peridotite and pyroxenite have been more severely sheared. Peridotites are chiefly composed of olivine, with or without other manganese and iron-rich minerals. Pyroxenites are rocks that are primarily composed of pyroxene minerals (enstatite, hypersthene, diopside, hedenbergite, etc.) and may contain accessory minerals such as hornblende, biotite and olivine (Ramp, 1977). Peridotites and pyroxenites in the Collier watershed were originally formed from igneous intrusions deposited near tectonic spreading centers. Serpentinite is an alteration product of olivine, pyroxenes and amphiboles that come in contact with hydrothermal fluids. In the Collier watershed they are indicative of profound tectonic movement and are thought to be approximately 155 million years old.

Gabbros and metagabbros are a group of dark-colored intrusive igneous rocks which form the Big Craggies. These rocks are described by Ramp as coarse to very coarse-grained hornblende-plagioclase rock or hornblendic metapyoxenite. Gabbros are the intrusive equivalent of basalt, and in the Collier watershed they are approximately 150 million years old. A small amount of diorite is found in the watershed. Diorite is an intrusive igneous rock, having a coarse texture. Typically, it is very resistant to weathering. Diorite is the rock that forms Collier Butte.

A very small amount of metasedimentary rocks are found in the watershed along the main stem of Collier creek. These rocks are likely members of the Cretaceous Humbug formation, a predominantly chert pebble conglomerate, which includes some mudstone and sandstone. Humbug rocks are approximately 125 million years in age.

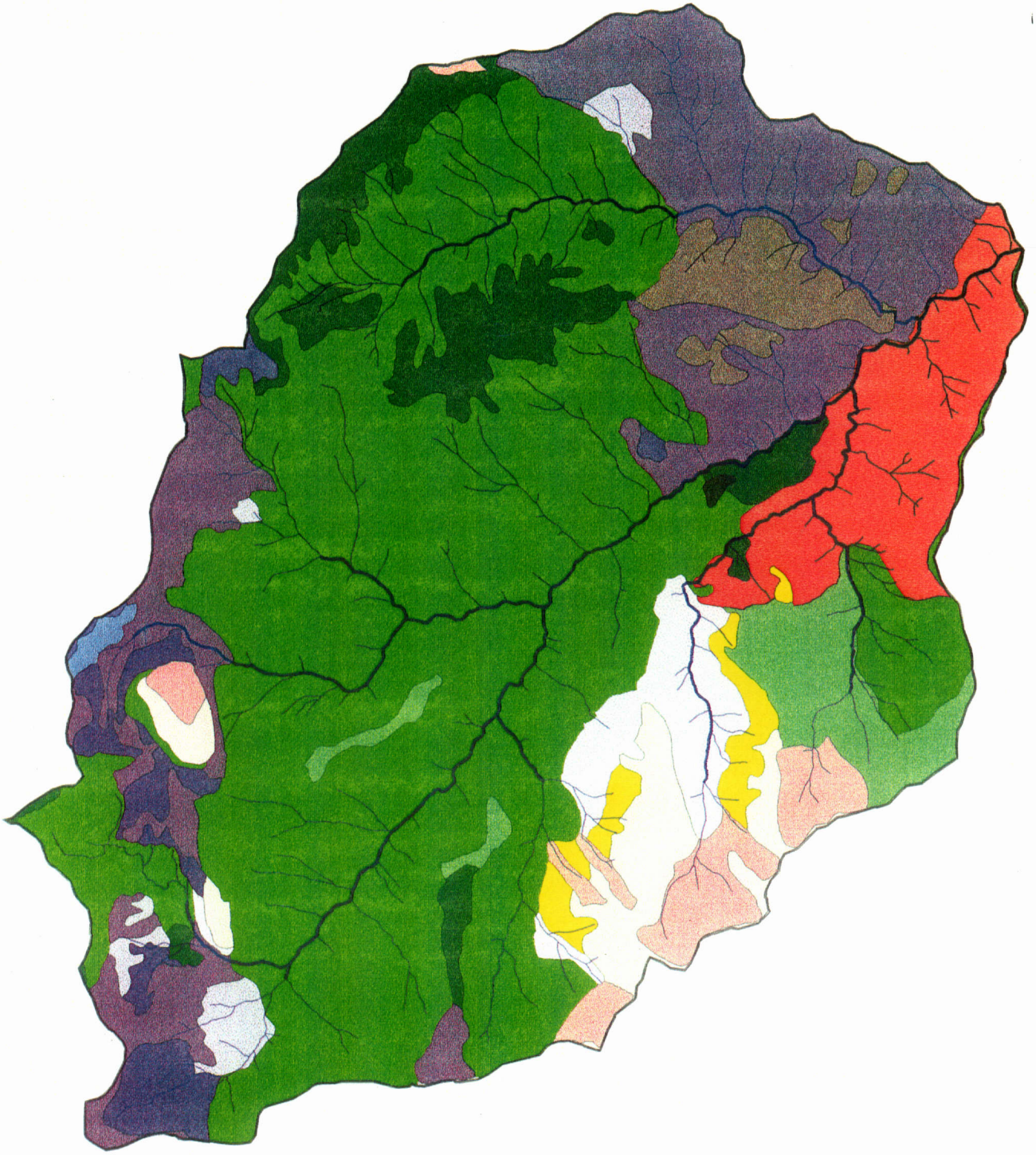
Structure

Thrust faulting of the older units over the top of the younger Dothan and Cretaceous rocks occurred from 135 million years ago to approximately 100 million years ago. General uplift of the area occurred and eroded the upper plate rocks, in some cases leaving them as islands capping younger Dothan rocks below. These rocks have a greater resistance to weathering and a surface expression of steeper topography. The Big Craggies, Green Craggy, and Collier Butte are all areas where older more erosion resistant rocks have been thrust over younger, less erosion resistant sediments.

The area has several high angle north-south trending faults. These faults can be seen to offset thrust fault segments. The age of these faults is not known, but undoubtedly some are still active. Movement along the faults has both a horizontal and vertical component.

Figure 3

COLLIER WATERSHED
Soil Depth/Parent Material



Valley Alluvium

Alluvium Fans, derived from Ultramafics

Rock Outcrop

GRANITIC ROCKS

Shallow

Moderate

ULTRAMAFIC ROCKS

Shallow

Moderate

Deep

OLIVINE GABBRO

Moderate

METASEDIMENTARY & METAVOLCANIC ROCKS

Shallow

Moderate

Deep

Very Deep

SCHIST & PHYLLITE

Moderate

Deep

NOTE: Soil depth is a weighted average for all soil series in each soil mapping unit.
Mapping for Curry and Josephine Counties by USDA Natural Resources Conservation Service.

October 31, 1997

What erosion processes are dominant within the watershed?

Natural Processes

Landsliding and erosion are natural processes that deliver sediment to streams which can affect fish habitat and stream morphology. Landsliding, the downslope movement of rock and soil, occurs when forces such as gravity and pore pressure exceed the shear strength of soils. Shear strength can be affected when slopes are over steepened or when components which contribute to shear strength are decreased (such as decay of tree roots). Reduced shear strength can be the result of natural processes such as fire, erosion, earthquakes and disease.

Landslides occur in the Collier watershed as ravel, debris flows, slump earthflows, inner-gorge slope failures and headward erosion. Ravel is the surface erosion of soils and in some cases rock. Typically within Collier this occurs where creeks erode the base of a landslide, resulting in small, periodic failures which make it difficult for vegetation to become established.

Debris flows, which often originate in steep headwall areas, can travel downslope for long distances and entrain significant volumes of wood and coarse sediment. They are mass failures with high energy and the ability to scour streams to bedrock and deposit large volumes of sediment in low gradient stream sections. Debris flows are linear features and do not affect large areas, but can have significant effects on streams and their morphology.

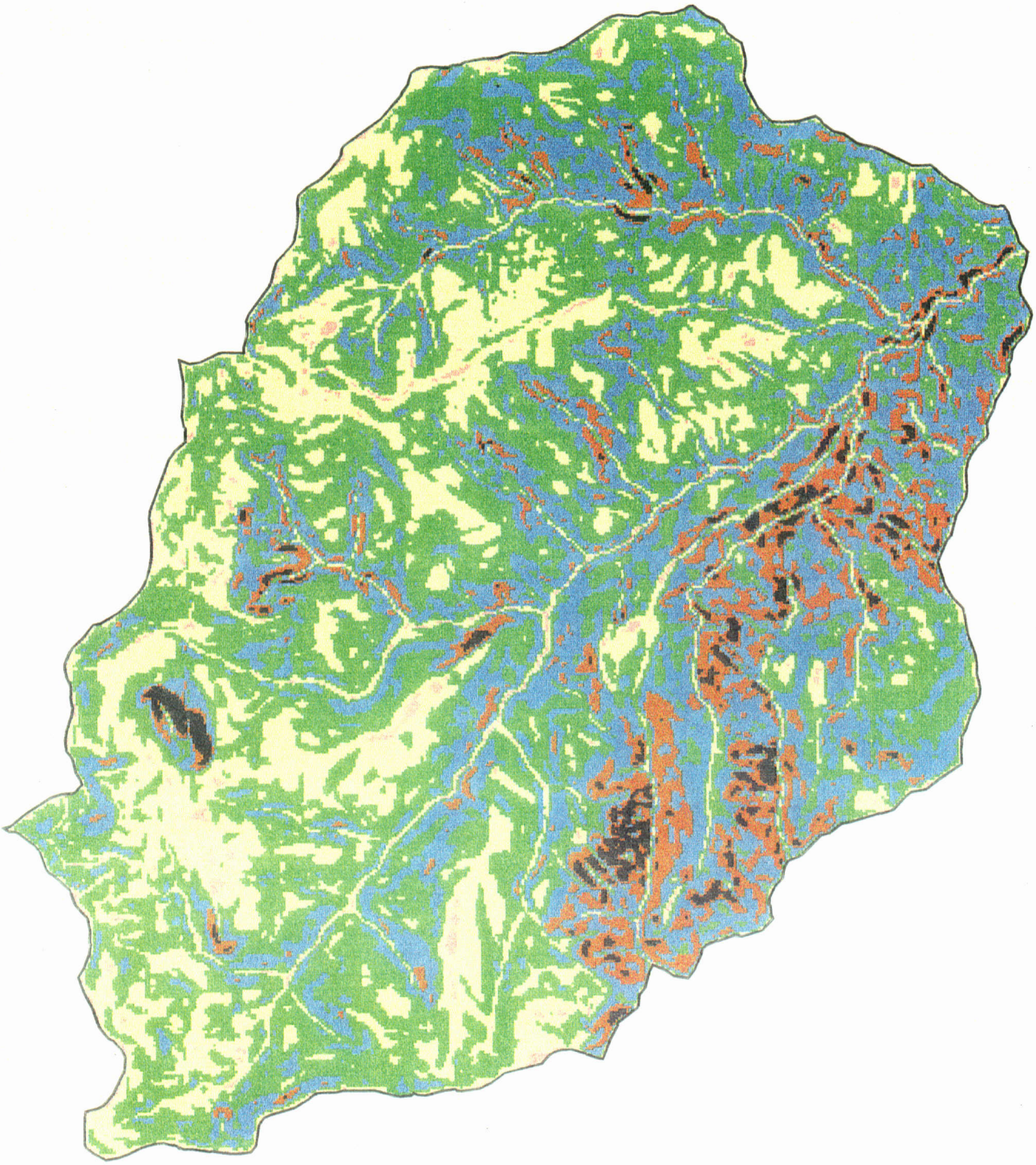
Slump-earthflows are downslope movements of soil and rock which can include large areas. Typically these are deep seated features associated with thick soils. Information derived from contract mapping indicates that large slump-earthflows may be a result of erosion resistant rock capping softer sediments. This creates steep slopes which have little lateral stability and can result in large mass failures. These features have a profound effect on topography. Large curved valleys with steep hillsides are formed by the downslope movement of the earth and rock. The deposits form areas of low slope and rolling topography, and can flow into streams causing diversions or blockages.

Regional uplift has resulted in a rugged mountainous terrain. Streams have eroded the sedimentary rocks creating oversteepened inner gorges and rapid headward erosion. Slopes in inner gorges generally range from 70 to 100 percent (Figure 4, Slope Classes). Inner gorge landslide activity is concentrated in the Dothan formation, particularly within highly erosive mudstone units (Ferraro, 1991). The oversteepened inner gorges generally fail, creating large landslides along and above the streams. Landslides within inner gorges can divert the streams creating new areas of undercutting, initiating or reactivating landslides in areas that may not have failed for many years.

Headward erosion continues up to the more resistant older overthrust rocks creating oversteepened slopes at the contact of the units. Rocks along the thrust contact have been highly sheared and have little strength when lateral support is removed. In addition, the sheared nature also has the effect of allowing greater infiltration of groundwater (Ferraro, 1991). These factors combine to create conditions for the formation of large landslides within the watershed.

Figure 4

COLLIER WATERSHED
Slope Classes



- 0 - 10%
- 11 - 30%
- 31 - 50%
- 51-70%
- 71-90%
- 91-100%

Human activities affecting erosion processes

Only a small portion of watershed has been roaded, harvested or mined. Harvest can result in the loss of shear soil strength, leading to landslides. Given the small amount of harvest, this would have had little effect on the sediment and erosion budget of the watershed.

