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Salmon River Watershed Analysis

Mt. Hood National Forest

USDA - Forest Service

First Iteration

Appendices

Appendix A - Soils, Geology

Appendix A

SEDIMENT REGIME

The objectives of evaluating the sediment regime for the Salmon watershed analysis are to:
identify practices which contribute to sediment production and delivery within the watershed.
evaluate and document the relative potential for surface erosion from soil disturbing activities within the watershed and between subwatersheds.
evaluate consistency with the Aquatic Conservation Strategy Objectives for sediment regime.
identify depositional channel reaches and estimate potential impacts to aquatic habitat.
prioritize activities and locations for mitigation, restoration and monitoring.

SEDIMENT PRODUCTION

Surface erosion occurs when the mineral soil surface is exposed to water from rainfall, snowmelt or runoff. Compacted surfaces increase runoff velocity and susceptibility to erosion. In forested ecosystems, trees, understory vegetation and litter and duff combine to effectively protect most soil surfaces from surface erosion. Surface erosion can result in reduced soil productivity. In addition, transport of eroded materials to water resources such as stream channels can reduce water quality and diminish aquatic habitat. Soil erodibility is influenced by soil characteristics that affect infiltration, permeability, water holding capacity, and aggregate stability. The transport of eroded materials to a water body is influenced by a number of site specific factors: slope gradient, slope length and shape, surface roughness, vegetation cover, texture of the eroded material, delivery distance and concentration of the water flow (USEPA-USDA Forest Service, 1980).

Analysis Methods

Methodology for the sediment module closely follows methods for evaluating surface erosion from hillslopes and roads described in the Standard Methodology for Conducting Watershed Analysis (Washington Forest Practices Board, 1993).
At certain steps within the module, data limitations necessitated alternate steps to those described in the methodology. The departures from the methodology retain the logic and assumptions of the original module and contribute to the state analysis objectives. Alternate steps are described in the project folder.
Data utilized for the analysis includes:

- Geology Map
- Landform Map
- Streams, wetlands, lakes and other water bodies
- Roads, harvest, recreation sites, quarries and other soil disturbing activities within 300 feet of lakes, streams and waterbodies.
- Erosion rates by landform
- Rates of sand application on Highways 26 and 35 within the watershed (measured)

TABLE SED.1
RELATIVE SEDIMENT CONTRIBUTION
BY ACTIVITIES OTHER THAN ROADS

SUBWATERSHED	RECREATION	HARVEST	GRAZING	TOTALS
Boulder		NO DATA		
Salmon	0.00			0.00

Cheeney	0.02			0.02
Lower Salmon	14.45			14.45
South Fork/Mac Hall	0.11			0.11
Middle Salmon	0.09			0.09
Linney/Draw	3.83	20.04		3.83
Upper Salmon	0.13	5.77	29.33	35.23
Mud Creek	11.77	10.62		22.39
West & East Forks	21.18	6.74		27.92

Table Sed.2
Potential Sediment From Management Activities
Salmon Watershed

SUBWATERSHED	ACRES	ROAD MILE	RECSED	HARVSED	ROADSED	COW SED	HWY SED	MILLQ SED	TOTAL SED
BOULDER	5076.0	0.4		NO DAT	18.1				18.1
SALMON R	5582.0	6.7	0.0		262.0				262.0
CHEENEY	6118.0	0.0	0.0		1.5				1.5
LOW SALMON	3742.0	4.0	14.4		88.0				102.5
SO FK/MAC HALL	8057.0	2.5	0.1		143.1				143.2
MID SALMON	13234.0	0.7	0.0		106.1				106.2
LINNEY/DRAW	10189.0	4.5	3.8	20.0	248.6				272.5
UP SALMON	11770.0	7.5	0.1	5.7	270.3	29.3	376.9		682.4
MUD CREEK	4394.0	3.4	11.7	10.6	160.4				182.8
W&E FORK	5098.0	8.5	21.1	6.7	533.6		2082.5		2644.1
WATERSHED TOTAL	73260.0		51.5	43.1	1832.1	29.3	2459.5		4415.7

Table Sed.3
Potential Sediment Delivery to Key Depositional Reaches
Salmon Watershed

KEY DEPOSITIONAL REACH	Subwatersheds	ACRES	TOTAL SED	per AREA Index
SALMON MEADOWS	W&E FORK	5098.0	2644.1	
	UP SALMON	4397.0	436.6	
	Reach Total	**9495.0**	**3080.7**	**0.3**
MUD CREEK	**Reach Total**	**4394.0**	**182.8**	**0.0**
LINNEY/DRAW	**Reach Total**	**10189.0**	**272.5**	**0.0**
FLY FISHING BRIDGE	UP SALMON	7376.0	2644.1	
	SO FK/MAC HALL	8057.0	143.2	
	MID SALMON	13234.0	106.2	
	Reach Total	**28667.0**	**2893.6**	**0.1**

SALMON RIVER WATERSHED ANALYSIS

Landslide Analysis

GEOLOGY

The Salmon River Watershed is comprised of 35 geologic units which were identified during previous mapping. The units are briefly described below in their approximate order of occurrence, from youngest to oldest.

Qal — ALLUVIUM: Unconsolidated gravel, sand, and silt eroded from debris- and pyroclastic-flow deposits emplaced during the Holocene. Occurs in the area of Salmon River Meadows and to a lessor extent within the Salmon-Huckleberry Wilderness.

Qhtc — PYROCLASTIC AND DEBRIS-FLOW DEPOSITS: Poorly-sorted pebbles, cobbles, and boulders in a reddish-gray sandy matrix. Occurs on the south slopes of Mt. Hood down-slope from the Qhpc unit.

Qhpc — PYROCLASTIC AND DEBRIS-FLOW DEPOSITS: Poorly-sorted boulders, cobbles, and pebbles in a gray sandy matrix. Includes minor debris-flow avalanche deposits of hydrothermally altered material. Occurs at the headwaters of the Salmon on the south slopes of Mt. Hood.

Qls — LANDSLIDE DEPOSITS: Poorly-sorted deposits of slumps and large debris slides. Several such deposits occur throughout the watershed but the largest is found east of Linney Butte.

Qt — TALUS: Blocky to platy, coarse-grained, rock detritus that is found throughout the watershed and forms unvegetated rock slopes (felsenmeers).

Qca — COLLUVIAL AND ALLUVIAL SLOPE DEPOSITS: Poorly-sorted slope and stream deposits that grade into alluvium at valley floors and give way to bedrock at higher elevations. Found along the valley wall to the west of Mud Creek.

Qgnt — TILL OF NEOGLACIAL AGE: Poorly-sorted pebble through boulder size material in a silty-sand matrix. It is found at the extreme headwaters of the watershed and forms moraines in the vicinity of contemporary alpine glaciers.

Qg — GLACIAL DEPOSITS: Very poorly-sorted pebbles, cobbles, and boulders in a fine-grained, silty-sand matrix. Includes alluvium where streams have reworked the deposits. Occurs over a broad area in the eastern half of the watershed and at the upper reaches of tributary streams in the western half of the watershed.

Qget TILL OF EVANS CREEK AGE: Poorly-sorted pebbles, cobbles, and boulders forming moraines that may mark the maximum extent of glaciers 20,000 years BP. Found only at the extreme eastern edge of the watershed north of Highway 35.

Qha ANDESITE AND DACITE LAVA: Form three dome-like features on the south slopes of Mt. Hood in the vicinity of Timberline Lodge.

Qaw ANDESITE OF WAPINITIA PASS: Medium gray, slightly porphyritic lava. Found in a small area in the southeastern corner of the watershed.

Qdf DACITE OF FROG LAKE BUTTES: Thick, massive lava found in a thin band in the southeastern corner of the watershed.

Qacl ANDESITE WEST OF CLEAR LAKE: Uncertain exposure of slightly porphyritic andesite in the south Salmon River valley wall.

Qob OLIVINE BASALT: Slightly porphyritic lava flows and minor breccia in the vicinity of Frying Pan Quarry.

QTtla ANDESITE: Lava flows of pyroxene andesite. Occurs in two locations south of Trillium Lake.

QTtlb BASALT: Lava flows of olivine basalt found in a small area east of Trillium Lake.

QTat ANDESITE OF TOM DICK AND HARRY MOUNTAIN: Slightly to moderately porphyritic pyroxene andesite lava flows. Occurs in one location on the south slopes of Mt. Hood.

QTb BASALT: Olivine basalt and minor basaltic andesite located in the southern portion of the watershed between High Rock and Frying Pan Lake.

QTbme BASALTIC ANDESITE OF MIRROR LAKE AND EUREKA PEAK: Lava flows found on Eureka Peak west of Trillium Lake.

Tiba INTRUSIVE ROCKS OF BASALT AND BASALTIC ANDESITE: Very fine- to medium-grained massive lava forming small plugs in the vicinity of High Rock.

Tbbu BASALT OF BULL RUN WATERSHED AND OTHER RIDGE-CAPPING BASALT: Lava flows that cap weaker pyroclastic rock at Hunchback Mountain in the northwest corner of the watershed.

Tbao BASALTIC ANDESITE OF THE OAK GROVE FORK: Lava flows and minor breccia, chiefly basaltic andesite in composition, slightly porphyritic containing clinopyroxene phenocrysts. Found along the southwestern edge of the watershed.

Tbg BASALT NEAR GHOST CREEK: Very dark gray to black, columnar jointed lava containing phenocrysts up to 4 mm. Occurs in a very

small area near Salmon River Meadows in the eastern portion of the watershed.

Ttla — ANDESITE: Lava flows found in a narrow band west of Salmon River Meadows.

Trbg — ROCKS OF BARROW RIDGE AND GUNSIGHT BUTTE: Chiefly andesite lava flows and minor volcaniclastic strata, but composition ranges from basalt to dacite. Found as a very small exposure immediately north of Trillium Lake.

Ta — ANDESITE: Lava flows of slightly porphyritic pyroxene andesite broadly capping the Rhododendron Formation in the western portion of the watershed.

Tfa — FINE-GRAINED ANDESITE: Nearly aphyric medium-gray andesite forming small plugs or lava flows in the southwestern portion of the watershed.

Tas — ANDESITE OF SALMON BUTTE: Moderately porphyritic lava flows and volcaniclastic rocks occurring along ridgetops in the southwestern portion of the watershed.

Tma — ANDESITE OF MIDDLE AND LATE MIOCENE AGE: Porphyritic pyroxene andesite lava found over a wide area near Linney Creek Campground in the central portion of the watershed.

Tdp — DACITE OF PLAZA LAKE: Light-blueish-gray to light-greenish-gray pyroxene dacite lava found in a small area west of Salmon Butte near the headwaters of South Fork Creek.

Tbam — BASALTIC ANDESITE OF MACK HALL CREEK: Slightly porphyritic lava flows and minor breccia found near Salmon Butte in the southwestern portion of the watershed.

Trh — RHODODENDRON FORMATION: Andesite tuff breccia that originated mainly as pyroclastic flows and lahars. The most common unit in the watershed, it comprises many of the steep valley walls cut by the Salmon River and its tributaries.

Tcwf — FRENCHMAN SPRINGS MEMBER OF THE WANAPUM BASALT: A member of the Columbia River Basalt Group consisting of fine-grained lava flows, and found along the trunk of the Salmon River down-stream from Linney Creek Campground.

Tcgn — GRANDE RONDE BASALT: A member of the Columbia River Basalt Group consisting of very fine-grained lava flows, and found along the trunk of the Salmon River down-stream from Linney Creek Campground.

The geologic units can be grouped into eight general categories:

Resistant Rock: Qha, Qaw, Qdf, Qacl, QTtla, QTtlb, QTb, QTat, QTbme, Tiba, Tbg, Tbbu, Ttla, Tfa, Tma, Tdp, Tcwf, and Tcgn;

Weak Rock: Trh, and Tma where hydrothermal alteration has occurred;

Intermediate Rock: Qob, Ta, Tbao, Trbg, Tas, and Tbam;

Till: Qg and Qget;

Landslide and Colluvial Deposits: Qca and Qls;

Unconsolidated Material: Qgnt, Qhpc, and Qhtc;

Alluvium: Qal;

Talus: Qt.

GEOMORPHOLOGY

The Salmon River originates on the south slope of Mt. Hood and flows several miles to the south before emptying into the Sandy River some fifteen miles west of Mt. Hood. Its crescent-shaped watershed can be justly divided on the basis of slope angle into eastern and western halves. The majority of the eastern portion has been glaciated and is gently-sloping at angles less than 30 percent. Consequently, both road construction and timber harvest have occurred on a broad scale. Exceptions are Mud Creek Ridge and the eastern watershed boundary where local slope angles may exceed 70 percent. The western half of the watershed falls mainly within the Salmon-Huckleberry Wilderness Area. It has been maturely dissected by the Salmon River and many of its tributaries, and is essentially free of roads and timber harvests. Here, slope angles frequently exceed 70 percent, and are seldom less than 30 percent.

The watershed has been divided into twelve landform types based primarily on slope angle, drainage density, and susceptibility to landsliding. These landforms are described below.

RESISTANT ROCK--STEEP SLOPES--DEEPLY INCISED (RRSSDI): Occurs in the central and western portions of the watershed. Slopes typically exceed 50 percent but small inclusions of slopes less than 50 percent have been made.

RESISTANT ROCK--STEEP SLOPES (RRSS): Occurs in the central and eastern portions of the watershed where local relief is slight. Slope angles usually exceed 50 percent.

WEAK ROCK--STEEP SLOPES (WRSS): Found only in the western portion of the watershed where the Rhododendron Formation occurs or where resistant rock has been hydrothermally altered and weakened. It consists of deeply incised valley walls and narrow ridges. Slopes exceed 70 percent regularly and are seldom less than 50 percent.

INTERMEDIATE ROCK--STEEP SLOPES (IRSS): Forms steeply-sloping valley walls and narrow ridges. May be deeply incised by tributary streams, particularly in the western portion of the watershed where it caps the Rhododendron Formation. Slope angles normally exceed 50 percent.

