Stouts/Poole/Shively-O'Shea Watershed Analysis

Roseburg District
South Douglas Resource Area

January 16, 1996

Watershed Team:

Paul Meinke	-Forester
Roli Espinosa	-Wildlife Biology
Rob Hurt	-Fisheries
Ed Rumbold	-Hydrology
Dennis Hutchison	-Soils
Dave Fehringer	-Silviculture
Ted Weasma	-Geology, Minerals
Gary Basham	-Botany
Dave Mathweg	-Recreation
Dave Roberts	-GIS Support

Table of Contents

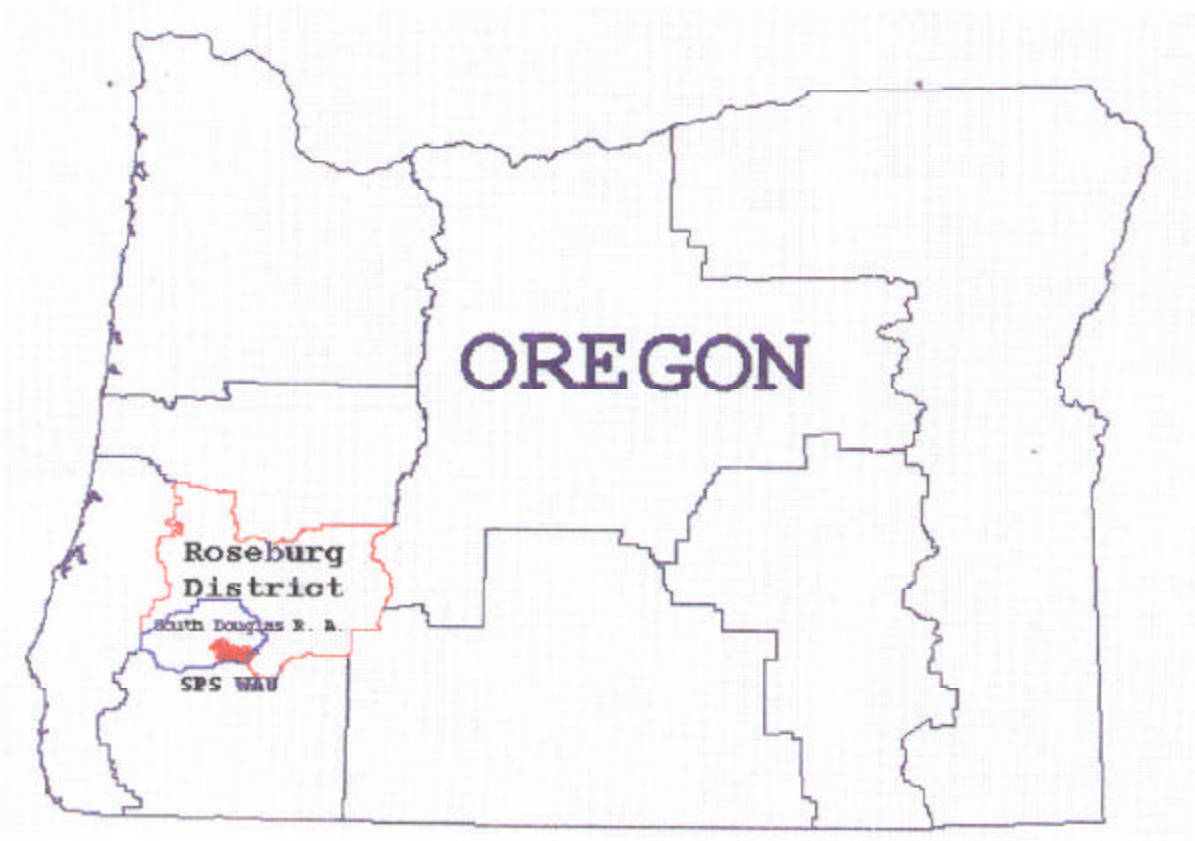
Appendices

List of Tables

List of Maps

List of Figures

Map 1: SPS WAU Vicinity Map



I. Characterization of the Watershed

The Stouts/Poole/Shively-O'Shea (SPS) Watershed Analysis Unit (WAU) is located in the South Douglas Resource Area of the Roseburg District BLM (see Map 1). The WAU is located approximately 25 miles southeast of Roseburg, in the southeast part of the Resource Area. The WAU is roughly located between Canyonville, Oregon and Tiller, Oregon south of the South Umpqua River almost to the southern boundary of the Roseburg District. This WAU covers approximately 52,322 acres. The Roseburg District BLM administers approximately 21,939 acres (42%) of the WAU. Privately owned and Umpqua National Forest administered lands cover the remaining 30,380 acres (58%).

This WAU is composed of three of the 35 watersheds identified within the Resource Area. The Stouts Creek, Poole Creek, and Shively-O'Shea Watersheds will be combined for this analysis. The Stouts Creek Watershed is approximately 21,220 acres in size. The Roseburg District BLM administers approximately 9940 acres (47%) of the Stouts Creek Watershed. Poole Creek Watershed encompasses approximately 5330 acres. Fifty percent (2651 acres) of the Poole Creek Watershed is managed by the Roseburg BLM. The Roseburg BLM administers approximately 9350 acres (36%) of the 25,770 acres in the Shively-O'Shea Watershed.

There are sixteen subwatersheds delineated within these watersheds. Stouts Creek Watershed contains the following subwatersheds: Milo, Hatchet Creek, Lower Stouts, East Stouts, West Stouts, Middle Stouts, and Upper Stouts. Homestead and Poole Creek are the subwatersheds in the Poole Creek Watershed. The subwatersheds in the Shively-O'Shea Watershed are Days Overlook, Beals Creek, Lower Shively, Lower O'Shea, Upper O'Shea, Upper Shively, and East Shively.

The major portion, 94%, of the WAU (approximately 20,660 acres) has been allocated as Late-Successional Reserve (LSR). Approximately 710 acres (3%) of the WAU is District Defined Reserve (DDR). The DDR is to be managed with the same standards as Late-Successional Reserves. The South Umpqua River/Galesville LSR Assessment, which includes the acres of DDR, was developed concurrently with this watershed analysis. Both documents should be used as guides when developing projects in the LSR. All of the matrix lands are allocated as General Forest Management Areas (GFMA). The GFMA consists of 350 acres or 2% of the WAU.

The Upper South Umpqua River basin has been designated as a Tier 1 Key Watershed in the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, Attachment A to the Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (hereafter referred to as SEIS ROD, S&G's). Tier 1 Watersheds were previously identified by the Scientific Panel on Late-Successional Forest Ecosystems (1991) and the Scientific Analysis Team Report (1993). The Stouts/Poole/Shively-O'Shea WAU lies within this Tier 1 Key Watershed. Tier 1 Key Watershed designation overlays other land use allocations and place additional management requirements on activities within these areas.

Tier 1 Watershed are designed to serve as refugia for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. The South Umpqua River Basin has been identified as water quality limited by the Oregon Department of Environmental Quality (DEQ) in their 1994 Water Quality Assessment. Key Watersheds with lower quality habitat were selected for their high potential for restoration and are designed to become future sources of high quality habitat with the implementation of a comprehensive restoration program (SEIS ROD, S&G B-18).

Management actions and directions on page 20 of the RMP state three requirements of management activities within Key Watersheds. They are 1) Key Watersheds are given the highest priority for watershed restoration. 2) Watershed analysis is required prior to management activities, including timber harvesting. Minor activities, such as those Categorically Excluded may proceed prior to watershed analysis being completed, if they are consistent with the Aquatic Conservation Strategy objectives. 3) Reduce existing road mileage inside Key Watersheds. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in Key Watersheds.

II. Issues and Key Questions

The purpose of developing issues is to focus the analysis on the key elements of the ecosystem that are most relevant to the management questions, human values, or resource conditions within the WAU. Areas covered by this watershed analysis will receive more in-depth analysis during project development and the National Environmental Policy Act (NEPA) process. New information gathered during the Interdisciplinary (ID) team process will be appended back to the watershed analysis document as an update.

A. ISSUE 1 - Late-Successional Reserve

The majority of the WAU (97%) is in reserved land use allocations. The Late-Successional Reserves and the District Defined Reserves are to be managed to maintain and promote a functional and interacting late-successional and old-growth forest ecosystem.

Key Questions

Vegetation Patterns

What are the natural and human causes of changes between historic and current vegetation conditions?

Where are the late-successional/old-growth stands within the WAU?

Where are the stands that may be treated to maintain or promote late-successional habitat within the LSR?

Where are the stands that risk reduction activities may occur in to protect late-successional/old-growth forests?

B. ISSUE 2 - Tier 1 Key Watershed

The upper South Umpqua River has been designated as a Tier 1 Key Watershed. Tier 1 Key Watersheds have been identified as priorities for watershed restoration.

Three components of watershed restoration include road treatments, silvicultural treatments to restore riparian vegetation, and restoring stream channel complexity. Road treatments (such as decommissioning or upgrading) would reduce erosion and sedimentation, and consequently improve water quality. Silviculture treatments such as planting unstable areas along streams, thinning densely-stocked stands, releasing young conifers overtopped by hardwoods, and reforesting shrub and hardwood dominated stands with conifers would improve bank stabilization, increase shade, and accelerate recruitment of large wood desired for future in-stream structure. The design and placement of in-stream habitat structure would increase channel complexity and provide a variety of habitats for fish and other aquatic organisms.

Key Questions

Vegetation Patterns

What are the vegetative conditions and seral stages in the riparian areas?

Soils / Erosion

What are the dominant erosion processes within the WAU and where have they occurred or are likely to occur?

Hydrology / Channel processes

What are the dominant hydrologic characteristics (e.g. total discharge, peak flows, and minimum flows) and other notable hydrologic features and processes in the WAU?

Water Quality

What are the limiting factors affecting water quality, and where are the priority opportunities to improve water quality and hydrologic conditions?

What beneficial uses dependent on aquatic resources occur in the WAU and which water quality parameters are critical to these uses?

Fisheries

Where are the locations of fish populations, historic and existing?

How have fish habitat and fish populations been affected by hydrologic processes and human activities?

What and where are the priority restoration opportunities to benefit fisheries?

III. Reference and Current Conditions

A. Vegetation

The Stouts/Poole/Shively-O'Shea WAU is located in the Klamath Mountain Physiographic Province described by Franklin and Dyrness (1984). The major plant community in the WAU is the mixed conifer/madrone-deciduous brush/salal group. Douglas-fir is the predominant overstory species mixed with incense cedar, grand fir, ponderosa pine, madrone, and chinquapin. Brush species include oceanspray, poison oak, salal, and ceanothus. In the interior valleys grasses can be a major competitor, especially in the early seral stages. Above 2,500 feet western hemlock, western red cedar, and sugar pine are associated overstory species.

Fire played a major role in the development of the historic patterns of vegetation within the SPS WAU. The land was probably a constantly changing mosaic of different age classes with mature stands, remnant patches of old-growth trees, and younger even-aged stands that resulted from stand replacement fires. These fires were caused by man (Native Americans used fire to clear lands, improve hunting areas, and produce desirable plant species) as well as lightning. Native American burning kept the lower elevations open and covered with lush native grasses. Fire suppression policies established early in the Twentieth Century, resulted in the replacement of the open forest with a more closed canopy forest with patches of dense undergrowth.

Various vegetation age classes have been documented in the SPS WAU. For this analysis vegetation on BLM administered lands is described by the age of the dominant conifer cover for each stand. The stands are aggregated into groupings of ten-year age classes (see Map 2 and Figure 1). These groupings were selected because they represent an array of wildlife habitat types. Private lands are aggregated by the same age class groupings, using a dominant conifer or hardwood stand age. Agricultural acres are also identified (see Map 4 and Figure 3). The arrangement of these age classes on the landscape within the WAU is a result of natural disturbance (e.g. fire and blowdown), and human caused, historic and recent, disturbance (introduced fire for clearing, tree harvesting, road construction, home building, and division of land by straight line boundaries).

The 1987 Bland Mountain Fire is a recent example of a large scale disturbance. The fire originated in the St. Johns Watershed northwest of the SPS WAU. The fire jumped the South Umpqua River, swept through the eastern portion of the Poole Creek Watershed and into the Stouts Creek Watershed. The fire consumed 10,000 acres within nine hours. Vegetation communities changed from mature (80+ years old) to open shrub-grass habitat as the result of the fire and salvage logging after the fire.

Map 2: Stouts - Poole - Shively O'Shea Cr. Watersheds - BLM Age Class Distribution

Figure 1: BLM Age Class Distribution

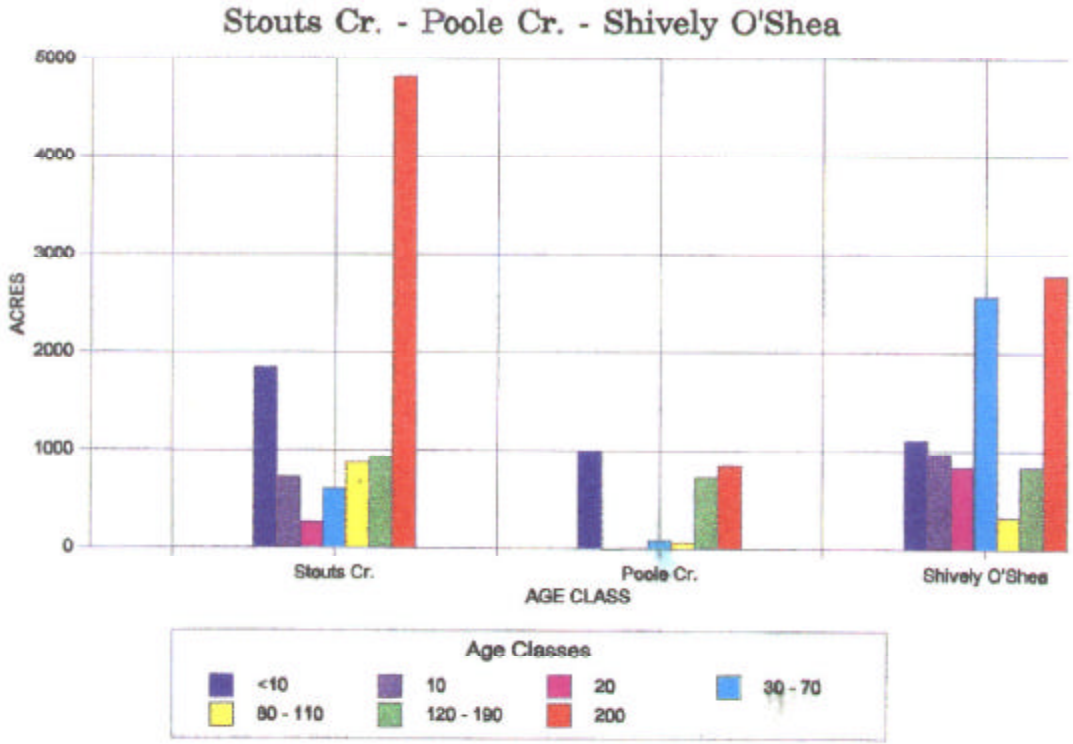
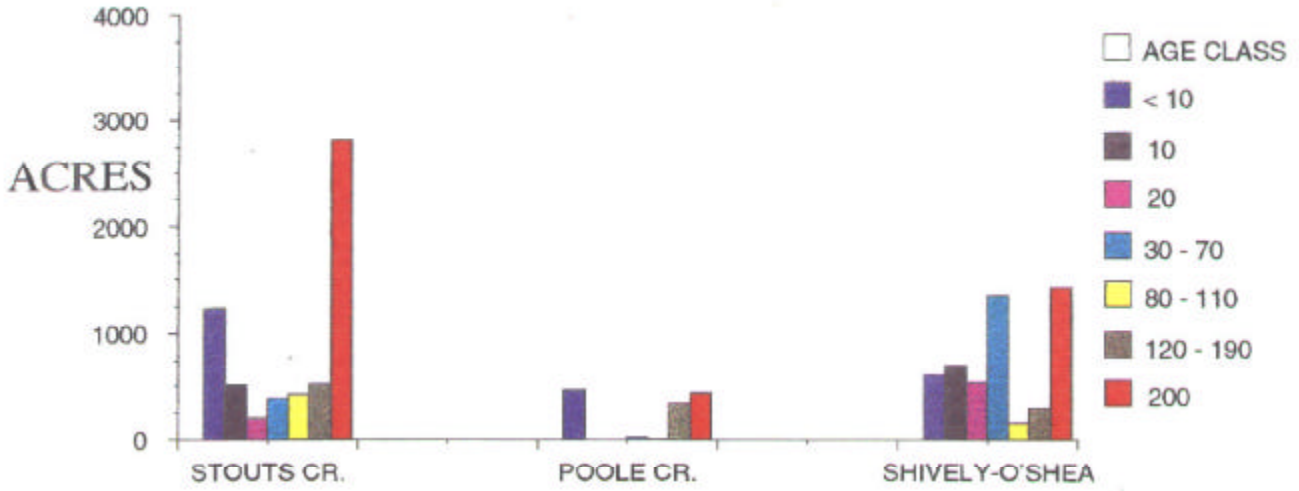
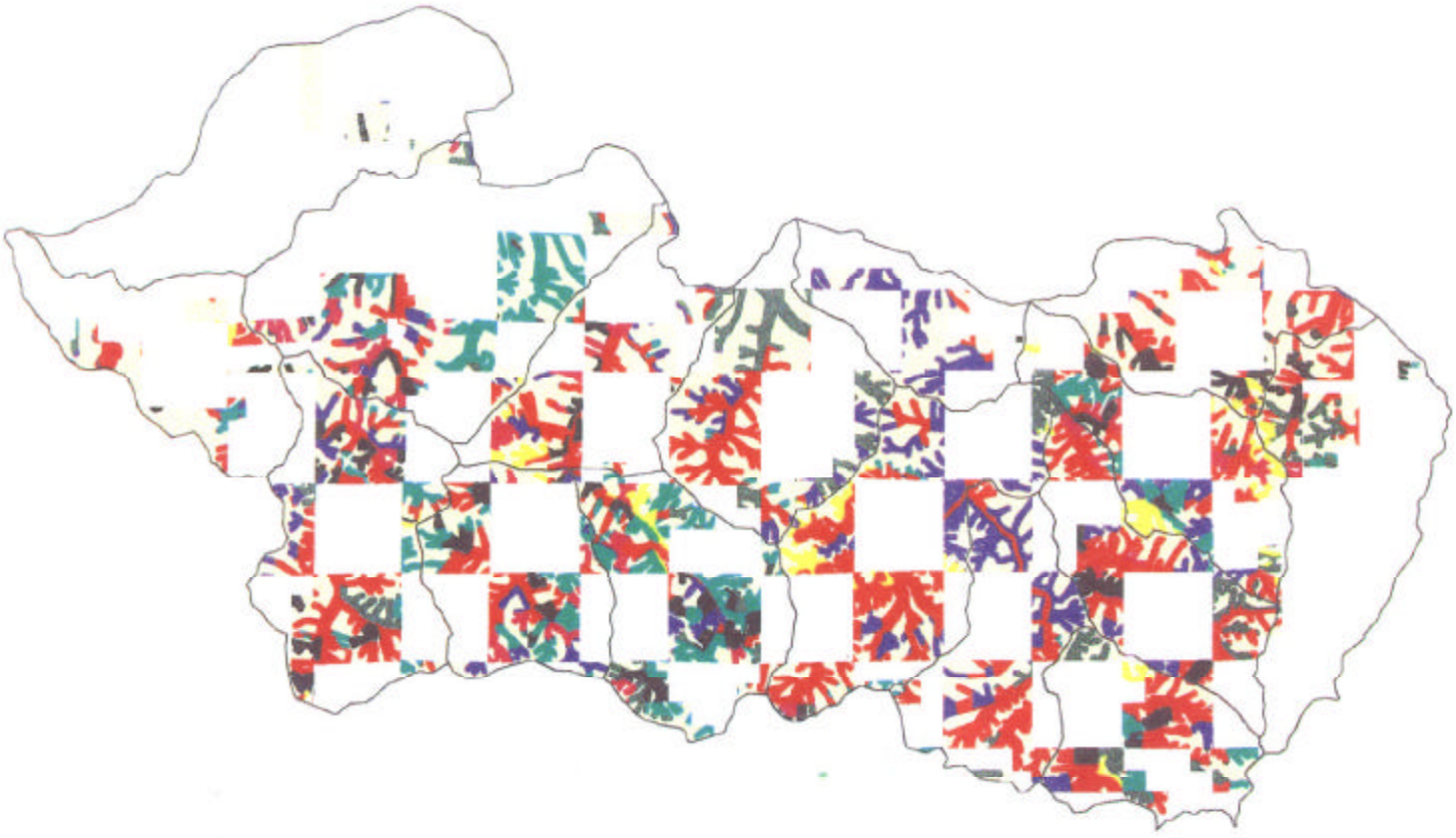