Roading within the watershed is also restricted to a limited area. Roads can affect the hydrologic regime within a watershed, resulting in increased erosion, sediment delivery and landslide rates. Generally this is due to poorly located culverts, diversion of runoff water and oversteepened cutbanks. This has had effects locally to small tributary streams, but there appears to be little discernible evidence of any effects to the mainstem of Collier Creek.

Mining in the Hurt Cabin area occurred in the early part of the century (see Social Aspects Narrative), and in the late 1960's. A number of areas around the cabin site appear to have eroded and failed, this may have been the result of mining in the early part of the century. The effects are difficult to assess since the mining method and location are unknown, and much of the area has revegetated. A cat road and some excavations were constructed in the late 1960's. Overburden material totaling several thousand cubic yards was pushed on to adjacent slopes, but it appears little of it reached any streams. The cat road covers over a mile from its intersection with Road 3680420 and Hurt Cabin. The grade of the road is steep and averages over 25 percent. There is some erosion due to the road diverting runoff water.

Information Needs: Areas need to be surveyed to determine potential sediment delivery to streams. These include harvest units in the North Fork and South Fork drainages and natural-caused landslides along the mainstem.

The extent of potential water diversions caused by roads, and the effect of recent flooding on landslide and sediment delivery rates needs to be assessed.

Management Opportunities: Roads in the watershed need to be evaluated for drainage modification or decommissioning, especially Road 3680420 and its spurs. The road drainage on the mining road into Hurt Cabin can be modified with hand tools to decrease potential for future erosion.

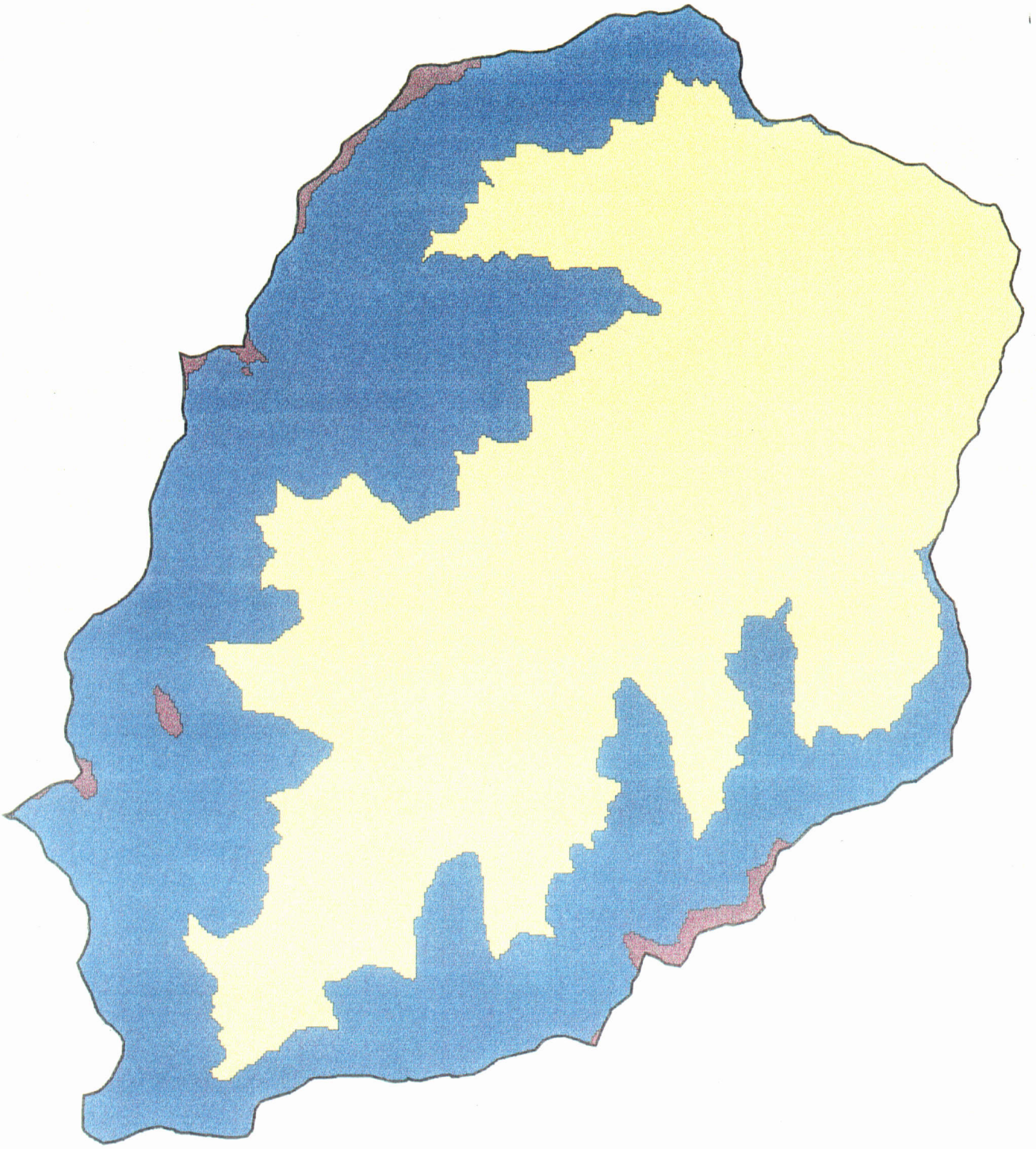
What are the dominant hydrologic characteristics and processes?

The Collier Creek watershed receives an average of 100 to 130 inches of precipitation per year (Oregon State Isohyetal map). Approximately 54 percent of the watershed is in the rain-dominated zone, and 45 percent is in the transient snow zone where rain-on-snow events concentrate precipitation to create high peak flows. About 1 percent is in the snowpack zone, near the summits of the Craggies, Collier Butte, Saddle Mountain, and Game Lake Peak (Figure 5, Elevation Zones).

Streamflow in Collier Creek has not been measured. Based on ocular field observations and drainage size, Collier Creek has approximately half the water flow of either the Silver or Indigo watersheds, and approximately the same amount as Lawson Creek. The absence of large woody material in the lower mainstem of Collier Creek suggests high energy winter stream flow. Changes in riparian vegetation and landslide activity can be seen by comparing aerial photos that began in 1940. These changes indicate that the flood events of 1955 and 1964 had major effects in the Collier watershed. As in the Lawson Creek watershed, the rain-on-snow event of 1964 had greater effects in Collier than the 1955 storm. During the winter of 1996/1997, neighboring Lawson Creek and Quosatana Creek experienced high flows estimated at a frequency of 25 years or more, with increased activity of inner gorge landslides and large increases in sediment movement and deposition. From a helicopter overflight, there was no apparent flood-related activity in the Collier watershed.

Figure 5

COLLIER WATERSHED
Elevation Zones



<2500 feet

2500 - 4000 feet

>4000 feet

October 31, 1997

Timber harvest and road construction have the potential to alter hydrologic processes, and may increase peak flows. Both harvested areas and roads are in the headwaters of Collier Creek and its tributaries, and primarily within the transient snow zone.

Harvest began in the Collier watershed in the late 1960's and continued through 1994. A total of 2 percent of the watershed was harvested prior to 1975, and another 3 percent since 1975. This amount of harvest may have affected small tributaries in the immediate harvest area, but would not have affected larger, perennial streams or the mainstem or forks of Collier Creek. Individual Watershed Analysis Areas (WAAs) with the greatest amount of harvest are 03, the headwaters of the North Fork, with 25 percent; and 07, a tributary to the South Fork, with 26 percent (Figure 6, Watershed Analysis Areas).

The overall road density for the Collier watershed is 0.7 miles per square mile, which is extremely low. Watershed Analysis Area (WAA) 08 has the highest road density at 2.6 miles per square mile. This is considered low density for affecting peak flows. However, the configuration of the roads would concentrate any effects on flows and increase the likelihood of roads and harvest increasing peak flows in this tributary to the South Fork Collier. WAA's 03 and 07 have road densities near two miles per square mile. Although this density is not high, the combined effects of roading and harvest may have increased peak flows in the tributaries that drain these WAA's.

Flood effects seen on the aerial photos appear about the same on segments of the mainstem of Collier Creek, the North Fork, and the South Fork that had harvest and road construction in the upstream basins as on those without harvest and road construction.

What are the basic morphological characteristics of stream channels and the general sediment transport and deposition processes?

The channel morphology created by the geology within the Collier Creek basin is diverse and typical of larger streams within the Kalmiopsis Wilderness. The discussion of channel morphology on the mainstem of Collier Creek is based on aerial photo and topographic map interpretation, with the addition of field notes from fisheries stream surveys on the lower three miles conducted in August, 1993.

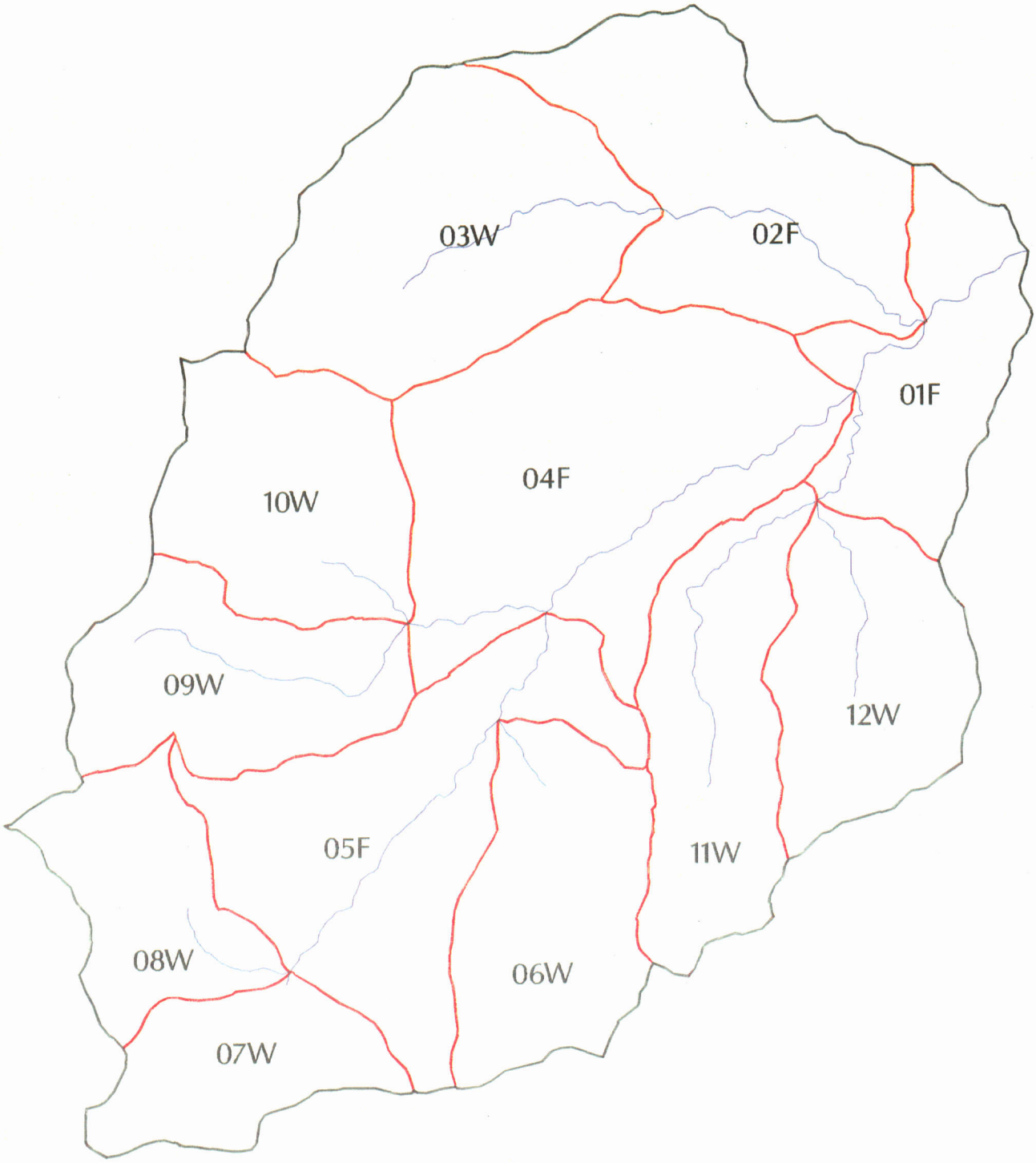
From the headwaters downstream into the Kalmiopsis Wilderness, the banks appear shallow with poorly vegetated rocky side slopes with the average gradient of 10 to 15 percent. Inside the Kalmiopsis Wilderness the gradient steepens to 20 to 25 percent. Side slopes average 50 percent, with large conifers in the riparian area. Channel morphology in this type of terrain would typically include cascades and step pools. There are occasional revegetated slides and one large earthflow containing large, live conifers.