RESISTANT AND INTERMEDIATE ROCK--GENTLE SLOPES (RIRGS): Occurs almost exclusively in the eastern half of the watershed and comprises much of the land around Frying Pan Quarry and the Abbott Burn. Slopes range from approximately 10 to 40 percent.

WEAK ROCK--MODERATE SLOPES (WRMS): Occurs within the western portion of the watershed, primarily within the Salmon-Huckleberry Wilderness Area. It generally represents ridge tops or, possibly, Quaternary landslide deposits. Its slope angles seldom exceed 30 percent.

ALLUVIAL VALLEY BOTTOMS AND TERRACES (AVBT): This landform type includes alluvial deposits and low-gradient glacial deposits, and occurs primarily within the eastern portion of the watershed. Slope angles rarely exceed 30 percent.

GLACIATED VALLEY SIDE SLOPES (GVSS): Occur throughout the watershed at elevations above about 2500 feet. In the eastern half of the watershed, they form portions of the valley walls of the Salmon River. In the western half of the watershed, they mantle valley walls and narrow valley floors containing tributary streams of the Salmon River. Slope angles range from 20 to 50 percent, with inclusions of steeper ground.

LANDSLIDE AND COLLUVIAL DEPOSITS (LCD): Three Quaternary landslides and a large band of colluvium have been mapped within the watershed. Their slope angles are typically less than 30 percent, but may exceed 50 percent in some areas.

TALUS (T): Several large talus slopes occur within the watershed on slopes ranging from less than 30 percent to more than 70 percent.

UNCONSOLIDATED MATERIAL--STEEP SLOPES (UMSS): Found only on the south slopes of Mt. Hood where pyroclastic and debris flow deposits and recent glacial deposits mantle the slopes. Slope angles are usually around 50 percent, but may exceed 70 percent.

UNCONSOLIDATED MATERIAL--MODERATE SLOPES (UMMS): Found only on the south slopes of Mt. Hood where pyroclastic and debris flow deposits mantle the slopes. Slope angles are around 30 percent and seldom exceed 50 percent.

LANDSLIDES

The landslide potential and relative sediment delivery rating for the landform types were determined by examining selected aerial photographs, field-checking landslides in three locations, consulting past project reports, interpreting an existing landslide map, and by consulting Randy Brown and Pat

Petteys. Since the western portion of the watershed has a greater propensity for landsliding, a more detailed landslide inventory was undertaken here. In some cases, as many as five sets of air photos were examined, compared to only two sets for the eastern portion of the watershed.

The results of this work are summarized in the tables below. Table I shows the combined landslide potential for each landform type. Table II shows the types of mass wasting and erosion processes that are likely to occur on a particular landform. Table III lists each landform type and its relative sediment delivery rating for mass wasting. It is important to note that landslide potential and relative sediment delivery are not necessarily equivalent because of variations in delivery capability and proximity to streams. Table IV summarizes the characteristics and processes associated with each landform.

TABLE I. LANDSLIDE POTENTIAL BY LANDFORM TYPE

Resistant Rock--Steep Slopes--Deeply Incised	High
Resistant Rock--Steep Slopes	High
Weak Rock--Steep Slopes	High
Intermediate Rock--Steep Slopes	High
Resistant and Intermediate Rock--Gentle Slopes	Low
Weak Rock--Moderate Slopes	Medium
Alluvial Valley Bottoms and Terraces	Low
Glaciated Valley Side Slopes	Medium
Landslide and Colluvial Deposits	Medium
Talus	Medium
Unconsolidated Material--Steep Slopes	High
Unconsolidated Material--Moderate Slopes	Medium

TABLE II. DOMINANT SEDIMENT TRANSPORT PROCESSES BY LANDFORM TYPE

	Debris Flow	Debris Slide	Earthflow	Slump	Creep	Rock Fall	Surface Erosion	Stream Bank Failures
RRSSDI	H	H	---	L	L	H	M	H
RRSS	M	H	---	L	L	H	M	H
WRSS	H	H	M	M	M	L	M	H
IRSS	H	H	---	L	L	M	M	H
RIRGS	L	L	---	L	---	---	L	L
WRMS	M	M	M	M	M	---	M	M
AVBT	---	---	---	M	---	---	L	H
GVSS	M	M	L	M	M	L	M	M
LCD	L	M	M	M	M	---	M	M
T	---	M	---	---	---	H	---	L
UMSS	H	H	---	---	L	---	H	H
UMMS	M	M	---	---	L	---	H	M

TABLE III. RELATIVE SEDIMENT DELIVERY BY LANDFORM TYPE*

Resistant Rock--Steep Slopes--Deeply Incised	High
Resistant Rock--Steep Slopes	High
Weak Rock--Steep Slopes	High
Intermediate Rock--Steep Slopes	High
Resistant and Intermediate Rock--Gentle Slopes	Low
Weak Rock--Moderate Slopes	Medium
Alluvial Valley Bottoms and Terraces	Low
Glaciated Valley Side Slopes	Medium
Landslide and Colluvial Deposits	Medium
Talus	Low
Unconsolidated Material--Steep Slopes	High
Unconsolidated Material--Moderate Slopes	Medium

*Sediment delivery via stream-bank failures is not considered in this table. Rather, it refers only to sediment delivered by debris flows, debris slides, earthflows, slumps, creep, and rockfall.

TABLE IV. LANDFORM CHARACTERISTICS AND ASSOCIATED PROCESSES

--Associated Rock Types--

Resistant Rock: fine-grained basalt and basaltic andesite flows, slightly porphyritic lava with minor flow breccia, basaltic and andesitic/dioritic intrusions;

Intermediate Rock: andesitic lava flows with volcaniclastic interbeds and minor tuff breccia and laharic deposits; composition ranges from basalt to dacite;

Weak Rock: andesitic tuff breccia, fluvial volcaniclastic sandstone and minor siltstone, hydrothermally altered andesite (propylite);

Alluvium: generally sorted deposits of sand, gravel, and re-worked ash;

Till: generally unsorted and compacted deposits of detritus ranging in size from silt to boulder;

Landslide and Colluvial Deposits: unsorted deposits of weathered detritus from adjacent formations;

Talus: unsorted deposits of basaltic or andesitic boulders and cobbles;

Unconsolidated Deposits: poorly-sorted dacite pebbles, cobbles, and boulders in sand matrix with silt and fine sand interbeds; may include deposits of hydrothermally altered material;

--Slope-Forming Processes--

Resistant Rock: lava flows, regional uplift, fluvial and glacial erosion, debris flows, debris slides, surface erosion, creep;

Intermediate Rock: lava flows, regional uplift, fluvial and glacial erosion, debris flows, debris slides, slumps, surface erosion, creep;

Weak Rock: pyroclastic and laharic deposits, minor lava flows, regional uplift, fluvial and glacial erosion, debris flows, debris slides, slumps, possible earthflow, surface erosion, creep;

Alluvium: peak-flow deposits, stream-bank failures, surface erosion;

Till: glaciation, debris slides, debris flows, surface erosion, creep;

Landslide and Colluvial Deposits: large-scale slumps and debris slides, minor debris slides and surface erosion within the slide mass, possible high-magnitude earthquakes;

Talus: glaciation, frost heave, debris slides, creep;

Unconsolidated Material: air-fall, debris flow, and pyroclastic flow deposits, glacial outwash, stream-bank failures, debris slides, debris flows, surface erosion.

--Sediment Delivery Mechanisms--

Resistant Rock: stream-bank failures, debris flows, debris slides, surface erosion, creep;

Intermediate Rock: stream-bank failures, debris flows, debris slides, surface erosion, slumps, creep;

Weak Rock: stream-bank failures, debris flows, debris slides, slumps, minor earthflows, surface erosion, creep;

Alluvium: stream-bank failures, surface erosion;

Till: stream-bank failures, debris slides, debris flows, surface erosion, creep;

Landslide and Colluvial Deposits: stream-bank failures, debris slides, surface erosion;

Talus: debris slides, subsurface erosion of fines, rockfall;

Unconsolidated Material: stream-bank failures, debris slides, debris flows, surface erosion, dry ravel.

LANDSLIDE DISCUSSION

The Salmon River Watershed is notable for its steep slopes, abundant precipitation, and weak geologic formations, conditions which are highly conducive to landsliding. The area most sensitive to landsliding is the western half of the watershed in the Salmon-Huckleberry Wilderness. Here, the Salmon River and its tributaries have cut steep, narrow valleys out of weak pyroclastic rock (WRSS), making them susceptible to debris slides. Where the valley walls have been incised by smaller tributaries, the potential for debris flows is high. In either case, the likelihood of sediment delivery from landslides occurring on these slopes is high. Moreover, the presence of resistant rock (RRSS and IRSS) may not eliminate the landslide risk, particularly of debris flows. It is often at the contacts of these landform types that landslides originate. The landslide inventory revealed that nearly all first order streams are capable of transporting large amounts of debris, and many showed convincing signs of recent activity. The aerial photos also revealed many small openings on valley walls and adjacent to streams. Many of these are probably felsenmeers or areas of shallow bedrock, but some are thought to have been created by debris slides.

In contrast, the eastern half of the watershed tends to be less sensitive to mass wasting, primarily because it contains more flat ground. Slope angles in this area seldom exceed 50 percent and are usually less than 30 percent. Exceptions with steeper slope angles include Eureka Peak and the watershed divide near Salmon River Meadows. Much of the land in the eastern half of the watershed also tends to have low drainage densities, further reducing the likelihood of sediment delivery. Stream-bank failures, however, are probably the most common type of landslide in this area and, because of their position, tend to deliver prodigious amounts of sediment to streams.

The steep, upper slopes of Mt. Hood (UMSS) are unvegetated, consist of unconsolidated pyroclastic and debris flow deposits and recent glacial deposits, and may receive in excess of 100 inches of precipitation each year. They are, therefore, highly susceptible to landsliding, particularly during times of heavy rainfall or rapid snow-melt when debris flows are easily triggered. Furthermore, since this landform type borders the headwaters of the Salmon River, sediment delivery is virtually assured.

Most of the landslides that occur in the headwaters above timberline are not single, isolated events. Rather, they are sites of continuous activity, regardless of the specific process. This is because the unstable conditions at the site tend to outlive the stabilizing effects of a single event. Indeed, the site itself may be considered a relatively permanent feature on the landscape. For example, a colluvial hollow acts like a receptacle for debris. As it fills, its stability decreases, as does, therefore, the amount of water needed to trigger a landslide. When the landslide occurs and the hollow is flushed, it returns to more stable conditions. However, if the source of debris has not been depleted, the hollow will start to fill again. In most environments, the filling and flushing of colluvial hollows takes some time. But on Mt. Hood and other stratovolcanoes, the process is rapid and landslides occur again and again at the same site. Other sites of recurrent mass wasting include rock outcrops, the distal end of ablating glaciers, and icefalls, where

seracs are prone to toppling. Not all such features are necessarily found within the watershed, but they are typical of Mt. Hood.

Tributary channels may act like colluvial hollows and collect debris introduced by headward erosion or deposited by stream-bank failures. Although many tributaries have been scoured to bedrock, their channel floors may periodically be mantled in loose rock and detritus. Episodes of peak flow associated with large storms or rain-on-snow events typically mobilize this debris in either of two ways. If a debris flow is triggered at the headwaters of the tributary, it may collide with and mobilize the channel debris as it passes. Lacking a debris flow, peak flow volumes must be sufficiently large to entrain the channel debris as a hyperconcentrated flood or possibly a debris flow. This alludes to the importance of events such as the 1964 flood, the cause of which is generally regarded to be a 100-year storm.

During the landslide inventory, 117 landslides were identified. Of these, 105 occurred within the period of photo record which dates back to 1946. The 12 remaining landslides are considered to be ancient and are only visible because they are quite large. Of the recent landslides, 67 are debris flows, 21 are debris slides, and 17 are stream-bank failures. Separating these landslides by land use indicates that 12 are associated with roads, 9 with clearcuts, 5 with roads and clearcuts, 5 with old clearcuts or possibly fire, 2 with non-forested land, and 72 with mature forest. In addition, at least 65 appear to be associated with the 100-year storm that occurred in 1964, 88 appear to have delivered sediment to waterways, and at least 11 have failed more than once within the period of photo record.

TABLE V. LANDSLIDE TYPES AND ASSOCIATIONS

117	landslides identified
12	ancient
105	recent
67	debris flows
21	debris slides
17	stream bank failures
105	
12	associated with roads
9	associated with clearcuts
5	associated with roads and clearcuts
5	associated with old clearcuts or fire
2	associated with non-forested land
72	associated with mature forest land
105	

One might be tempted to conclude that natural rates of mass wasting are not significantly altered by road-building and clear-cutting. There are, however, two reasons why this conclusion cannot be reached based on these data alone, each of which reflects a lack of control over one or more important variables. First, the inherent stability of the managed landforms is not the same as that

of the unmanaged landforms. For example, both the geologic units and slope angles are notably different. For a valid comparison, variables such as these need to be held constant, and this was not done. In this case, however, even if these variables had been held constant, the unforeseen influence of the 1964 storm would have been sufficient to alter the results since its impact varied locally and was greatest in the lower portion of the watershed near the confluence of the Salmon and Sandy rivers. In other words, irrespective of land use, areas more impacted by the 1964 storm are expected to have elevated rates of mass wasting.

EFFECTS OF THE 1964 FLOOD

Of the 105 recent landslides identified in the inventory, 65 were first visible in the 1967 set of aerial photographs. The similarities between these landslides support their association with the 1964 storm. Although some may be unrelated to the storm, others not identified or lacking the clear association may in fact have been caused by the 100-year storm.

The majority of the landslides associated with the storm are debris flows. Most of these occurred near the confluence of the Salmon and Sandy Rivers, where the effects of the storm were severe (Waananen et al. 1971), possibly due to the orientation of the Sandy River Valley. As mentioned above, debris flows often originate where colluvium and detritus have accumulated in tributary channels during periods of normal flow. The material is then mobilized during peak flow events or when triggered by another landslide. Following the 1964 storm, valley walls were scarred with the fresh tracks of debris flows. In some cases, material was transported more than one mile through tributary channels to trunk streams on the valley floor. The size of the deposits for any particular event is unknown, but rough estimates of the total volume displaced can be made from the channel length and cross-sectional area.