Figure 2: SPS WAU - BLM Riparian Reserve Age Class Distribution



MAP 3: SPS WAU - BLM Riparian Reserve Age Class Distribution



Map 4: Stouts-Poole-Shively O'Shea Cr. Watersheds - Private Age Class Distribution

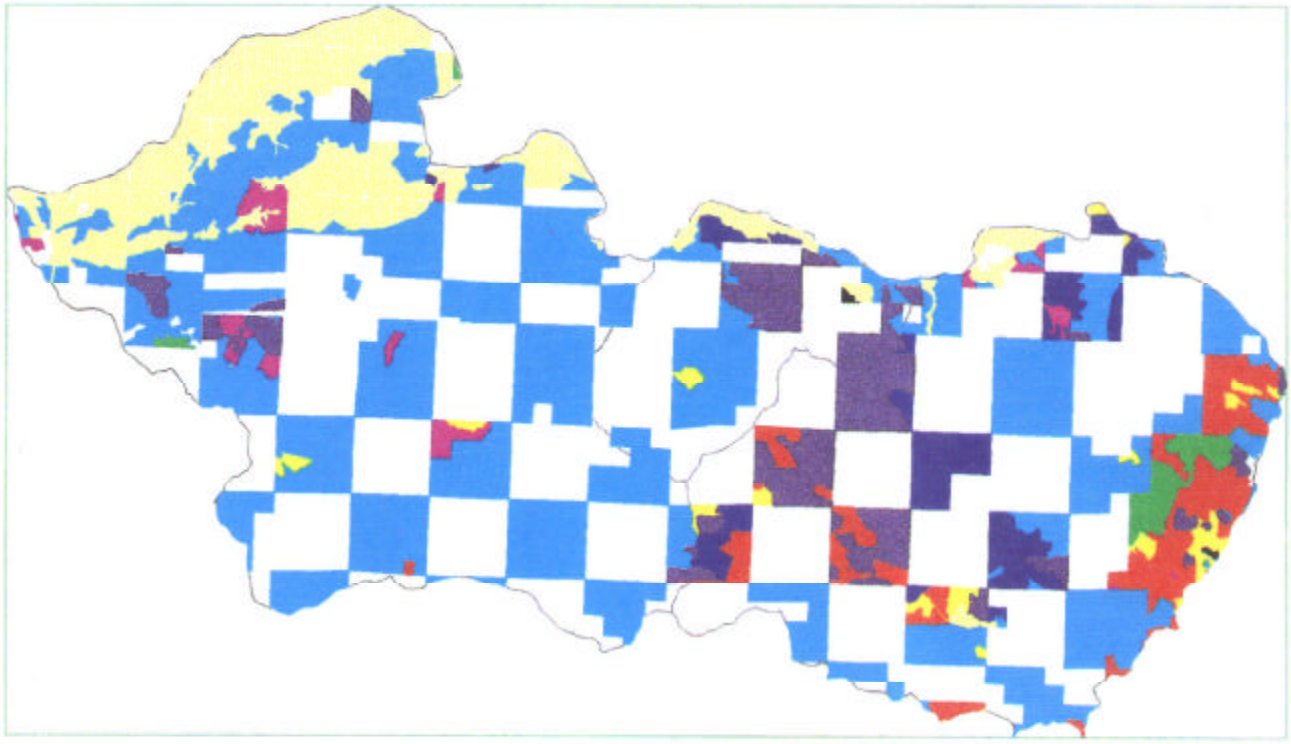
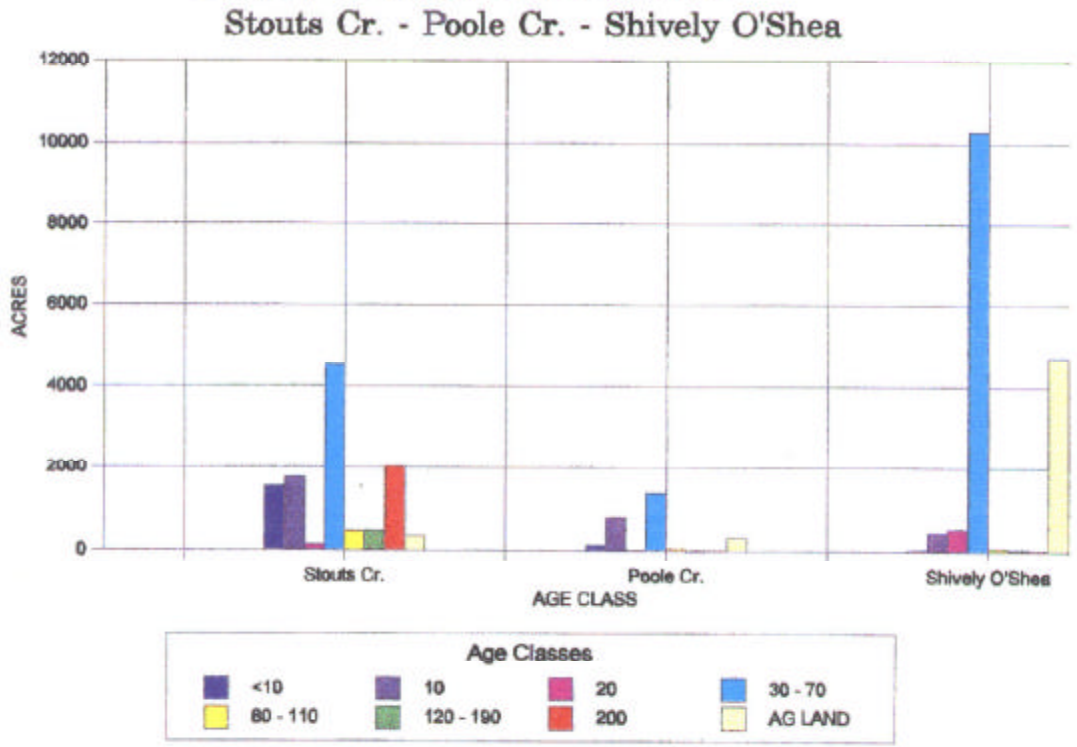


Figure 3: Private Age Class Distribution



1. BLM Administered Lands

The WAU contains approximately 21,939 acres (42%) of BLM administered lands. Bureau of Land Management and private lands are intermingled in the "checkerboard" pattern characteristic of Revested Oregon and California (O&C) Railroad lands.

Stouts Creek and Poole Creek Watersheds display the effects of the Bland Mountain Fire. Approximately 18% of BLM administered lands in the Stouts Creek Watershed and 38% of the Poole Creek Watershed are less than ten years old. Even with the fire 4,815 acres (48%) of the Stouts Creek Watershed and 819 acres (31%) of the Poole Creek Watershed are in the 200+ age class (see Table 1).

Table 1: ACRES BY AGE CLASS ON BLM LANDS

AREA	ACRES of age class <10	ACRES of age class = 10	ACRES of age class = 20	ACRES of age class = 30 TO 70	ACRES of age class = 80 TO 110	ACRES of age class = 120 TO 190	ACRES of age class = 200+	TOTAL
STOUTS CR	1,819	701	250	588	848	919	4,815	9,940
POOLE CR	1,000	0	0	77	53	702	819	2,651
SHIVELY- O'SHEA	1,104	963	811	2,567	315	812	2,776	9,348
TOTAL	**3,923**	**1,664**	**1,061**	**3,232**	**1,216**	**2,433**	**8,410**	**21,939**

Riparian Vegetation

Riparian Reserves within the SPS WAU account for 57 percent of the total BLM land base (12,398 acres out of 21,939 acres) (see Table 2, Figure 2, and Map 3). The purpose of Riparian Reserves is to "maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide greater connectivity of the watershed" (ROD, B-13). For this analysis, the riparian reserve widths were developed using a site potential tree height of 180 feet. All intermittent streams were given a riparian reserve width of 180 feet on each side of the stream. Perennial streams were given a reserve width of 360 feet (2 times the site potential tree height) on each side of the stream.

2. Private and Forest Service Lands

Private and Forest Service lands make up approximately 30,063 acres (58%) of the SPS WAU (see Table 3). Private ownership is intermingled with BLM lands. There is a concentration of private ownership along the South Umpqua River, consisting mainly of agricultural lands.

Table 2: ACRES BY AGE CLASS IN RIPARIAN RESERVES ON BLM LANDS

AREA	ACRES of age class <10	ACRES of age class = 10	ACRES of age class = 20	ACRES of age class = 30 TO 70	ACRES of age class = 80 TO 110	ACRES of age class = 120 TO 190	ACRES of age class = 200+	TOTAL
STOUTS CR	1,231	508	198	381	421	519	2,826	6,084
POOLE CR	453	0	0	23	5	329	433	1,243
SHIVELY-O'SHEA	603	707	536	1,353	158	288	1,426	5,071
TOTAL	**2,287**	**1,215**	**734**	**1,757**	**584**	**1,136**	**4,685**	**12,398**

Agricultural lands account for approximately 5,380 acres, most of them (4,732 acres) are in the Shively-O'Shea Watershed along the South Umpqua River. Forested lands total approximately 24,683 acres. Most of the forested lands have been previously harvested. A block of Forest Service lands in the Stouts Creek Watershed contains the majority of the late seral age classes (80+ years). Fifty-four percent of the forested lands are in the 30 to 70 year age class. Private lands in the Stouts Creek and Poole Creek Watersheds display the effects of the Bland Mountain Fire, where there is a concentration of stands that are in the 10 years old and younger age classes.

Table 3: ACRES BY AGE CLASS ON PRIVATE AND FOREST SERVICE LANDS

AREA	ACRES of ag lands	ACRES of age class <10	ACRES of age class = 10	ACRES of age class = 20	ACRES of age class = 30 TO 70	ACRES of age class = 80 TO 110	ACRES of age class = 120 TO 190	ACRES of age class = 200+	TOTAL
STOUTS CR	341	1,531	1,764	148	4,541	468	474	2,013	11,280
POOLE CR	307	124	800	0	1,373	44	0	0	2,648
SHIVELY- O'SHEA	4,732	23	430	525	10,288	74	46	17	16,135
TOTAL	**5,380**	**1,678**	**2,994**	**673**	**16,202**	**586**	**520**	**2,030**	**30,063**

B. Soils and Erosion Processes

1. Soils

Soils in this WAU have developed dominantly from Jurassic geologic formations. Galice Sedimentary Rocks are dominant and occupy about 44% of the WAU. Jurassic Volcanic Rocks comprise 27% of the WAU, Igneous Rock 18%, and Dothan-Otter Point Formation 5%. The remaining 6% of the WAU is comprised of Triassic, Cretaceous, and Quaternary formations.

The four main soils related properties significant to planning and analysis for this WAU are: granitic parent material, flood prone areas (flood plains), hydric soils (wetlands), and landscape segments that commonly exhibit riparian/wetland characteristics (potentially wet). There are 5,200 acres of granitic or granitoid soils mapped in this WAU. Most of these soils (4,800 acres) occur in the Stouts Creek Watershed. Flood plain soils occupy 1,500 acres, most commonly found on private land ownership in the Shively-O'Shea Watershed. Most flood plains on BLM lands are too narrow to delineate on the National Cooperative Soil Survey (NCSS). There are about 600 acres of hydric soils mapped, 450 acres occur in the Shively-O'Shea Watershed. Hydric soil areas too small for mapping (NCSS <2 acres) are found in granitic and volcanic areas. These wet areas usually exist as minor components within mapping units that have been labeled 'potentially wet'. There are 2,300 acres of 'potentially wet' soils in this WAU. The Stouts Creek Watershed has 1,900 acres of the 2,300 acre total. It is anticipated that less than 20% of the 2,300 acres will classify as hydric soils. Most of these hydric inclusions will usually be less than one acre in size.

2. Landslides

A major process that can effect water quality, erosion, and sedimentation is the occurrence of landslides. Landslides can occur naturally or be triggered by human activities such as road building or logging.

The Stouts/Poole/Shively-O'Shea WAU landslide occurrence/potential is shown on Map 5. This gives a general indication of slope stability.

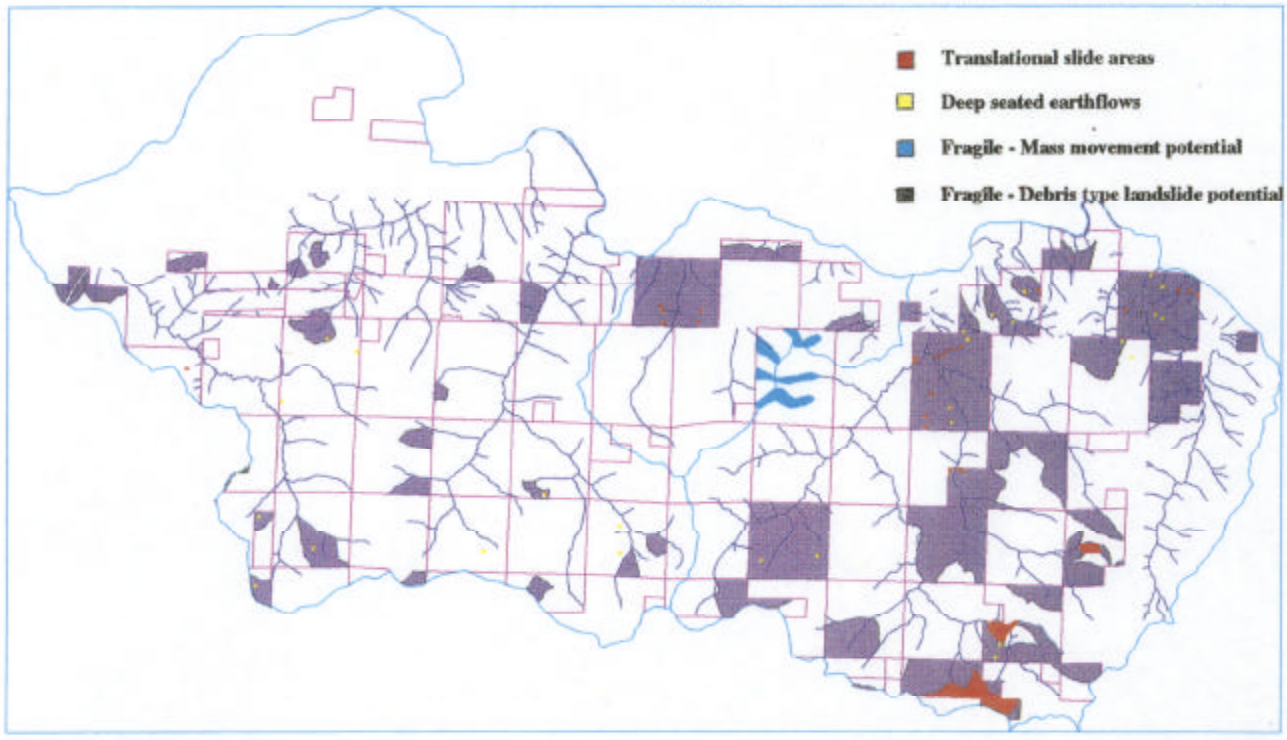
The **translational slide areas** (shown in red) are generally on steep slopes (60% to 100%) where debris type landslides have occurred. These areas are not suitable for forest management activities. Most of the translational slide areas occur in the upper headwaters of the Stouts Creek Watershed.

The area classified as **fragile: debris type landslide potential** (shown in gray) is characterized by slopes commonly ranging from 60% to 100% plus. Unacceptable soil and organic matter losses are expected to occur as a result of forest management activities unless mitigating measures (see Best Management Practices, Appendix D, Roseburg District Resource Management Plan) are followed to protect the soil/growing site. A considerable area associated with this classification is located in the Stouts Creek Watershed.

The **deep seated earthflow** areas (shown in yellow) are characterized by undulating topography and slopes less than 60%.

The area classified as **fragile: mass movement potential** (shown in blue) is characterized by undulating topography generally less than 60% where soil tension cracks and sag ponds may exist. Because of the slow rate of movement, forest management is feasible, when combined with Best Management Practices (BMP).

Map 5: Landslide Potential in the SPS WAU



C. Hydrology

Average annual rainfall between 1956 and 1992 measured at a permanent United States Geological Survey (USGS) station at Tiller, Oregon was 37 inches, with the majority of the precipitation (68%) occurring from October to March. The elevation of the station is approximately 1,100 feet. This station is along the South Umpqua River upstream from the Stouts Creek Watershed. Stream discharge measured at the same station closely followed precipitation (Swanston 1991) due primarily to the location and elevation where measurements were taken. Elevations found in the WAU range from 700 to 4200 feet above sea level. The uplands of the SPS WAU fall within the transient snow zone (2,000 to 5,000 feet elevation). Flows in the transient snow zones can be extreme, especially during warm rain-on-snow events (Swanston 1991). Grant and Jones (1995), Wemple (1994) and others have done studies relating clearcutting and road building to increased peak flows. Increased water delivery can trigger landslides on steep, marginally stable slopes, particularly on older road fills and stream crossings constructed before the mid-1970s.