As the stream continues down to the confluence with South Fork Collier, the frequency of partially revegetated slides increases. The terrain is steep inner gorge with a 5 to 10 percent gradient. Pools, riffles, and glides, with occasional gravel bars is the morphology typical of this terrain. From the South Fork confluence to the Hurt Cabin area, the channel is flatter and more open with a continuous band of partially revegetated slides. These slides are related to the Dothan formation and serpentinite discussed under Geology.

One segment, approximately 600 feet long, is a narrow canyon with vertical walls several hundred feet high. The stream is 15 to 20 feet wide in places with large pools to 30 feet deep. Tributaries enter the stream as waterfalls; one is 150 feet high. Below this canyon and for the next 200 feet to the confluence with the North Fork Collier is a steeper gradient, with a continuous cascade dominated by truck-sized boulders and large pools up to 7 feet deep.

igure 6

COLLIER WATERSHED
Watershed Analysis Areas



Watershed Analysis Area boundaries

Class I and II streams

October 31, 1997

What beneficial uses dependent on aquatic resources occur in the watershed? Which water quality parameters are critical to these uses?

The primary beneficial use of the watershed's aquatic resources is the anadromous fishery. Water quality parameters important to this use are temperature and clarity. There is no domestic use of water from Collier Creek.

The water clarity in Collier Creek is excellent, which is typical of streams in this area. During major winter storms sediment from banks and slides can cloud the water for short periods. Good water clarity returns quickly after these events. Sediment enters the creek primarily from naturally occurring slides throughout the stream system. Natural streambank slides occur where the creek passes through areas of ultramafic rock. Sediment from the South Fork Collier decreases water clarity in the mainstem from the mouth of the South Fork to the Illinois River. A large unnamed tributary flowing out of the Big Craggies and entering Collier Creek approximately one mile above the North Fork has exceptional clarity. The overall clarity of Collier Creek is similar to that of Silver and Indigo Creeks.

Management activities may have added to the naturally occurring sediment in the stream. Increased sediment from roads and clearcut areas (discussed in Geology and Channel Morphology) would have contained fine particles that decrease water clarity. Mining activities near Hurt Cabin left steep, unvegetated, gullied ground that may contribute minor amounts of sediment to the mainstem.

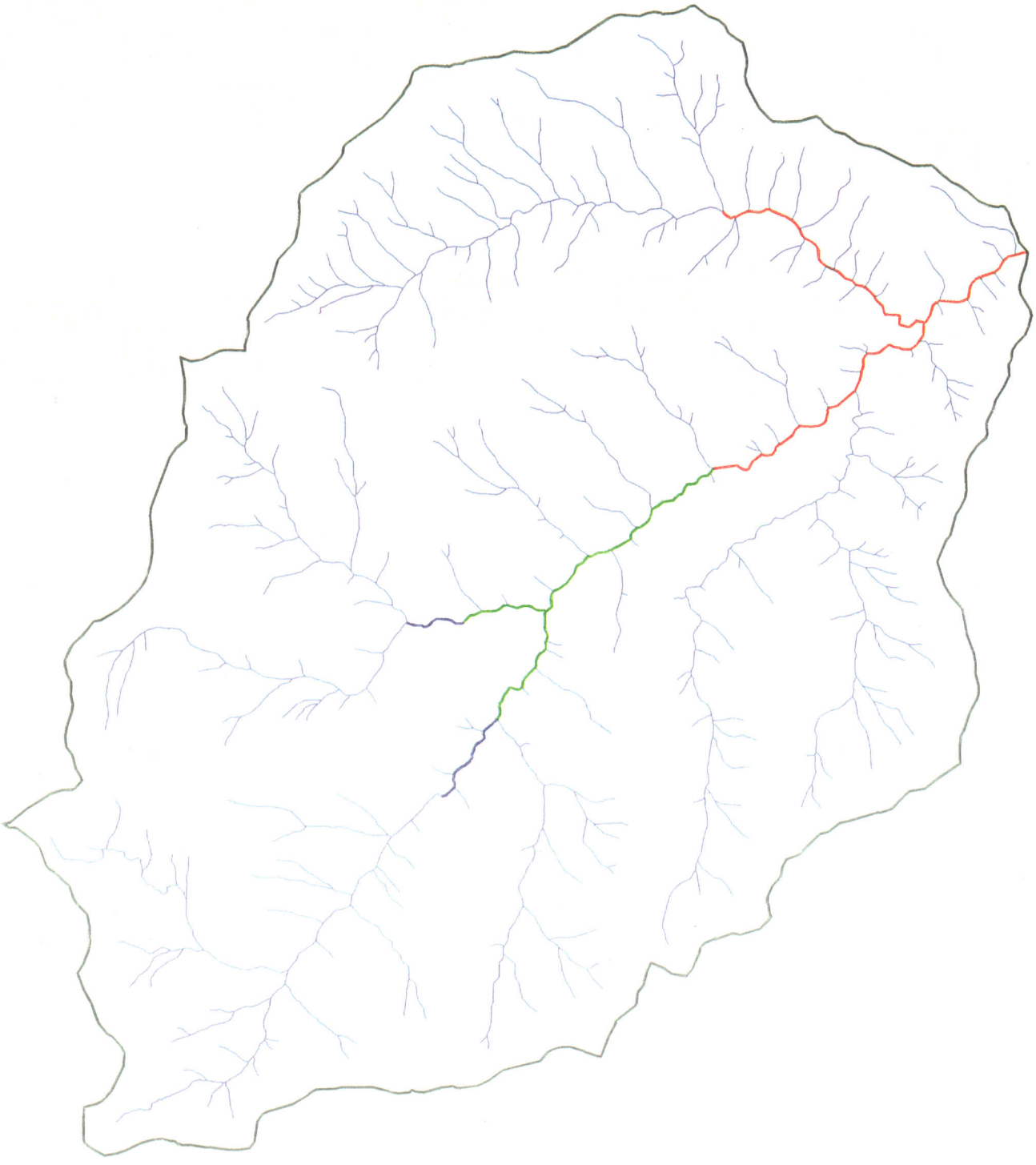
Summer water temperature in the lower reaches of Collier Creek is considered to be warmer than optimal for salmonids (Siskiyou NF Management Plan FEIS, pp. III-90 and 91). A temperature recorder placed near the mouth of the mainstem throughout the summer of 1993 recorded a 7-day average maximum of 67.3 degrees F in early August. This is typical of watersheds of this size in the western Siskiyous. Stream temperatures were probably warmer following the 1964 flood that widened riparian openings along the mainstem and forks. Open areas of channel have since grown in with alder, and in 1986 photos appear similar to 1940 photos.

The South Fork Collier Creek mainstem has been infested with *Phytophthora lateralis*, which has killed approximately 25 percent of the Port-Orford-cedar located within the riparian areas of the mainstem and one of its headwater tributaries. Loss of riparian shade because of disease is minimal as most of this mainstem contains low to moderate concentrations of Port-Orford-cedar (0-20 percent crown cover) with high amounts of Douglas-fir remaining for shade.

Management Opportunities: The roads in the watershed need to be evaluated for decommissioning, especially Roads 3680420 and 1376510. Drainage on all roads needs to be improved. Assess ongoing effects from past mining activities to determine if sediment is being introduced to streams and if there is an opportunity to reduce sediment contributions. Maintain shade on streambanks to benefit all components of aquatic resources. Risk of *Phytophthora* introduction needs to be reduced through sanitation, seasonal and year-around road closure, and other measures. Shade and large woody material needs to be maintained on streambanks. Large woody material needs to be accelerated in plantations through thinning and manual release treatments.

Figure 7

COLLIER WATERSHED
Estimated Fish Distribution



Coho, Fall chinook, Winter steelhead, Resident cutthroat, Resident rainbow

Winter steelhead, Resident cutthroat, Resident rainbow

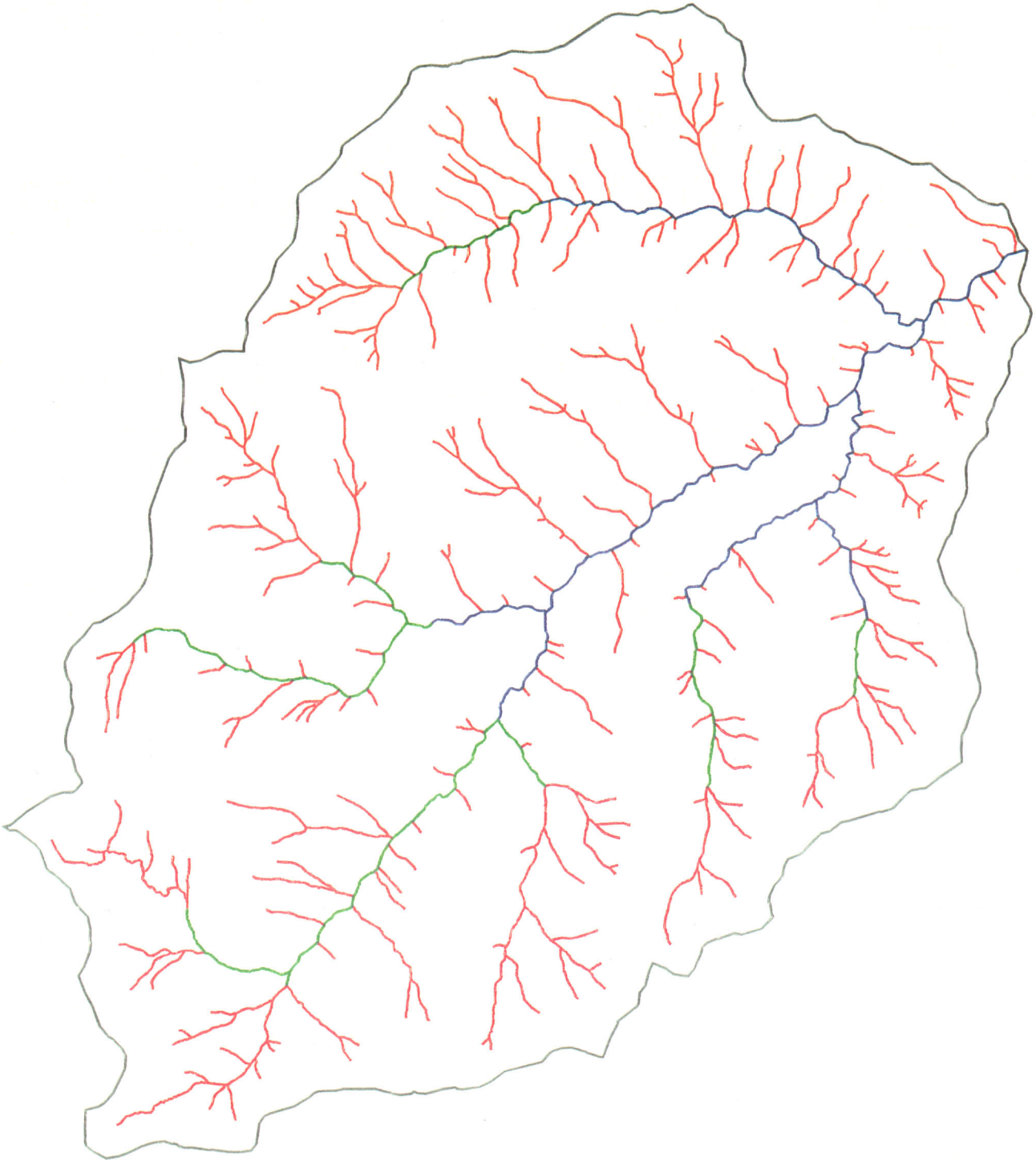
Resident cutthroat, Resident rainbow

Class I, II and III streams

October 31, 1997

Figure 8

COLLIER WATERSHED
Stream Classes



Fish-bearing streams (Class I)

Strong incluence on fish-bearing streams (Class II)

Small perennial streams (Class III)