ADDITIONAL COMMENTS AND OBSERVATIONS

Previous geologic and stability investigations for the Green Canyon Timber Sale indicate that there are several major faults in the vicinity with the predominant fault trend in a northwest to southeast direction. These faults contribute to the poor stability of the area by fracturing and altering the associated rock, which in turn facilitates rapid weathering through the affected zone as a result of groundwater movement. Planes of weakness created in this manner can lead to shallow, planar landslides. In addition, the soil - bedrock contact tends to be shallow and abrupt and therefore is the site of abundant groundwater flow. At steeper slope angles, shallow debris slides may be associated with saturated soils formed by shallow groundwater flow.

From the limited amount of field work conducted in the area, stream-bank failures appear to be vastly underrepresented in the landslide inventory. This is of course because stream-bank failures tend to be small and are often concealed by riparian vegetation. They are, therefore, difficult to detect on

aerial photographs at a scale of 1:12,000. Rough estimates indicate that stream-bank failures producing in excess of 50 cubic yards of debris can be concealed from air photo observation by the riparian canopy. In addition, while debris flows and debris slides tend to have return intervals of a few years, stream-bank failures occur with great regularity. It seems that stream-bank failures probably account for a majority of the sediment delivered to streams by landslides.

Certain geologic conditions within the watershed are inherently unstable and merit special attention during field investigations. Some of these areas are listed below. The majority of these sites are found in the Salmon-Huckleberry Wilderness Area where geologic formations tend to be weak and slopes tend to be steep.

1. Contacts between weak and resistant rock. Changes in permeability at these contacts often result in springs or shallow groundwater tables. Altering the groundwater conditions in these areas can trigger debris slides and debris flows. Important contacts include the following:

   Contacts between weak rock (WRSS) and resistant rock (RRSS) on steep slopes. Occur throughout the watershed.

   Contacts between the Rhododendron Formation (Tr) and more resistant overlying cap rock (Ta), found in the western portion of the watershed.

   Contacts between lava flows and the area of propylitic alteration, located between Wolf Creek and Goat Creek.

2. Around the edges of intrusions (Tiba). The heat from these intrusions has often altered and weakened the adjacent rock making it more prone to mass wasting. Intrusions are found throughout the watershed, though some are not mapped because of their small size.

3. Along the margins of dikes and sills. Similarly to intrusions, the heat associated with dike and sill emplacement tends to alter and weaken the adjacent rock making it more prone to mass wasting. Dikes and sills are not shown on the maps but may be found throughout the watershed.

4. Along stream banks within the WRSS, UMSS, or UMMS landforms. Slumps, debris slides, and stream-bank failures may occur next to down-cutting or laterally-cutting streams. These failures are not usually visible on aerial photographs.

5. On slopes with gradients in excess of 60 percent where shallow soils overlie less permeable materials. Although these conditions may be met on many landforms, they are most common on landform types RRSS, WRSS, and GVSS. These conditions are prone to shallow failures.

6. Along the margins of ancient landslides or earthflows. Changes in groundwater levels near these margins often trigger debris slides, debris flows, and slumps.

7. On the scarps of ancient landslides. These areas are steep, have shallow soils, and are prone to debris slides and debris flows. The scarps are not designated on the maps.

8. At the headlands of tributaries with steep gradients, usually found within the Salmon-Huckleberry Wilderness. Historically, many such areas have experienced debris flows, and those presently filled or filling with colluvium may fail with the slightest provocation.

9. In the vicinity of fault zones on steep slopes. Increased fracturing and weathering in these areas decreases stability. Faults are not shown on the landform map.

There is some overlap among the geologic conditions listed above. Although the presence of these conditions does not automatically mean that the area is unstable, it does mean that the area needs to be investigated carefully by an experienced geologist, geotechnical engineer, or geomorphologist during project-level planning.

The information provided in this report should be used in conjunction with the landform map as a tool for evaluating the appropriateness of conducting certain management activities on particular landforms. Land-use planners and anyone responsible for planning management activities should consult these documents prior to finalizing their plans.

LIMITATIONS AND ASSUMPTIONS

1. Due to time constraints, only a few of the inventoried landslides were field-checked. Consequently, it is not possible to accurately estimate landslide sediment production.

2. Rates of sediment delivery were not calculated.

3. The connection between the '64 Flood and specific mass wasting events is assumed. Aerial photographs were used to bracket the flood event, but the time they span is 9 years, 1958 to 1967. It is possible that some of the landslides that appear to be associated with the '64 Flood actually occurred earlier or later.

4. Natural rates of landslide occurrence were not determined.

5. A causal relationship between land management practices and landslide occurrence could not be determined due to the nature of the analysis, a lack of field work, and the inability to control for certain factors such as the distribution of landforms, the types and locations of permissible management activities, and the '64 Flood. This causal relationship, however, is well documented in the scientific literature (O'Loughlin 1974; Swanson and Dyrness 1975; Gresswell et al. 1979; Amaranthus et al. 1985; Wolfe and Williams 1986; Neely and Rice 1990; Sidle 1992).

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Appendix B - Historic Fire and Vegetation

The following historical fire and vegetation information is summarized from:

Forest Conditions in the Cascade Range Forest Reserve, US Geological Survey 1903.

On file is the accompanying map of the Cascade Range Forest Reserve for Mt. Hood and Vicinity dated 1901.

1903 HISTORIC INFORMATION
NORTHERN PORTION CASCADE RANGE FOREST RESERVE

STAND OF TIMBER SPECIES (M. feet B.M.)

	WHITE PINE	LODGEPOLE PINE	YELLOW PINE	WHITE-BARK PINE	WHITE FIR	NOBLE FIR	LOVELY FIR	SUBALPINE FIR
T2S;R9E	435	7,833	277	1,937	865	506	11,206	1,296
T3S;R7E	414	-	-	-	-	4,228	11,012	714
T3S;R 81/2E	752	-	-	-	300	2,805	6,432	1,980
T3S;R9E	5,989	4,951	-	582	2,401	88,733	46,046	3,343
T4S;R7E	-	-	-	-	-	1,232	9,907	-
T4S;R8E	2,228	4,120	-	-	-	18,334	14,319	-
T4S;R81/2E	3,522	45	-	-	-	1,759	1,230	-
T4S;R9E	7,510	13,840	-	-	2,356	25,867	5,779	-

	RED FIR	MERTENS HEMLOCK	PATTON HEMLOCK	RED CEDAR	ENGELMANN SPRUCE	TAMARACK	JUNIPER
T2S;R9E	15,848	3,685	25,649	370	8,416	11,957	-
T3S;R7E	31,744	270	-	316	-	-	-
T3S;R8 1/2E	20,555	17,276	6,165	5,140	119	-	-
T3S;R9E	108,771	31,577	46,393	4,184	11,119	3,435	-
T4S;R7E	18,638	14,474	1,539	203	-	-	-
T4S;R8E	93,553	125,038	6,260	7,888	1,626	374	-
T4S;R8 1/2E	87,006	85,019	-	15,596	-	341	1,553
T4S;R9E	170,969	130,386	4,779	11,318	812	9,445	-

CLASSIFICATION OF LAND (acres)

	TIMBERED	BURNED	GRAZING	BARREN	RESTOCKED	GLACIER	CULTIVATED	WATER
T2S;R9E	11,560	1,225	130	7,845	-	2,280	-	-
T3S;R7E	1,455	5,315	-	-	4,728	-	22	-
T3S;R8 1/2E	2,230	3,435	95	-	-	-	-	-
T3S;R9E	14,900	4,255	600	3,285	-	-	-	-
T4S;R7E	6,560	11,880	-	-	2,510	-	-	-
T4S;R8E	11,525	8,115	60	-	2,355	-	-	25
T4S;R8 1/2E	5,880	35	85	-	-	-	-	-
T4S;R9E	18,855	3,015	810	-	-	-	-	360

FOREST CONDITIONS

	AVERAGE HEIGHT, CLEAR TIMBER	AVERAGE %, CLEAR TIMBER	AVERAGE DIAMETER	LITTER	REPRODUCTION	DEPTH OF HUMUS
T2S;R9E	26 feet	-	15 inches	Medium	Fair	2 do
T3S;R7E	-	-	-	-	-	-
T3S;R8 1/2E	47 feet	-	23 inches	Medium	Light	1 1/2 do
T3S;R9E	29 feet	10%	19 inches	Medium	Medium	1 1/2 do
T4S;R7E	-	-	-	-	-	-
T4S;R8E	45 feet	-	21 inches	Medium	Light	1 1/3 do
T4S;R8 1/2E	25 feet	-	20 inches	Medium	Light	1 1/2 do
T4S;R9E	-	-	-	-	-	-

LIST OF TIMBER SPECIES
NORTHERN PORTION CASCADE RANGE FOREST RESERVE

HISTORIC NAME (1903)	CURRENT NAME
Yellow pine, *Pinus ponderosa*	Ponderosa pine, *Pinus ponderosa*
White pine, *Pinus monticola*	Western white pine, *Pinus monticola*
Lodgepole pine, *Pinus murrayana*	Lodgepole pine, *Pinus contorta*
White-bark pine, *Pinus albicaulis*	Whitebark pine, *Pinus albicaulis*
White fir, *Abies grandis*	Grand fir, *Abies grandis*
Noble fir, *Abies nobilis*	Noble fir, *Abies procera*
Lovely fir, *Abies amabilis*	Pacific silver fir, *Abies amabilis*
Subalpine fir, *Abies lasiocarpa*	Subalpine fir, *Abies lasiocarpa*
Red fir, *Pseudotsuga taxifola*	Douglas-fir, *Pseudotsuga menziesii*
Mertens hemlock, *Tsuga mertensiana*	Western hemlock, *Tsuga heterophylla*
Patton hemlock, *Tsuga pattoniana*	Mountain hemlock, *Tsuga mertensiana*
Red Cedar, *Thuja plicata*	Western red cedar, *Thuja plicata*
Alaska cedar, *Chamaecyparis nootkatensis*	Alaska yellow cedar, *Chamaecyparis nootkatensis*
Engelmann spruce, *Picea engelmannii*	Engelmann spruce, *Picea engelmannii*
Tamarack, *Larix occidentalis*	Western larch, *Larix occidentalis*
Incense cedar, *Libocedrus decurrens*	Incense cedar, *Calocedrus decurrens*
Yew, *Taxus brevifolia*	Pacific yew, *Taxus brevifolia*
Pacific oak, *Quercus garryana*	Oregon white oak, *Quercus garryana*
Cottonwood, *Populus trichocarpa*	Black cottonwood, *Populus trichocarpa*
Quaking aspen, *Populus tremuloides*	Quaking aspen, *Populus tremuloides*
Maple, *Acer macrophyllum*	Big-leaf maple, *Acer macrophyllum*
Chinquapin, *Castanopsis chrysophylla*	Chinquapin, *Castanopsis chrysophylla*
Alder, *Alnus oregona*	Red Alder, *Alnus rubra*

1903 HISTORIC INFORMATION
NORTHERN PORTION CASCADE RANGE FOREST RESERVE

TOWNSHIP 2 SOUTH, RANGE 9 EAST

This township contains the summit of Mount Hood and the greater part of the barren slopes around it. A little more than one-half of its area is timbered. Streams radiate in every direction from the glaciers and snowfields of the mountain, forming a succession of canyons, some of which are deep and very precipitous. The wide altitudinal range, extending from 3,500 to 11,000 feet, favors many peculiar conditions of forest growth. Patton hemlock and white-bark pine reach the highest elevations on the mountain. The timber line varies from 6,000 to 6,500 feet, but on the southeastern slope white-bark pines grow at an elevation of 7,400 feet.

Above timber line are areas of vegetation which afford some grazing, and below are wide areas of open woods in which is an excellent growth of grass, but the soil is so light that the trampling of sheep would soon destroy the thin sod.

The soil is either light volcanic ash or glacial deposits of sand, gravel, and rock, and it erodes rapidly under the action of water.

The timber of this township is remote from natural means of transportation, so it is not probable that it will be in demand for some time.

TOWNSHIP 3 SOUTH, RANGE 7 EAST

Only the eastern half of this township is included in the reserve. Across this area, from southeast to northwest, extends a high precipitous ridge dividing Salmon River from Still Creek and Zigzag River. West of Salmon River is a similar range; hence the surface of this township is extremely rough and broken.

Almost the entire area has been burned over. Along the east side of Salmon River, from the reserve line to the bend of the stream, is a narrow strip of timber, mainly second growth, consisting of red fir mixed with maple and alder, averaging 10 inches in diameter. Above the bend, along the narrow river bottom, is the remnant of a once grand forest of red fir and cedar, which in some instances have attained a diameter of 8 or 9 feet. Only three or four trees remain on each acre, being very old trees which have long since reached maturity.

Above the forks of the river, extending through section 34, remains an excellent body of red fir which is estimated to be from 75,000 to 100,000 feet per acre. Many of the trees are dead, and the litter is very heavy as it is all along the stream. Along Still Creek and Zigzag, the conditions are similar to those described in Township 3 south, Range 8 east.

Reforestation is very good in all parts except on the divides above 3,500 feet. The soil is very rocky in all sections.

TOWNSHIP 3 SOUTH, RANGE 8 1/2 EAST

The greater part of this fractional township is burned. Some good timber remains in the wide basin at the head of Mud Lake Creek and along Still Creek. This consists of mainly red fir and hemlock. On the slopes toward Zigzag the timber is Patton hemlock and other Alpine species.

The soil is very rocky sand.

TOWNSHIP 3 SOUTH, RANGE 9 EAST

The township lies southeast of Mount Hood, and includes a part of the barren land above timber line. It is drained by Hood, White, and Salmon rivers. The wide bottom of the canyon of White River is an immense deposit of rocks and sand which is constantly flooding down from the moraine deposits and barren ridges below the glacier.

Evidence of an old forest remain, showing that at one time this canyon was heavily forested, but now nothing of any value remains. The canyon at the headwaters of Hood River is very similar to that of White River, but the movement of debris has long since ceased and the basin is well covered with timber, most of which is lodgepole pine, lovely fir, and Patton hemlock. On the sides of the canyons of these streams there is an abundance of timber of the finest quality, consisting mainly of noble and red fir.