Soils in the SPS WAU, which are common in the South Umpqua Basin, are susceptible to soil erosion and mass wasting depending on the soil type, depth of soil, and slope (Richlen 1973). The South Umpqua Basin is less permeable than the North Umpqua Basin, and therefore has less water storage capacity (Rinella 1986). Deeper soils with high water storage capacities are able to generate baseflow to streams during periods of little or no precipitation. The combination of dry summers, minimal snow pack, low-yield headwater aquifers, and surface-water withdrawals for irrigating about 13,000 acres can result in extremely low flows in the South Umpqua River during the summer (Rinella 1986).

There are 631 miles of streams in the 81 square mile WAU; with 288 miles in Stouts Creek, 56 miles in Poole Creek, and 287 miles in Shively-O'Shea Watersheds. The stream densities for Stouts, Poole, and Shively-O'Shea Watersheds are 8.7, 6.7, and 7.1 miles per square mile, respectively. The stream density for the WAU is 8.2 miles per square mile. There are 262 miles of streams on BLM in the WAU, and a BLM stream density of 7.6 miles per square mile. These numbers were derived from GIS HYD and ORD databases, which have varying accuracies with respect to first and second order streams.

Stream densities are higher in this watershed analysis unit than the John/Days/Coffee (JDC) Watershed Analysis Unit. Following a storm event, the timing and duration could decrease and the magnitude of peak flows increase in the SPS WAU as compared to the JDC WAU. The flow for a drainage basin with greater stream lengths and drainage density will produce more flow per unit area. Other factors, such as the presence of large woody debris (LWD) in the channel and floodplain, channel roughness, soil depth and type, road and stream crossing densities, and stream gradient may also affect the timing and duration of peak flows.

1. Water Quality

The Department of Environmental Quality (DEQ) conducted a statewide assessment in 1988 on water quality conditions resulting from nonpoint sources of pollution and the effects on certain beneficial uses of water. The 1988 assessment identified streams within the WAU as having no data and/or no problems with water quality conditions.

The 1994 Water Quality Assessment (305b Report) required under Section 303 of the Clean Water Act contains more specific and up-to-date water quality information. The South Umpqua Basin was identified as being water quality limited in the 1992 and 1994 Water Quality Assessments based on water quality standards for dissolved oxygen, fecal bacteria, and pH being exceeded. Aesthetics, aquatic life, and water contact recreation are beneficial uses listed as "not supporting." A "not supporting" use indicates 25 percent or more of the samples exceed water quality standards for an identified time period, and is the most severe classification for water quality. The State Antidegradation Policy is to maintain and protect surface water quality from point and nonpoint sources of pollution in order to protect State identified beneficial uses of water (Oregon Department of Environmental Quality (DEQ) Administrative Rules, Chapter 340-26-026).

According to Oregon Department of Fish and Wildlife (ODFW) Aquatic Inventory Reports completed on Stouts Creek and its tributaries, lack of large wood in streams and within riparian zones, summer low flows and sediment are limiting factors to water quality. These limiting factors are created to a large degree from past land use practices; grazing, timber removal in the riparian zone, road construction, low water fords, and stream crossings which have cumulative impacts to water quality and fish habitat.

2. Sediment and Turbidity

Suspended sediment refers to that portion of the sediment load suspended in the water column (MacDonald et al. 1990). Turbidity refers to the amount of light that is scattered or absorbed by a fluid (APHA 1980). Turbidity is caused by the finer texture particles in suspension such as clay, silt, and finely divided organic and inorganic matter. Turbidity is a good indicator of clarity and how well fish can see food. A recent review concluded that the ability of salmonids to find and capture food is impaired at turbidities in the range of 25-70 Nephelometric Turbidity Units (NTU) (Lloyd et al. 1987). Fish usually avoid areas with turbidities above 70 NTU (Meehan 1991). Turbidities and suspended sediment numbers are highest due to peak discharges during the winter months. Peak flows cause streambank erosion, bedload transport, and the movement of particles into the water column. There are no past records of suspended sediment or turbidity monitoring data for the SPS WAU; however, large quantities of sediment are stored in the channels of the Stouts Creek drainage. Specifically, large quantities occurred at mile 6.6 to mile 6.2 and mile 5.0 to mile 2.2 on the main stem; mile 4.3 to mile 3.1 on the northeast fork; and mile 4.8 to mile 3.6 on the east fork of Stouts Creek (Tooley 1981). The need may arise at the project level to monitor these water quality parameters, especially timber sale units near perennial streams and associated road building activities.

Roads have been identified as a major impact on the forest environment and have been explicated in numerous publications. The impacts include increased sedimentation in the streams, the potential for incising the stream channel to bedrock simplifying aquatic habitat complexity, and higher flows that rearrange stream substrates. Roads introduce sediment into the stream channel because of surface drainage, stream crossings, and poor design. Most of the roads built before the mid-1970's were designed without BMPs in place, as well as legislation directing companies and agencies to maintain and protect water quality from nonpoint sources of pollution. Many of the culverts located in the upper reaches of the WAU are undersized and become plugged by debris during peak flows greater than a five year event. This causes water to run over the road surface and subsequently input large amounts of sediment into the channel. Over time, sediment buildup in the upper stream reaches provides a source of sediment for downstream reaches when the next storm runoff event occurs. One example is a deep pool on the southwest fork of Stouts Creek where a thermograph was located in water year 1994. A new location was chosen in 1995 because the pool had filled in with sediment, due to a 5-year flow event that occurred in January 1995. Sediment may cover important salmonid spawning beds; lower the concentration of intergravel dissolved oxygen and lessen pool depth, which may be critical to fish during the summer low flow period.

The construction of roads in riparian areas often constricts the stream flow and has in some cases redirected and forced the stream to erode the opposite bank. Roads within the riparian area; especially those within the floodplain, restrict stream sinuosity. Road fills adjacent to streams often channelize stream flow and cause the incision of the streambed and the rearrangement of stream substrates. Once incised, the stream may be incapable of moving outside it's banks to utilize associated side channels and overflow channels (floodplain). These side channels and overflow channels serve important roles hydraulically, hydrologically, and biologically. Side channels act as flood control features during high water, releasing water downstream at a slower rate. In some instances, these channels act as sediment settling ponds for the stream system providing a "built-in" filtering system to the watershed. These backwater areas/alcoves also act to recharge ground water/subsurface water aquifers and provide salmonids and other aquatic organisms escape cover or resting cover during high winter flows and peak spring-time runoff flows.

Research indicates that forest roads greatly increase the drainage efficiency of basins and intensify peak flow events following winter storms and/or rain-on-snow events (Wemple 1994). Warm rain-on-snow events and storm runoff intercepted by compacted roads and their ditches becomes surface flow, instead of moving as shallow baseflow. Wemple focused on the hydrologic interaction between roads (ditches) with stream networks, and their contribution to peak flows. The study points out that roads (ditches) might have extended the stream network by as much as 40% during peak flow events. A USGS study found that the mean annual peak flow varies with stream density, using the equation Q/(mi.)2 = 1.3 (D)2, where Q is flow and D is drainage density. If we apply the 40% increase in drainage density (Wemple's study) to the equation, we find that the flow would almost double in size (using an average figure from their work). Wemple found these results in the study of two watersheds where the road density was only 1.61 miles/mile^2.

Table 4 shows BLM road densities approximately two to three times the road density in the study. High densities of roads and stream crossings in this WAU pose greater risks of introducing sediment into the stream channel. Since Shively-O'Shea and Stouts Creek Watersheds have relatively high road and stream crossing densities, opportunities to improve stream crossings, road drainage, and reducing channel extension should be focused in these watersheds. The priority for drainages is based upon fish passage, acres of aquatic habitat, and perceived sediment concerns. Decreasing road densities, especially natural surface roads near stream channels, should be a priority in order to reduce sediment inputs and restore the pre-management hydrologic function of the soil.

Table 4. Road, Stream, and Stream Crossing Densities in the SPS WAU.

Watershed	BLM Road Miles	BLM Road Densities (miles/mile^2)	% of Roads in Watershed on BLM	Stream Crossings/ mile^2	Stream Crossings/Stream mile
Stouts	56	3.58	41	4.52	1.60
Poole	12	2.86	40	2.38	0.70
Shively-O'Shea	65	4.47	31	4.25	0.99

3. Stream Temperature

High summer stream temperatures in the WAU are attributable to a large extent to low flow conditions and water quantity. There is less volume of water to heat per unit area of stream in the summer months (June - September). Water is withdrawn from streams for livestock, irrigation, and domestic uses during the warm summer months. Low summer flows and increased stream temperature leads to increased phytoplankton plant growth, increased fecal bacteria growth, decreases in dissolved oxygen, and increases in pH in streams within the WAU. Many of these water quality standards are exceeded for extended periods of time, which negatively affects beneficial uses. Moreover, the Umpqua Basin water temperature standard of 58 degrees Fahrenheit (F), identified by DEQ in the Oregon Administrative Rules, Chapter 340, is exceeded for extended periods of time during the summer. The purpose of the standard is to protect the aquatic habitat and beneficial uses, and does not allow measurable temperature increases due to forest management activities. Inputs of cooler water into the South Umpqua River from the WAU would help ameliorate poor water quality conditions in the South Umpqua River during summer low flow conditions.

Temperature monitoring in the east fork and southwest fork of Stouts Creek was initiated in 1992, and continued in 1994 and 1995. These stations will be monitored in subsequent years as long as funds are available. The data from 1992 and 1994 for both streams indicates that the lowest

temperatures occurred between the hours of 7:00 am and 10:00 am, when latent heat to the streams is at a minimum. The lowest summertime stream temperatures exceeded the basin standard (58 degrees F) for all of July and most of August for both 1992 and 1994. Conversely, maximum stream temperatures for both years occurred between the hours of 4:00 pm and 9:00 pm, and exceeded the basin standard for all of July and August, and part of September. Table 5 summarizes the summer stream temperature data for 1992 and 1994.

Table 5. Stouts Creek Stream Temperatures (1992 and 1994)

Stream Name (Water Year)	Maximum Temp. (F)	Dates	7-Day Ave. Daily Max.	Dates
East Fork Stouts (92)	69	08/13/92	68	08/13/92 - 08/19/92
West Fork Stouts (92)	73	07/16/92	72	07/13/92 - 07/19/92
East Fork Stouts (94)	71	07/21/94	69*	07/19/94 - 07/25/94
West Fork Stouts (94)	74	07/21/94	72	07/17/94 - 07/23/94

* The warmest stream temperatures probably occurred between 07/17/94-07/23/94, based upon the peak temperature occurring on 07/21/94. The thermograph was stolen prior to 07/19/94.

The 1986 Environmental Protection Agency (EPA) publication, Quality Criteria for Water, states that the weekly warm season temperature should meet site-specific requirements for migration, rearing, egg incubation, and spawning for fish; preserve normal species diversity; and not exceed a value more than 1/3 of the difference between the optimum and the lethal temperature for sensitive species (EPA 1986). The optimum temperature for fish is 58 degrees fahrenheit based upon the basin standard. The average lethal temperature is 74 degrees fahrenheit; however, fish become stressed at stream temperatures 70 degrees F and above. In the west fork of Stouts Creek, the average lowest stream temperatures exceeded 58 degrees F and the maximum stream temperatures exceeded 70 degrees F for eleven consecutive days in 1992, and eight consecutive days in 1994. In the east fork of Stouts Creek, maximum stream temperatures exceeded 70 degrees F one day in 1994, and zero days in 1992. The average lowest stream temperatures exceeded 58 degrees F twelve days in 1992 and ten days in 1994. It is apparent that fish are being stressed in both drainages, especially in the west fork of Stouts Creek.

The size and density of riparian vegetation and the roughness of the channel can have a profound impact on stream temperature. Holaday (1992) studied water temperature at the mouth of Canton Creek from 1969 to 1990 and discovered a decreasing trend in maximum summer water

temperature. He associated the decreasing trend to recovering riparian vegetation. A review of ODFW Aquatic Inventory Reports indicates a relationship between the percentage of open sky and the size, density, and crown closure of riparian vegetation. Stream temperatures are a net result of energy transfer processes, and these processes are modified by flow depth and velocity and groundwater inflow. Those stream reaches surrounded by mature timber will tend to have cooler stream temperatures, because the vegetation buffers the stream from incoming shortwave radiation. Many years of temperature data is needed to identify trends.

4. Streamflow

Timber harvesting, road building, and other forest management activities can result in changes in the volume and timing of runoff. Changes in the size of peak flows and discharge at low flows are not considered water quality parameters, but can have an effect on water quality. Peakflows in the winter months that result in a bankfull condition affect channel stability, turbidity and suspended sediment, and overall aquatic habitat condition.

Tributaries of the South Umpqua River from Tiller, Oregon downstream to Days Creek, Oregon contribute ten percent of the peak flood flow to the South Umpqua River for the 1090 square mile area. There are no gaging station records for the SPS WAU; however, flood flow frequency and magnitude can be estimated for ungaged sites on Roseburg BLM administered lands (Butler 1983). A District equation and USGS methods were used to estimate peak flows, and compared to each other for the SPS WAU. The two, five, ten, 25, 50, and 100-year flood events are presented in Table 6.

The District equation (developed by Butler 1983) was utilized to compute a quick estimate of peak flows, but is useful to compare with other methods because of the different variables considered in the equations. Moreover, the USGS method incorporates precipitation intensity and the area of lakes and ponds in their equations.

The Stouts Creek Watershed encompasses 22.45 square miles, which is 28% of the area in the WAU. Past estimates of streamflow at the mouth of Stouts Creek indicates that the Stouts Creek Watershed contributes 35% of the flow to the SPS WAU for a given flood frequency.

Canyon Creek located downstream from the Stouts Creek Watershed encompasses 36.9 square miles. The Canyonville gaging station (No. 14308900) on Canyon Creek recorded a peak flow of 3810 cubic feet per second (cfs) on 12/21/55, which equates to a 22-year flood event. The 25-year and 50-year events are 3960 cfs and 4280 cfs respectively based upon Log Pearson equations. The flow per unit area for a 25-year event is 107 cubic feet per second per square mile (cfsm). The Stouts Creek Watershed is 22.45 square miles and has a flow per unit area of 123 cfsm for a 25-year event. Days Creek gaging station (No. 14308685) operated by Douglas County from 1985 to the present indicated two peak flows occurred on 2/23/86 and 1/10/89, with magnitudes of 427 cfs and 1180 cfs respectively. The average peak flow per unit area in 1986 was 44 cfsm and in 1989 was 121 cfsm. The recurrence intervals for these flows are 4-years (1986) and greater than a 10-year event (1989), respectively. Canton Creek (54.6 square miles)

and the South Fork of Smith River (13.21 square miles) watersheds experienced peak flows of 7,670 cfs and 1,070 cfs respectively on January 10, 1989. The recurrence intervals for these two floods were 5-years and 3.5 years, respectively. The Canton Creek Watershed appears to route runoff per unit area more efficiently as reflected in the average peak flow per area of 139 cfsm compared to 121 cfsm for Days Creek, 81 cfsm for South Fork Smith River, and 107 cfsm for Canyon creek. The estimated average peak flow of 123 cfsm indicates that the Stouts Creek Watershed is similar to the Days Creek Watershed in its ability to manage runoff. The mechanisms that produced these peak flows probably differ dramatically based on precipitation, geology, and percentage of land in the transient snow zone. Flow measurements at the mouths of Shively, Stouts, and Poole Creeks during winter storms and summer low flow periods should be taken in the future.

Table 6. Estimated Flood Frequencies and Magnitudes for SPS WAU

Flood Event	District Equation	USGS Method
2-year	No Data	3039 cfs
5-year	No Data	4936 cfs
10-year	No Data	6087 cfs
25-year	9043 cfs	7932 cfs
50-year	10,568 cfs	9539 cfs
100-year	No Data	10854 cfs

5. Large Woody Debris

Large woody debris (LWD) that is well-distributed and occurs frequently in the stream, interacts with pools in the channel over time through a wide range of flows to create a diversity of aquatic habitat types. Large woody debris is one of the most important sources of habitat and cover for fish populations in streams (MacDonald et al. 1990). Relationships exist between LWD, habitat complexity, and salmonid production (Bisson et al. 1987). Reeves et al. (1993) noted that greater numbers of LWD pieces were found in basins with lower levels of timber harvest and that the level of harvest was strongly correlated with salmonid community diversity.

Large woody debris is a major component of channel form in smaller streams, and smaller streams usually contain more wood than larger systems (Bilby and Ward 1987). This phenomenon is due to the ability of larger systems to flush LWD downstream. Large woody debris influences channel meandering, bank stability, variability in channel width, and affects the form and stability of gravel bars. A close look at Pfankuch surveys, completed during the summer of 1995 for streams within the WAU, should indicate any changes in channel stability due to flooding, debris torrents, and timber harvest. Large woody debris in the upper stream

reaches slows the timing and energy associated with peak flows, and increases sediment storage and local hydraulic variability. The Record of Decision Standards and Guidelines and Best Management Practices provide guidance for maintaining LWD in the upper stream reaches in stands 80 years old and greater (or trees greater than 20" dbh) in the WAU. The recruitment of LWD is equally important in aquatic habitats where fish migration occurs. Large woody debris is a limiting factor to the aquatic and hydraulic components of this WAU. A review of Oregon Department of Fish and Wildlife (ODFW) Aquatic Inventory Reports notes a lack of riparian conifers greater than 20" and/or an abundance of hardwoods in the lower reaches of Stouts Creek.

D. Species and Habitats

1. Fisheries

The SPS Watershed Analysis Unit (WAU) is located within a Tier 1 Key Watershed. Tier 1 Key Watersheds were selected to conserve anadromous salmonids and should be given highest priority for watershed restoration (SEIS ROD B-19). Key Watersheds were designated to act as anchors for the potential recovery of depressed or at-risk anadromous and resident fish stocks by maintaining high quality aquatic habitat and recovering degraded aquatic habitat (SEIS ROD B-18).

a. Historic and Current Fish Use in the South Umpqua Basin

The South Umpqua River historically supported healthy populations of resident and anadromous salmonid fish. A 1937 survey conducted by the Umpqua National Forest of the United States Forest Service (USFS) reported that salmon, steelhead, and cutthroat trout were abundant throughout many reaches of the river and its tributaries (Roth 1937). Excellent fishing opportunities for resident trout and anadromous salmon and trout historically existed within the South Umpqua River (Roth 1937). The historical condition of the riparian zone along the South Umpqua River favored conditions typical of old-growth characteristic forests found in the Pacific Northwest. Roth noted the shade component that existed along the reaches of streams surveyed. The majority of the stream reaches surveyed were "arboreal" in nature, meaning "tall timber along the banks, shading most of the stream" (Roth 1937). The river and its tributaries were well shaded by the canopy closure associated with mature trees. Streambanks were provided protection by the massive root systems of these trees.