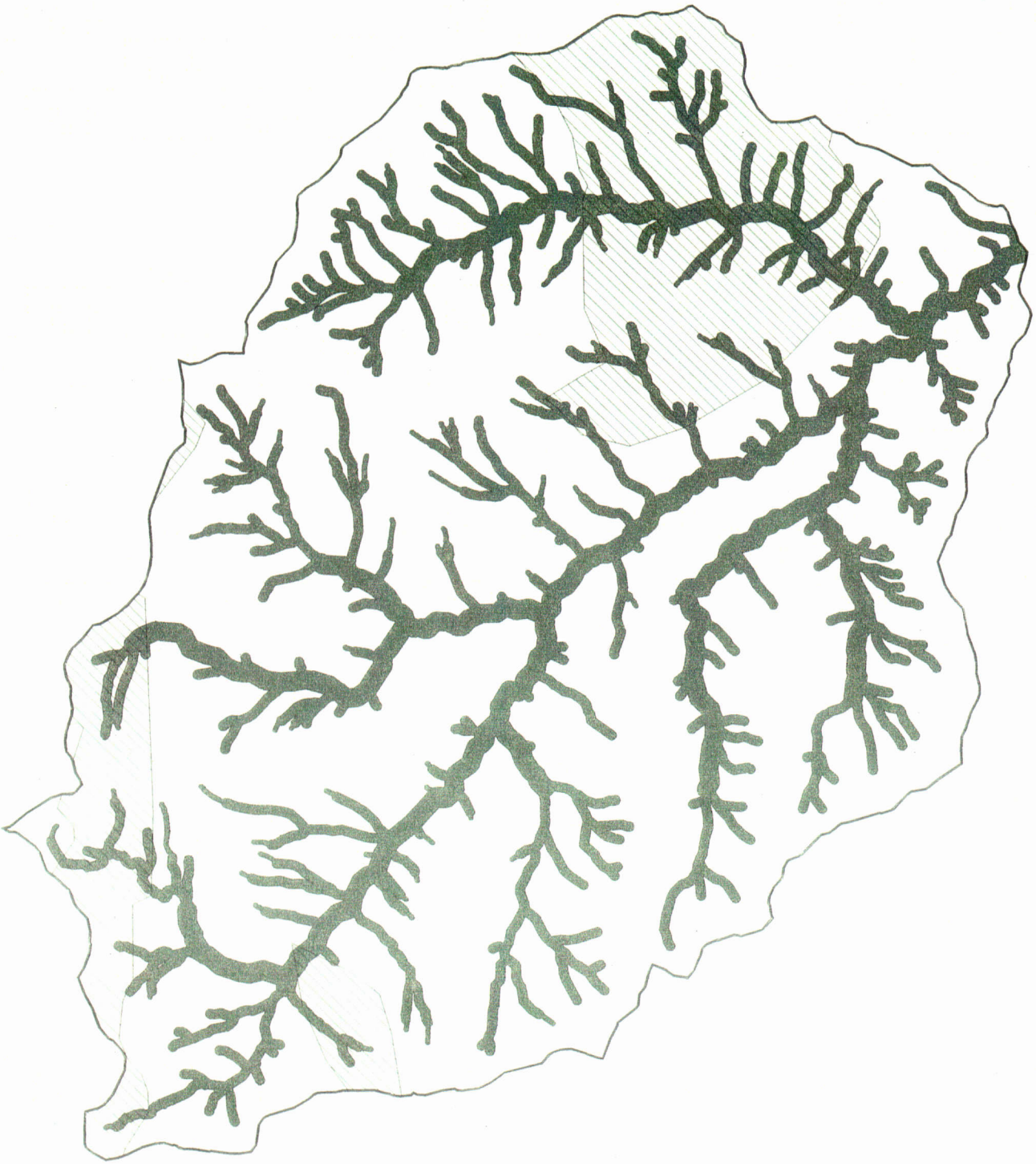
What are the vegetative types of riparian areas in the watershed?

Riparian areas in the Collier Creek watershed can be stratified into three distinct categories based on vegetative characteristics. These are conifer forest, meadows, and ultramafic riparian areas. **Conifer forest** is the most abundant riparian type in the watershed. About 83 percent of the riparian acreage in the watershed, or 4500 acres, is this type. Most human impacts have occurred in this type, primarily timber harvest and road construction. It is the most important riparian type for microclimate and wildlife dispersal. **Meadow riparian** areas have open canopies and provide little microclimate, but add to downstream aquatic diversity. Most have been encroached upon by conifers. There is very little meadow riparian habitat in the watershed, less than 1 percent. **Ultramafic riparian** stands have an open to moderately closed canopy. Therefore, seasonal and diurnal temperatures fluctuate more than in conifer riparian stands. Port-Orford-cedar is often the primary overstory component. About 17 percent of the riparian acreage, or 900 acres, is this type (See Figure 9, Riparian Reserves).

Management Opportunities: Riparian planting, precommercial thinning, and road repair or decommissioning can be used to restore altered riparian processes where applicable. Activities could be implemented within Riparian Reserves, or interim Riparian Reserve boundaries could be adjusted when riparian processes are preserved and Aquatic Conservation Strategy objectives are met. Activities and/or adjustments are more likely to occur in intermittent Riparian Reserves due to the high variability of these stream processes.

Figure 9

COLLIER WATERSHED
Riparian Reserves



Riparian Reserves for streams

Ultramafic Rocks

TERRESTRIAL ECOSYSTEM NARRATIVE

Vegetative and Wildlife Habitat Characterization

Vegetation types in the Collier watershed are variable due to: its location between the coastal face and drier inland habitats; variation in aspect, soil types, and elevation; and endemic and remnant plant species of the Klamath Province associated with ultramafic soils and isolation from glaciers. Mixed broadleaf/coniferous forest is the most common habitat type in the watershed. The plant series in the watershed are white fir, Jeffrey pine, and Douglas-fir (Figure 10, Plant Series).

Ultramafic soils underlay the northern portion and western edge of the watershed. These soils support a wide variety of conifers, including widely-spaced Jeffrey and western white pines on drier upper slopes and Port-Orford-cedar in wet areas. Big Craggies and Sourgame Botanical Areas contain especially diverse, unique species, including Brewer spruce and rare lilies.

Port-Orford-cedar in the Collier Creek watershed, along with the adjacent Lawson, Mislatnah, and Windy Creek watersheds, are relatively undiseased in comparison to Port-Orford-cedar areas from Coos Bay south to the Rogue River. The one main disease site likely originated from the end of road 1376510 near the time it was constructed in the 1970's. The disease currently is restricted to that location and downstream points (South Fork Collier and the mainstem Collier below that). One very small disease site is being eradicated through fire at the crest of Road 3680423.

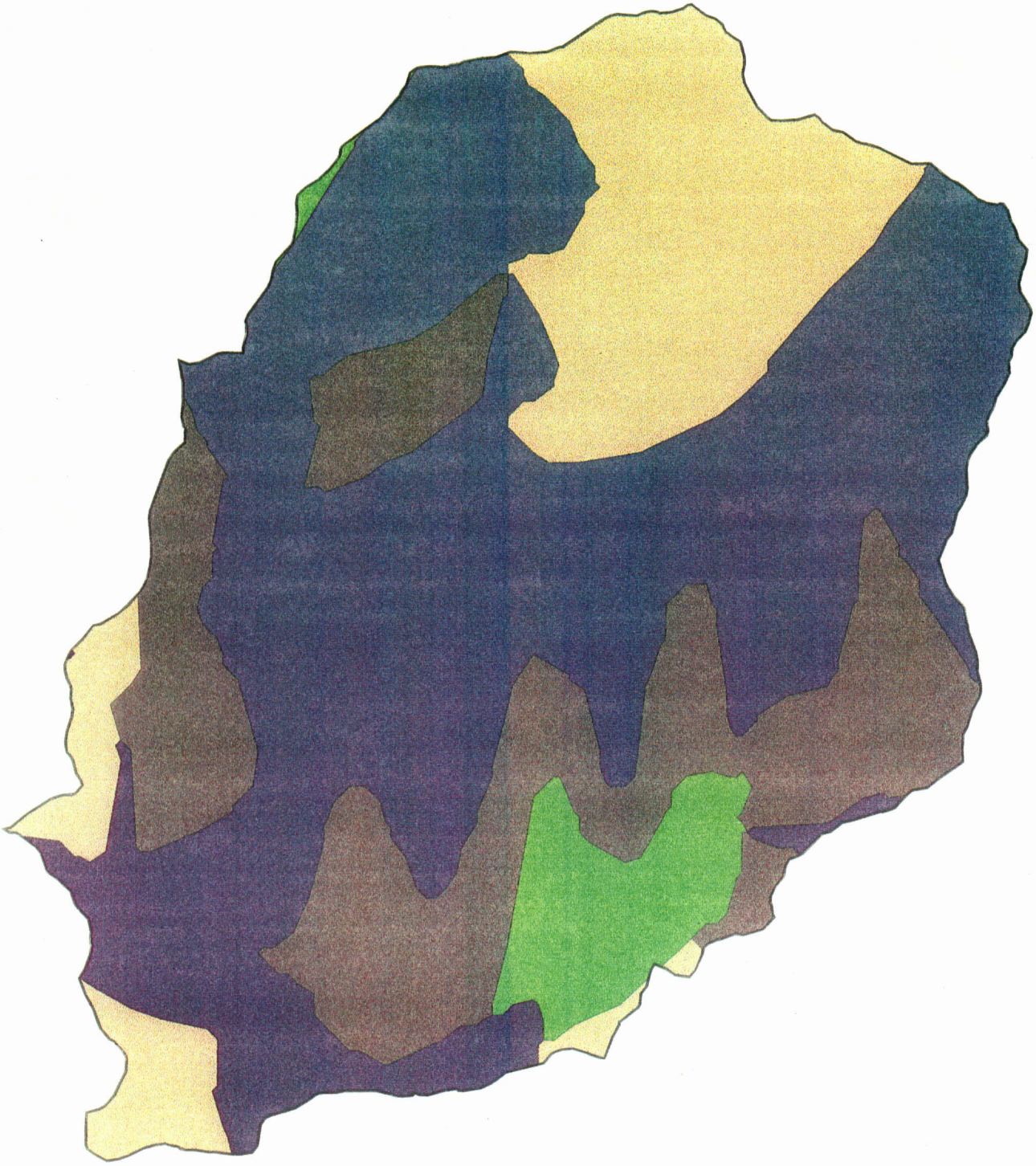
The majority of the Collier watershed is part of the Kalmiopsis Wilderness and Fish Hook/Galice Late-Successional Reserve (LSR). The western boundary of the Fish Hook/Galice LSR is the known inland extent for the range of the marbled murrelet on the Siskiyou National Forest. No murrelets have been detected in the Collier watershed.

The late-successional habitat in the watershed provides important nesting habitat for the threatened northern spotted owl. Currently 36 percent of the watershed is suitable owl habitat (mature and old-growth habitat). An additional four percent of the watershed is in mature and old-growth habitat condition but is on ultramafic soils and does not supply habitat for the northern spotted owl. This habitat is expected to increase over time since 98 percent of the watershed will be managed towards late-successional habitat under the land allocations designated by the Siskiyou LRMP, as amended by the ROD. (Figure 11, Wildlife Habitat).

Pioneer successional habitat (grass/forb/low shrub) in the watershed is found in recent (less than 15 years old) clearcut areas, meadows, open woodland areas and brushfield areas. About 26 percent (6024 acres) of the watershed is currently in this habitat. This watershed has little meadow habitat (10 acres), although one plantation has established a superb native grass species meadow. Approximately 3 percent of the pioneer habitat in the watershed is in managed stands. The majority of the existing clearcut areas that are functioning as pioneer habitat will grow out of this condition within the next 10 years. The remaining 34 percent (7,790 acres) of the watershed is in early to mid-successional forest habitat which typically is smaller diameter trees with closed canopy (Figure 12, Structural Stages).

igure 10

COLLIER WATERSHED
Plant Series



- *White fir (ABCO)*
- *Tanoak (LIDE3)*
- *Jeffrey pine (PIJE)*
- *Douglas fir (PSME)*

October 31, 1997

igure 11

COLLIER WATERSHED
Wildlife Habitat

Marten and Pileated Woodpecker Habitat

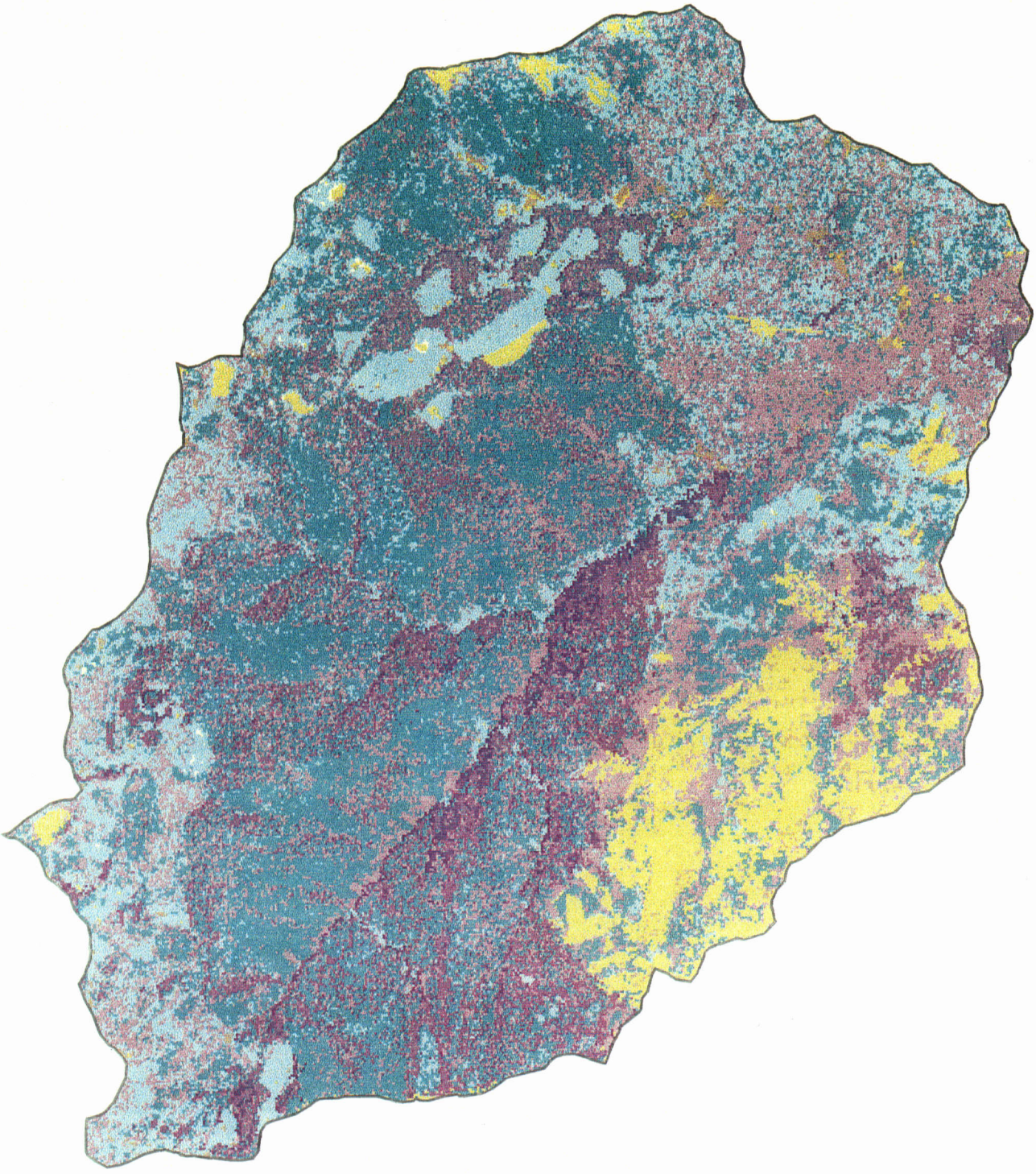
Spotted Owl, Marten and Pileated Woodpecker Habitat