At the head of the basin of Hood River, and on the White River divides, below timber line, are grassy slopes and alpine meadows, through which are scattered clusters of white-bark pine, subalpine fir, and hemlock. South of White River, where the forest has not been devastated by fire, there is generally a good stand of timber.

The soil is volcanic ash, sand, and rock. The timber in the Hood River Basin could be logged down Hood River, but the remainder could only be handled by small portable mills, and the output hauled or flumed to market.

TOWNSHIP 4 SOUTH, RANGE 7 EAST

This township lies on the western side of the reserve and the extremely rough area at the heads of Roaring River, South Fork of Salmon River, and Eagle Creek. The former stream is a tributary of the Clackamas. Terrific forest fires have swept over nearly all of this township, destroying the greater part of its timber. That which is left is along the summit of the high divide between Salmon and Roaring rivers, extending down the basin of the South Fork of Salmon to almost to the township line. Along the summit of the divide the timber is mainly hemlock, lovely fir, and noble fir. Lower is a stand of almost pure red fir, very dense and thrifty, averaging 12 inches in diameter. Along Salmon River the old burns are rapidly restocking with an excellent growth of red fir from 4 to 6 feet in height. Huckleberries are everywhere and there is good sheep range along the divides, but it is difficult of access.

TOWNSHIP 4 SOUTH, RANGE 8 EAST

This township is all drained by Salmon River. A large part of it has been burned clean, and much more has been damaged by creeping fires. The divides on either side of the Salmon River afford excellent grazing for sheep. The high ridge north of the river is also a favorite huckleberry patch, which is visited annually by Indians from the Warm Springs Indian Reservation. Reforestation along the lower slopes is of an excellent character, being a dense, thrifty growth of red fir. The soil is mostly light sand and gravel of volcanic origin.

A flume down Salmon River would be required to transport the timber. The best timber is along the Mud Lake Branch, in the northeastern part of this township.

TOWNSHIP 4 SOUTH, RANGE 8 1/2 EAST

Nearly all of this township contains a heavy stand of timber. On the slopes of the Mud Creek Basin, it is especially good. It consists of mainly red fir and Mertens hemlock, with some excellent red cedar along the creeks. The soil is sandy gravel with much rock along Salmon River.

If logs could be driven down Salmon River this timber could all be logged to that stream very cheaply, but it is questionable whether this could be done with any profit.

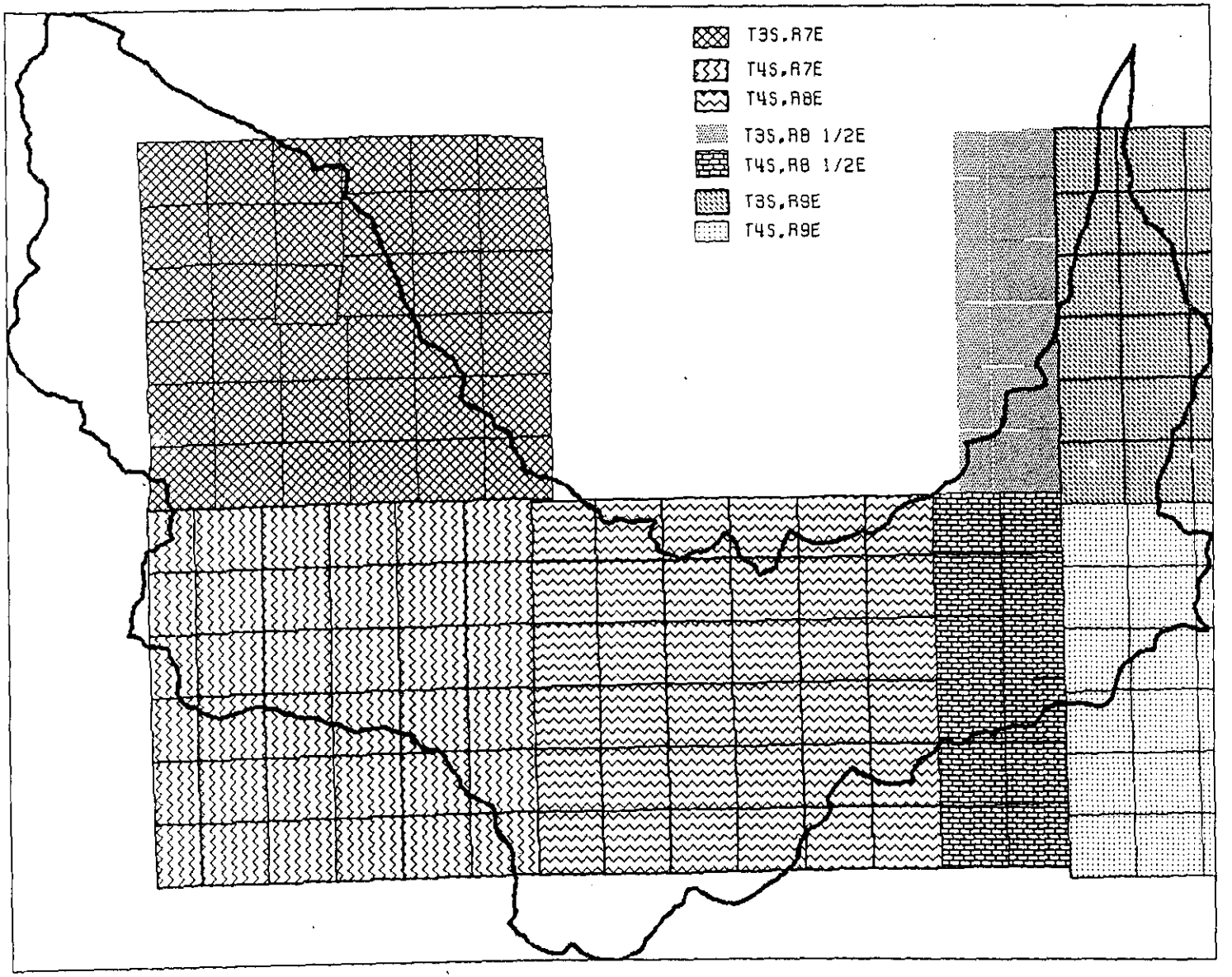
The soil is very rocky on the steep hills, where much rock in place occurs, but along the more gentle slopes and creek bottoms the soil is deep and fertile.

It is very improbable that the timber standing in his township will ever be cut, but it could be logged to Salmon River.

TOWNSHIP 4 SOUTH, RANGE 9 EAST

This township covers the low pass across the main divide of the Cascade Mountains where crossed by the Barlow and Oak Grove roads. It is drained on the western side by Salmon River and on the eastern side by White River and two of its important tributaries - Clear Lake and Frog Lake creeks. The timber is variable and generally of poor quality. Mertens hemlock and red fir are the prevailing species. Throughout the southern half of the township a large percentage of the timber is defective. The original forest was red fir and some of the old trees are still standing, apparently sound and clear, but all are badly decayed. A number of burns have occurred, but these are not extensive. All of this timber could be logged to the streams mentioned, but flumes or other artificial means of transportation would be required to transport it to market.

The soil is mostly a deep gravelly sand.


T3S,R7E
T4S,R7E
T4S,R8E
T3S,R8 1/2E
T4S,R8 1/2E
T3S,R9E
T4S,R9E

Appendix C - Fire

Appendix C - Fire

Fire Occurrence

Historical fire occurrence records for the Mt. Hood National Forest consist of documented fires from 1960 - 1994. Fire records prior to 1960 consist of a survey of the Cascade Range Forest Reserve conducted in 1901 - 1903, fire lookout records circa 1920, and fire lookout panoramic photos taken in 1933 - 1934. It is apparent by studying the available historic information that fire occurrence in the Salmon River Watershed and the surrounding watersheds (Eagle, Roaring River, and Zigzag watersheds) that fire has burned much of the area.

Prior to the establishment of the Cascade Range Forest Reserve, fires raged throughout most of the forest with little or no effort to suppress them. It is believed that many of the fires were intentionally set by sheepmen to increase acreage of range land, as well as hunters, campers, and others who thoughtlessly left unattended campfires to spread. American Indians were also thought to have been responsible for intentionally setting some fires to improve berry picking fields and increase forage for animals.

As documented in the survey of the Cascade Range Forest Reserve, as much as 60% of the land base of some townships was burned over by wildfires. The survey documents that the earliest forest fires were believed to have occurred around 1852 which burned over the area near Government Camp and the headwaters of Mud Creek.

The next documented record of fire activity is the fire lookout records circa 1920. The survey map lists 15 fires that occurred from 1908 through 1917 within the Salmon River watershed. The largest fire documented was in the Sherar Burn area (10,000 acres) which occurred in 1915. Lightning was listed as the causal factor for this fire. The second largest fire (3,700 acres) originated within the Eagle Creek watershed and burned into the western portion of the Salmon River watershed. Ignition source for this fire is unknown. Of the 15 documented fires during this time period, 42% were from lightning; 28% were human-caused; 2% were from brush/debris burning, and for 28%, the ignition source was unknown.

The panoramic photos taken from the fire lookouts in 1933-34 show the devastation throughout much of the watershed. Also evident in the photos is evidence of more recent fires burning in the Wolf Camp Butte/Sherar Burn area. it is apparent that additional fires have burned within this area due to lack of old down woody material and snags in the photos.

Beginning in 1960, the Mt. Hood national Forest started keeping records for statistical fires. This data base is located at the Mt. Hood National Forest Supervisor's Office in Gresham. The records have been transposed and are kept on a PC data base for record keeping and storage. Since 1960 there have been approximately 142 statistical fires within the Salmon River watershed. These fires range in size from class A (less than .25 acre) to class C (10-99 acres). The graphs in Chapter 4 show the fires by statistical cause (lightning, smoking, equipment, etc.) and the fire occurrence by size class for the period form 1960 to 1994. Of the 142 fires, 60% were human-caused (campfires, smoking); 15% were lightning; 8% were debris burning; 5% were equipment fires, and 12% were miscellaneous, of unknown origin.

There are no fire data records or fire lookout photos from 1934-1959. Sometime during this period, at least one other significant fire occurred within the Salmon River watershed, the Abbott Burn. At the present time, I have not been able to locate any documentation for this fire.

When comparing the Size and Structure Veg 1944 map with the circa 1920 lookout photos and 1933-1934 panorama photos, they compare almost identically with the typical vegetation class associated with high fire activity levels.

In 1994, a national airtanker study was conducted to determine the past, present, and proposed most efficient use of airtankers for fire suppression. One of the products of the study was an analysis of the numbers and types of fires for the past 25 years. In comparing the statistical cause of fires for the past 25 years for the Pacific Northwest in general, 75% of all fires were caused by lightning. In contrast, only 15% of the fires in the Salmon River watershed were lightning starts. In reviewing the locations of the fires for the 1970-79 period, approximately 80% of all human-caused statistical fires were abandoned campfires or smoking fires in or near Trillium Lake Campground. Most of the remaining human-caused fires could be associated with dispersed campsites or existing road-trail systems.

Given the fire occurrence from 1960 to present, the Salmon River watershed can expect to have a fire occurrence rate of .062 fires/1,000 acres/year. This occurrence rate translates into approximately 4 fires per year.

Fire Regimes

There are three dominant fire groups within the Salmon River Watershed. They are Fire Groups 8, 9, and 10. These are summarized from the draft document "Fire Ecology of the Mid Columbia" (Evers et al, 1994). These groups are based

on plant associations and can be used to describe and predict the influence of fire. However, existing conditions within the Salmon River Watershed do not necessarily fit these descriptions. Therefore, existing conditions must be taken into consideration when using these Fire Groups for predictions or management recommendations.

FIRE GROUP 8 covers approximately 80% of the watershed analysis area and includes most of the western hemlock and Pacific silver fir plant associations. In general, the plant associations reflect a warm, moist climate. 'Classic' old growth stand conditions (closed canopy overstory of large diameter trees over a lush understory) are common in undisturbed areas, indicating infrequent disturbance. Fuel loading s tend to build rapidly once the overstory begins to die from insect and disease attack and the canopy breaks up. Deep duff and large logs are typical of this group. The resulting wildlife hazard is usually low to moderate, depending on weather conditions in a given year and whether extensive canopy gaps have begun to develop. Burning for hazard reduction should occur when duff moisture is relatively high to avoid soil damage and seedbed scarification caused by prolonged smoldering.

FIRE GROUP 9 covers approximately 6% of the watershed analysis area and occurs primarily on south and west aspects in the Salmon River drainage. Typical site characteristics include stony, rocky, gravely, or otherwise well drained soils, steep slopes and generally dry conditions. Fire Group 9 consists of dry western hemlock plant associations where Douglas-fir is the major species with a grassy and brushy understory. Stand-replacing crown fires can develop and do not necessarily depend on the combination of prolonged draught and east wind conditions typical of Group 8. In the absence of east winds, topography and rockiness tend to control fire size and shape.

FIRE GROUP 10 covers approximately 8% of the watershed analysis area and occurs in higher elevations in glacially carved streams and rivers, higher peaks and ridges, and at Timberline on Mt. Hood. Mountain hemlock is the most common tree species in all associations. Group 10 is characterized by relatively sparse fine fuels and moderate to heavy loadings of large diameter woody fuels. Much of the dead and downed woody fuel loadings result from wind and snow breakage, windthrow, insects, and disease. Stands in this fire group are not important timber producing stands. Instead, much of the area covered by this group is managed for wilderness, watersheds, and recreation. Fire is infrequent and tends to do little damage in terms of management objectives. However, fire fighting equipment and tactics can greatly damage these fragile sites; therefore, prescriptions should allow fire to more nearly play its natural role.

Fire Management Direction

Fire management direction within the Salmon River watershed is divided into several different groups requiring different management direction. Included within the Salmon River watershed is State of Oregon protected land, Wildland Urban interface lands, general forest land, and land within the Salmon Huckleberry Wilderness.