Since the 1937 survey was conducted, many changes have occurred within the South Umpqua Basin and in the stream reaches surveyed by Roth. A comparative study was conducted by the Umpqua National Forest during the summer low-flow period between 1989 and 1993 in all of the stream reaches surveyed for the 1937 report. The results of the study show that of the 31 segments of stream surveyed, 22 stream segments were significantly different than in 1937. There were 19 of the stream segments that became significantly wider while the remaining three stream segments were significantly narrower. Of the eight streams surveyed within designated wilderness areas, only one stream channel appeared to have increased in width since 1937. In contrast, 13 of 14 stream segments located in timber harvest emphasis areas were significantly wider than in 1937.

The cause for stream widening could have resulted from increased peak flows. Peak flows typically result from removal of vegetation (tree canopy) and the increase in compacted area within a watershed, especially within the transient snow zone (Meehan 1991). Peak flows can introduce sediment into the channel from upslope and upstream and can also simplify the channel by rearrangement of instream structure. Excessive sediment delivery to streams usually changes stream channel characteristics and channel configuration. These changes in the stream channel normally result in decreasing the depth and the number of pool habitats and reduces the space available for rearing fish (Meehan 1991). The results from the recent USFS study substantiate the changes in low-flow channel widths that have occurred within the South Umpqua Basin since 1937 (Dose and Roper 1994). Land management activities (road construction and timber harvest) have contributed to the changes in the channel characteristics and it may be that these changes in channel condition have resulted in the observed decline of three of the four anadromous salmonid stocks occurring in the basin (Dose and Roper 1994).

Winter steelhead and resident rainbow trout (Oncorhynchus mykiss), fall and spring chinook salmon (Oncorhynchus tshawytscha), coho salmon (Oncorhynchus kisutch) and sea-run cutthroat and resident cutthroat trout (Oncorhynchus clarki) have been documented utilizing the SPS WAU. Over the last 150 years, salmonids have had to survive dramatic changes in the environment where they evolved. The character of streams and rivers in the Pacific Northwest have been altered through European settlement, by urban and industrial development, and by land management practices. Modifications in the landscape and waters of the South Umpqua Basin, beginning with the first settlers, have made this river less habitable for salmonid species (Nehlsen 1994).

The South Umpqua River once supported abundant populations of chinook and coho salmon, and steelhead and cutthroat trout. These species survived in spite of the naturally low streamflows and warm water temperatures that occurred historically within this subbasin (Nehlsen 1994). Currently, salmonid populations throughout the Pacific Northwest are declining. A 1991 status report identified a total of 214 native, naturally spawning stocks in the Pacific Northwest as vulnerable and at-risk of extinction (Nehlsen 1991). According to this 1991 report, within the South Umpqua River, one salmonid stock is considered extinct, two stocks of salmonids are at-risk of extinction, and two stocks were not considered at-risk. The following information discusses the historic and present status of fish species in the South Umpqua River Basin.

Historically steelhead runs in the South Umpqua River were strongest in the winter (Roth 1937). Currently, winter steelhead are considered to be the most abundant anadromous salmonid in the South Umpqua River (Nehlsen 1994). In 1937 Roth reported summer steelhead above the South Umpqua Falls. Summer steelhead are now considered to be extinct (Nehlsen 1991).

Roth (1937) reported the principal run of chinook was in the late spring and summer. Presently, spring chinook runs are considered to be depressed by ODFW. Nehlsen (1991) reported the spring chinook run at high risk of extinction. Fall chinook are considered to be healthy by ODFW (Nehlsen 1994).

Coho salmon were considered abundant in the South Umpqua River Basin in 1972 by the Oregon State Game Commission (Lauman et al. 1972). An estimated 4,000 fish spawned in the basin with the majority of these fish (1,450) spawning within Cow Creek. Presently, the coho salmon in the South Umpqua River Basin are suffering the same declines as other coastal stocks. These declines are potentially due to several factors, including the degradation of their habitats, the effects of extensive hatchery releases, and overfishing (Nehlsen 1994). Based on the 1937 survey, no coho salmon were sampled within the survey area (i.e. upper stream reaches of the South Umpqua River). A subsequent study conducted during the summer of 1989 in Jackson Creek, a major tributary to the South Umpqua River, documented the common presence of coho salmon within this tributary (Roper et al. 1994). The documentation of coho salmon utilizing Jackson Creek qualifies this species existence in the upper reaches of the South Umpqua Basin. Coho salmon have been observed and sampled within the SPS WAU as well.

Sea-run cutthroat are assumed to be depressed from historic levels. The information provided in the 1937 Roth report noted cutthroat trout were common and/or abundant throughout the stream segments surveyed in the Upper South Umpqua Basin. There are limited historical records on cutthroat population size within the South Umpqua River.

The assumption that sea-run cutthroat trout abundance is currently below historic levels throughout the Umpqua Basin has been based upon the information provided by the fish counting station at Winchester Dam on the North Umpqua River. Between the years of 1947 and 1957 the North Umpqua River boasted runs of sea-run cutthroat trout averaging approximately 900 fish/year. The highest number return of 1800 fish occurred in 1954 and the lowest return for the ten year period was 450 fish in 1949. In the late 1950's the sea-run cutthroat trout returns declined drastically.

The stocking of Alsea River cutthroat trout into the Umpqua system began in 1961 and was continued until the late 1970's. The stocking of this genetically distinct stock of trout into the Umpqua system has apparently led to compounding the problem for the sea-run cutthroat trout native to the Umpqua River Basin. Sea-run cutthroat trout returns have been extremely low since discontinuing the hatchery releases in the late 1970's. The levels of returns resemble prehatchery release conditions of the late 1950's, with an average return of <100 fish/year (ODFW 1994 - overhead packet). In 1992, no sea-run cutthroat returned to the North Umpqua River. In subsequent years, sea-run cutthroat trout numbers have been a total of 29 fish in 1993, 1 fish in 1994, and 79 fish in 1995.

According to the data available, the South Umpqua River appears to have supported a larger run of sea-run cutthroat trout than did the North Umpqua River. In 1972, a total of 10,000 sea-run cutthroat trout were estimated within the South Umpqua River Basin. Sea-run cutthroat trout populations seemed to have the highest occurrence in those streams occupied by and accessible to coho salmon (Lauman et al. 1972). Today, these fish are limited to the upper portion of the mainstem South Umpqua River and Cow Creek, one of the major tributaries to the South Umpqua River. Warm water temperatures, lack of over-summering pool habitats, and low flows have precluded their use of the lower stream reaches in the basin (Nehlsen 1994).

Two species of salmonids have been proposed for listing under the Endangered Species Act (ESA) of 1973, as amended. The Umpqua Basin cutthroat trout has been proposed as an endangered species and the coastal coho salmon has been proposed as a threatened species under the ESA. Two fish species, the Pacific lamprey and the Umpqua chub, are on the Federal Candidate list. All of these species have been documented within the South Umpqua River.

Current anadromous fish distribution limits have been mapped on GIS HYD and ORD theme maps for the streams with documented barriers within the SPS WAU. Distribution limits of anadromous and resident fish are determined by the extent these fish are able to migrate upstream. Natural waterfalls, log or debris jams, beaver dams, and road crossings are potential barriers to fish movement and migration.

The SPS WAU consists of three distinct watersheds: Stouts Creek, Poole Creek, and Shively-O'Shea. Aquatic habitat inventories have been completed for only the mainstem and major tributaries of the Stouts Creek Watershed. The Stouts Creek inventory covers 14.3 miles of the approximate 631 total stream miles within the SPS WAU (refer to Table 7). The inventories are used to describe the current condition of the aquatic habitat with a focus on the fish bearing stream reaches within a watershed. Streams located within the SPS WAU that have not been inventoried for aquatic habitat condition are the mainstem of Poole Creek, East Fork Poole Creek, Coon Creek, Shively Creek, East Fork Shively Creek, Hatchet Creek, O'Shea Creek, Beals Creek, Sweat Creek, Spring Creek, and Slimewater Creek. Shively Creek and O'Shea Creek were planned to be inventoried during the summer of 1995.

Fish use and distribution information was noted in the habitat inventory conducted for Stouts Creek. The aquatic habitat inventory is not a fish distribution/abundance survey. The habitat inventory is designed only to survey physical habitat features. The stream surveyors were informed to take note of fish use by visual observation only. Fish distribution surveys are currently underway within the Roseburg District to determine the upper limits of resident fish use on BLM administered lands. The SPS WAU was surveyed for resident fish during the summer of 1995. The information available on the habitat condition and the distribution of fish species in the streams that have not been surveyed is in the form of personal communications and observations by ODFW and BLM biologists.

The data collected through the ODFW Aquatic Habitat Inventory can be used to analyze the components that may limit the aquatic habitat and the fishery resource from reaching their optimal functioning condition. Limiting factors for the fishery resource may include conditions where there has been a reduction of instream habitat structure, an increase in sedimentation, the absence of a functional riparian area, a decrease in the water quantity or quality, or the improper placement of drainage and erosion control devices associated with the forest road network. The Habitat Benchmark Rating System is a method developed by the Umpqua Basin Biological Assessment Team to rank aquatic habitat conditions. The intention of this matrix is to provide a system by which habitat condition can be easily and meaningfully categorized. The matrix is not intended to reflect equality of the habitat condition of each stream reach, but is intended to summarize the overall condition of the surveyed reaches. The matrix is a four category rating system consisting of an *Excellent*, *Good*, *Fair*, and *Poor* rating.

Table 7: Stream Inventory Summary for Stouts/Poole/Shively-O'Shea WAU

Stream	Total Miles WAU	Total BLM Miles	Total Miles Anadromous	BLM Miles Anadromous	Total Miles Resident	BLM Miles Resident
Stouts Creek Watershed	288.3	129.3				
Stouts Creek			4.8	2.6	7.0	3.4
East Fork of Stouts Creek			0.4	0.4	0.4	0.4
Northeast Fork of Stouts Creek			0.1	0.1	1.9	0.8
Southwest Fork of Stouts Creek			0.4	0.3	2.2	1.4
Hatchet Creek			2.0	0.0	2.5	0.0
Poole Creek Watershed	55.7	27.0				
Poole Creek			1.7	1.4	2.7	2.5
East Fork of Poole Creek			1.5	0.6	**n/a**	0.6
Coon Creek			**n/a**	0.0	**n/a**	0.0
Shively-O'Shea Watershed	286.8	105.9				
Shively Creek			4.0	1.4	4.8	1.8
East Fork of Shively Creek			0.4	0.2	0.4	0.3
Beals Creek			2.0	0.2	0.2	0.2
Unnamed tributary to Beals Creek			1.0	0.0	**n/a**	**n/a**
Spring Creek			**n/a**	0.0	**n/a**	0.0
Slimewater Creek			0.2	0.0	**n/a**	**n/a**
Sweat Creek			0.2	0.1	**n/a**	**n/a**
O'Shea Creek			2.6	0.0	6.8	1.0

n/a Not available (not sampled/surveyed - no information available).

b. Current Stream Habitat Conditions

1. Stouts Creek Watershed

The Stouts Creek Watershed consists of the mainstem of Stouts Creek, East Fork of Stouts Creek, Northeast Fork of Stouts Creek, Southwest Fork of Stouts Creek, three smaller tributaries of Stouts Creek, and Hatchet Creek. There are approximately 288 total miles of streams within this watershed. The major land uses within the Stouts Creek Watershed include timber production

and rural residential. Impacts within the Stouts Creek Watershed have come from past timber harvesting activities and a relatively recent forest fire (1987 Bland Mountain Fire).

There are approximately 7.0 miles of road located within the Riparian Reserve land use allocation along Stouts Creek. Approximately 4.5 miles are within a one site potential tree height in distance from the stream channels within Stouts Creek Watershed (information provided by use of a map wheel, existing maps of the watershed, and on-the-ground knowledge of the area). Site potential tree height is important for determining the potential for future recruitment of LWD into the stream channel. Trees located within half the distance of one site potential tree height from the stream are more likely to provide future LWD to the channel (within 90 feet in slope distance from the stream), than are those trees located a full site potential tree distance from the stream (180 feet in slope distance from the stream).

Salmonids utilize approximately 10.0 miles of stream within Stouts Creek and its tributaries. Approximately 5.3 miles is accessible to anadromous salmonids. Anadromous salmonids are incapable of passage beyond some natural and man-made obstructions. These obstructions were identified during the stream survey and recorded in the field notes on the survey forms.

The overall aquatic habitat rating for the mainstem of Stouts Creek is *Fair*. Limiting factors for the fisheries resource within the mainstem of Stouts Creek include the low number of LWD pieces and the volume of LWD in reaches of fish bearing portions of the mainstem and the lack of pools greater than three feet in depth. There is a relatively high percentage of sand/silt/organics located in these reaches. The existence of roads within the Riparian Reserves will limit the future input and quantities of LWD into the stream channel and the riparian zone.

Approximately 4.3 miles of the mainstem of Stouts Creek is accessible to anadromous salmonids and 7.0 miles is occupied by resident stocks. The upstream barrier to the anadromous fish is a log/debris jam approximately 5 feet in height. The potential exists for anadromous fish to bypass this jam in the future. Following a large enough flow event, the log/debris jam may shift or break apart to allow fish easier passage upstream. Historical distribution within this fork of Stouts Creek is assumed to have been upstream of this jam.

The Southwest Fork of Stouts Creek was rated as *Fair*. Limiting factors affecting the fisheries resource in this stream are similar in nature to the mainstem. The survey noted a lack of deep pools (deeper than one meter), relatively high amounts of sediment within the channel, and a low percentage of gravel present in the riffle habitat units. The two reaches surveyed appear to have a relatively high number and volume of LWD instream that provides habitat for the aquatic biota. The LWD component appears to occur within the lower third of the stream. The location of LWD corresponds with the anadromous portions of the stream. The portions of stream containing LWD are, according to the survey data, the portions of stream lacking the shade component. Past land management activities (clearcutting and road construction) and forest fire have reduced riparian vegetation adjacent to the stream. Anadromous fish distribution within this stream is another limiting factor on the fisheries resource.

Approximately 0.4 miles of stream are accessible to anadromous salmonids and 1.6 miles of stream are occupied by resident stocks within the Southwest Fork of Stouts Creek. Anadromous

fish passage is impeded by a bedrock waterfall approximately 10 feet in height. The barrier constitutes the upper distribution of the anadromy and is assumed to be the natural, historic barrier to distribution.

The East Fork of Stouts Creek was rated as *Poor*. The factors affecting the fisheries resource in this tributary to Stouts Creek are the number and size of pools, the lack of LWD pieces and volume of wood instream, access for the anadromous fish resource, and the location of the road system in the riparian area, adjacent to the stream. According to the survey data, a moderate to low amount of sand/silt/organics is present within the reaches of stream surveyed and gravel percentages within the riffle habitat units are relatively high.

Approximately 0.5 mile of stream in the East Fork of Stouts Creek is accessible by anadromous salmonids. A 26.0 foot waterfall forms the upstream barrier to anadromous fish migration. No visual observations of resident fish were made by the ODFW survey crew in the stream reaches above the falls. Fish distribution surveys have been conducted in the East Fork. The data collected by electro-fishing the reaches of stream above the falls supports the information recorded by the ODFW stream survey crews. No resident fish were found utilizing these stream reaches. Potential reasons for no resident fishes being found upstream of the falls may be due to the low number and the spatial distribution of pool habitat units within the upper reaches of this stream, the relatively high amount of bedrock substrate in the reaches, the low flow associated with this stream, and the lack of LWD and other instream structure (boulders, cobble, etc...) to maintain water flow and habitat upstream of the falls.

The Northeast Fork of Stouts Creek was rated as *Poor*. Factors that limit the fisheries resource in this stream include a lack of pool habitat, low amounts of LWD component, low flow conditions, and access for the anadromy. According to the notes in the data, low flow conditions created isolated pools where resident fishes were observed utilizing the remaining habitat available to them. There were numerous "dry" habitat units throughout the upper reaches of this stream.

Fish use within this stream is limited to approximately 0.1 mile for the anadromy and approximately 1.6 miles for resident stocks. The anadromous fish barrier appears to be an 8.0 foot debris jam located in a stream reach dominated by bedrock substrate. The potential for upstream passage for anadromous fish is assumed to be unlikely in the future due to the bedrock substrate found beneath the log jam. The location of the log jam is assumed to be the historic limits of the anadromy.

2. Poole Creek Watershed

The Poole Creek Watershed consists of the mainstem and East Fork of Poole Creek and Coon Creek. There are approximately 55.7 miles of stream within this watershed. Poole Creek has not been surveyed by the ODFW Aquatic Habitat Inventory crews to date. A stream survey conducted by ODFW (c.1970) mentioned no barriers to migration. This suggests that the stream has a gentle gradient and had no definitive natural or man-made barriers at the time of the survey. Fish distribution surveys have determined anadromous fish use approximately 1.7 miles and resident fish use approximately 2.7 miles within the mainstem of Poole Creek.

3. Shively-O'Shea Watershed

The Shively-O'Shea Watershed consists of mainstem Shively Creek, East Fork Shively Creek, O'Shea Creek, Beals Creek, Sweat Creek, Spring Creek, and Slimewater Creek. There are approximately 287 miles of stream within this watershed. The aquatic habitat within these streams has not been inventoried by the ODFW stream crews. Stream surveys are planned to be completed for Shively Creek and O'Shea Creek during the summer of 1995. Anadromous fish use approximately 4.4 miles and resident fish use approximately 5.2 miles of streams within Shively Creek and its tributaries. O'Shea Creek provides approximately 2.6 miles of potential anadromous fish habitat and approximately 6.8 miles of resident fish habitat. Further survey information within this watershed will be provided to this watershed analysis report at a later date.

2. Wildlife

A variety of wildlife species use the different plant communities present in the WAU. The various types of vegetation present provide habitat to over 200 vertebrate species and thousands of invertebrate species. Of these species, 38 species are of special concern because they are federally threatened (FT), endangered (FE), candidate (FC), Bureau sensitive (BS) or Bureau assessment species (BS). In addition to these species, the Record of Decision (ROD) for the Management of Habitat for Late Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl (USDA and USDI 1994b), has a list of species to survey and manage for in Oregon, Washington and California (USDA and USDI Appendix J2 1994a).

a. Threatened and Endangered Species

Five species known to occur in the Roseburg District are legally listed as federally threatened (FT) or federally endangered (FE). These include the American Bald Eagle (Haliaeetus leucocephalus) (FT), the Marbled Murrelet (Brachyramphus marmoratus) (FT), the Northern Spotted Owl (Strix occidentalis caurina) (FT), the Peregrine Falcon (Falco peregrinus anatum) (FE), and the Columbian White-tailed Deer (Odecoilus virginianus leucurus) (FE). Three of these species; the bald eagle, the spotted owl, and the peregrine falcon are known to occur within or in the vicinity of the SPS WAU.

1. The Northern Spotted Owl

The northern spotted owl is found in the Pacific Northwest, from northern California to lower British Columbia in Canada. The geographic range of the northern spotted owl has not changed much from its historic boundaries. However, available habitat historically used by spotted owls has changed to the point that owl population numbers have declined and distribution rearranged. These changes are considered a result of habitat alteration and removal by timber harvest, fire, and land development (Thomas et al. 1990). An extensive review of the history, biology, and spotted owl population changes is available elsewhere (Thomas et al. 1990, USDI 1992a).