Ultramafic Rocks

October 31, 1997

Figure 12

COLLIER WATERSHED
Structural Stages



- ROCK, SPARSELY VEGETATED
- GRASS
- SHRUB
- PIONEER
- EARLY SERAL
- MID SERAL
- LATE SERAL
- CLIMAX

NOTE: Map derived from Pacific Meridian Research Pixel Data

October 31, 1997

The Siskiyou National Forest was established on October 5, 1906. Henry Haefner, an early forester in the area states, "In 1909 the National Forest area was about as the Indians had left it. Nothing of importance had been done to improve the property or even find out what it contained in the way of timber or other natural resources." The early forester's duties included mapping, estimating the amount of timber and agricultural land, law enforcement, fire protection, as well as a multitude of other jobs involved with the administration of a large timberland. The rangers often built their own stations and headquarters.

An important component of the historic fabric of the watershed is the trail system. Review of the Siskiyou National Forest 1911 map shows a trail going from the Illinois River Trail at Bald Mountain through Pupps Camp and Collier Bar to Game Lake. Another trail, which first appears on the Forest map of 1933, roughly parallels Collier Creek, through the Hurt Cabin site, and ends at the Game Lake Trail near Saddle Mountain. It is likely that the former trail followed an older aboriginal route, although it is not identified by "Chief" Elwin Frye. Frye was a packer for the Forest Service and descendent of early Rogue River pioneers who developed a map of early Indian trails and village sites from oral interviews with his Indian relations. The latter mentioned trail was probably developed to access the copper mines in the Hurt Cabin area. Since ore was packed out of this area as early as 1908, the trail was probably in existence long before it was noted on the maps.

The Siskiyou National Forest 1915 map shows a Ranger Station located at Game Lake. These early day stations provided the roaming ranger on horseback, shelter, water and livestock feed. By the 1930's, fire detection and prevention had attained an important position in the hierarchy of a ranger's responsibilities. The fire lookout became the backbone of the fire prevention movement. Two lookout sites were developed in the Collier Creek watershed. Collier Butte lookout was a simple "rag camp", a crude camp that amounted to a one person pup tent often with a convenient tree which the lookout could climb several times a day to scan the landscape. By 1934, Game Lake Peak contained a true lookout. This was an "L-4" cabin, a design which allowed a person to live safely and comfortably during his seasonal mountaintop life. The "L-4" was a 14 by 14 foot frame cabin bundled in kits for hauling by mule train to its final destination. It could be easily erected atop four tall poles cut on site. The Game Lake Peak Lookout remained in active duty from 1934, when it was built, until abandoned in 1942.

The Depression of the 1930's brought an influx of people to the public forest lands. Numerous out-of-work individuals sought survival in the mountains undertaking a subsistence economy life-style. Many of these people were engaged in prospecting and mining encouraged by the revaluation of gold. The Depression Era also saw the development of the Civilian Conservation Corps (CCC), another important chapter in the history of the Pacific Northwest. Fire prevention and suppression, timber stand improvement, range improvement, soil conservation, road building and forest facilities construction were all undertaken by the CCC. The Civilian Conservation Corps provided employment and a measure of financial relief for men and their families. Even though the historic element is by far more tangible than the prehistoric, little of this cultural fabric within the watershed is known. Many of the sites in the watershed have not been formally documented or evaluated for their historic significance.

Does the watershed contain any culturally significant traditional use areas?

There is no evidence to suggest the watershed is presently used for traditional activities by local Indian groups. Recognized tribes consulted (Tolowa, Karuk, Coquille and Siletz) did not provide any additional information regarding traditional use in the watershed.

Information Needs: The complete status and number of cultural sites in the watershed are unknown. Formal site evaluations of many sites need to be conducted.

These peoples inhabited much of southwestern Oregon from the beaches to the upland forests. They occupied the region from south of Bandon, Oregon to northern California and extending up the major drainages like the Chetco, Pistol, Rogue and the Illinois Rivers. The bands were numerous and the locations diverse.

According to an 1854 map and census compiled by J.L. Parrish, Indian Agent for the Port Orford District, the watershed was utilized by a Tututni band called the Shasta Costa (also called the Chasta Costa or Shas-te-koos-tees). The 1854 census by Parrish reported the "Shas-te-koos-tees" numbered 146 individuals with their major "chief" being Yah-chum-see. The map compiled by Parrish attempted to locate the approximate territories of the native peoples. According to this map, the Shasta Costas occupied the area surrounding the Rogue River from the Illinois to Paradise Bar and up the Illinois River. Parrish describes their major village as "being on the north bank of the Rogue River, nearly opposite the confluence of the Illinois River." However, it is known today that a number of smaller villages existed, such as at Oak Flat and other locations scattered along the two rivers.

Generally, the Tututni were hunter-gatherers, subsisting on a diet consisting primarily of salmon and acorns and supplemented by a variety of game and collected food items. A seasonal round of activities was practiced which is characterized by small, dispersed hunting and gathering groups which would traverse the upland areas in search of game, plants, nuts, berries and other raw materials during spring and summer months. Temporary camps in the uplands consisted of grass covered, brush or animal hide shelters. Fall signalled the time for communal fishing and acorn gathering and the occupation of winter villages by multi-family groups. In winter, these people would subsist largely on stored resources collected during the summer and fall.

Prehistorically, the stream and river corridors were used as resource procurement areas for shell and anadromous fishes. Upland areas were seasonally used as procurement areas and as travel routes. The Collier watershed was likely used as a dispersal/procurement area, as described above, with the winter villages located in the lowlands along the Illinois River.

A small number of prehistoric sites and isolated finds have also been discovered along the ridge forming the divide between the Collier Creek and Horse Sign Creek, in the vicinity of Game Lake. This may indicate the presence of a travelway between the Illinois River, Game Lake and the Pistol River drainage. The Game Lake area, which is immediately adjacent to the Collier watershed, was probably used for a summer camp.

Differences in culture, life-style and economic subsistence between the native peoples and the newly arrived Euroamericans inevitably led to conflicts. By the end of the Rogue Indian Wars in 1856, the remaining population of aboriginal people had been removed to the Grand Rhonde and/or the Siletz reservations. Some individuals escaped relocation or were allowed to return to their homelands, mainly because of intermarriage with the white settlers. Additionally, some individuals returned to their homelands after the enactment of the Dawes Act which opened public domain allotments to Indian peoples. In 1938, twenty-three allotments were in existence in Curry County.

Glimpses of these people and their way of life have been made known to us through ethnographic information, the journals and manuscripts of the early white explorers and settlers, records and accounts from the Rogue Indian Wars and the archaeological record as it pertains to the Northwest Coast Culture area. The ethnographic information that exists for these people was acquired from research conducted at Siletz and Grande Rhonde reservations and the Smith River rancheria. However, by the time the interviews or ethnographic sketches were compiled in the late 1800's and the early part of this century, most sources of information were already a generation removed.

Management Opportunities: Prescribed fire can be used to achieve the resource objectives for encroached meadows, special and unique habitats, protection of Late-Successional Reserve (LSR) and other land allocations.

As funding is made available, a fire management plan can be completed to determine conditions where prescribed fire can be used in the LSR and in the watershed. The fire management plan will incorporate the objectives and conditions for the LSR as described in the Southwestern Oregon LSR Assessment. The LSR assessment recognizes that fire can be used for the enhancement of fire-dependent species and prevention of stand replacement fire events. These objectives can be met using either natural-caused or management-ignited prescribed fire under the proper conditions. Generally, any fire in the LSR or in the watershed will need to be of low intensity, with an emphasis on the retention of snags and large woody material. Additional funding will be necessary to complete environmental assessment work and implement the prescribed fire projects after the fire management plan is completed.

What are the consequences of fires originating within the Kalmiopsis Wilderness escaping into the surrounding Late-Successional Reserves, and what measures can be taken to reduce potential impacts to LSR values?

For more than 50 years, natural fire starts have been suppressed at small sizes with the assistance of the climatic conditions associated with lightning events. The Silver Fire which burned into the Kalmiopsis Wilderness is the only exception to this. Although rapid wildfire suppression is generally the management direction to be followed, the Kalmiopsis Wilderness Fire Management Plan does allow fire to burn under prescribed conditions. The majority of stands throughout the Wilderness have evolved for the past half century without fire and fire effects. Fuel loading on the forest floor has accumulated during this time. The potential of a wildfire originating in the Kalmiopsis Wilderness, and subsequently escaping to the surrounding LSR is a recognized threat.

The Kalmiopsis Wilderness Fire Management Plan allows natural prescribed fire to burn under certain conditions. The plan also recognizes that fire may burn beyond the Wilderness boundary into the surrounding LSR under certain conditions. Prescribed fires from management ignitions shall be allowed in the Wilderness only to reduce the risks and consequences of wildfires within or escaping from the wilderness. Within the Collier watershed, the topographical features between the Wilderness and LSR offer little resistance to the escape of a low to moderate intensity fire originating in the Kalmiopsis WIlderness. As a result, the likelihood of a fire escaping from the Wilderness and into the LSR is high. If the fire was of low intensity the results of such an escape would be beneficial to LSR values. Conversely, these same variables could allow a fire to burn with more intensity generating detrimental effects to LSR values.

Information Needs: A fuels inventory in both the LSR and in the Kalmiopsis Wilderness could be completed.

Management Opportunities: The Kalmiopsis Fire Management Plan has provided for management-ignited prescribed burning in the Wilderness. This would aid in the reduction of risks and consequences of a lightning-caused fire escaping the Wilderness under conditions not acceptable in the adjacent LSR. Additional funding will be necessary to complete Environmental Assessment work and implement the prescribed fire projects after the fire management plan is completed.

A major fire event was reported by sailors off the Southern Oregon coast in 1864. Although not supported by solid documentation, this fire was said to be of a gigantic magnitude, reaching from the California border to north of the mouth of the Rogue River. The origin of several stands within the watershed date back to this time.

Recorded fire history documents two major fires burning approximately 6,500 acres or 28 percent of the drainage between 1927 and 1930. One fire appears to have been human-caused and related to the mining activities around the Hurt Cabin area. The other fire was lightning-caused, and burned from the south side of Collier Creek and into the Craggies. In 1987, the Silver fire entered the Collier Creek drainage, and burned approximately 4,300 acres, 4,000 acres of this fire overlapped the earlier fire. Only 600 acres of these fires were outside the Kalmiopsis Wilderness area.