Fire management direction for National Forest Lands can be found in the Forest Plan, FSM 5100, and in the Fire Management Action Plan (FMAP). In general, all three documents direct fire and fuels management activities to accomplish three basic objectives:

1. Minimize cost plus net value change (costs and changes to inherent resources values).
2. Use appropriate suppression response for all wildfires, based on Objective #1 above.
3. Fire management activities shall contribute to the most cost-effective fire protection program consistent with Management Area management direction.

Fire management activities include presuppression (such as construction and maintenance of fuelbreaks, helispots, water sources, etc.); prevention; suppression; detection, and treatment of both natural and activity fuels.

Additional direction in various land allocations includes:

> KEY SITE RIPARIAN AREAS (A9). Heavy equipment should not be used for fire suppression. Use of chemical fire retardants should be minimized. Prescribed burning should be considered for the purpose of enhancing riparian resource values.
>
> SCENIC VIEWSHEDS (B2). Prescribed burning may occur for wildlife forage enhancement, but broadcast burning should not occur within foreground areas. Use of handpile prescriptions should be emphasized in near-foreground areas. Exceptions to the downed Woody Standards and Guidelines may occur within near-foreground areas with Retention and partial Retention Visual Quality Objectives.
>
> GENERAL RIPARIAN AREAS (B7). Dozer firelines should not be constructed during wildlife suppression activities, although perpendicular crossings are allowed with subsequent rehabilitation. Broadcast burning

may be allowed where prescriptions are consistent with riparian management activities.

For all lands within the Salmon River watershed, the most common suppression response will be a control strategy. Confine strategy may be feasible, but it has not been used to date.

In addition to the direction described above, the Northwest Forest Plan created new land allocations and additional Standards and Guidelines related to fire and fuels management. Allocations in the Salmon River watershed include Late-Successional Reserves, Riparian Reserves, and Matrix lands within a Tier 1 Watershed.

LATE SUCCESSIONAL RESERVES. Silvicultural activities are permitted to reduce the risk of large scale catastrophic disturbances. Activities should focus on younger stands and avoid degrading suitable spotted owl habitat and late-successional forest conditions. Activities in older stands are permitted under certain conditions. treatment should be designed to provide effective fuel breaks. Associated fuel treatments should promote the u se of minimum impact suppression tactics during wildfires. The goal of wildfire suppression is to limit the size of all wildfires. Prescribed natural Fire (PNF) may be considered.

RIPARIAN RESERVES. Fire and fuel management activities should meet the Aquatic Conservation Strategy objectives and minimize disturbance of riparian ground cover and vegetation. Management strategy should recognize the role of fire in the ecosystem and identify where fire suppression or fuels management activities could damage long-term ecosystem function. As with Late-Successional Reserves, the goal is to limit the size of all wildfires and PNF may be considered.

MATRIX LANDS. Until specific models are developed, fuel treatments should leave at least 120 linear feet of logs per acre at least 16 inches in diameter and 16 feet long. Retain as many of the existing downed logs as possible. Fuel treatments will need to protect retained green-tree patches in harvest units. Prescribed burning should minimize consumption of community or stand condition. Additional wildfire hazard reduction activities may occur in coordination with local governments, agencies and landowners in the wildland/urban interface.

WILDERNESS. Preference shall be given to those suppression methods and strategies resulting in the least practicable land burned, commensurate with cost-effectiveness, and having the least effect on wilderness values. Currently a fire management plan does not exist for the Salmon Huckleberry Wilderness. When the fire management plan has been completed, naturally occurring ignitions could be managed as a prescribed fire unless declared a wildfire. The use of motorized

equipment fore fire suppression unless approval has been obtained from the Forest Supervisor (see FSM 2324.2).

Fire Protection Infrastructure

The fire protection infrastructure in the Salmon River Watershed consists of detection, water sources, helispots, prevention signs, and patrols. Primary fire detection is provided by Clear Lake Butte lookout. Engines and tenders can draw water from numerous streams within the watershed.

No formally designated helispots exist within the Salmon Watershed Analysis area. There are numerous areas suitable for landing, including existing rock pits, large openings in the forest canopy, old spots off Hunchback Trail, and forest road intersections.

Airtankers are available for retardant support from Redmond Air Center with additional support from Troutdale Air Tanker Base. In addition, the Zigzag IHC crew is located at Zigzag District Office and a 100-person fire cache is stationed at Troutdale Tanker Base.

The district maintains a 300 gallon fore prevention patrol, a 1,000 gallon engine, and a 3,000 gallon watertender. Additional support is available from the Columbia Gorge Bull Run Engine and Bear Springs District.

Potentially extreme fire conditions usually occur during late July and August and are exacerbated by east wind events. These are most often confined to the Gorge, but can occur forestwide. When east wind events occur, most, if not all, fire lookouts on the forest report having the same event. Prevailing areas of stronger east winds are not apparent.

STATE PROTECTED LANDS. Oregon Department of Forestry (ODF) Molalla provides fire protection services for State Protected lands. As identified in the Appropriate Suppression Response guide, ODF maintained a 600 gallon and a 1,000 gallon engine fore suppression forces. In addition, the Mt. Hood also has a reciprocal fire fighting agreement (closest forces) that states both units (FS and ODF) will respond to wildfires within these areas.

RURAL FIRE PROTECTED LANDS. Brightwood, Wildwood, and Wemme are included in the Hoodland Rural Fire protection District. The Forest Service provides backup assistance to Hoodland in the event that a fire from a private structure threatens National Forest Lands.

Appendix D - Botany

BOTANICAL RECOMMENDATIONS AND RESTORATION OPPORTUNITIES

Summarized below are points of botanical interest for the Salmon River Watershed. Refer to documents covering Survey and Manage Species, Species of Concern, Riparian Species, and Noxious Weeds/Invasive Plants for more information.

SURVEY AND MANAGE SPECIES/TABLE C3

1. Species in Table C3 with survey strategy ratings 1 (manage known sites beginning in 1995) and 2 (conduct surveys and manage sites for 1999 project implementation and beyond) demand the most immediate attention. Survey and Management Guidelines for species with 1,2 ratings are due from the REO in June 1995. Recommendations listed below for fungi, lichens, bryophytes and vascular plants documented in the Salmon River watershed could change based on these guidelines.

2. *Martiella* #649, rare endemic false truffle (1,3): Minimize non-winter use of Phlox Point Area. Light camping OK. Identify areas of similar habitat.

Martellia

3. *Oxyporus nobilissmus*, noble polypore (1,2,3): NW Oregon / SW Washington endemic (only 8 sites known, not found elsewhere in world). Protect known site on road 220 from logging activities with one square mile buffer with fungus in center. Survey potential habitat.

4. Lichens and Bryophytes (1,2,3,4): a) Get documented locations for lichens from Mark Boyll. b) For nitrogen-fixing arboreal species - maintain 10-40 acre patches of old growth trees for microclimate and dispersal. 200+ year old trees with large lateral branches and emergent crowns are important (Appendix J2 pg. 228-234). c) For riparian species - maintain a diversity of hardwoods in stands, especially large big leaf maple. Control special forest product harvest of lichens and mosses. (Appendix J2 pg. 240-241). d) For aquatic species - maintain clear, clean water (Appendix J2 pg. 242-243). e) For rock species - maintain shading and microclimate. f) Control harvest of mosses and lichens as special forest products.

5. *Hypogymnia oceanica*, rare oceanic-influenced lichen (1,3): Get exact location on Salmon-Huckleberry Trail #793a from Mark Boyll. Consider special buffer designation for site to protect microclimate from impacts (Appendix J2 pg. 245-246).

6. *Allotropa virgata*, sugar stick (1,2): Need more surveys of potential habitat to determine locations. Create "Wanted" poster for district personnel, public.

7. *Botrychium minganese* and *B. montanum*, grapeferns (1,2): Mt. Hood NF Sensitive Plants. Maintain and enhance wet cedar areas.

8. *Corydalis aquae-gelidae*, coldwater corydalis (1,2): A NW Oregon / SW Washington endemic (found nowhere else in the world); Mt. Hood NF

Sensitive Plant and candidate for federal listing. a) Confirm site on gravel bar in Salmon River upstream of Green Canyon Campground. b) Determine extent of population in Linney Creek/Draw Creek, evaluate habitat and potential for restoration of habitat as recommended in the Salmon National Wild and Scenic River Management Plan (1993). c) If populations are located in riparian reserves with buffer widths of less than 300 ft, increase width to 300 ft around population site (Draft Survey and Management Guidelines for *Corydalis aquae-gelidae*, Stein 1995).

9. Coptis trifolia, threeleaf goldthread (1,2): Mt. Hood NF Sensitive Plant Conduct further surveys of potential habitat. Suggest Botanical Special Interest Area designation for Jackpot Meadows and exclusion of grazing.

OTHER PLANT SPECIES OF CONCERN

10. Unusual plant species grow in the wet meadows of the Salmon River Watershed: Buxbaum's sedge, cotton grass, scheuchzeria, pale blue-eyed grass (an iris relative), lesser bladderwort and wild cranberry. Pale sedge has not been located since 1987. The Salmon National Wild and Scenic River Management Plan (1993) recommends evaluating Salmon River/Redtop Meadows for Botanical Special Interest Area designation in 1996.

11. *Scheuchzeria palustris var. americana*, scheuchzeria: Mt. Hood NF Sensitive Plant. Salmon National Wild and Scenic River Management Plan (1993) recommends designing methodology and location of partial grazing exclosure in Salmon River Meadows to monitor impacts on scheuchzeria. Incorporate direction for protection in grazing allotment plan.

RIPARIAN RESERVES

12. Due to lack of knowledge about bryophytes, lichens and fungi maintain recommended widths.

13. Restore vegetation and functions of riparian areas in Mud Creek drainage. Enhance connectivity between wet meadows and creek. Recognize the Mud Creek area as one of high vegetative diversity and as a transition area between west Cascades and east Cascades vegetation.

NOXIOUS WEEDS

14. Continue aggressive control of knapweeds; use herbicides as needed.

15. Target tansy ragwort population in Linney/Draw Creek area for monitoring and biocontrol.

16. Keep eyes open in wet meadows for purple loosestrife invasion.

17. Work with adjacent private landowners to control blackberries and prevent spread onto USFS land.

18. Develop strategy to control English ivy.

19. Prevent invasion of noxious weeds into restoration areas by removing weeds on site before conducting ground disturbing activities and maintaining/planting native vegetation.

WET MEADOWS

20. Wet Meadows: a) Create species lists for wet meadows. b) Recognize importance of Redtop/Salmon River Meadows complex for plant diversity. c) Evaluate the potential to designate this complex as Botanical Special Interest Area as proposed in Salmon River National Wild and Scenic Management Plan (1993). d) Evaluate potential to designate Jackpot Meadows as Botanical Special Interest Area for Coptis trifolia and associated species. e) Restore vegetation and connectivity of Mud Creek wet meadows and riparian area. f) Assess conditions of wet meadows in Passline/Snowshoe area.

21. Oak Openings: Create species lists for oak openings. Create management scheme for maintaining oak openings in landscape.

22. Grassy Balds/Rocky Outcrops: Create species lists for Salmon River Bluffs and other areas of importance. Buffer rock outcrops from disturbance, especially those north-facing and moist, to maintain microclimate for lichens and bryophytes.

23. Alpine/subalpine: Salmon National Wild and Scenic River Management Plan (1993) recommends designing monitoring plan for plant communities in zone of river and high-use recreation sites.

BOTANY

Molly Sullivan
Spring, 1995

III. CODES USED IN THE ATTATCHED TABLE:

The attached table format is similar to the ROD Table C-3 on pages 49 to 61, with fungi groups listed first, lichen groups second, bryophytes third, and vascular plants last. Additional columns were added to incorporate habitat information and known range and/or geographic extent. Appendix J2, pages 83-247, provided a large percent of the information available regarding species range and geographic extent. A format "key" is also attached. The key identifies codes used to expedite and condense this document. Among the codes is "D" for documented occurrence on the Mt. Hood National Forest. An asterisk (*) preceding a D indicates that there is a specimen of that species in our Forest Herbarium at the Supervisor's Office in Gresham.

Survey Strategy: 1= manage known sites; 2 = survey prior to activities manage sites; 3 = conduct extensive surveys and manage sites; 4 = conduct general regional surveys

Watersheds:

S - Salmon
ZZ- Zigzag
SR- Sandy River
BR- Bull Run

Occurrence:

D - Documented sites on MHNF
p - Potential habitat present
n - Not likely to occur
? - Unknown, inadequate info.
S - Seen, but not documented

Trees and Shrubs:

ABAM - Abies amabilis (Pacific silver fir)
ABCO - Abies concolor (White fir)
ABGR - Abies grandis (Grand fir)
ABLA2 - Abies lasiocarpa (Subalpine fir)
ABPR - Abies procera (Noble fir)
ACCI - Acer circinatum (Vine maple)
Arsp - Arctostaphylos (Manzanita)
CACH - Castanopsis chrisophylla (Chinquapin)
PIAL - Pinus albicaulis (Whitebark pine)
PICO - Pinus contorta (Lodgepole pine)
PIEN - Picea engelmannii (Engelman spruce)
PILA - Pinus lambertiana (Sugar pine)
PIMO - Pinus monticola (Western white pine)
PISI - Picea sitchensis (Sitka spruce)
PIPO - Pinus ponderosa (Ponderosa pine)
PSME - Pseudotsuga menziesii (Douglas-fir)
QUGA - Quercus garryana (Oregon white oak)
TABR - Taxus brevifolia (Pacific yew)
THPL - Thuja plicata (Western redcedar)
TSHE - Tsuga heterophylla (Western hemlock)
TSME - Tsuga mertensiana (Mountain hemlock)

IV. C-3 FUNGI

SPECIES	SURVEY STRAT.	MHNF	S	ZZ	SR	BR	HABITAT	RANGE OR EXTENT
MYCORRHIZAL FUNGI-BOLETES								
Gastroboletus subalpinus	#1, 3	D	P	P	P	N	Above 4500', ecto-michorrizal w/ pines.	Endemic OR Casc. & N. Sierras.