In the SPS WAU, the spotted owl is known to occur in 18 areas on BLM administered lands dispersed throughout the WAU. Approximately 2000 acres on the east side of the Stouts Creek

Watershed is managed by the United States Forest Service (USFS), Tiller Ranger District. On Forest Service administered land within the Stouts Creek Watershed, there are four spotted owl activity centers (AC). Activity centers on Forest Service and BLM administered land in the SPS WAU and on BLM administered land within a mile of the southern and western WAU boundaries are included in the South Umpqua River/Galesville LSR. No known spotted owl activity centers occur on Matrix lands within the SPS WAU, as of 1995.

Habitat important to the spotted owl has been identified by Roseburg District BLM biologists based upon on-the-ground knowledge, inventory description of forest stands, and known characteristics of the forest structure. These habitats have been named Habitat 1 (HB1) and Habitat 2 (HB2). Habitat 1 describes forest stands that provide nesting, foraging, and resting components, and Habitat 2 is described as providing foraging and resting components but lacks nesting components. Other areas not fitting into the HB1 or HB2 category and greater than 40 years old, are considered dispersal habitat, used by the spotted owl to move from one area to another (Thomas et al. 1990, USDI 1992c). Tables 8 and 9 give the acres of HB1 and HB2 present in the SPS WAU. Table 10 contains information about the current status of use, habitat acres, occupation, and spotted owl reproduction success of these activity centers.

Table 8. Spotted Owl Suitable Habitat Within The SPS WAU**

SPECIES	HABITAT 1	HABITAT 2	TOTAL
SPOTTED OWL	5995	5555	11550
	51.9%	48.1%	100%

TABLE 9. Percent Area Of Habitat 1 and 2 Related To The Total Land Area In The SPS WAU (Includes Only Federal Land).

HABITAT 1	HABITAT 2	HABITAT 1 AND 2	TOTAL AREA IN SPS
5994	5555	11550	52322
11.4%	10.6%	22.0%	100%

** See text for definition of habitat 1 & 2.

Table 10. Spotted Owl Activity Center Ranking Data In The SPS WAU (1995).

MSNO	YEAR SITE WAS LOCATED	LAST YEAR OF KNOWN ACTIVE PAIR (PAIR STATUS + # JUVENILES)	LAST YEAR OCCUPIED & (PAIR STATUS)	No. OF YEARS OF REPRODUCTION / (PAIR STATUS=P) SINCE 1985	ACRES IN PROVINCE RADIUS (1.3 MILE)S	ACRES IN .7M RADIUS	OCCUPANCY RANK	ACRES RANK	HISTORY RANK
0283	1976	ND	ND	0/0	634	70	3	D	3
0289	1976	1990 (P+0J)	94(M+F)	1/7	766	151	1	D	2
0296	1977	1994(P+2J)	94(P)	3/7	894	374	1	D	1
0297	1976	1994(P+2J)	94(P)	6/6	594	289	1	D	1
0298A	1992	1992(P+2J)	94(P)	1/1	1095	398	1	B	1
0363	1981	PU	92(PU)	0/O	652	219	1	D	3
0364	1981	1991(P)	94(M+F)	0/4	695	235	1	D	3
1813A	1989	1989(P+2J)	89(P)	1/1	1028	103	1	B	3
1932	1987	1993(P+2J)	94 (P)	4/7	765	353	2	D	1
1933	1986	1986(P+2J)	94 (P)	1/6	947	232	1	D	2
1934B	1994	1994(P+2J)	94 (P))	1/1	1080	499	2	B	1
1935	1987	1992(P)	9 4(M+F)	1/4	1293	361	3	B	1
1997	1988	1989	94 (M+F)	1/4	1478	520	2	A	1
2087	1989	1989(P+2J)	94 (P)	1/4	846	264	2	D	2
3104	1986	1993(P)	1993(P)	0/2	1285	348	3	A	1
3906	1994	1994(P+2J)	1994(P)	1/1	1036	458	1	B	1
3909	1992	1994(P)	1994(P)	0/1	735	277	1	D	1
4052	1993	1994(P+1J)	1994(P)	1/1	621	225	1	D	1

OCCUPANCY RANK- 1: Sites with this ranking have current occupancy and have been occupied by a single or pair for the last 3 years; 2: Sites with this ranking have been occupied in the past, show sporadic occupancy by single owl or an owl pair, may be currently occupied; 3: Sites with this ranking have not been occupied during the last 3 years.

LAST YEAR OF KNOWN ACTIVE PAIR- Gives the year, pair status and young produced; NP: site has not had a pair

ACRES RANK- A: Regarding suitable spotted owl habitat, these sites have greater than 1000 acres in the provincial radius and greater than 500 acres within a .7 mile radius; B: Greater than 1000 acres in the provincial radius but less than 500 acres within a .7 mile radius ; C: Less than 1000 acres in the provincial radius and greater than 500 acres in the .7 mile radius; D: Less than 1000 acres in the provincial radius and less than 500 acres in the .7 mile radius.

HISTORY RANKING: This ranking includes occupancy ranking, reproduction data, acres ranking, habitat evaluation, field experience about the site (location, quality, forest structure etc.). 1: A site considered stable due to consistently occupied by spotted owls and has been producing young consistently; 2: site is consistently used by spotted owls but reproduction sporadic; 3: site shows some reproduction, occupation sporadic or no occupation.

STATUS = M: MALE; F: FEMALE; J: JUVENILE; P: PAIR STATUS; (M+F): TWO ADULT BIRDS, PAIR STATUS UNKNOWN; PU: PAIR STATUS UNDETERMINED, INCOMPLETE OR NO DATA (ND).

Another habitat component that can be measured is 50-11-40 acres. This number (50-11-40) refers to the amount (in acres) of forested land that at this time is in a condition where 50% is composed of 11 inch diameter trees with a minimum of 40% canopy closure (Thomas et al. 1990). This habitat condition is considered important for dispersal habitat used by the spotted owl. Table 11 gives the acres of 50-11-40 present in the SPS WAU by the quarter townships that overlap the WAU boundary.

TABLE 11. Acres Of 50-11-40 Habitat In The SPS WAU.

QTR.	TOTAL AVAIL-ABLE	1140 ACRES	1140 AVAILABLE	1140 %
30-02-SW	1,527	875	112	57
30-03-SW	1,078	464	0	43
30-03-SE	827	401	0	48
30-04-NW	425	374	160	87
30-04-SW	107	86	33	80
30-04-SE	0	0	0	0
30-05-SE	66	78	39	100
31-02-NW	17	17	9	100
31-03-NE	0	0	0	0
31-03-NW	0	0	0	0
31-03-SE	72	72	36	100
31-03-SW	0	0	0	0
31-04-NE	0	0	0	0
31-04-NW	0	0	0	0
31-04-SE	0	0	0	0
31-04-SW	0	0	0	0
31-05-NE	2,316	1,466	308	63
TOTALS	6,435	3,833	697	60

TOTAL AVAILABLE: Total forested acres including 50-11-40 acres.
1140 ACRES: Amount of 50-11-40 acres in the total forested acres.
1140 AVAILABLE: Number of acres above the 50% level of total acres available.
1140%: Percent of 50-11-40 acres in the township (1140 acres/total available).

Table 11 shows the amount of 1140 acres available per township. Another way to view this, is to look at the 1140% column; the percent shown includes the level above 50% for the township. For example in township 31-03-SE, 100% includes the 50% above the mid-mark or 36 acres is 50% of the total acres available.

Critical Habitat

The SPS WAU boundary overlaps the critical habitat unit (CHU) OR-32, designated by the USDI Fish and Wildlife Service (1992b) for the recovery of the spotted owl under the Endangered Species Act of 1973 as amended. This CHU has a total of 65,208 acres of forest habitat. Fifty three percent (34,414 acres) of this CHU is considered spotted owl habitat (Chris Cadwell, November 1992 Final Critical Habitat, OSO). The portion of the SPS WAU that overlaps the CHU-OR-32 has 11,550 acres of suitable spotted owl habitat (33% of the suitable spotted owl habitat in the CHU).

A general guideline for critical habitat is to keep in focus the intent of critical habitat; mainly to maintain and provide protection for habitat that contains "habitat elements in sufficient quantities and quality to maintain a stable population of owls" (spotted owls) throughout its range, and identify lands that "may be needed" for the eventual recovery and delisting of a species. Guidelines set for the South Umpqua River/Galesville LSR would aid in meeting the intent and objectives of critical habitat where the SPS WAU boundary overlaps the CHU-OR-32.

2. The American Bald Eagle

Historic distribution of the bald eagle included the entire northwestern portion of the United States (California, Oregon, Washington), Alaska, and western Canada. Declines in bald eagle populations probably started in the 19th century but noticeable declines in numbers did not start until the 1940s (USDI 1986).

Throughout the North American range, drastic declines in bald eagle numbers and reproduction occurred between 1947 and the 1970s. In many places, the bald eagle disappeared from the known breeding range. The reason for this decline was the use and impact of organochloride pesticides (DDT) on the quality of egg shells produced by the eagles (USDI 1986). This decline was likely present in the Roseburg District in light of the use of DDT in much of western Oregon from 1945 to the 1970s (Henny 1991). Other causes of eagle decline included shooting and habitat deterioration (Anthony et al. 1983). Historically, the removal of old growth forests in the vicinity of major water systems (e.g. South Umpqua River) contributed to habitat deterioration through loss of bald eagle nesting, feeding, and roosting habitat.

Data collected by Fierstine and Anthony (1978) indicated no bald eagle nest sites were present in the South Umpqua Planning Unit (SUPU), an area that included the current boundary of the SPS WAU. In 1979, the Roseburg District Biologist believed the SUPU was "never a high density nesting area, but prior to timber harvest activities adjacent to the South Umpqua River, the carrying capacity in the planning unit could have been as high as four nesting pairs" (SUPU 1979). Current information collected from yearly inventories (1971-1994) of known bald eagle sites by Isaacs and Anthony (1994) of Oregon State University does not list any sites, nests, or territories within or in the vicinity of the South Umpqua River, which is the northern boundary of the SPS WAU. The northern boundary of the SPS WAU has forested habitat considered as

suitable bald eagle habitat within one half mile of the South Umpqua River. To date there has been no evidence of nesting bald eagles. The South Douglas Resource Area has documented observations of bald eagles during the fall or spring when adults are moving through the area. On occasion bald eagles are observed during the winter but the eagles do not stay and do not appear to be using the area as a long term wintering ground.

3. The Peregrine Falcon

In Oregon, peregrine falcons were a "common breeding resident" along the Pacific coastline and were present in many areas including the southwestern portion of Oregon (Haight 1991). Peregrine falcon populations in the Pacific Northwest declined as a result of organochloride pesticides use, shooting, use of other chemicals (avicides: e.g. organophosphates) to kill other bird species considered pests, and habitat disturbance (loss of wetlands, loss of fresh water marsh environments in interior valleys, and increased rural development) (Aulman 1991).

Although the peregrine falcon has been documented in the South Douglas Resource Area (documented sightings) no nest locations are known within the SPS WAU. The parent material that makes up the topography within the WAU, has in some places eroded to create cliffs and ledges. Some of these areas are present throughout the WAU. Surveys to locate peregrine falcons in the WAU have not been conducted (as of 1994). The Upper South Myrtle Watershed north of the SPS WAU contains an area known as White Rock (a rock outcrop at 4021 feet above sea level), that has physical material and structure that qualifies the area for possible use by peregrine falcons. An evaluation of potential peregrine habitat in the SPS WAU is ongoing and some results should be available after the summer of 1995.

4. The Marbled Murrelet and The Columbian White-tailed Deer

The marbled murrelet is found in the Roseburg District, but is unlikely to be found in the SPS WAU. The western edge of the WAU is 66 air miles inland from the Oregon coast which is beyond zone 2 established by the northwest forest plan (USDA and USDI 1994b) and the 50 mile zone used by the BLM. Because of this, the SPS WAU will not be surveyed for the presence of the marbled murrelet.

Another species, the Columbian white-tailed deer, is not present in the WAU. Historically this species may have been present in the lower elevations of the watershed. Today the known population of this species is located northeast of Roseburg, in oak savannah, approximately 20 air miles from the northern boundary of the WAU.

5. Remaining Species of Concern

Other species of concern not threatened or endangered, fall into a federal candidate, Bureau sensitive, or Bureau assessment category. Of these, 18 are federal candidate 2 (FC2), one is Bureau sensitive, and 14 are Bureau assessment species.

Although there is information about the biology and habitat requirements of these species, the population levels and current distribution for these species are not available. Many of these species require unique features (ponds, seeps, caves, talus, etc.) found throughout the landscape and associated vegetation cover. This makes it hard to evaluate the presence or absence of a species as it relates to habitat. In the SPS WAU, the vegetation types based on age class is available but the distribution pattern and abundance of unique habitats is not available at this time.

Amphibian species such as the northern red-legged frog, foothill yellow-legged frog, and clouded salamander use unique habitats that are often found across vegetation classes. These habitats include large down woody material talus slopes, creeks, seeps, ponds, and wetlands. These features are abundant in the WAU throughout the elevational range. These species have been documented in the District and are suspected to occur in the SPS WAU.

An inventory of amphibians in the South Douglas Resource Area was recently completed (Bury 1994). This inventory serves to document the extent of amphibian species in the area. A species like the spotted frog is not expected in the WAU and was not found during the 1994 inventory. The tailed frog is likely to be present in the SPS WAU. This species serves as an indicator of watershed water quality, because of its sensitivity to changes in sediment loads, and water temperature. Two other species, the Cascades Frog and the Southern Torrent salamander (Rhyacotriton variegatus) were documented in the WAU.

During the summer of 1994, a survey to identify the bat species present in the South Douglas Resource Area was conducted under contract by Dr. Steve Cross of Southern Oregon College, Ashland, Oregon. Bat species use unique habitats (caves, talus, cliffs, snags, etc.) located within young or older age vegetation stands for roosting, hibernation, and maternity sites. In addition they will utilize other unique habitat (ponds, creeks, streams) for feeding. Both the special status bat species and the listed C-3 species (USDA AND USDI 1994b) are present in the District and expected in the SPS WAU. Surveys to locate the general habitat, and unique habitats used by these species for breeding, roosting and feeding is needed.

Mammals like the white-footed vole, that have a geographic range which includes the Roseburg District, are expected to be present in the SPS WAU. Information about the biology and life history of this species is limited (Marshall 1991). This species is associated with riparian zones, woody materials, and heavy cover. More recent information indicates association with mature forest (Marshall 1991). No surveys have been done for this species.

Information about the Northern goshawk is readily available (Marshall 1991). However the majority of the work with this species has been done east of the Cascades. Current geographic distribution indicates that the goshawk would not be expected in the majority of the Roseburg District. However, observations recorded since 1984, indicate that the goshawk is present north of the expected distribution range. In the early 1980s, two nest sites were found in the Roseburg District but neither one was located within the SPS WAU. Surveys to detect adult goshawks and/or goshawk nesting sites have not been conducted in the SPS WAU (through 1995).

The SPS WAU is known to support bird of prey populations common to the region but local surveys have not been conducted. These raptor species are expected to be present given the habitat existing throughout the District. Some information is available about ospreys. This WAU has the South Umpqua River as the northern boundary. The river provides ideal habitat for ospreys where nesting habitat is present on BLM or private land. Osprey surveys have been conducted along this section of the river where three nests are currently active.

b. Neotropical Species

Oregon has over 169 bird species that are considered neotropical migrants; that is, these birds breed north of Mexico and migrate south to Mexico, Central America, and South America to spend the winter. Of these species, over 25 species have been documented to be declining in numbers (Sharp 1990). During 1993 and 1994 the South Douglas Resource Area conducted neotropical bird capture, banding, and habitat evaluation. However none of this work was done in the higher elevations common in the SPS WAU. The habitat types and age classes are likely being used by neotropical species during migration and the breeding season. No information is available about the local neotropical bird population numbers in the SPS WAU.

c. Big Game Species (Elk and Deer)

Historically, the occupied range of Roosevelt Elk extended from the summit of the Cascade Mountains to the Oregon coast. In 1938, the elk population was estimated to be at 7,000 in Oregon (Graf 1943). Numbers and distribution of elk were altered as people settled in the region. Over time, the elk habitat areas shifted from the historic distribution to "concentrated population centers which occur as islands across forested lands of varying seral stages" (SUPU 1979). Information about the historic distribution of elk within the SPS WAU and the equivalent Dixon management unit (set by ODFW) is not available. Given the increased number of people in the area, road construction, and home construction it is suspected that elk numbers also declined as reported in other parts of the region.

Like elk, the black-tailed deer was present throughout Oregon. During the increased logging that occurred after WWII, suitable young seral age stands (less than 20 years old) were abundant and black-tailed deer populations increased to the point that liberal hunting seasons were permitted. Overall black-tailed deer numbers remained stable through the late 1970s in the SUPU (1979). Creation of early seral stands as a result of timber harvest benefited deer and elk as a byproduct not as part of a specific management plan for these game species.

Current numbers on the Roosevelt Elk and black-tailed deer populations in the SPS WAU are not available (Personal communication from ODF&W). Both species are present and use similar habitats. Areas where elk and deer forage for food includes the open areas where the vegetation includes grass-forb, shrub, and open sapling communities. Both species use a range of vegetation age classes for hiding. This hiding component is provided by large shrub, open sapling, closed sapling, and mature or old-growth forest components (Brown 1985).

The SPS WAU includes two elk management areas (Green Butte and Hyde Ridge) identified in the Roseburg District RMP/ROD (1995) and the Proposed Roseburg District Resource Management Plan/Environmental Impact Statement (USDI 1994). Communication with the Oregon Department of Fish and Wildlife identified this area is lacking current estimates of the elk population (personal communication).

3. Plants

Surveys have been conducted for Special Status Plants on approximately eleven percent of BLM administered lands within the SPS WAU. These surveys did not identify any special status plants as occurring within the WAU. However, many suspected "Survey and Manage" plant species, as well as "protection buffer species" identified in the SEIS, have not had surveys conducted since survey protocols have not been developed.

For some suspected species, the survey would start at the watershed analysis level with identification of likely species locations based on habitat. The following list of special status plants have been documented in the South Douglas Resource Area and could be suspected to occur in the SPS WAU.

Aster vialis; FC2, "Survey and Manage" Species
Aster vialis is a rare locally endemic taxon known only from Lane, Linn, and Douglas Counties in Oregon. It occurs primarily along ridges between Eugene and Roseburg.

Aster vialis is not a shade tolerant species. Plant succession resulting in canopy closure of the forest over these plants could be a significant management concern. Long term survival of this species at this site may depend on controlled disturbance of the habitat to allow more light to penetrate the canopy and improve conditions for Aster vialis reproduction. The role of fire is probably important to maintaining viability. It seems to thrive most vigorously in open gaps within old growth or edge habitat (Alverson and Kuykendall 1989).