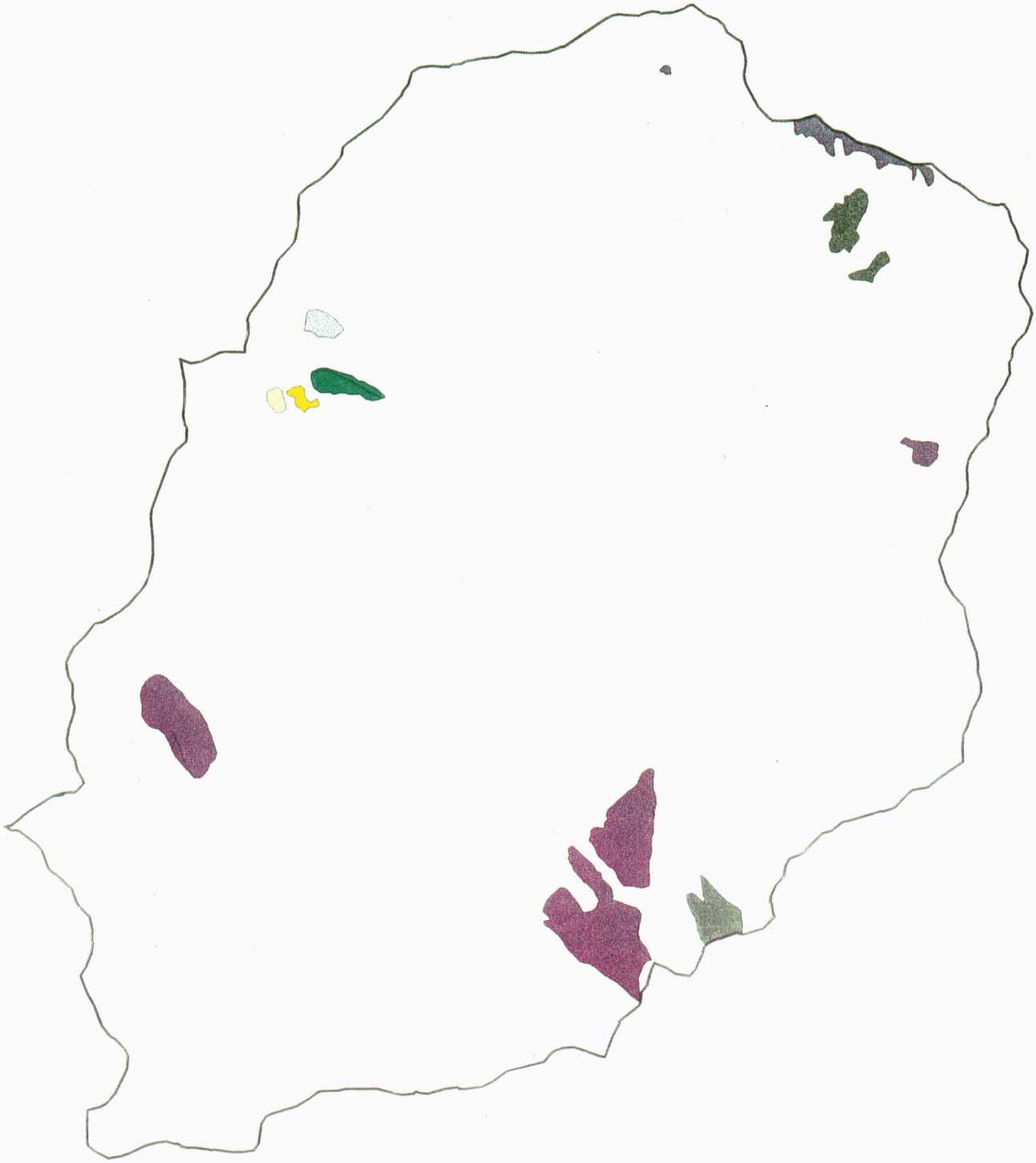
While record searches indicate that there are data gaps (and other fires may have occurred), few other wildfire incidents have been recorded in the watershed. Several human-caused fires were recorded in the 1910's. One fire originated in the Game Lake area and burned approximately 240 acres in the Collier watershed. The other two fires were smaller than 20 acres each. Two lightning-caused fires occurred in 1992. Both were suppressed at around 5 acres each. One other aspect of recorded fire events was the use of prescribed fire for slash disposal in managed stands. This activity occurred on approximately 4 percent (883 acres) of the Collier watershed.

Up until the 1920's and 1930's most fires were simply monitored, as effective fire suppression resources and tactics did not exist. From this time forward, fire suppression capabilities have become more effective and fire suppression policies mandated all fires be controlled. As a result of fire suppression, the majority of stands in the watershed have evolved for the past half century or longer without fire being a part of the forest disturbance regime. The only use of prescribed fire in the watershed has been slash treatments applied to harvested areas. Overall, fuels have been accumulating on the forest floor. Areas that were historically or pre-historically burned for human needs have become encroached upon by surrounding vegetation. Unique native plant species, dependent on the return of fire, are receiving competition from non-native and sometimes noxious vegetation.

Presently, lightning presents the greatest threat of wildfire in the Collier Creek area. Other activities such as recreation, timber harvest, and fuels treatment may contribute to some risk of human-caused fires. Along with the lightning events, the area is subject to other weather events which favor fire during the summer months. Summer temperatures can range from 70 degrees F to 90 degrees F at the higher elevations and well over 100 degrees F at the lower elevations. Ridge winds occur at the higher elevations and the lowest points in the drainage receive winds from the main Collier Creek drainage and the Illinois River canyon. The entire watershed is subject to the diurnal wind influence that is created by heating and cooling each day. During the late summer and into the fall, atmospheric conditions can bring hot and dry east winds to the area. These winds generally over-power the local winds, move at unusually high velocities, and maintain very high temperatures and low humidities for 24 hours a day. These east wind events are generally short lived, lasting from one to three days. However, they can happen several times during the season, sometimes occurring right before the first heavy rains of the fall.

Figure 13

COLLIER WATERSHED
Special Wildlife Sites

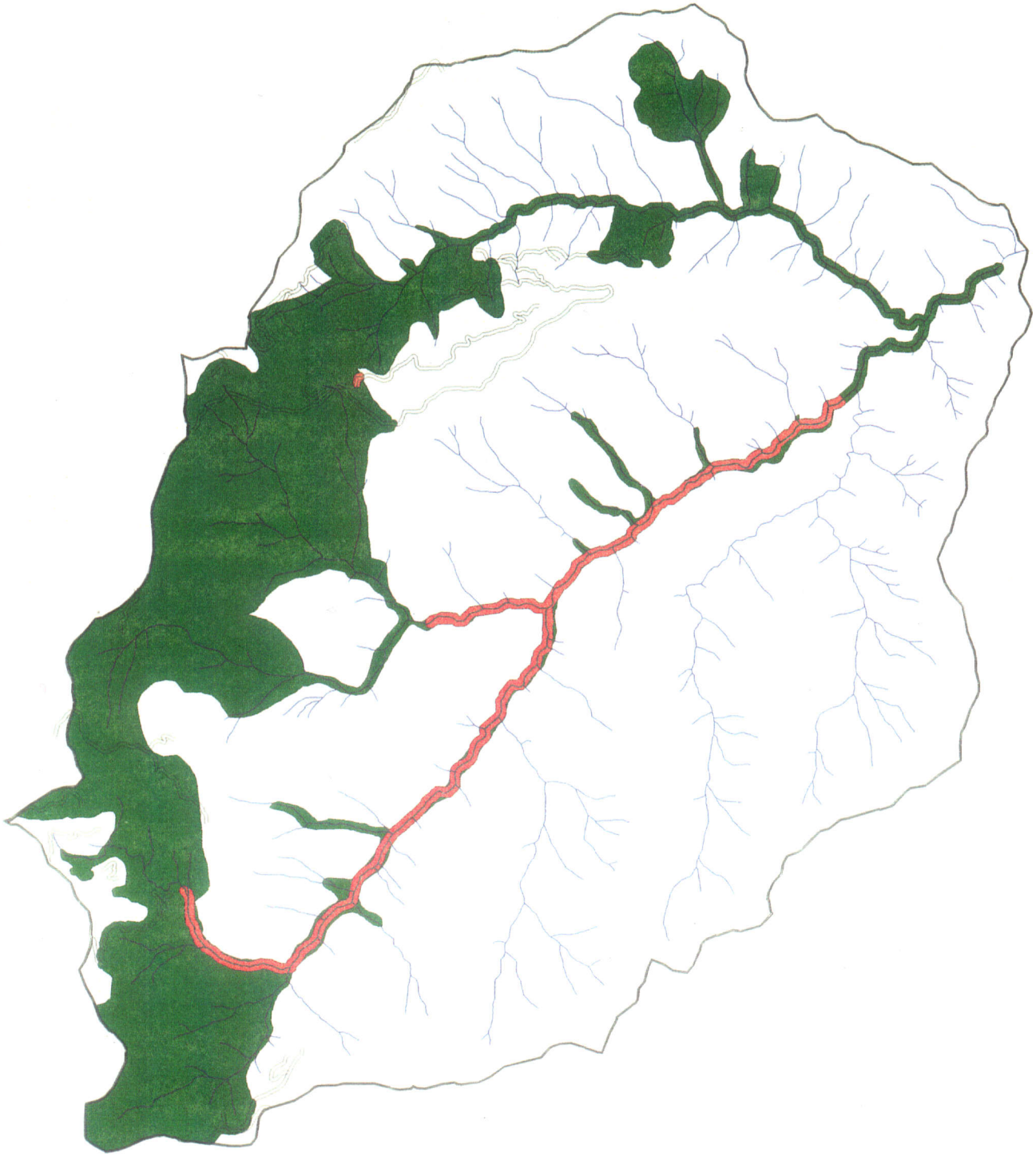


- *Dispersed Habitat*
- *Lakes, Ponds, & Bogs*
- *Meadows, Prairies, & Openings*
- *Rock Sites*
- *Botanical*
- *Meadow - Recommended for MA-9*

October 31, 1997

Figure 14

COLLIER WATERSHED
Port-Orford-cedar



Port-Orford-cedar

Phytophthora lateralis

Streams (Class I, II and III)

Existing Roads

October 31, 1997

Port-Orford-cedar can be both a pioneer and a climax species in the same stand. It retains the ability to respond after dominants die. Port-Orford-cedar reproduces more effectively in shade than associated conifers, except for western hemlock and sometimes white fir. In old stands, Port-Orford-cedar seems as tolerant of fire as Douglas-fir. Older trees develop thick bark and survive large, deep, fire scars. The wood has a high resistance to decay and insects. It can be especially valuable as large wood in riparian areas, remaining in streams longer than equal-sized logs of associated species. It can also have lesser value for cavity-nesters due to its decay resistance.

Port-Orford-cedar timber brings higher prices than almost any other conifer in the United States due to log export to Japan. Port-Orford-cedar boughs are used commercially for floral arrangements and have been collected along the road system in the watershed.

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

The Collier watershed, along with adjacent Mislatnah, Lawson and Windy Creek watersheds, is a transition area from heavier disease infestations to the north and less diseased areas to the south. The disease was apparently introduced at the end of Road 1376510 with the 1972 Windy Collier Timber Sale. It is estimated that 25 percent of the Port-Orford-cedar below the 1376510 road, located in the South Fork drainage, has been infected with *Phytophthora lateralis*. In the entire watershed, about 2 percent (385 acres) of the area where Port-Orford-cedar is a stand component has some occurrence of root disease. The North Fork, portions of the main fork, and many tributaries remain uninfested.

Port-Orford-cedar root disease zoospores are mobile in water. Resting spores are long-lived in organic soil. One introduction of the root disease may spread to riparian stands in the watershed below. Natural uphill spread of root disease is slow. Generally, the acreage within 200 feet each side of the streamcourse contain the higher concentrations of Port-Orford-cedar. Areas upslope generally have lower concentrations. In this watershed, approximately 5 percent (1,210 acres) of the area containing Port-Orford-cedar occurs within 200 feet of uninfested stream and below the existing road system. Approximately half or 630 of these streamside acres lie below roads that are currently closed seasonally.

Risk of disease spread

In comparison to watersheds to the north, there are several reasons for less disease in Collier. There is less intensive heavy equipment activity; there is distance from major disease centers on the north side of the Rogue River; and a fair portion of the watershed is closed by snow in the wet season.

Most past spread, and future risk, lies in intensive activity such as unwashed heavy equipment operation in the wet season. General road traffic can also introduce the disease over long distances. Mud has been observed to stay on vehicles for trips over 30 miles, including trips on 15 miles of four-wheel drive road (Forbes, 1993). The highest risk of spread by general road traffic is during the fall rainy season. Hunting and collection of special forest products, including mushrooms, occurs during this time. People involved in these activities often use four-wheel-drive vehicles that can carry mud which transports the disease.

The Collier watershed has a fairly large amount of uninfested Port-Orford-cedar and a relatively small amount of road mileage. South Fork Collier Creek, North Fork Collier Creek, and the mainstem areas are about equal in disease-risk. Road 3680420 has four to five tributaries of mainstem Collier Creek below it, each about one mile in length, that are undiseased and contain moderate to high amounts of Port-Orford-cedar. Tributaries below the junction of Roads 3680420 and 3680423 flow down to uninfested stands within the Kalmiopsis Wilderness.

Sanitation treatments and seasonal and year-around road closure can be effective in maintaining the uninfested populations. Seasonal closure of critical roads in the watershed and removal of Port-Orford-cedar trees along roadsides have been implemented. A programmatic strategy of sanitation removal of Port-Orford-cedar and year-around and seasonal closure of critical roads is being considered. Pre-project washing of equipment and dry season operation are the preferred project-level control measures.

To estimate the amount of deer and elk habitat, the amount and quality of forage and cover was analyzed. GIS estimated number of acres of pioneer habitat (forage), early seral habitat (hiding cover), mid-seral habitat (thermal cover), and late and climax successional stages (optimal cover). Table 5 lists the acres of each type of habitat estimated for the Collier watershed. (See Figure 12- Structural Stage.)