Gastroboletus turbinatus	#3	D	P	P	P	N	Mid-high elev. w/true firs, PIEN/PISI, TSHE/ TSME, w/abundant large woody debris, humus.	WA to N. CA, WA/OR Coast Range; Siskiyou Mts.; Klamath Mts.; N. ID; MI; Mexico.
BOLETES LOW ELEVATION								
Boletus piperatus (1)	#3	D	S	S	P	P	Low-mid elev forests, requires coarse woody debris in Douglas fir.	Unknown.
Tylopilus pseudoscaber (2)	#1, 3	S	S	S	S	P	Low elev, moist habitat, often with Sitka spruce.	Endemic to Pacific NW Coast.
RARE BOLETES								
Boletus haematinus	#1, 3	P	P	P	P	P	High elev. silver fir.	CA north to WA.
Boletus pulcherrimus	#1, 3	P	P	P	P	P	Low-mid elev. conifer.	CA to Canada, north to Olympics.
Gastroboletus imbellus	#1, 3	P	P	P	P	P	Upper-mid elev (5000') w/ ABAM, ABGR, PSME, TSHE, TSME, possibly ectomycorrhizal w/ pine.	Locally endemic to Willamette Nat. Forest, Olallie Trail & Lamb Butte specific.
Gastroboletus rubra	#1, 3	D	P	P	D	N	Upper mid-high elev. w/ mature TSME and developed humus layer.	Endemic to northern WA Cascades south to Willamette Pass in OR. **Trail to McNeil Pt.**
FALSE TRUFFLES								
Nivatogastrium nubigenium	#1, 3	P	P	P	P	P	Mid-high elev. in mature forests w/ abundant lg. coarse woody debris. (relies on mammals for dispersal)	Cascade. Mts. of CA, north to Mt. Adams and northern ID.
Rhizopogon abietis *R. atroviolaceus* *R. truncatus*	#3 #3 #3	P P P	P P P	P P P	P P P	? ? ?	High elev. mixed conifers (true firs, pines, PSME, TSME) in moderate to dry sites.	E. Canada, E. USA; northern Rockies; Strawberry Mts.; Cascades and Klamath Mts. in OR/
Thaxterogaster pinque	#3	D	D	P	P	P	Only mid-high elev. true firs w/ thick humus, large coarse woody debris.	Cascade Mts. south of Canadian border, to N. Sierras; Siskiyou Mts. in OR; Klamath Mts. in CA. **Pioneer Woman's Grave.**
(1) Uncommon in S and ZZ **(2) Uncommon in S, ZZ, and SR**								
UNCOMMON FALSE TRUFFLES								

Macowanites chlorinosmus	#1, 3	?	?	?	?	?	Low elev. PISI, PSME, TSHE w/ lg. coarse woody debris.	Endemic OR coast & Coast Ranges
RARE FALSE TRUFFLES								
Alpova alexsmithii	#1, 3	D	P	D	P	P	Mid to upper-mid elev. w/ true firs, TSHE, and possibly pines.	Endemic to Cascade Mts. & British Columbia Coast Range. **Still Creek Campground.**
Alpova olivaceotinctus	#1, 3	?	?	?	?	?	Single site known in range of N. Spotted Owl w/ Shasta fir.	Unknown.
Arcangeliella crassas *A. lactorioides*	#1, 3	?	?	?	?	?	Mid-high elev. montane forests w/ Abies spp. and/or TSME.	Western OR; northern CA; Mts. Shasta and Lassen.
Destuntzia fusca *D. rubra*	#1, 3	P	P	P	P	P	Low to lower-mid elev. in variously mixed true firs, TSHE, PSME, oaks, pines, redwood.	Mendocino County, CA; Willamette Nat. Forest, Linn County.
Gautieria magnicellaris	#1, 3	P	P	P	P	N	High elev. w/TSME and true firs.	Willamette NF; Klamath NF; Mt. Wash. Wilderness; NE USA; Germany; Czechoslovakia.
Gautieria otthii	#1, 3	P	P	P	P	N	Mid to upper-mid elev., ectomychorrizal w/ Pinaceae.	Northern CA; Siskiyou Mts.; central Cascades in OR; AK; Europe.
Leucogaster citrinus	#1, 3	P	P	P	P	P	Low to high elev. w/ PSME, TSHE, CACH, manzanita, tanoak, or in stands w/ lg. coarse woody debris.	Mendocino County, CA north to Linn & Benton counties.
Leucogaster mocrosporus	#1, 3	D	P	P	P	P	Mid elev. w/ PSME or in stands w/ abundant legacy of coarse woody debris.	Slopes of western Cascade Mts.; northern Cascades & Coastal Range of OR/ southern Cascades of WA.
Macowanites lymanensis	#1, 3	P	P	P	P	P	Mid elev. old-growth TSME/ ABPR forest.	Lyman Lake, Wenatchee, WA.
Macowanites mollis	#1, 3	D	P	P	P	P	Mid elev. mature to old-growth TSME/ Abies spp..	Mt. Rainier NP; Larch Mt.; MHNF.
Martellia fragrans	#1, 3	P	P	P	P	P	Mid-high elev. old-growth TSME/ Abies spp..	Southern OR; northern CA; ID.
Martelllia idahoensis	#1, 3	P	P	P	P	P	Mid-upper mid elev. w/ true firs, Pines.	Coast Range SNF; Casace Range, WNF; northern ID.
Martellia monticola	#1, 3	P	P	P	P	P	Mid-high elev. old-growth TSME/ Abies spp.	Central to north OR Cascades.

Octavianina macrospora	#1, 3	D	P	D	P	P	Mt. foothills in PSME/ TSME old-growth forest.	Former Twin Bridges. Forest Camp (**Kiwanis Camp Rd.**)
Octavianina papyracea	#1, 3	?	?	?	?	?	Coastal mixed PSME/ TSME PISI forest in a fog belt.	Humboldt County, CA.
Rhizopogon brunneiniger	#1, 3	D	P	P	P	P	Low-high elev. dry old-growth PSME/ TSME/fir/pine forest.	Northern OR Cascades & coast ranges; north CA.
Rhizopogon evadens var. subalpinus	#1, 3	D	P	D	P	P	Upper mid elev. TSME/ fir/pine forest near timberline.	Northern CA to WA & ID. **Still Creek Campground.**
Rhizopogon exiguus	#1, 3	P	P	P	P	P	Moist-dry mature to old-growth PSME/ TSME low-mid elev. forest.	Cascade Mts., WA to coast ranges of OR.
Rhizopogon flavofibrillosus	#1, 3	P	P	P	P	P	Mid-upper elev., mature to old-growth PSME forest.	Northern CA; Siskiyou Mts.; central Cascades of OR.
Rhizopogon inquinatus	#1, 3	P	P	P	P	P	Mid-upper mid elev. mature to old-growth PSME forest.	S. Santiam River; WNF; ID.
Sedecula pulvinata	#1, 3	?	?	?	?	?	Mid-high elev. old-growth PSME forest.	Mt. Shasta to Yuba Pass; CA; CO.
UNDESCRIBED TAXA, RARE TRUFFLES & FALSE TRUFFLES								
Alpova sp. nov. *Trappe # 9730*	#1, 3	?	?	?	?	?	Mid-high elev. mature to old-growth PSME/ PILA/ ARSP/ PIAT/ ABMASH forest.	Siskiyou Mts. of southwestern OR.
Trappe # 1966	#1, 3	?	?	?	?	?		
Arcangeliella sp. nov. *Trappe # 12382*	#1, 3	?	?	?	?	?		
Arcangeliella Trappe # 12359	#1, 3	?	?	?	?	?	Mature to old-growth PISI/ TSME/ PSME coast fog belt forest.	Lane, Lincoln, & Tillamook counties, OR.
Chamonixia pacifica sp. nov. *Trappe # 12768*	#1, 3	?	?	?	?	?	Upper mid elev. old-growth PSME/ TSME/ PISI/ ABAM forest.	Northern coastal OR & northern Cascades of WA.
Elaphomyces sp. nov. *Trappe # 1038*	#1, 3	?	?	?	?	?	Mature to old-growth PISI/ TSME/ PSME coast fog belt forest.	Lane, Lincoln, &Tillamook counties, OR.
Gastroboletus sp. nov. *Trappe # 2897*	#1, 3	P	N	N	N	N	Mid-high elev. mature to old-growth PSME/ PILA/ ARSP/ PIAT/ Shasta fir.	Siskiyou Mts. of southwestern OR.
Gastroboletus sp. nov. *Trappe # 7515*	#1, 3	P	P	P	P	P	High elev. old-growth TSME forest.	Crater Lake NP.
Gastrosuillus sp. nov.							High elev. mature to old-growth true fir &	Klamath NF, OR.

Trappe # 7516	#1, 3	P	P	P	P	P	coniferous forest.	
Gastrosuillus sp. nov. Trappe # 9608	#1, 3	P	N	N	N	N	Upper mid elev. mature mixed conifer forest w/ PILA.	Lassen NF, CA
Gymnomyces sp. nov. Trappe # 4703 Trappe # 5576	#1, 3	?	?	?	?	?	Upper mid elev. mature ABPR forest.	Siuslaw NF, OR; Coast Range of OR.
Gymnomyces sp. nov. Trappe # 5052	#1, 3	D	D	D	P	N	High elev. mature to old-growth TSME/ ABAM forest.	**Phlox Pt., Mt.Hood NF, OR.**
Gymnomyces sp. nov. Trappe # 1690 Trappe # 1706 Trappe # 1710	#1, 3	P	P	P	P	P	Upper mid elev. mature to old-growth ABGR/ ABPR/ ABAM/ TSME forest.	Western OR Cascades, Willamette NF.
Gymnomyces sp. nov. Trappe # 7545	#1, 3	P	P	P	P	P	High elev. mature to old-growth true fir & coniferous forest.	Klamath NF, OR
Hydnotrya sp. nov. Trappe # 787 Trappe # 792	#1, 3	D	P	P	P	P	Upper mid elev. old-growth ABAM/ TSME forest.	Mt. Jefferson, Willamette NF.
Hydnotrya subnix sp. nov. Trappe # 1861	#1, 3	P	P	P	P	P	Old-growth ABAM forest.	Gifford Pinchot NF, WA.
Martellia sp. nov. Trappe # 311 Trappe # 649	#1, 3	D	D	P	P	N	High elev. mature to old-growth TSME/ ABAM forest.	**Phlox Pt., Mt.Hood NF, OR.**
Martellia sp. nov. Trappe # 1700	#1, 3	P	P	P	P	P	Upper mid elev. mature to old-growth ABGR/ ABAM/ PSME/ TSME forest.	Willamette NF, OR.
Martellia sp. nov. Trappe # 5903	#1, 3	P	P	P	P	P	Upper mid elev. old-growth ABAM/ TSME forest.	Mt. Jefferson, Willamette NF.
Octavianina sp. nov. Trappe # 7502	#1, 3	P	P	P	P	P	Upper mid elev. mature to old-growth ABGR/ ABAM/ PSME/ TSME forest.	Willamette NF, OR.
Rhizopogon sp. nov. Trappe # 9432	#1, 3	P	N	N	N	N	Mid-high elev. mature to old-growth PSME/ PILA/ Arsp/ PIAT/ Shasta pine forest.	Siskiyou Mts. of southwestern OR.
Rhizopogon sp. nov. Trappe # 1692 Trappe # 1698	#1, 3	P	P	P	P	P	Upper mid elev. mature to old-growth ABGR/ ABAM/ PSME/ TSME forest.	Willamette NF, OR.
Thaxterogaster							Mature to old-growth	Lane, Lincoln, &

sp. nov. *Trappe # 4867* *Trappe # 6242* *Trappe # 7427* *Trappe # 7962* *Trappe # 8520*	#1, 3	?	?	?	?	?	PISI/ TSME/ PSME coastal fog belt forest.	Tillamook counties, OR.
Tuber *sp. nov.* *Trappe # 2302* *Trappe #12493*	#1, 3	?	?	?	?	?	Mature to old-growth PISI/ TSME/ PSME coastal fog belt forest.	Lane, Lincoln, and Tillamook counties, OR.
RARE TRUFFLES								
Balsamia nigra	#1, 3	P	N	N	N	N	Low elev. mature xeric pine/oak forest.	Sierra Nevada Mts, CA to Yamhill Co., OR.
Choiromyces alveolatus	#1, 3	D	P	P	P	P	Mid-high elev. old-growth TSME/ Abies spp. forest.	Mt. Hood, OR to Yuba Pass, CA. High Rock.
Choiromyces venosus	#1, 3	P	P	P	P	P	Low elev. w/coniferous, deciduous, or mature PSME forest.	Springfield, OR; Europe.
Elaphomyces anthracinus	#1, 3	P	N	N	N	N	Mature PIPO forest.	Western Europe; Eastern N. America; Eastern OR Cascades.
Elaphomyces subviscidus	#1, 3	P	N	N	N	N	Mid elev. mature to old-growth pine forest.	Central to Southern OR Cascades.
CHANTERELLES								
Cantharellus cibarius	#3, 4	S	S	S	P	P	Coniferous & mixed forest.	Northern CA; OR; WA.
Cantharellus subalbidus		S	S	S	P	P		Same as above.
Cantharellus tubaeformis		S	S	S	P	P	Late-successional forest.	Same as above.
CHANTERELLES - GOMPHUS								
Gomphus bonarii *G. clavatus*	#3	P S	P S	P S	P P	P P	Northern & montane conifer forest in N. America.	Throughout region, esp. Northern CA.
G. floccosus	#3	S	S	S	S	P	Same as above.	Throughout region, esp. Northern CA.
G. kauffmanii	#3	S	S	S	P	P	Western conifer forests.	Throughout region, esp. Northern CA.
RARE CHANTERELLE								
Cantharellus formosus	#1, 3	P	P	P	P	P	A variety of mixed & conifer forest.	Northern CA; OR; WA.
Polyozellus	#1, 3	S	S	P	P	P	In montane areas	Northern Sierras; OR;