Lupinus sulphureus var kincaidii; FC2
This is one of three varieties of Lupinus sulphureus found in Oregon. It is known in the Willamette Valley and south into Douglas County, with a disjunct population reported in Lewis County, Washington (Eastman 1990).

Lupinus sulphureus has been observed growing in road cuts and jeep trails. Long term survival of this species may depend on controlled disturbance of the habitat to allow more light to penetrate the canopy and improve conditions for lupine reproduction.(Kaye et al. 1991)

Cypripedium montanum; Tracking, "Survey and Manage" Species
Cypripedium montanum populations are small and scattered; less than 20 are extant west of the Cascades. Small populations may reflect the slow establishment and growth rate of this species. Cypripedium montanum seems to persist in areas which have been burned. This species ranges from Southern Alaska and British Columbia, south to Montana, Idaho, Wyoming, Oregon, and

California. Survival of the species may depend on protection of known populations and development of a conservation plan (USDA and USDI Appendix J2 1994a).

Astragalus umbraticus; Assessment Species
Woodland milk vetch grows in open woods at low to mid elevation from Southwest Oregon to Northwest California.

Bensoniella oregona; FC2
This species occurs along intermittent streams or meadow edges in mixed evergreen forest and white fir communities from 3000 feet to 5000 feet in elevation. It is typically less frequent in riparian shrub and forest openings, usually occupying upper slopes and ridgetop saddles with north aspects. It appears to tolerate some disturbance, if subsurface drainage is not altered. Populations are very small along streams without cover or in clearcuts. According to Copeland (1980, in Lang 1988) Bensoniella occurs within very specific meadow and stream edge habitat on soils derived from ancient sedimentary rocks.

Noxious Weeds

Specific noxious weeds have not been identified in the SPS WAU, however it is likely that some noxious weeds do occur within these watersheds. The encroachment of noxious weeds have been steadily reducing natural resource values. Invasion of noxious weeds is known to dramatically affect native plant communities reducing their abundance and distribution (Bedunah 1992).

The intent of an integrated weed management program is to implement a strategy that will facilitate restoration and maintenance of desirable plant communities and healthy ecosystems. Currently the Bureau of Land Management has an agreement with the Oregon Department of Agriculture (ODA) where locations of noxious weed invasions are identified and monitored by the BLM and control measures are administered by the ODA.

The following goals are important in the implementation of integrated weed management:
-Inventory by species
-Identification of potential invaders
-Monitoring
-Prioritization of noxious weed species
-Habitat management and restoration

4. Human Uses

a. Timber

Timber harvesting has been the dominant human use within the SPS WAU during the past 50 years. Nearly all of the private lands and approximately 45% of BLM administered lands have been harvested. The production of forest products is important to the local economy, providing jobs and revenue to local inhabitants.

In the WAU, approximately 350 acres of BLM administered lands are in the GFMA land use allocation. Approximately 42 acres are in the Stouts Creek Watershed and the rest (308 acres) are in the Shively-O'Shea Watershed. Lands in the GFMA are to be managed for timber production to meet the Probable Sale Quantity (PSQ) established in the RMP. The 42 acres in the Stouts Creek Watershed have been identified in Appendix C of the Resource Management Plan (USDI 1995) for disposal through exchange or sale.

b. Minerals

There are numerous mining sites located throughout the WAU, with the majority in the Shively-O'Shea Watershed. Mining and mineral exploration leading to claim staking and surface disturbance has been minimal during the past decade. No significant impacts from past mineral exploration work is known. The Shively-O'Shea Watershed has a moderately favorable potential for mining gold, silver, copper, lead/zinc, and chromium/nickel deposits. Future exploration and mining would be expected to concentrate on potential lode deposits within the Shively-O'Shea Watershed.

The construction of roads within the SPS WAU has led to the development and mining of rock quarries to provide surfacing material. The SPS WAU contains some excellent sources of surfacing rock. There are nine quarries in the WAU, eight of the quarries are on BLM administered land and one quarry is located on private land. Seven of the eight quarries on BLM administered lands are community pits with lots of material remaining. Two potential quarries exist on BLM administered lands in the Shively-O'Shea Watershed.

Full development of the Stouts Creek community pit would require extensive vegetative disturbance. This is a concern since some of the vegetation disturbed may include late-successional habitat within a Late-Successional Reserve. Surfacing rock will continue to be in demand in these and adjacent watersheds, and would be used to reduce sediment and soil runoff by upgrading roads. The rock from this quarry would supply the adjacent rock poor watersheds north of the South Umpqua River and the east side of the Stouts Creek Watershed, which are in a Tier 1 Key Watershed. This rock may be used to help upgrade existing roads causing problems and help attain Aquatic Conservation Strategy objectives. The potential benefits of attaining Aquatic Conservation Strategy objectives in this key watershed may exceed the costs of habitat impairment.

c. Agriculture

There are approximately 5,380 acres of agricultural land within the WAU. The majority of the agricultural land (4,732 acres) is in the Shively-O'Shea Watershed along the South Umpqua River. These lands contain pastures for grazing cattle and sheep, fields for grain production, and farmlands for seasonal crops of fruits and vegetables, and christmas trees.

d. Recreation

Lands within most of the South Douglas Resource Area and all of the Stouts/Poole/Shively-O'Shea WAU are managed for dispersed recreation. The most common forms of dispersed recreation found in this area include driving for pleasure, camping, hunting, gathering (berries, flowers, mushrooms, greens, and rocks), and target shooting. The South Umpqua River was identified in the RMP as having potential for designation as a wild and scenic river. A pond was planned in the NE corner of T30S, R3W, Section 29. Potential trail sites exist along Stouts Creek and the ridge top from the end of the 31-3-10.3 road to Green Butte.

IV. Interpretation of Information and Recommendations

A. Vegetative Condition

Although private and Forest Service administered lands are a major component of this WAU, the focus of interpretation will be on BLM administered lands. Private lands are in a constant state of change, and although we can assume that stands more than 30 years old will continued to be harvested, we cannot predict the timing or amount of harvest.

Approximately 2,000 acres of Forest Service administered lands are contained in the Stouts Creek Watershed. These Forest Service lands are designated as Late-Successional Reserve and are part of the South Umpqua River/Galesville LSR. The Forest Service lands would be expected to be managed similar to BLM administered lands within the South Umpqua River/Galesville LSR.

Most of the BLM administered lands in the SPS WAU are in the Late-Successional Reserve land use allocation. Late-Successional Reserves are to be managed to maintain and promote a functional and interacting late-successional and old-growth forest ecosystem. Silvicultural treatments in the LSR would generally be limited to stands that are less than 80 years old. However, there may be stands greater than 80 years old that lack some component of late-successional habitat, or at risk of a stand replacing disturbance that would benefit from a silvicultural treatment. The purpose of the silvicultural treatments within the LSR would be to benefit the creation and maintenance of late-successional forest conditions.

There are two general types of management activities which enhance late-successional conditions:

1. Activities in younger stands designed to accelerate the successional development of stands to late-successional character. Younger stands, approximately 0-80 years old, could be managed to accelerate the development of late-successional character by:

    a. Increasing stocking levels of conifers and species diversity through methods such as interplanting with seedlings of various species, or creating openings in existing brush patches within conifer plantations and allowing natural seeding from nearby overstory conifers. Areas needing conifer plantings might be young stands, smaller than six inches

in diameter, that are below some minimum target level, such as fewer than 100 trees per acre.

b. Reducing competing vegetation by cutting, burning, digging up, or pulling out unwanted species, or avoidance strategies such as allowing higher densities of young conifers at early age establishment to shade out competing vegetation then thinning conifers once this has been accomplished. Release treatments in young stands help to assure tree survival and avoid stand growth stagnation.

c. Managing the spacing of conifers and desired hardwood species. This can be accomplished through density management, by increasing conifer density to reduce competing vegetation, or by decreasing stand densities (such as precommercial or commercial thinning) to promote faster diameter growth where competing vegetation is not a major problem. Stands targeted for precommercial thinning might be those stands with an average diameter between one and six inches and having stand densities greater than 350-400 trees per acre. The timing of a commercial thinning would depend on stand density, minimum average diameter for an economic entry, site quality, and previous silvicultural treatments.

d. Increasing the stocking of desired hardwood species in stands where they are lacking. This can be done by reducing competition from conifers where hardwood stumps, seedlings, saplings, or sprouts are present. This can increase the species diversity of a stand, one element of late-successional characteristics.

e. Increasing conifer species diversity if it is currently low. This could be done by planting various conifer species that are currently absent or poorly represented that would naturally be in the stand.

f. Employing growth enhancing measures such as fertilization, or density management as described previously. These treatments would be used to accelerate diameter growth.

The SPS WAU contains approximately 9,880 acres of forested BLM lands in age classes less than 80 years old, where these treatments may occur. The Shively-O'Shea Watershed has the majority (5,445 acres) in these age classes, followed by Stouts Creek Watershed (3358 acres) and then Poole Creek Watershed (1077 acres).

2. Activities within older stands designed to provide one or more characteristics which may be missing or inadequate, either naturally or through past management actions. Older stands within the LSR which currently exhibit late-successional or old growth characteristics would be retained without active management, unless they are identified as needing treatment as part of a risk reduction effort. Other older stands, which do not currently exhibit late-successional characteristics could be managed using many of the same management practices as described for younger stands. These include increasing stocking levels of conifers or hardwoods, altering stand species composition, and accelerating the growth of the existing stand through fertilization or

density management. In addition, there are other possibilities for enhancing late-successional conditions, including:

a. Creating small canopy gaps (approximately 1/4 to 1 acre) where they are not present, to increase stand diversity.

b. Underburning to reduce heavy brush and increase stand diversity by creating small canopy gaps or snags.

c. Treating the understory using young stand treatments to facilitate development of multi-layer canopies.

d. Tree-culturing to protect desirable trees such as pines and large hardwoods, and to develop large limbs.

The SPS WAU contains approximately 12,059 acres of forested BLM lands in age classes 80 years and older (all land use allocations). Stouts Creek Watershed contains the highest percentage (66%) of mature stands, followed by Poole Creek Watershed (59%), and the Shively-O'Shea Watershed (42%).

Silvicultural activities aimed at reducing risks in Late-Successional Reserves would be to make stands less susceptible to natural disturbance. Areas considered to be at high risk would be those stands 1) on southerly aspects, 2) that have a large amount of slash or down fuels, such as areas that have been precommercially thinned within the past five years or areas of windthrow, 3) overstocked stands, such as plantations that have not been thinned, and/or 4) where large amounts of grass or brush are growing in the stand, such as parts of the Bland Mountain Fire area. Risks can be reduced by chipping or lopping and scattering precommercial thinning slash, thinning overstocked stands, promoting a closed canopy to reduce the amount of grass and brush, pruning to remove fuel ladders, using prescribed fire to reduce fuels, or by shifting even-aged, single-species stands toward more multi-aged, mixed-species stands.

For GFMA lands, treatments in stands less than 80 years old would be similar to those described for young stands in the LSR. Treatments for stands greater than 80 years old may involve commercial thinning, density management, or regeneration harvest. Regeneration harvest with a retention of 6 to 8 green conifers per acre greater than 20" in diameter would be programmed at culmination of mean annual increment (CMAI), which is between 80 and 100 years old on the average for this area. The estimated number of acres per decade to be harvested in the Stouts Creek Watershed is seven acres and 58 acres in the Shively-O'Shea Watershed.

Silvicultural treatments in the GFMA may affect the management of the LSR. Feathering harvest units adjacent to the LSR may be appropriate to reduce the risk of wind damage along boundaries. Fire and fuels management in the GFMA can also reduce the risk of fire and other large-scale disturbances that would jeopardize the LSR.

B. Hydrology / Water Quality

The South Umpqua Basin has been identified by DEQ as water quality limited. Water Quality standards are exceeded for extended periods of time causing degradation of beneficial uses of water. Strict adherence to the Management Actions/Direction in the RMP as well as implementing Best Management Practices should maintain and protect water quality. Limiting factors to current aquatic habitat and water quality conditions include sediment loading (due in part to large road and stream crossing densities), absence of LWD, and elevated summer stream temperatures. These factors are interrelated and important to the natural function within the channel and the riparian and floodplain areas. Attention should focus on the effects of increased sediment loading and elevated summer stream temperatures on aquatic macroinvertebrate communities. Improvements in road drainage, stream crossings and other design features, and road removal should be considered at all levels of planning to reduce sediment loads into streams. This should also be done in conjunction with improving fish migration. Watershed restoration should begin at the headwaters and progress downstream, in order to avoid the disturbance of habitat downstream from upstream sources. Mature timber in riparian reserves will continually provide LWD to streams as trees decay or are damaged by wind, and eventually more habitat complexity downstream via peak flow events.

C. Fisheries

The fisheries resource has been influenced negatively by past human management activities within the SPS WAU. Harvesting practices reduced the LWD component left adjacent to stream channels. Roads were constructed adjacent to streams and harvest activities took place in the draws further reducing the future recruitment of LWD into the stream channel. Roads located in Riparian Reserves are considered a high priority for renovation, obliteration, or decommissioning due to their location and direct influence on the stream system (PRMP/EIS Chapter 2-58&59).

Limiting factors affecting the fisheries resource differs among the streams being analyzed in this WAU. The limiting factors include access for anadromous salmonids to areas of their historic distribution (i.e. a dam on O'Shea Creek for supplying water to Canyonville has formed a barrier to historically accessible stream reaches), the lack of instream habitat structure (i.e. LWD, boulders, side channels, pools, etc...), the relatively high amount of sediment found in the gravel substrates required by spawning salmonids (i.e. the pool that filled with sediment on Stouts Creek after the 5 year flood event in January 1995), and the lack of future LWD recruitment into the stream channels from the adjacent riparian area. Minimizing or reducing the effects of these limiting factors on the fisheries resource is a goal or standard to achieve within these watersheds. The inclusion of the SPS WAU within a Tier 1 Key Watershed further emphasizes the intent of these watersheds as future refuges for the at-risk and depressed stocks of anadromous salmonids.

The BLM administers lands and waters interspersed with private lands in each of these watersheds. These watersheds are influenced by ownership patterns and differing land management schemes and objectives associated with a variety of land owners and land

administrators. For the most part, however, the management ability exists for the BLM to positively affect these watersheds and to improve on their overall aquatic health.

D. Wildlife

1. Northern Spotted Owl

Based on direction in the SEIS ROD, all spotted owl activity centers in GFMA located prior to January 1994 must be protected by maintaining the best 100 acres of suitable habitat in the vicinity of the activity center. In watersheds that overlap with LSRs, boundaries for activity centers have not been identified, because management direction in LSRs is to maintain and develop late successional forest stands across the landscape. Projects within LSRs would still require consideration of activity centers, impact to critical habitat, and impact to threatened and endangered species (i.e. the spotted owl). With this in mind, a ranking of the activity centers using the provincial radius (1.3 miles) and the 0.7 mile radius surrounding the owl site is presented in Table 10. Ranking provides an evaluation of the spotted owl sites based on the number of years occupied, general history, reproduction history, habitat present, and professional judgement about the function of a site based on field experience. This ranking is to provide management with a guide and does not represent a clearance as needed, or may effect determination as required by section 7 of the Endangered Species Act (ESA) of 1973 as amended.

The South Umpqua River/Galesville Late-Successional Reserve Assessment has been developed for the area in the SPS WAU that is designated as LSR. The LSR Assessment presents topics relevant to the management goals for the forest stands within the LSR and should be consulted to ensure those objectives are understood and followed. Evaluation of spotted owl habitat acres and activity centers is repeated here.

Within the provincial radius of spotted owl activity centers (1.3 miles) maintain and promote spotted owl habitat so that all sites have at least 40 percent of the radius in suitable spotted owl habitat. Analyze existing suitable habitat around owl sites, as well as other factors like productivity of the sites, connectivity to other suitable habitat in the vicinity, and location of the site on the landscape. This information can form the basis for creating a priority list of owl sites. The list can be used to determine where treatments may occur to increase suitable owl habitat within the home range or increase connectivity of habitat by manipulating forest stands to accelerate the development of young forest stands toward late-successional/old-growth stand characteristics. The treatment or type of stand manipulation may differ based on the particular factor deficient near individual owl sites.

Knowledge of the owl sites involved and the associated owl and forestry data is important for the reasons listed below.

1) Stand manipulation within the LSR still requires "may effect" determinations under the ESA of 1973 as amended. Whether the impact is negative, positive, or neutral, on the spotted owl or critical habitat, a "may effect" determination must be done by the BLM

prior to project implementation. This can be done with knowledge about the owl sites, home range, current forest stand ages, and distribution of stands on the landscape.

2) Each owl site should be evaluated. What is good for one site may not be good for another site. Evaluation should be conducted primarily by wildlife biologists but should include input from silviculturists to ensure that proper methods and prescriptions are developed and that goals can be achieved.

3) Goals of the forest stand manipulation should be tied to and based on the analysis of the data previously discussed.

Twelve owl sites in the SPS WAU are below the 30% suitable habitat level (see Appendix C). This is 10% below the threshold considered important by the USFWS. These sites should be considered first for evaluation following the guidelines listed here and in the South Umpqua River/Galesville LSR.

Most quarter townships where the SPS WAU is located, are currently below the 50% threshold for dispersal habitat. This threshold is also used in the "may effect" determination under the ESA. Quarter townships that include private lands are likely to have less 50-11-40 acres than areas where public lands are more concentrated. This difference is because 50-11-40 acres are determined by considering the amount of 50-11-40 acres on public lands only. Within the WAU, 8 of 17 (47%) quarter townships are currently at zero percent, 7 of 17 (41%) are at greater than 50%, and 2 of 17 (12%) are between 40 and 50 percent.

When planning projects within the SPS WAU, determine whether the project would be in Matrix or the LSR. Then make a "may effect" determination of the proposed action considering the concerns listed below. Projects planned in quarter townships currently below the 50% level require may effect assessment and consultation with the USFWS.

In Matrix evaluate the location and amount of dispersal habitat. Projects that further reduce dispersal habitat in quarter townships currently below 40% should be avoided. Maintain well connected stands of dispersal habitat where possible, or present on the landscape. Quarter townships with dispersal habitat above the 50% level should be considered first for regeneration harvest or other projects where dispersal habitat may be modified or removed. Plan projects so dispersal habitat does not fall below 50%, and physical connection of dispersal habitat is maintained.

Projects in the LSR would not be expected to reduce the amount of dispersal habitat. In the LSR evaluate quarter townships below the 50% level for opportunities where young stand management may increase dispersal habitat. The goals and objectives in the South Umpqua River/Galesville LSR Assessment should be followed also.

2. Other Species of Concern

Some species, like the brown creeper, hermit thrush, pileated woodpecker, winter wren, hairy woodpecker, and Vaux's swift are closely associated with late-successional forests. These species and other animals, like many bat, amphibian, and a large number of invertebrate species benefit from managing for and maintaining large connected areas of late-successional old-growth forests.