Table 5. Elk Habitat Type in 1993

Habitat Type	Acres	Percent of Watershed
Optimal Cover	2988	13
Thermal Cover	5568	24
Hiding Cover	7940	35
Forage	6024	26

There are 6,024 acres of pioneer habitat in the Collier watershed. Of the pioneer habitat, only 10 acres are in meadow and 196 acres are in clearcut harvest areas from the 1980's. The remaining forage acres are regeneration from stand replacement events resulting from the 1987 Silver Fire or ultramafic influenced areas with grass growing under scattered trees. This watershed has a higher component of forage area than the adjacent Lawson or Quosatana watersheds. Although the Collier Watershed meets Siskiyou LRMP Standard and Guideline 4-11 which states, 20 percent of the watershed should be maintained in forage areas, many of these areas are low quality. Forage in the ultramafic influenced areas generally dries out early in the season. Historic and future elk habitat estimates have not been completed in the area.

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

Management Opportunities: Existing snags in the watershed should be retained, except those that are hazardous along roads. Snag pockets need to be protected during management activities and snags created where needed to meet the Siskiyou LRMP as amended by the ROD. Forage seeding could be used where timber harvest occurs to enhance forage for elk. Areas of exposed soil can be seeded with native species.

Neotropical Migratory Birds

The large blocks of relatively unfragmented blocks of habitat within the Collier watershed provide good nesting sites for most neotropical migratory birds. Neotropical migratory birds are particularly vulnerable to parasitism by brown-headed cowbirds. Cowbirds are not known in the Collier drainage. Cowbirds are particularly attracted to human habitation and cattle, neither of which occur in the watershed. The high elevation areas provide good habitat for unusual species on the Forest including Cassin's finch, mountain chickadee and fox sparrow (stephensi subspecies).

Indicator Species

Bald Eagle and Osprey

Bald Eagle and Osprey utilize habitat corridors along major rivers, sometimes nesting up to one mile (occasionally further) from rivers in large green trees or dead trees. Existing bald eagle and osprey sighting data in the Collier watershed was reviewed and there are no nests located in the watershed. As a result, the contribution of the Collier watershed to the viability of bald eagle and osprey is determined to be insignificant.

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

The northern spotted owl represents over 150 other wildlife species which use late-successional forest habitat for all or part of their life cycles (Guenther and Kucera, 1978, Brown, 1985). Spotted owls are strongly associated with dense mature and old-growth Douglas-fir forests. These habitats provide the structural characteristics required by the owls for food, cover, nest sites, and protection from weather and predation. Pileated woodpeckers and pine marten represent the composite needs of over 160 wildlife species which utilize mature forest (Guenther and Kucera 1978, Brown 1985). Existing sighting data from the Wildlife Observation (WILDOBS) database was analyzed. All three indicator species are known to be in the watershed. Ninety-eight percent of the watershed is in management allocations that will allow late-successional habitat to be maintained and developed over time. Due to this, it appears late-successional habitat will be sufficient in the future. No efforts to calculate historical and future levels of habitat for these species will be accomplished with this watershed analysis. Existing levels of spotted owl and pileated woodpecker/marten habitat were calculated (Table 4). Mature and old-growth seral stages were used for pileated woodpecker and marten habitat. For the spotted owl analysis, mature and old-growth seral stages on ultramafic soil types were not included (Figure 11, Wildlife Habitat).

Table 4. Spotted Owl, Pileated Woodpecker and Pine Marten Habitat

	Spotted Owl Habitat		Pileated Woodpecker/Marten Habitat	
Year	Acres	Percent Watershed	Acres	Percent Watershed
1993	8276	36 percent	9065	40 percent

Spotted owl activity centers and home range areas have been relatively unimpacted by management activities in the Collier watershed. This watershed is a low priority for Late-Successional Reserve treatments to enhance spotted owl habitat.

Management Opportunities: Cultural resource surveys will precede all ground disturbing projects. All sites discovered will be documented and added to the Forest inventory. The significance of inventoried sites shall be evaluated for eligibility for the National Register of Historic Places. Suitable cultural resource properties may be interpreted for recreational use and educational benefit of the general public. There is an opportunity for partnership with the recognized tribes in the development of recreational and educational programs.

What are the major recreational uses and where do they occur in the watershed?

The earliest known recreational activities in the Collier watershed were horseback riding and hiking on trails, followed by motorized recreation on jeep trails and mining roads (Sorenson, Stansell, and Shroeder 1997). Motorized recreation in the watershed increased in the 1960's through the 1980's, as roads were constructed to provide access for timber sales. Today, recreational activities include leisure driving, hiking, hunting, dispersed camping, botanical study and wildflower viewing, noncommercial collecting of special forest products, and snow related activities.

The Collier watershed provides both roaded and unroaded recreation opportunities. The primary roads in the watershed are Roads 1376 and 3680. These roads provide access to important recreation sites, Snow Camp Lookout and Game Lake Campground, although both sites are outside the watershed. The remaining roads in the watershed are single-lane gravel roads that serve recreation and administrative traffic or primitive non-system roads. Many of the recreational activities that occur in the watershed are connected to the existing road system. There is some moderate use of the roads during summer holidays and weekends as well as hunting season.

There are no developed recreation facilities in the watershed. Dispersed camping occurs at a variety of locations, primarily during hunting season. In the winter, the roads are closed at the higher elevations due to snow. There are no traffic counters on these roads, so the exact amount of use is not known, but it is expected to be low. All roads in the watershed, except Road 3680, have existing or proposed year-around or seasonal closures for Port-Orford-cedar protection.

Hiking occurs primarily along the two developed trails, Pupp's Camp Trail #1174 and the Hurt Cabin Trail #1178. The Pupp's Camp Trail runs from Game Lake to Collier Bar on the Illinois River through the Kalmiopsis Wilderness. During the summer months and at low flows, hikers can ford the Illinois River and connect to the Illinois River Trail (#1161 and #1182). Collier Bar is often used for camping by hikers and rafters travelling down the Illinois River. The Pupp's Camp Trail probably receives much higher use than the Hurt Cabin Trail, although its use would be considered light. The Hurt Cabin Trail accesses an area that was mined in the early 1900's (See Key Question on Historical Uses). A cabin was built at the site but nothing remains today. The trail is steep and ends at the site, approximately a half mile from Collier Creek.

Local recreationists take day hikes to the top of Collier Butte. It is accessed by hiking Road 3680401 and following a mining road to near the summit. The final distance to the summit is through manzanita brush. An occasional hiker accesses the Green Craggie from the end of the Road 1376462. However, this use is extremely limited due to the lack of a trail and the amount of brush encountered.

With the exception of the 3680420 road system, the roads are along the edges of the watershed. The area near the Collier mainstem, the lower portions of the North Fork and South Fork and the Kalmiopsis Wilderness portion of the watershed are largely unroaded and remain natural in appearance. The watershed can be stratified into three recreational opportunity classes, based on the Forest Service Recreation Opportunity Spectrum (ROS) classification system. In the vicinity of the road system, the ROS classification is Roaded Natural. From this area across the Collier mainstem and up to the vicinity of the Big Craggies, the ROS classification is Semi-Primitive Non-Motorized. The area near the Big Craggies is classified as Primitive.

What commodities can be produced from the watershed?

Timber

Timber harvest has occurred on approximately 1,135 acres since 1965, or 5 percent of the watershed (Table 6, Acres Harvested in Five-Year Periods, Figure 14, Managed Stands Map). With 72 percent of the watershed allocated to Wilderness and 23 percent allocated to Late-Successional Reserve, future programmed timber harvest in the watershed is very limited. Programmed timber harvest could occur in matrix, or in retention and partial retention allocations if visual objectives are met. This represents approximately 1.5 percent of the watershed.

Table 6. Acres Harvested in Five-Year Periods.

Year of Harvest	Acres	Percent of Watershed	Percent of Watershed excluding Wilderness
65-69	346	2	5
70-74	188	1	3
75-79	277	1	3
80-84	189	1	3
85-89	101	<1	2
Total	**1135**	**5**	**17**

Information Needs: Stands in Late-Successional Reserve that would benefit from commercial or precommercial thinning to improve LSR conditions need to be determined.

Management Opportunities: The objective of the Late-Successional Reserve (LSR) is to protect and enhance conditions of late-successional forests. Limited stand management is permitted if treatment improves or hastens stand development toward mature conditions. Currently, no specific stands have been identified where commercial thinning would benefit LSR conditions. However, stands 40 to 80 years old that may exist now or in the future may benefit from this treatment. LSR conditions may also benefit by precommercial thinning and manual release of plantations. This would accelerate growth and development of early seral stands in the watershed.

Commercial timber harvest can occur in matrix or in retention and partial retention land allocations if visual objectives are met.

Commercial timber harvest may result from salvage and sanitation proposals for Port-Orford-cedar. This would occur in or near riparian reserves where present and future coarse woody debris needs are met and other Aquatic Conservation Strategy objectives are not adversely affected.

Some commercial timber harvest may occur as a result of removing trees that have encroached on meadow habitat.

Timber salvage could occur if hazard trees adjacent to open roads are identified or if catastrophic events occur, such as stand-replacement wildfires or major wind storm events.

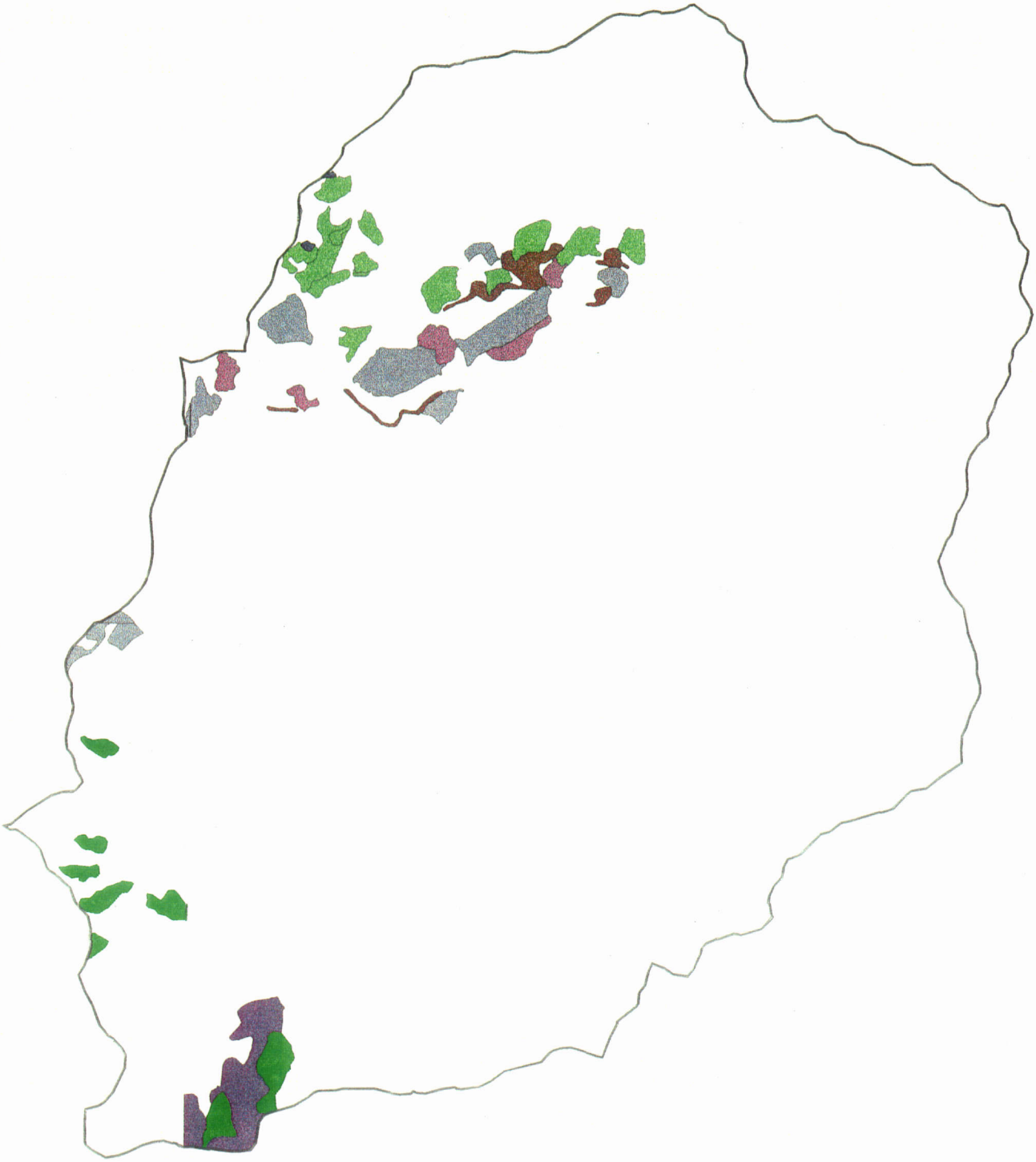
Grazing

No historical grazing allotments are known in the watershed. Range capacity areas from 1912 to 1920 were mapped, but records are incomplete and it is not known if they were actually used. A 1912 account by John Adams, a Game Warden, mentioned travels through the watershed on horseback, but no mention of cattle or sheep.