multiplex							alongintermittent streams/seeps with true fir & spruce.	WA Cascades. **Rd. 199/169 (Hwy 35).**
UNCOMMON & RARE CORAL FUNGI (App. J2, pp 163. 164)								
Ramaria spp. *R. araiospora* *R. botrytis v. aurantiiramosa*	(1, 3) & (3)	P S S	P S S	P S S	P P P	P P P	With TSHE, Abies, Picea, Pinus, Pseudotsuga, & Taxus.	Northern CA, OR, WA. Overall distribution of individual spp., unknown.
PHAEOCOLLYBIA (App. J2, p. 166)								
Phaeocollybia spp *P. olivacea*	(1, 3)	P S	P S	P S	P P	P P	Low elev. to montane, w/ conifers, moist habitat (prefers low elev.)	Distribution, frequency currently under study.
UNCOMMON GILLED MUSHROOMS (App. J2, p. 168)								
Catathelasma sp. *Cortinarius sp.* *Dermocybe sp.* *Hebeloma sp.* *Hygrophorus sp.* *Russula sp.*	(1,3) & (3)	P	P	P	P	P	Ectomycorrhizal in low elev. to montane, w/ conifers.	Distribution and range of individual species is unknown. Some may be Pacific NW endemics.
RARE GILLED MUSHROOMS								
Chroogomphus loculatus	#1, 3	P	P	P	P	P	Upper mid-elev (5000') w/ ABAM, ABGR, PSME, TSHE, TSME.	Local endemic, type locality at Ollalie Trail, Willamette NF.
Cortinarius canabarba *C. rainierensis* *C.variipes* *Tricholoma venenatum*	#1, 3	P	P	P	P	P	The range of elev. and host species are unknown. All require diverse coniferous forests w/ heavy humus layer and coarse woody debris.	Overall ecology and distributions are not well known for these species.
Cortinarius verrucisporus	#1, 3	P	P	P	P	P	High elev. montane, w/ conifers & true firs, hypogeous (fruits underground).	CA; OR.
Cortinarius wiebeae	#1, 3	D	P	P	P	P	(Same as above)	Local endemic/ Mt. Hood NF. only known site.
UNCOMMON ECTO-POLYPORES								
Albatrellus ellsii *A. flettii (1)*	#3	? S	? S	? S	? P	? P	Coastal old-growth & mixed hardwood.	WA; OR; Northern CA; Rocky Mts.; NE USA.
RARE ECTO-POLYPORES								
Albatrellus avellaneus (5)	#1, 3	?	?	?	?	?	Coastal old-growth & mixed hardwood forest.	WA; OR; Northern CA; Rocky Mts.; NE USA;

A. caeruleoporus								Europe.

TOOTH FUNGI (4)

Hydnum repandum (2) *H. umbilicatum (3)* *Phellodon atratum* *Sarcodon fuscoindicum* *S. imbricatus*	#3	S P	S P	S P	P P	P P	Late successional second-growth conifer & hardwood forest.	Widespread in North America & Europe.

(1) Plentiful some years
(2) Common late fall
(3) Less common late fall
(4) Hericium coralloides/H. ramosum common in S and ZZ
(5) Boletopsis subsqyamosa (kurotake), a look-alike, common in SR, less in S and ZZ

RARE ZYGOMYCETES

Endogone acrogena	#1, 3	P	P	P	P	P	Low elev. mesic old-growth PSME/TSME forest.	W. Cascades from Mt. Rainier to Whitechuck Rv.
Endogone oregonensis	#1, 3	?	?	?	?	?	Low elev. old-growth PSME/ PISI/ TSME coastal forest.	Suislaw NF, OR.
Glomus radiatum	#1, 3	P	P	P	P	P	Mature to old-growth Coastal Redwood/ Alaska cedar mesic wet forest.	OR & WA Cascades; Northern CA; NE USA.

SAPROBES (DECOMPOSERS)
UNCOMMON GILLED MUSHROOMS

Species are collectively grouped. See App. J2 p. 179

	(#1, 3) (#3)	P	?	?	?	?	Low-mid elev. conifer ecosystems; on PISI, recently fallen logs, or decomposed logs.	Northern CA; OR; WA.

RARE GILLED MUSHROOMS

Clitocybe subditopoda *C. senilis*	#1, 3	P	P	P	P	P	Low-mid elev. moist late-successional forest, large logs in later stages of decay.	WA; OR;CA.
Neolentinus adherens	#1, 3	P	P	P	P	P	Same as above	Olympic NP
Rhodocybe nitida	#1, 3	P	P	P	P	P	Same as above	WA, OR, & CA.
Rhodocybe speciosa	#1, 3	P	P	P	P	P	Same as above	Mt. Rainier NP to Barlow Pass

Tricholomopsis fulvescens (1)	#1, 3	D	S	S	S	P	Same as above	Mt. Hood area, Mt. Rainier NP, Mt. Baker-Snoq. NF.
NOBLE POLYPORE(rare and endangered)								
Oxyporus nobilissimus (2)	#1, 2, 3	D	D	P	P	P	Late-successional forest on Abies spp. esp. A. procera.	OR & WA Cascades. **Rd. 220 off Hwy 35.**
(1) Very common and plentiful in sandy soil, wet years; up to TLL 5500 ft **(2) Young specimen, verified by DNA analysis**								
BONDARZEWIA POLYPORE								
Bondarzewia montana	#1, 2, 3	P	P	P	P	P	Late-successional high-elev. forest on ass'd w/ Abies.	Pacific NW, Western NV, and ID.
RARE RESUPINATES AND POLYPORES								
Aleurodiscus farlowii	#1, 3	P	P	P	P	P	On wood, humus, litter, stumps, & dead roots.	WA, OR, & Northern CA.
Dichostereum granulosum	#1, 3	P	P	P	P	P	Same as above	Same as above
Cudonia monticola	#3	P	P	P	P	P	Duff layer of mature conifer forest.	WA, OR, & Northern CA
Gyromitra californica *G. esculenta (1)* *G. infula* *G. melaleucoides* *G. montana (syn. G. gigas)(2)*	#3, 4	P S S P S	P S S P P	P S S P P	P P P P P	P P P P P	Decaying matter in soil & rotten wood in older forest (except G. esculenta, which prefers second growth).	Northwestern N. America; Europe.
Otidea leporina *O. onotica* *O. smithii*	#3	P	P	P	P	P	Conifer duff in moist wet late successional mid-low elev. conifer forest.	Unknown,
Plaectania melastoma	#3	P	P	P	P	P	Late-successional to old-growth conifer forest duff.	NE. & NW. N. America; Europe.
Podostroma alutaceum	#3	P	P	P	P	P	Mature conifer & mixed conifer/hardwood forest duff.	Pacific Northwest.
Sarcosoma mexicana	#3	P	P	P	P	P	Late-successional & old-growth high-elev. forest.	Coastal OR & CA.
Sarcosphaera eximia (3)	#3	S	P	P	P	P	Conifers & Fagaceae sp on chalky soils.	Pacific Northwest; CA; Rocky Mts.; NE USA; Europe.
Spathularia flavida	#3	P	P	P	P	P	Duff layer of mature conifer forest.	OR, WA, & Northern CA.

(1) Common but in small quantities
(2) Common some years on Bear Springs
(3) Common at McCubbins Gulch, Bear Springs RD

RARE CUP FUNGI

Aleuria rhenana	#1, 3	P	P	P	P	P	Late succesional conifer forest litter.	San Francisco to Mt. Rainier.
Bryoglossum gracile		P	P	P	P	P	Mossy, wet, alpine/ subalpine montane conifer forest.	Arctic & alpine N. America and Europe.
Gelatinodiscus flavidus	#1, 3	P	P	P	N	N	Needles, cones, & twigs of high elev. Alaska Yellow Cedar.	BC; Olympic Penninsula; OR and WA Cascades; Central OR.
Helvella compressa *H. crassitunicata* *H. elastica* *H. maculata*	#1, 3	P	P	P	P	P	Lw-mid elev. riparian & wet late -successional forest.	Tmperate forested areas of N. America.
Neournula pouchetii	#1, 3	P	P	P	P	P	Late-successional Thuja & Tsuga forest.	Northern OR; WA.
Pithya vulgaris	#1, 3	P	P	P	P	P	High elev. Abies forest.	BC; WA; ID; OR.
Plectania latahensis	#1, 3	P	P	P	P	N	Upper montane, sub-alpine con..er forest.	Same as above.
Plectania milleri	#1, 3	P	P	P	P	N	Montane, subalpine conifer forest.	Same as above.
Pseudaleuria quinaultiana	#1, 3	P	P	P	P	P	Low elev. wet late-successional conifer forest on wood or soil.	Olympic Peninsula; coastal WA & OR.

CLUB CORAL FUNGI

Clavariadelphus ligula *C. pistilaris* *C. truncatus* *C. borealis* *C. lovejoyae* *C. sachalinensis* *C. subfastigiatus*	#3, 4	P S P	P S P	P S P	P P P	P P P	Cool/cold moist late-successional hardwood or conifer forest, increases in frequency with increasing latitude & elevation, need well developed litter layer.	Pacific Northwest; B.C.; AK, Midwest, & Eastern N. America.

JELLY MUSHROOM

Phlogoitis (1) helvelloides	#3, 4	P	P	P	P	P	Riparian zones, upper headwater seeps, & intermittent streams with lg woody debris.	Pacific Northwest; northwest; midwest; Rocky Mts.

BRANCHED CORAL FUNGI

Clavulina cinerea(2) *C. cristata (2)* *C. omatipes*	#3, 4	S	S	S	P	P	Late-successional forest with well-developed litter layer.	Pacific Northwest & elsewhere.
(1) Rare **(2) Very common on Forest**								
MUSHROOM LICHEN								
Phytoconis ericetorum	#3, 4	P	P	P	P	P	Large woody debris in well-lit forest with alt. high/low moisture, increases northward.	CA to artic, coast to subalpine elev..
PARASITIC FUNGI (App. J2 p. 212) Species are collectively grouped. See App. J2 pg. 216								
	#3	P	P	P	P	P	Late-successional moist forest on host fungus.	Pacific NW; distribution and ecology unknown.
CAULIFLOWER MUSHROOM								
Sparassis crispa (1)(2)	#3	S	S	S	S	S	Low-mid elev. old-growth conifer forest on lg roots, esp. PSME.	Pacific Northwest; Northern CA.
MOSS DWELLING MUSHROOM (App. J2 p. 216) Species are collectively grouped. See App. J2 p.216								
	#3	P	P	P	P	P	Late successional moist forest, closely associated with and dependent upon mosses.	Pacific NW; Northern CA.
CORAL FUNGI								
Clavicorona avellanea	#3	P	P	P	P	P	Low-mid elev. moist late-successional forest on lg. roots.	Pacific Northwest.
(1) Very common in wet years on Forest **(2) Peziza proteana var. sparassoides is look-alike but very rare; seen at McCubbins Gulch**								

LICHENS

SPECIES	SURVEY STRATEGY	MHNF	S	ZZ	SR	BR	HABITAT	GEOGRAPHICAL EXTENT
RARE FORAGE LICHENS								
Bryoria tortuosa	# 1, 3	P	P	P	P	P	Low-mid elev. coastal conifers, inland, pine/ oa wet regimes.	Central CA to BC Cascades.
RARE LEAFY LICHENS								
Hypogymnia duplicata	# 1, 2, 3	?	?	?	?	?	Low elev. wet foggy, windy coast, maritime sites on conifers.	OR to AK.
Tholurna dissimilis	# 1, 3	P	P	P	P	P	Subalpine foggy zone on stunted TSME, canopy of old-growth PSME.	Montane areas of OR and WA.
RARE NITROGEN FIXING LICHENS								
Dendriscocaulon intricatulum	# 1, 3	P	P	P	P	P	Low-mid elev. wet boreal, riparian, late-successional forest.	Southern WA to southeast AK.
Lobaria hallii	# 1, 3	P	P	P	P	P	Low-mid elev. wet, fogg forest on lg diameter hardwoods, shrubs.	Central coastal CA to northern AK.
L. linita	# 1, 3	P	P	P	P	P	Old-growth PSME moist fir forest.	Norhtern OR to southeast CA, ID.
Nephroma occultum	# 1, 3	P	P	P	P	P	Pristine old-growth, approx. 400 years old.	Willamette NF to B.C.
Pannaria rubiginosa	# 1, 3	P	P	P	P	P	Bases of trees in mature forest.	Salem, OR and Mt. Rainier, WA.
Pseudo-cyphellaria rainierensis	# 1, 3	*D	D	D	D	P	Old-growth forest on trunks of PSME.	Cascades of OR & WA. **Burnt Lake Trail.**
NITROGEN FIXING LICHENS								
Lobaria oregana	# 4	*D	D	D	D	D	Open 200 year old-growth coastal forests, conifers.	Pacific NW Cascades, **Old Maid Flats.**
L. pulmonaria	# 4	*D	D	D	D	D	Moist, hardwood old-growth forests and swamps.	Pacific NW Cascades **Old Maid Flats.**
L. scrobiculata	# 4	*D	D	D	D	D	Old-growth forests, 140-200 years old.	Pacific NW Cascades.

Nephroma bellum	# 4	P	P	P	P	P	Open old-growth & along roadsides.	Pacific NW Cascades.
N. helveticum	# 4	*D	D	D	D	D	Northern coastal & montane forests, foothills & wetlands, valleys.	Pacific NW Cascades.
N. laevigatum	# 4	P	P	P	P	P	Low elev. coastal old-growth forests.	Pacific NW Cascades.
N. parile	# 4	*D	D	D	D	D	Moist coniferous deciduous old-growth forests.	Pacific NW Cascades.
N. resupinatum	# 4	*D	D	D	D	D	Low-mid elev. coast, montane, coniferous and shady forest.	Pacific NW Cascades.
Pannaria ....leucostictoide	# 4	*D	D	D	D	D	Low elev. open coastal old-growth forests.	Pacific NW Cascades.
P. mediterranea	# 4	P	P	P	P	P	Old-growth forests 140-200 years old.	Pacific NW Cascades.
P. saubinetii	# 4	P	P	P	P	P	Same as above.	Same as above.
Peltigera collina	# 4	*D	D	D	D	D	Low elev. coastal, montane & old growth forests.	Same as above.
P. neckeri	# 4	*D	D	D	D	D	Old-growth forests, 140-200 years old.	Same as above.
P. pacifica	# 4	*D	D	D	D	D	Same as above.	Same as above.
Pseudo-cyphellaria anomala	# 4	*D	D	D	D	D	Low-mid elev. coastal montane old-growth forests.	Same as above.
P. anthrapsis	# 4	*D	D	D	D	D	Low-mid elev. open, coniferous, old-growth forests.	Same as above.
P. crocata	# 4	*D	D	D	D	D	Old-growth forests, 140-200 years old.	Pacific NW Cascades. **Old Maid Flats.**
Sticta beauvoisii	# 4	*D	D	D	D	D	Same as above	Pacific NW Cascades
S. fuliginosa	# 4	*D	D	D	D	D	Low elev. coasts, moist coniferous old-growth forest.	Same as above
S. limbata	# 4	*D	D	D	D	D	Low-mid elev. coastal & old-growth forests.	Same as above.