A large number of animal species not associated with older age stands are present throughout the WAU. As the stand ages increase through time, the available habitat for these species would diminish in the LSR. These species may use adjacent federal and private lands where forest management for timber production is likely to maintain vegetation in younger age classes.

Ways to benefit wildlife species would be to locate, quantify, and evaluate special habitats used, maintain vegetation and stand structural diversity, and schedule management activities to avoid disturbing sensitive wildlife species during nesting and breeding periods. Knowledge of special habitat types like cliffs, talus slopes, wetlands, seeps, and mine shafts can aid in pinpointing areas used by wildlife and the species that use these special habitats.

From a wildlife standpoint, stands should not be managed as a uniform, even aged plantation. Management activities should take into account the diversity, abundance, and location of tree species, understory shrubs, and other vegetation present. Small canopy gaps could be created in areas of dense vegetation or clumps of vegetation could be left when thinning or brushing stands.

3. Elk

The opportunity is present to develop an elk management goal for the identified management areas and the overlapping watersheds. Several questions and comments need to be addressed prior to developing specific methods.

1) What level of elk management is envisioned?
2) Consider maintaining early age classes by not allowing them to grow to older age classes in areas currently 20 years old and younger, and less than 40 acres in size.
3) Consider road closures in an amount large enough to influence positive use of habitat by elk.
4) Transplant elk from other areas to the Green Butte management area.

Any approach to elk management would benefit from information about distribution and use of the WAU by elk. This information is not currently available. Within the LSR it is unlikely that late-successional vegetation would be removed to benefit elk. Some benefits to elk could be obtained from preventing early successional stands to develop to older age stands in selected areas. However, this would probably not be necessary throughout most of the WAU since private lands will probably continue to provide early seral age classes. Reducing road construction, closing roads, or using harvest methods that do not require roads would benefit elk. Road construction usually leads to road use by people. The human use often determines the use of foraging areas by elk and deer. To achieve the most from management action, roads should be

selected for closure as outlined on page 39 of the Roseburg RMP ROD, and constructing new roads should be minimized or avoided. This should be done after careful identification of elk use within the Hyde Ridge and Green Butte management areas.

E. Priorities for restoration in the SPS WAU

From a hydrologic standpoint, Shively-O'Shea and Stouts Creek Watersheds should receive the highest priorities for restoration activities. Since Shively-O'Shea and Stouts Creek Watersheds have relatively high road and stream crossing densities, opportunities to improve stream crossings, road drainage, and reducing channel extension should be focused in these watersheds. These watershed priorities are based upon fish passage, acres of aquatic habitat, and perceived sediment concerns. Decreasing road densities, especially natural surfaced roads near stream channels, should be a priority in order to reduce sediment inputs to streams and restore the pre-management hydrologic function of the soil.

The roads in the SPS WAU have been evaluated using the Transportation Management Objectives (TMO's) as a guide. Roads identified by the TMO's are known as "system" roads. System roads have road numbers, road records, and usually require some type of maintenance. Non-system roads are characterized by jeep roads and trails, which are usually unsurfaced roads that are not recorded. A list was compiled of roads rated as having a low value for future resource access needs. Roads were preliminarily divided into the following categories: natural surfaced roads on BLM to decommission, surfaced roads on BLM to decommission, natural surfaced roads that access private land to decommission, surfaced roads that access private land to decommission, and roads to be improved (see complete list in Appendix D). Roads to be improved are identified as important for access but needing treatment. Roads that access private land would not be decommissioned without the adjacent landowners concurrence. Natural surfaced roads on BLM lands are the top priority to decommission.

Decommissioning, also referred to as hydrologic obliteration, to meet Tier 1 objectives could be accomplished in the following manner. The removal of those elements of a road that reroute hillslope drainage and demonstrate slope stability hazards. Decommissioning may include the removal of culverts, decompaction of the road surface (ripping), outsloping, waterbarring, and the removal of unstable or potentially unstable fills. With decommissioning, most of the road bed is left in place, facilitating inexpensive reconstruction should the need arise, but hydrologic risks are greatly reduced (FEMAT, Appendix V-J).

From a fisheries standpoint, Stouts Creek Watershed should receive the highest priority for restoration among the three watersheds being analyzed because of the watershed having a high percentage of BLM administered lands, a high road density and stream crossing density, and the most available, accessible anadromous fish habitat. The BLM administers approximately 47% of the Stouts Creek Watershed. Stouts Creek Watershed has a high road density (3.58 miles of roads per square mile) and the highest stream crossing densities of the three watersheds (4.52 stream crossings per square mile and 1.6 stream crossings per stream mile). Anadromous fish species are capable of accessing approximately 7.7 miles of habitat within Stouts Creek Watershed. The BLM administers approximately 3.4 miles of this habitat.

A stream restoration project (Stouts Creek Fisheries Habitat Enhancement Project) was planned on the mainstem of Stouts Creek located in T31S, R3W, Section 3. This project was proposed following field visits and surveys within the Stouts Creek Watershed. The proposed project site (approximately 0.4 miles of Stouts Creek) was determined to be deficient of several desirable instream habitat features (i.e. LWD and pools). An environmental assessment conducted by an interdisciplinary team determined the impacts of this project on multiple resources. The determination of no significant impacts on the resources was made based on the environmental assessment. Following the signing of the decision record, materials (i.e. logs and boulders) were delivered to the project site. The 31-3-34.0 road provides access to the project site and is located adjacent to the mainstem of Stouts Creek. Access points to the stream have been designated through the riparian area. The contract for this project was advertised in September 1993, but the project was not bid on. The project has been on hold since the signing of the SEIS ROD in 1994.

The Stouts Creek stream restoration project included plans for providing LWD structure to the stream channel, placement of boulder-rootwad clusters, construction of blast pools and alcoves, and placement of shade logs across the stream channel. These structures are intended to provide a variety of habitats for fish and other aquatic organisms that utilize Stouts Creek.

The Shively-O'Shea Watershed would be the next fisheries priority for restoration. The Shively-O'Shea Watershed is second to Stouts Creek in total stream miles. The BLM administers approximately 1.9 miles of anadromous streams in this watershed. Due to the number of stream miles and road miles within this watershed, the main concentration on restoration efforts should focus on road renovation, decommissioning, and/or obliteration. Stream restoration opportunities exist within this watershed. Aquatic inventory data would help identify and prioritize these opportunities.

Poole Creek Watershed has the lowest priority for restoration. The Poole Creek Watershed is a relatively small drainage and has the lowest road density and stream crossing density of the three watersheds being analyzed. This watershed has the least amount of habitat available for anadromous fish. The BLM has management control on 2.0 miles, of an approximate total of 3.2 miles, of potential and/or existing anadromous fish streams within this watershed.

F. Priority for identification of treatment areas

Maintaining large blocks of late-successional forests that have physical contact to other late-successional forest stands would provide habitat for species that use late-successional forests, including the spotted owl. This would serve to provide for important ecological functions such as dispersal of organisms. The checkerboard ownership pattern within the SPS WAU hinders the management of this area to provide connectivity between late-successional forests from one section to another. However, some areas where the BLM administered lands are contiguous, large blocks of late-successional forests may be possible to attain.

Forest stands large enough to provide undisturbed interior habitat (area within a forest stand greater than 400 feet from nearby adjacent stands younger than 70 years old) are an important component of retaining biological diversity. Selection of treatment areas following the priority list established for spotted owl sites would help contribute to the goal of maintaining and enhancing physical connectivity, block size, and suitable habitat within spotted owl centers of activity.

The following is an example of the priority selection process.

a. Select owl sites that fall below habitat acre thresholds of 500 acres within 0.7 miles and 1335 acres within 1.3 miles of the owl site.

b. Selected sites (below thresholds) would be prioritized by looking at the reproductive history of the site, occupancy ranking, history ranking, and number of years site has been occupied by a pair (see Table 10).

c. Owl sites selected may be further evaluated by determining the seral age classes within the radii around the owl sites. The purpose here is to locate forest age classes adjacent to suitable habitat that may be manipulated to accelerate stand development toward late successional characteristics.

d. Review connectivity information and overlay with spotted owl site information. The goal here is to evaluate the connectivity of suitable spotted owl habitat to other late successional habitat in the vicinity of the owl sites. In general terms, locate older stands (80+ years old) and analyze how the current blocks are connected to other similar blocks. The evaluation should answer the following questions.

1. Does the provincial radii of owl sites contain forest stands suitable for manipulation that may accelerate attaining late-successional characteristics?

2. Will stand manipulation aid in the development of connectivity between current owl site habitat and adjacent habitat?

3. Where is the connectivity needed? In the upland or in the riparian area of the drainage ?

4. Is stand manipulation needed? What are the pros and cons of the proposed action?

Treatment areas that would create larger late-successional old-growth blocks, enhance connectivity, and accelerate development of suitable owl habitat within the home range of spotted owl activity centers currently with less than 30% suitable owl habitat should be areas of high priority. Areas that meet two of these criteria would be the next priority and those that meet one criteria would be the last priority.

The Bland Mountain Fire area may be an exception to this priority list. This is a large area lacking late-successional stands. Opportunities to accelerate the development of late-successional, old-growth characteristics by precommercial thinning and release treatments exist in this area. Accelerating the development of stands in this area would eventually provide larger blocks of habitat and connectivity with other blocks of late-successional habitat.

V. Monitoring

General objectives of monitoring are:
1) To determine if the plan is being implemented correctly.
2) Determine the effectiveness of management practices at multiple scales, ranging from individual sites to watersheds.
3) Validate whether ecosystem functions and processes have been maintained as predicted.

The Roseburg RMP, Appendix I provides monitoring guidelines for various land use allocations and resources discussed by the plan. Implementation, effectiveness, and validation monitoring questions are addressed. At least 20 percent of all management actions will be monitored prior to project initiation and following project completion.

Some key resource elements to monitor in the SPS WAU are as follows:

A. All land use allocations

Are surveys for the species listed in the Roseburg District RMP, Appendix H conducted before ground disturbing activities occur?
Are protection buffers being provided for specific rare and locally endemic species and other species in the upland forest matrix?
Are the sites of amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropod species listed in Appendix H being surveyed?
Are the sites of amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropod species listed in Appendix H being protected?
Are high priority sites for species management being identified?

B. Late-Successional Reserves

What activities were conducted or authorized within the LSR and how were they compatible with objectives of the LSR assessment?
Were activities consistent with the SEIS ROD Standards and Guidelines, Roseburg RMP management direction, the LSR Assessment, and REO review requirements?
What is the status of development and implementation of plans to eliminate or control non-native species which adversely impact late-successional objectives?

C. Key Watersheds

Was watershed analysis completed prior to implementation of management activities?
Have the number of miles of roads been reduced or at least no net increase in roads been achieved?

Are at-risk fish species and stocks being identified?
Are fish habitat restoration and enhancement activities being designed and implemented which contribute to attainment of Aquatic Conservation Strategy objectives?
Are potential adverse impacts to fish habitat and fish stocks being identified?

Appendix A

Glossary

Age Class - One of the intervals into which the age range of trees is divided for classification or use.

Aquatic Conservation Strategy - Plan developed in Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, designed to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats.

Anadromous Fish - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Salmon, steelhead, and shad are examples.

Beneficial Use - The reasonable use of water for a purpose consistent with the laws and best interest of the peoples of the state. Such uses include, but are not limited to, the following: instream, out of stream and groundwater uses, domestic, municipal, industrial water supply, mining, irrigation, livestock watering, fish and aquatic life, wildlife, fishing, water contact recreation, aesthetics and scenic attraction, hydropower, and commercial navigation.

Best Management Practices (BMP) - Methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and nonstructural controls, and procedures for operations and maintenance. Usually, Best Management Practices are applied as a system of practices rather than a single practice.

Bureau Assessment Species - Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040), which are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state listed or Bureau sensitive species.

Bureau Sensitive Species - Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the State Director.

Candidate Species - Those plants and animals included in Federal Register "Notices of Review" that are being considered by the Fish and Wildlife Service (FWS) for listing as threatened or endangered. There are two categories that are of primary concern to BLM. These are:

> Category 1. Taxa for which the Fish and Wildlife Service has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.

Category 2. Taxa for which the Fish and Wildlife Service has information to indicate that listing is possibly appropriate. Additional information is being collected.

Commercial Thinning - The removal of merchantable trees from an even-aged stand to encourage growth of the remaining trees.

Connectivity - A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.

Connectivity / Diversity Block - A land use classification under Matrix lands managed on 150 year area control rotations. Periodic timber sales will leave 12 to 18 green trees per acre.

Core Area - That area of habitat essential in the breeding, nesting and rearing of young, up to the point of dispersal of the young.

Critical Habitat - Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.

Density Management - Cutting of trees for the primary purpose of widening their spacing so that growth of remaining trees can be accelerated. Density management harvest can also be used to improve forest health, to open the forest canopy, or to accelerate the attainment of old growth characteristics if maintenance or restoration of biological diversity is the objective.

District Defined Reserves (DDR) - Areas designated for the protection of specific resources, flora and fauna, and other values. These areas are not included in other land use allocations nor in the calculation of the Probable Sale Quantity.

Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with National Environmental Protection Agency when no Environmental Impact Statement is necessary.

Ephemeral Stream - Streams that contain running water only sporadically, such as during and following storm events.

50-11-40 Rule - A proposed guideline requiring maintenance of adequate spotted owl dispersal habitat on lands outside designated "habitat conservation areas" for the Northern Spotted Owl. It would assure that, on the quarter township basis, 50 percent of the stands would have conifers averaging 11 inches dbh and a 40 percent canopy closure.

General Forest Management Area (GFMA) - Forest land managed on a regeneration harvest cycle of 70-110 years. A biological legacy of six to eight green trees per acre would be retained to assure forest health. Commercial thinning would be applied where practicable and where research indicates there would be gains in timber production.

GIS - Geographic Information System, a computer based mapping system used in planning and analysis.

Intermittent Stream - Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Issue - A matter of controversy or dispute over resource management activities that is well defined or topically discrete. Addressed in the design of planning alternatives.

Land Use Allocations - Allocations which define allowable uses/activities, restricted uses/activities, and prohibited uses/activities. They may be expressed in terms of area such as acres or miles etc. Each allocation is associated with a specific management objective.

Late-Successional Forests - Forest seral stages which include mature and old-growth age classes.

Late-Successional Reserve (LSR) - A forest in its mature and/or old-growth stages that has been reserved.

Matrix Lands - Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels.

Mitigating Measures - Modifications of actions which (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree or magnitude of the action and its implementation; (c) rectify impacts by repairing, rehabilitating or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring - The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Nonpoint Source Pollution - Water pollution that does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation, and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, radiological integrity of water.

Peak Flow - The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Stream - A stream that has running water on a year round basis.

Precommercial Thinning (PCT) - The practice of removing some of the trees less than merchantable size from a stand so that remaining trees will grow faster.

Probable Sale Quantity (PSQ) - Probable sale quantity estimates the allowable harvest levels for the various alternatives that could be maintained without decline over the long term if the schedule of harvests and regeneration were followed. "Allowable" was changed to "probable" to reflect uncertainty in the calculations for some alternatives. Probable sale quantity is otherwise comparable to allowable sale quantity (ASQ). However, probable sale quantity does not reflect a commitment to a specific cut level. Probable sale quantity includes only scheduled or regulated yields and does not include "other wood" or volume of cull and other products that are not normally part of allowable sale quantity calculations.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service or National Marine Fisheries Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Resident Fish - Fish that are born, reared, and reproduce in freshwater.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Riparian Reserves - Designated riparian areas found outside Late-Successional Reserves.

Riparian Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Stream Reach - An individual first order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of 1/2 to 1-1/2 miles in length unless channel character, confluence distribution, or management considerations require variance.

Transportation Management Objectives (TMO) - An evaluation of the current BLM transportation system to assess future need for roads, and identify road problem areas which need attention, and address future maintenance needs.

Appendix B - References

Alverson, E.A. and K. Kuykendall. 1989. Field studies on Aster Vialis. Unpub. report on file at the Bureau of Land Management, Eugene District Office, Eugene, Oregon.

Aulman, D.L. 1991. The impacts and pressures on west coast peregrines. pp. 55-63. In: Rogue National Forest. 1991. J.E. Pagel. ed. Proceedings. Symposium on peregrine falcons in the Pacific Northwest. January 16-17. Ashland, OR.

Anthony, R.G., F.B. Isaacs, and R.W. Frenzel. 1983. Proceedings of a workshop on habitat management for nesting and roosting bald eagles in the western United States. Oregon State University, Corvallis, OR.

APHA. 1980. Standard Methods for the Examination of Water and Wastewater. American Public Health Association. Washington, D.C. 1134 p.

Bedunah, D. 1992. The Complex Ecology of Weeds, Grazing, and Wildlife. Western Wildlands 18:2.

Bilby and Ward. 1987. Changes in Large Organic Debris Characteristics and Function with Increasing Stream Size in Western Washington. Weyerhauser Co. Tech. Rep.

Bisson, P.A., M.D. Bryant, C.A. Dolloff, G.B. Grette, R.A. House, M.L. Murphy, K.V. Koski, and J.R. Sedell. 1987. Large Woody Debris in Forested Streams in the Pacific Northwest: Past, Present, and Future. Pages 143-190 in E.O. Salo and T.W. Cundy. Streamside Management. University of Washington. Seattle, WA.

Brown, E.R., tech. ed. 1985. Management of wildlife and fish habitats in forests of Oregon and Washington. Part 1 & 2 (Appendices). Publ. R6-F&WL-192-1985. Portland, OR: USDA, Forest Service, Pacific Northwest Region.

Bury, R.B. 1995 (unpublished). Amphibians and reptiles of the BLM Roseburg District, Oregon. Final report to the Roseburg District BLM. 101 pp.

Butler, M.A. 1983. Peak Flow Estimation in the Roseburg District BLM, Oregon. 32 p.

Copeland, W. 1980. Bensoniella oregona: Field study and status report. Final Summary. USDA Forest Service. Six Rivers National Forest, Eureka, Calif.

Dose, J.J. and B.B. Roper. 1994. Long-term Changes in Low-Flow Channel Widths Within the South Umpqua Watershed, Oregon. Water Resources Bulletin Vol. 30, No. 6.

Eastman, D.C. 1990. Rare and Endangered Plants of Oregon. Beautiful America Publishing Co. p. 114.

Environmental Protection Agency. 1986. Quality Criteria for Water: 1986. US Environmental Protection Agency, Office of Water Regulations and Standards. Washington, D.C.

Fierstine M., and R. Anthony. 1978. Bald eagle nest locations and history of use in Oregon. Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis. 18 pp. memo.

Franklin, J.F. and C.T. Dyrness. 1984. Natural Vegetation of Oregon and Washington. Oregon State University Press, Corvallis, OR, 452 pp.

GIS. 1992-1993. Roseburg District Geographical Information System.