In the 1960's and probably before, cattle grazed at Snow Camp Meadow which is in an adjacent watershed (Sorenson, Stansell, and Schroeder, 1997). Although it is possible that cattle could have ranged to the Sourdough Camp and Game Lake areas from Snow Camp Meadow, there are no documented sightings or information. Currently, there are no allotments in the watershed and none are planned at this time.

Figure 15

COLLIER WATERSHED
Managed Stands



- *Harvested 1965-1969*
- *Harvested 1970-1974*
- *Harvested 1975-1979*
- *Harvested 1980-1984*
- *Harvested 1985-1989*
- *Harvested 1990-1994*

October 31, 1997

Which roads are needed for future access in the watershed and which roads need treatment to protect the resources of the watershed?

There are 23.8 miles of road identified in the Collier watershed. Of this, 17.7 miles are currently open including 4.8 miles that are open only seasonally for Port-Orford-cedar protection. The roads that are closed include: 4.1 miles of non-system roads that are old logging spur roads or mining roads no longer accessible; 0.3 miles of system road closed for Port-Orford-cedar protection; and, 1.73 miles of system roads that have been closed due to road damage, or the roads have grown in with brush and trees and are no longer accessible.

In response to a shrinking road maintenance budget, the Forest completed a Network Analysis in Spring, 1994 to determine which roads were needed to continue land management activities and to provide general public access. These roads were classified as either primary or secondary roads. Primary roads are the main roads in the watershed. For the Collier watershed, they are Roads 1376 and 3680 and total 2.2 miles. The secondary roads are Roads 3680420 and 1376460 and total 3.2 miles. The remaining roads are candidate roads and total 14.3 miles. These roads may remain open or may be closed to vehicular traffic as need, funding and priorities allow. Currently there is a proposal that would close all open roads in the watershed for Port-Orford-cedar protection, either year-around or seasonally with the exception of Road 3680, (See Figure 16, Road Classification Map).

In the future, there may be proposals to close certain roads for watershed protection. Treatments available include decommissioning and stormproofing. Decommissioning is a type of road treatment that makes the road unusable by vehicles, but can provide greater protection to the streams and resources in a flood event. Examples of decommissioning include pulling culverts, pull back of road fills, ripping of the road surface. Any one or all of these treatments could be used to decommission a road. Stormproofing is a road treatment where outsloping, ditches, and/or waterbars are placed to control water and lessen the amount of sediment that would flow into a stream during a major storm event. Vehicular access is generally maintained with this type of treatment.

The Network Analysis was used as a starting point to further assess the roads in the watershed from a variety of resource perspectives. These include: sediment source potential, effect on peak flow, proximity to critical reach, wildlife concern, proximity to Port-Orford-cedar (POC), level of recreation use, and level of potential or actual administrative and commercial use. Each road was rated with a high, moderate or low factor on how that road might affect the resource. Finally, a future treatment option and any comments were recorded. If the effects to a resource were not known, a rating of "Evaluate" was listed. Many of the "Proximity to critical reaches" had this evaluation. The actual rating will be determined after stream survey notes are analyzed in Winter, 1998.

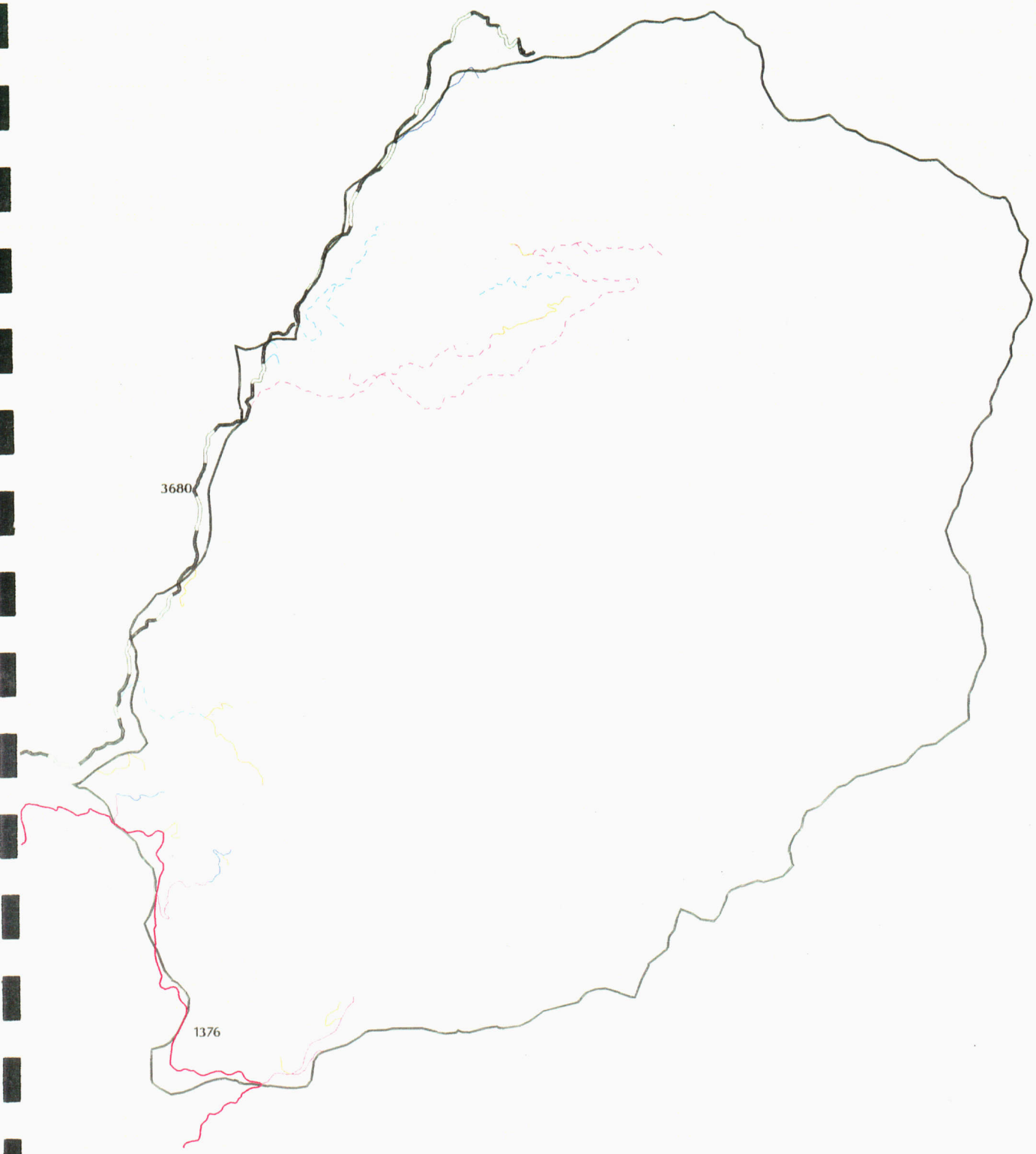
Table 7 describes the road assessment for the watershed.

Information Needs: The roads in the watershed need evaluation to determine the necessary treatments for watershed protection and restoration.

Management Opportunities: Roads 1376 and 3680 will need continued maintenance. Many roads in the watershed are in need of treatment for watershed protection and restoration. Specific treatments, whether it be road maintenance, stormproofing, or decommissioning, need final determination before implementaion can take place.

Figure 16

COLLIER WATERSHED
Road Classification



- *Primary roads*
- *Candidate roads*
- *Closed system roads (Non-POC)*
- *EXISTING POC Year-round Closure*
- *PROPOSED POC Year-round Closure*
- *EXISTING POC Seasonal Closure*
- *PROPOSED POC Seasonal Closure*
- *Closed non-system roads*

October 31, 1997

Table 7. Road Assessment

Road	Transport Class	Sediment Source	Peak Flow	Proximity to Crit Hab Reach	Wildlife	POC	Recreational Use	Administrative Commercial	Treatment and Comments
1376	Primary	Low	Low	Low	Low	High	Mod	Mod	Access to Snow Camp Lookout. Existing POC seasonal closure. Opportunities to improve drainage, including cross drains to prevent diversions. A culvert is needed above the 1376510 road.
1376460	Secondary/ Candidate	High	Low	Evaluate	Low	High	Low	Low	Secondary 0.2 miles, Candidate 0.8 miles. Evaluate for decommissioning or stormproofing. Existing POC seasonal closure.
1376460 unnumbered spur	Closed	Evaluate	Low	Evaluate	Low	High	None	None	Brushed in, not accessible to vehicles. Evaluate for decommissioning.
1376462	Secondary	Evaluate	Low	Evaluate	Low	High	Low	Low	Dispersed recreational use. Access to Green Craggie.
1376464	Closed	Evaluate	Low	Evaluate	Low	High	None	None	Brushed in, not accessible to vehicles. Evaluate for decommissioning.
1376510	Candidate	High	Evaluate	Evaluate	Low	Mod/ High	Low	Low	Storm damage, ditch erosion. Potential to wash out. Closed at 0.7 miles, landing failure beyond. Evaluate for decommissioning. Existing POC seasonal closure.
1376550	Candidate	Mod	Low	Evaluate	Low	High	Low	Low	Closed at 0.25 miles. Evaluate for decommissioning. Existing POC seasonal closure.
3680	Primary	Low	Low	Low	Low	Mod/ High	Mod	Mod	Access to Game Lake Campground. Maintain road for current uses.
3680401	Candidate	Low	Low	Evaluate	Low	High	Low	Low	Currently seasonal POC closure, proposed for year-around. Evaluate for decommissioning, but allow trail access. Accesses Collier Butte.
3680404	Candidate	Low	Low	Evaluate	Low	High	Low	Low	Currently seasonal POC closure, proposed for year-around. Evaluate for decommissioning.
3680405	Closed w/ tank trap	Low	Low	Evaluate	Low	High	Low	Low	Currently seasonal POC closure, proposed for year-around. Evaluate for decommissioning.

Literature Cited

Atwood, Kay. 1978. *Illahe: The Story of Settlement in the Rogue River Canyon.* Gandee Printing Center, Inc. Medford, Oregon.

Atzet, T. and Martin, R. 1991. Natural Disturbance Regimes in the Klamath Province . Proceedings on the Symposium on Biodiversity of Northwestern California, October 28-30, 1991. Santa Rosa, CA.

Beckam, S.D. 1971. *Requiem For A People- The Rogue Indians and The Frontiersmen* University of Oklahoma Press, Norman, Oklahoma.

Beckam, S.D. 1978. *Cultural Resource Overview of the Siskiyou National Forest.* Siskiyou National Forest. Grants Pass, Oregon.

Brown, E.R. (Tech Ed.), 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington (two volumes). USDA Forest Service Publication No. R6-F&WL-192-1985. Pacific Northwest Region, Portland, OR. 302 p., 332p.

Butler, G.M. and Mitchell, G.J. 1916. Preliminary Study of Geology and Mineral Resources of Curry County, Oregon. Oregon Bureau of Mines and Geology, Vol. 2, No. 2, Portland, Oregon.

Cooper, L. 1937. A History of the Siskiyou National Forest. Siskiyou National Forest, Galice, Oregon.

Dodge, O. 1898. Pioneer History of Coos and Curry Counties or Heroic Deeds and Thrilling Adventures of the Early Settlers. Capital Printing Co., Salem, Oregon.

Ferraro, T., 1991; Geology, Soil, and Slope Stability, Collier Project Area. Contract Report 53-OMOO-1-11N for USDA Forest Service.

Forbes, Bill. 1993. Personal Observation. June, 1993.

Frye, E. 1972. Aboriginal Travel Routes and Village Locations. Siskiyou National Forest Map of 1972. Siskiyou National Forest, Grants Pass, Oregon.

Griffen, D. 1983. Archeological Investigation at the Marial Site, Rogue River Ranch, 35CU84. Department of Anthropology, Oregon State University, Corvallis, Oregon.

Guenther, K. and T. Kucera. 1978. Management of Wildlife in the Pacific Northwest, BLM District and National Forest. USDA Forest Service, Pacific Northwest Region. 128 p.

Haefner, Henry. 1975. *Some Reminiscences of An Early Forester 1909 to 1925 and 1930.* Siskiyou National Forest, Grants Pass, Oregon.

Kresek, R. 1984. *Fire Lookouts of the Northwest.* Ye Galleon Press, Fairfield, Washington.

Martinek, Gary. 1995. Lawson Creek Watershed Analysis Area. Social Aspects, Prehistoric and HistoricUse of the Watershed. Siskiyou National Forest. Gold Beach Ranger District. Gold Beach, Oregon.

Interdisciplinary Team Members

Bill Blackwell, Interdisciplinary Team Leader, Recreation

Angie Dillingham, Fisheries Biologist

Colin Dillingham, Wildlife Biologist

Bruce Floyd, Fire/Fuels Specialist

Bill Forbes, Silviculture Forester

LaRece Irvin, District GIS Coordinator

Kevin Johnson, Geologist

G.W. Martinek, Archeological Technician

Dave Pivorunas, Botanist

Connie Risley, Hydrologist

Mary Stansell, Writer/Editor

Jerry Wilks, Transportation Engineer

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, DC 20250, or call 1-800-245-6340 (voice) or 202-720-1127 (TDD). USDA is an equal employment opportunity employer.