Graf W. 1943. Natural History of the Roosevelt Elk. Oregon State College, Corvallis, OR. 222 pp. Ph.D. Dissertation.

Grant, G.E. and J.A. Jones. 1995. Peak Flow Responses to Clearcutting and Roads in Small and Large Basins, Western Cascades, Oregon. 48 p.

Haight, W. 1991. Status/future of management and recovery of Oregon peregrine falcons. pp. 68-71. In: Rogue National Forest. 1991. J.E. Pagel. ed. Proceedings. Symposium on peregrine falcons in the Pacific Northwest. January 16-17. Ashland, OR.

Henny, C.J. 1991. Peregrine falcons in Oregon and DDT in the Pacific Northwest. pp 75-80. In: Rogue National Forest. 1991. J.E. Pagel. ed. Proceedings. Symposium on peregrine falcons in the Pacific Northwest. January 16-17. Ashland, OR.

Holaday, S.A. 1992. Summertime Water Temperature Trends in Steamboat Creek Basin, Umpqua National Forest, Oregon. 128 p.

Isaacs, F.B., and R.G. Anthony. 1994. Bald eagle nest locations and history of use in Oregon 1971 through 1994. Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis. 16 pp.

Johnson, K.N., J.F. Franklin, J.W. Thomas, J. Gordon. 1991. Alternatives for Management of Late-successional Forests of the Pacific Northwest. Scientific Panel on Late-Successional Forest Ecosystems. A Report to the Agriculture and Merchant Marine Fisheries Committees of the U.S. House of Representatives. Washington, D.C. 59 p.

Kaye, T., K. Kuykendall, and W. Messinger. 1991. Aster vialis inventory, monitoring, and pollination biology. Cooperative Challenge Cost Share Project 90-1, prepared for the BLM Eugene and Roseburg Districts. On file at ONHP, ODA, and BLM Roseburg District.

Lang, F. 1988. Draft Species Management Guide for Bensoniella oregana (Abrahams and Bacig.) Morton. USDA Siskiyou National Forest. Grants Pass, Oregon. 36 p.

Lauman, J.E., K.E. Thompson, and J.D. Fortune, Jr. 1972. Fish and Wildlife Resources of the Umpqua Basin, Oregon, and Their Water Requirements. Oregon State Game Commission. Portland, Oregon. 127 p.

Lloyd, D.S., J.P. Koenings, and J.D. LaPerriere. 1987. Effects of Turbidity in Fresh Waters of Alaska. N. Am. J. Fish Management 7(1): 18-33.

MacDonald, et al. 1990. Monitoring guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska. Environmental Protection Agency. Washington, D.C. 166 p.

Marshall, D.B. 1991. Sensitive Vertebrates of Oregon. First Ed. Oregon Department of Fish and Wildlife. Portland, OR.

Meehan, W.R., editor. 1991. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. Bethesda, Maryland: American Fisheries Society. Special Publication 19.

Nehlsen, W., J.E. Williams, and J.A. Lichatowich. 1991. Pacific salmon at the crossroads: Stocks at risk from California, Oregon, Idaho and Washington. Fisheries 16(2):2-21.

Nehlsen, W. 1994. South Umpqua River Basin Case Study. The Pacific Rivers Council. 58 p.

Oregon Department of Environmental Quality. 1988. Statewide Assessment of Nonpoint Sources of Water Pollution. Prepared by the Oregon State Printing Division. Portland, Oregon.

Oregon Department of Environmental Quality. 1992. Oregon's 1992 Water Quality Status Assessment Report, 305(b) Report. Portland, Oregon.

Oregon Department of Environmental Quality. 1994. Oregon's 1994 Water Quality Status Assessment Report, 305(b) Report. Portland, Oregon.

Reeves, G.H., F.H. Everest, and J.R. Sedell. 1993. Diversity of Juvenile Anadromous Salmonid Assemblages in a Basin in Coastal Oregon, U.S.A. With Different Levels of Timber Harvest. Transactions of the American Fisheries Society 122: 309-317.

Richlen, E.M. 1973. Soil Survey of the South Umpqua Area, Oregon. USDA Forest Service, Tiller, Oregon.

Rinella, J. 1986. Analysis of Fixed-Station Water-Quality Data in the Umpqua River Basin, Oregon. Water-Resources Investigation Report 85-4253. United States Geological Survey, Portland, Oregon. 96 p.

Roper, B.B., D.L. Scarnecchia, and T.J. La Marr. 1994. Summer Distribution of and Habitat Use by Chinook Salmon and Steelhead Within a Major Basin of the South Umpqua River, Oregon. Transactions of the American Fisheries Society 123: 298-308.

Roth, A.R. 1937. A survey of the waters of the South Umpqua Ranger District, Umpqua National Forest. USDA Forest Service. Portland, Oregon.

South Umpqua Planning Unit (SUPU). 1979. Unpublished.

Sharp, B. 1990. Population trends of Oregon's Neotropical Migrants. Oregon Birds 16(1):27-36. Spring.

Swanston, D.W. 1991. Natural Processes. American Fisheries Society Special Publication 19: 139-180.

Thomas, J.W., E.D. Forsman, J.B. Lint, et al. 1990. A Conservation Strategy for the Northern Spotted Owl : A Report of the Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl. Portland, OR. USDI, USDA, and NPS. 427 pp.

Thomas, J.W., M.G. Raphael, R.G. Anthony, et al. 1993. Viability Assessments and Management Considerations for Species Associated with Late-successional and Old-growth Forests of the Pacific Northwest. The Report of the Scientific Analysis Team. Portland, OR: USDA Forest Service, National Forest System, Forest Service Research. 530 p.

Tooley, J.E. 1981. Level 4 Inventory of Stouts Creek in the South Umpqua Basin. Bureau of Land Management, Roseburg, Oregon. 33p.

USDA Forest Service, USDC National Oceanic and Atmospheric Administration, USDC National Marine Fisheries Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, and Environmental Protection Agency. 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Assessment Team. (FEMAT)

USDA Forest Service and USDI Bureau of Land Management. 1994a. Final Supplemental Environmental Impact Statement, on Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl.

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

USDI Bureau OF Land Management. 1992a. Draft Roseburg District Resource Management Plan and EIS. Roseburg, OR, 2 vols.

USDI Bureau of Land Management. 1994. Roseburg District Proposed Resource Management Plan/Environmental Impact Statement.

USDI Bureau of Land Management. 1995. Roseburg District Record of Decision and Resource Management Plan.

USDI Fish and Wildlife Service. 1986. Pacific Bald Eagle Recovery Plan (PBERP). Portland, OR. 163 pp.

USDI. 1992b. Endangered and threatened wildlife and plants; Determination of critical habitat for the northern spotted owl. Federal Register (FR), 57(10):1796-1838. January 15, 1992.

USDI. 1992c. Recovery plan for the northern spotted owl - final draft. Portland, Oregon: U.S. Department of the Interior. 2 vol.

Wemple, B.C. 1994. Hydrologic Integration of Forest Roads with Stream Networks in Two Basins, Western Cascades, Oregon. 87 p.

Appendix C. Suitable Spotted Owl Habitat Conditions within Known Owl Nest Sites in the SPS WAU.

GIS Generated Owl Sites and Acreages				Spotted Owl Habitat		
MSNO	Owl Site Name	Acres	Acres	Provincial Radius 1.3 Miles (3345 Acres)		
		0-0.7M	0-1.3M	<30%	30-40%	>40%
ROSEBURG DISTRICT BLM						
3104	Bear Paw	348	1285		X	
3906	E. Fork Poole Creek	458	1036		X	
2087	E. Stouts Creek	246	846	X		
1932	Hyde Ridge	353	765	X		
0296	Mighty Fine	374	894	X		
0283	Miller's Mine	70	634	X		
3909	No Doubt Stout	277	735	X		
1933	Oshea Corners	232	947	X		
0298-A	Oshea Creek	398	1095		X	
0363	Pinfeather	219	652	X		
1997	Poole Creek	520	1478			X
0297	Shively Forks	289	594	X		
0289	Shively Poole	151	766	X		
1813-A	Stouts Creek	103	1028	X		
1934-B	Stouts Meadow	499	1080		X	
0364	Sweat Creek	235	695	X		
4052	Three Stouts	225	621	X		
1935	West Stouts	361	1293		X	

Stouts/Poole/Shively-O'Shea Watershed Analysis Unit
Natural Surfaced Roads on BLM Lands to Obliterate

ROAD	MILES	WATERSHED	ROAD PROBLEM
30-4-22.0 M	0.10	Shively-O'Shea	
30-4-28.2 B	0.70	Shively-O'Shea	
31-3-1.2 A	0.14	Stouts Creek	
31-3-16.3 C	0.50	Stouts Creek	
31-3-16.4 B	0.31	Stouts Creek	Slides/Erosion
31-3-25.0 A	0.38	Stouts Creek	Slides/Erosion
31-4-9.1 A	0.52	Shively-O'Shea	
31-4-9.5 A	0.35	Shively-O'Shea	
31-4-13.0 D	0.61	Shively-O'Shea	
31-4-24.0 B	0.16	Shively-O'Shea	

Stouts/Poole/Shively-O'Shea Watershed Analysis Unit
Surfaced Roads on BLM Lands to Obliterate

ROAD	MILES	WATERSHED	ROAD PROBLEM
30-3-33.0 A	1.60	Poole Creek	Slides/Erosion
30-4-28.3 B	0.63	Shively-O'Shea	Slides/Hard to Find
31-3-1.1 A	0.35	Stouts Creek	
31-3-5.0 A	0.50	Stouts Creek	Slides/Erosion
31-3-10.0 A	0.44	Stouts Creek	Slides
31-3-11.1 A	0.47	Stouts Creek	
31-3-16.0 C	0.56	Stouts Creek	Slides/Erosion
31-4-3.2 A	0.48	Shively-O'Shea	Slides
31-4-3.3 A	0.17	Shively-O'Shea	Slides
31-4-5.0 B	0.43	Shively-O'Shea	Slides/Needs Mulch
31-4-5.1 B	0.04	Shively-O'Shea	Needs Mulching
31-4-5.2 A	0.48	Shively-O'Shea	
31-4-5.3 A	0.52	Shively-O'Shea	Slides/Needs Mulch
31-4-5.4 A	0.40	Shively-O'Shea	Needs Mulch/Short Spur
31-4-5.5 A	0.50	Shively-O'Shea	Needs Mulching
31-4-9.0 A	0.78	Shively-O'Shea	Slides
31-4-9.6 A	0.16	Shively-O'Shea	
31-4-13.3 A	0.28	Shively-O'Shea	
31-4-14.2 A	1.52	Shively-O'Shea	
31-4-15.0 A	1.07	Shively-O'Shea	Slides/Erosion
31-4-19.0 C	0.97	Shively-O'Shea	Erosion
31-4-20.0 B	0.13	Shively-O'Shea	
31-4-23.0 A	0.51	Shively-O'Shea	
31-4-7.0 A	0.64	Shively-O'Shea	Erosion
31-4-23.2 A	0.42	Shively-O'Shea	

Stouts/Poole/Shively-O'Shea Watershed Analysis Unit
Natural Surfaced Roads That Access Private Land to Obliterate

ROAD	MILES	WATERSHED	ROAD PROBLEM
30-3-29.1 A	0.23	Poole Creek	
31-4-9.3 A	0.10	Shively-O'Shea	
31-4-13.0 C	0.15	Shively-O'Shea	
31-4-13.1 A	0.18	Shively-O'Shea	Hard to Find
31-4-13.4 A	0.11	Shively-O'Shea	
31-4-19.2 A	0.48	Shively-O'Shea	Erosion

Stouts/Poole/Shively-O'Shea Watershed Analysis Unit
Surfaced Roads That Access Private Land to Obliterate

ROAD	MILES	WATERSHED	ROAD PROBLEM
30-3-29.0 B	0.29	Poole Creek	Slides
30-3-29.0 D	0.14	Poole Creek	
30-3-30.1 B	0.68	Poole Creek	
30-4-36.0 A	0.84	Poole Creek	Slides/Erosion
30-4-26.2 A	0.27	Shively-O'Shea	Erosion
30-4-26.3 A	0.33	Shively-O'Shea	
31-3-15.0 A	0.41	Stouts Creek	Erosion
31-3-15.2 A	1.14	Stouts Creek	Slides/Erosion
31-4-2.0 A	0.28	Shively-O'Shea	
31-4-2.1 A	0.26	Shively-O'Shea	
31-4-4.4 B	0.13	Shively-O'Shea	Needs Mulching
31-4-20.0 A	0.23	Shively-O'Shea	Slides/Erosion

Stouts/Poole/Shively-O'Shea Watershed Analysis Unit
Roads to be Improved

ROAD	MILES	SURFACE	WATERSHED	PRIVATE	ROAD PROBLEM
31-3-11.0	0.50	Natural	Stouts Creek	Yes	
31-3-17.1	2.40	Natural	Stouts Creek	Yes	Slides/Erosion

Stouts/Poole/Shively-O'Shea Watershed Analysis Unit
Roads to be Closed

ROAD	SEGMENT	MILES	WATERSHED	DATES CLOSED TO PUBLIC	REASON FOR CLOSURE
31-3-1.0	AB	2.07	Stouts Creek	Entire Year	Wildlife
31-3-1.1	A	0.35	Stouts Creek	Entire Year	Wildlife
31-3-1.2	A	0.14	Stouts Creek	Entire Year	Wildlife
31-3-1.3	A	1.23	Stouts Creek	Entire Year	Wildlife
31-3-1.4	A	1.12	Stouts Creek	Entire Year	Wildlife
31-3-1.5	A	0.84	Stouts Creek	Entire Year	Wildlife
31-3-2.2	ABC	1.52	Stouts Creek	Entire Year	Wildlife
30-2-31.0	A	0.79	Stouts Creek	Entire Year	Wildlife
31-4-19.0	C	0.97	Shively-O'Shea	Entire Year	Wildlife
30-4-27.0	A	1.52	Shively-O'Shea	Entire Year	Wildlife
30-3-29.1	A	0.23	Poole Creek	Oct. 15-May 15	Water Quality
30-3-30.0	D	0.45	Poole Creek	Oct. 15-May 15	Water Quality
30-3-34.0	N	0.18	Stouts Creek	Oct. 15-May 15	Water Quality
30-4-21.0	B2	1.07	Shively-O'Shea	Oct. 15-May 15	Water Quality
30-4-21.1	E	0.10	Shively-O'Shea	Oct. 15-May 15	Water Quality
30-4-22.0	M	0.10	Shively-O'Shea	Oct. 15-May 15	Water Quality
30-4-27.1	A	0.40	Shively-O'Shea	Oct. 15-May 15	Water Quality
30-4-28.0	G2	0.59	Shively-O'Shea	Oct. 15-May 15	Water Quality
30-4-28.0	I	0.10	Shively-O'Shea	Oct. 15-May 15	Water Quality
30-4-28.2	B	0.60	Shively-O'Shea	Oct. 15-May 15	Water Quality
30-4-35.0	A	0.10	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-3-7.1	D	0.36	Poole Creek	Oct. 15-May 15	Water Quality
31-3-16.3	C	0.50	Stouts Creek	Oct. 15-May 15	Water Quality

ROAD	SEGMENT	MILES	WATERSHED	DATES CLOSED TO PUBLIC	REASON FOR CLOSURE
31-3-16.4	B	0.31	Stouts Creek	Oct. 15-May 15	Water Quality
31-3-25.0	A	0.38	Stouts Creek	Oct. 15-May 15	Water Quality
31-3-29.0	C	0.30	Stouts Creek	Oct. 15-May 15	Water Quality
31-4-4.1	E	0.25	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-4.3	B	0.20	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-9.1	A	0.52	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-9.2	A	0.17	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-9.3	A	0.10	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-9.4	A	0.10	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-9.5	A	0.35	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-11.1	C	0.35	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-11.1	E	0.18	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-13.0	B	0.21	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-13.0	C	0.15	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-13.0	D	0.61	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-13.1	A	0.18	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-13.4	A	0.11	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-19.2	A	0.48	Shively-O'Shea	Oct. 15-May 15	Water Quality
31-4-24.0	B	0.16	Shively-O'Shea	Oct. 15-May 15	Water Quality

April 30, 1996

Addendum
Precommercial Thinning
Stouts/Poole/Shively-O'Shea
Watershed Analysis

I. Introduction.

This document appends the watershed analysis for the Stouts/Poole/Shively-O'Shea Watershed.

There are 17 units comprising 417 acres of young stands 12 to 18 years of age that have been identified as having in excess of 350 trees per acre and which could be precommercially thinned. All of these stands are located in the Roseburg District portion of the South Umpqua River/Galesville LSR.

II. Proposal.

The South Douglas Resource Area proposes to precommercially thin approximately 417 acres within the South Umpqua River/Galesville LSR to provide adequate growing space for the young trees and to provide for stand diversity by selecting hardwoods and minor conifer species where possible within the stand.

Project Specifications would include:

(a) Spacing would be on a 16 X 16 foot spacing which would leave approximately 170 trees per acre in these stands.
(b) Hardwood clumps which fall on the spacing will be thinned to one stem.
(c) Pacific yew will be reserved from cutting and will not be considered as a leave tree for spacing requirements.
(d) All trees greater than 8 inches in diameter will be reserved.

III. Review of Proposal against Watershed Analysis and Late-Successional Reserve Assessment.

The proposed project is in conformity to both the watershed analysis and the lsr assessment. Stated objectives in younger stands designed to accelerate the successional development of stand to a late-successional character include decreasin stand densities by precommercial thinning to promote faster diameter growth on desiralble conifer and hardwood species (WA pg.38, LSR Assessment pg. 34).

Attached is a list of units which could be included in this proposed project.

PRECOMMERCIAL THINNING
STOUTS CREEK LSR
FY 1996

KEY NO.	UNIT NO.	TRS	FOREST TYPE	ACRES	WTSHD	REMARKS
13522	1	30-2-31-090	D1=1981	20	USU	
13177	2	31-3-01-006	D1=1983	29	USU	
13176	3	31-3-01-005	D1=1983	65	USU	
13179	4	31-3-01-008	D1-=1982	4	USU	
13178	5	31-3-01-007	D1-=1981	16	USU	
13139	6	30-3-35-004	D1-=1983	9	USU	
13138	7	30-3-35-003	D1-=1983	44	USU	
13140	8	30-3-35-005	D1-=1983	21	USU	
13183	8	31-3-03-005	D1-=1983	17	USU	DF SEEDLING PLOT
13137	9	30-3-35-002	D1-=1983	21	USU	
13136	10	30-3-35-001	D1-=1984	21	USU	
13184	11	31-3-03-006	D1-=1981	13	USU	
13223	12	31-4-11-001	D1-=1984	14	LSU	
13227	13	31-4-13-004	D1-=1984	31	LSU	
13228	14	31-4-13-005	D1=1984	23	LSU	
12222	15	31-4-09-005	*D1-1981	26	LSU	
13243	16	31-4-23-001	D1-=1982	43	LSU	
	TOTALS			417		