PIN LICHENS

(See App. J2, pp234, 235)

Species grouped collectively; all have potential to occur in MHNF watersheds.
Three species listed below, from the Pin lichen group, have special information.

Calicium ....adaequatum	# 4	*D	D	D	D	D	Sheltered microsites with high atmospheric humidity, provided by old-growth forest	Pacific NW; northern Europe
C. viride	#4	*D	D	D	D	P		

Stenocybe clavata	#4	P	P	P	P	P	conditions. Substrate, texture specific.	Endemic to the Pacific NW
RARE ROCK LICHENS								
Pilophorus ....nigricaulis	# 1, 3	P	P	P	P	P	Talus rock patches within old-growth forest w/ low fire frequency.	Coastal OR, WA, BC.
Sticta arctica	# 1, 3	?	?	?	?	?	Rocky outcrops in foggy wet coastal forest.	Coastal Range of OR.
RIPARIAN LICHENS								
Cetrelia ....cetrarioides	# 4	*D	D	D	D	D	Low-mid elev. foggy riparian forest on older hardwood trees.	Coastal OR and AK.
Collema ....nigrescens	# 4	P	P	?	?	?	Low-mid elev. foggy riparian forest, mostly on QUGA.	Pacific NW to AK. (t Ecuador).
Leptogium burnetiae ....var. hirsutum	# 4	*D	D	D	D	D	Low-mid elev. foggy riparian forest on older hardwood trees.	Pacific NW & northern Europe.
L. cyanescens	# 4	*D	D	D	D	D	Same as above.	Ecuador to AK, including OR.
L. saturnium	# 4	*D	D	D	D	D	Low-mid elev. boreal riparian forest on older hardwood trees.	Pacific NW (mostly Canada).
L. teretiusculum	# 4	P	P	P	P	P	Low-mid elev. foggy riparian forest on older hardwood trees.	Pacific NW & Montana.
Platismatia ....lacunosa	# 4	P	P	P	P	P	Low-mid elev. moist forest on deciduous and hardwood forests.	Central OR to southcentral AK.
Ramalina thrausta	# 4	P	P	P	P	P	Low-mid elev. boreal forest on hardwood and coniferous forests.	OR, WA, ID, CA, B.C., Montana.
Usnea longissima	# 4	*D	D	D	D	D	Low-mid elev. wet coniferous & hardwood forest, swamps.	Northwest CA to AK. **Wildwood Rec. Site.**
AQUATIC LICHENS								
Dermatocarpon luridum	# 1, 3	P	P	P	P	P	Low-mid elev. streams.	OR, VA, B.C., CO, VA.
Hydrothyria venosa	# 1, 3	*D	D	D	D	D	Mid-high elev. cold and clear streams, pristine old-growth.	Central CA to central B.C.

Leptogium rivale	# 1, 3	P	P	P	P	P	Low-mid elev. streams.	Oregon and Montana.
RARE OCEANIC INFLUENCED LICHENS								
Bryoria pseudo-capillaris	# 1, 3	N	N	N	N	N	PSI forests, open sand dunes on coast.	Oregon coast.
B. spiralifera	# 1, 3	N	N	N	N	N	Pantropical areas on peninsulas and headlands	Northern CA.
B. subcana	# 1, 3	N	N	N	N	N	Coastal bays and streams.	OR, AK, CA.
Buellia oidalea	# 1, 3	?	N	N	N	N	Low elev., dry, coastal oak forest.	Mexico to B.C.
Erioderma sorediatum	# 1, 3	N	N	N	N	N	Stabilized dunes in old PISI, PICO forest.	Oregon coast.
Hypogymnia oceanica	# 1, 3	*D	D	D	D	D	Coast, maritime microclimate in old-growth forest.	Inland, coastal OR. **Salmon-Huck, 793a.**
Leioderma sorediatum	# 1, 3	N	N	N	N	N	Stabilized dunes in old PISI, PICO forest.	Oregon coast.
Leptogium brebissonii	# 1, 3	N	N	N	N	N	Stabilized dunes in old PISI, PICO forest.	Oregon coast.
Niebla cephalota	# 1, 3	N	N	N	N	N	Promontories of land along windswept coast.	Coastal southern CA to maritime northern WA.
Pseudo-cyphellaria mougeotiana	# 1, 3	N	N	N	N	N	Coastal old-growth PISI forest.	Oregon coast.
Teloschistes flavicans	# 1, 3	P	N	N	N	N	Dry uplands and prairies, on coastal shrubs.	Ecuador to OR coasts
Usnea hesperina	# 1, 3	N	N	N	N	N	Broken dune PICO forest	Oregon coast.
OCEANIC INFLUENCED LICHENS								
Cetraria californica	# 1, 3	N	N	N	N	N	Scrubby dune areas on old-growth PICO.	Southern CA to southeast AK coasts.
Heterodermia leucomelos	# 1, 3	N	N	N	N	N	On large PISI in forested headlands.	Southern CA to northern WA coasts.
Loxospora nov. sp. 'corallifera'	# 1, 3	*D	N	N	D	N	Old-growth conifers on immediate coast.	Pacific NW coasts. **Old Maid Flats.**
Pyrrhospora quernea	# 1, 3	N	N	N	N	N	Same as above.	Southern CA to northern WA coasts.
ADDITIONAL LICHENS (Added after Appendix J2)								
Cladonia norvegica	# 3	?	?	?	?	?	Unknown (not listed in unknown Appendix J2)	

Heterodermia sitchensis	# 3	?	?	?	?	?	Unknown (not listed in unknown Appendix J2)	
Hygomnia vittiata	# 3	?	?	?	?	?	Unknown (not listed in unknown Appendix J2)	
Hypotrachyna revoluta	# 3	P	P	P	P	P	High elev. open forest.	Northern CA, western OR, western WA.
Ramalina pollinaria	# 3	?	N	N	N	N	Low elev. northern coastal forest w/ sandstone outcrops.	Western OR, western WA.
Nephroma isidiosum	# 3	?	?	?	?	?	Unknown (not listed in unknown Appendix J2)	

BRYOPHYTES

SPECIES	SURVEY STRATEGY	MHNF	S	ZZ	SR	BR	HABITAT	GEOGRAPHICAL EXTENT
Antitrichia curtipendula	# 4	*D	D	P	P	P	Low-mid elev. old-growth forest canopies.	N. CA to N. OR, west of Cascades.
Bartramiopsis lescurii X	# 1, 3	P	P	P	P	P	Old-growth forest. Low-mid elev. old-growth forest on rotting logs.	Pacific NW, esp. WA. Cascades.
Diplophyllum albicans	# 1, 2	?	?	?	?	?	Coastal old-growth TSME/PISI forest.	Unknown.
D. plicatum	# 1, 2	?	N	N	N	N	Coastal PISI forest.	W. OR and W. WA.
Douinia ovata	# 4	P	P	P	P	P	Low-mid elev. foggy old-growth forest w/ ridges & rock outcrops.	Pacific NW Cascades and coast.
Encalypta brevicolla var. crumiana 'X'	# 1, 3	P	P	P	P	P	Foggy rock outcropping shaded by old-growth forest.	Mountains of OR and WA.
Herbertus aduncus 'X'	# 1, 3	P	P	P	P	P	High-elev. old-growth forest.	Northern coast, Cascade of OR, WA.
H. sakurali	# 1, 3	?	P	P	P	P	Foggy rock faces in old-growth forest.	Northern coast range of OR.
Iwatsukella leucotricha	# 1, 3	?	P	P	P	P	Bark in old-growth forest.	Northern coast range of OR.
Kurzia makinoana	# 1, 2	P	P	P	P	P	Low-elev. old-growth forest.	OR and WA old-growth.
Marsupella emarginata var. aquatica	# 1, 2	P	P	P	P	P	Mid-high elev. stream splash zones.	OR Cascades.
Orthodontlum gracile	# 1, 3	?	N	N	N	N	Old-growth redwood forest.	Northern CA and southwestern OR.
Plagiochila satol 'X'	# 1, 3	P	P	P	P	P	Old-growth forest on cliffs, rocks & bark.	Pacific NW.
P. semidecurrens var. crumniana	# 1, 3	?	P	P	P	P	Foggy cliffs and shaded rocks.	OR Coast Range.
Pleuroziopsis ruthenica 'X'	# 1, 3	P	P	P	P	P	Low elev. shrub thickets, old-growth swamps, stream edges.	WA.
Ptilidum californicum	# 1, 2	P	P	P	P	P	Conifers in old-growth forest.	Northern CA.
Racomitrium aquaticum 'X'	# 1, 3	P	P	P	P	P	Shaded moist rocks & streambanks of old-growth forest.	Unknown.
Radula brunnea 'X'	# 1, 3	?	P	P	P	P	Foggy rock walls in old-growth forest.	Northern coast range of OR.
Scouleria marginata	# 4	D	D	P	P	P	Splash zone of streams.	Pacific NW endemic. **Draw Creek.**
Tetraphis geniculata	# 1, 3	P	P	P	P	P	Low-mid elev old-growth forest on moist, shaded wood.	Northern CA to western WA.

Tritomaria exsectiformis 'X'	# 1, 2	P	P	P	P	P	Old-growth forest on moist, shaded rocks.	OR & WA old-growth.
T. quinquedentata 'X'	# 1, 3	P	P	P	P	P	Old-growth forest on moist shaded rocks.	OR & WA old-growth.
(X = Added after Appendix J2)								

VASCULAR PLANTS

SPECIES	SURVEY STRATEGY	MHNF	S	ZZ	SR	BR	HABITAT	GEOGRAPHICAL EXTENT
Allotropa vigrata	# 1, 2	D	D	D	P	P	1500'-5000' elev under clos. d canopy ABAM ABGR, PICO, PSME requires association w/ fungus & vascular plants (saprophytic).	East slopes of the Cascade range to the coast, Brit. Columbia to Canada, disjunct in Idaho and Missouri.
Arceuthobium tsugense	# 1, 2	S	S	S	P	P	Parasitic primarily on TSHE older than 600 yrs. & on shore pine.	Rare from Alaska south to California, southern Oregon.
Aster vialis	# 1, 2	?	N	N	N	N	Low elev. with mid-successional conifers, thriving in edge habitats or in canopy openings.	Endemic to Oregon, Lane, Linn, Douglas counties (Willamette valley).
Bensoniella oregana	# 1, 2	?	N	N	N	N	3000'-5000' elevation with mixed evergreen and white fir, meadow/ stream.	Coast Rng. OR, CA Douglas, Josephine, Curry and Roseburg counties. (Siskiyou)
Botrychium minganese	# 1, 2	D	P	P	P	P	Variable elev w/ THPL and/or ACCI, ACMA variable habitats.	Endemic to North America, difficult taxonomically.
B. montanum	# 1, 2	D	P	P	P	P	Between 3200'-4100' (MHNF) in deep shade of old-growth THPL, seeps.	Endemic to western North America.
Clintonia andrewsiana	# 1, 2	N	N	N	N	N	Coastal redwood forest.	California coast.
Coptis asplenifolia	# 1, 2	P	P	P	P	P	360'-3600' with ABAM, THSE, THPL, in cool, wet, shady habitats.	Oregon coastal range, WA Cascades, Olympic peninsula.
C. trifolia	# 1, 2	D	D	P	N	N	Perimeters of small wetlands/swamps with PSME.	Disjunct in OR (MHNF) eastern Oregon Jackpot Meadow
Corydalis aquae-gelidae	# 1, 2	D	D	P	D	P	1220'-4260' on gravel bars in cold perennial streams with high canopy.	Gifford Pinchot NF, MHNF, Salem BLM. Draw Ck., Linney Ck., Wildcat Mtn.
Cypripedium fasciculatum	# 1, 2	?	?	?	?	?	1300' to 5300' in 60 to 100% shade by	Western United States.

							numerous plant communities.	
C. montanum	# 1, 2	D	S	P	P	P	Broad range habitats, presence of specific symbiotic fungi.	All Cascade provinces, (Hood River, Wasco county).
Galium kamschaticum	# 1, 2	P	N	N	N	P	Seeps with conifers and west Cascades riparian associated species.	Circumboreal Olympic and western WA Cascade provinces.
Habenaria orbiculata	# 1, 2	P	N	N	N	P	Mesic - dry mossy forest with deep litter in TSHE and lower ABAM zones.	Uncommon, wide-spread, western WA Cascade Provinces.
Pedicularis howellii	# 1, 2	N/?	N	N	N	N	4200'-6300' in mixed conifer/shrub, edge of openings and damp shade.	Endemic to the Siskiyou mountains.
Scoliopus biglovei	# 1, 2	N/?	N	N	N	N	Low elevation Redwood forest.	Endemic to CA; Siskiyou NF; Six Rivers NF.

FUNGI, LICHENS, BRYOPHYTES AND VASCULAR PLANTS

TERRESTRIAL MODULE - Questions IB

Species for which finer scale attention was deemed necessary in the EIS.

Species which are documented as occurring in the watershed, require survey strategies 1, 2 or 3, and are of special interest are listed below. The management of known sites (strategy 1) is to begin in 1995. Management and survey recommendations for critical species (strategy 1,2) are expected from the REO in June 1995. Strategy 3 surveys are to begin in 1996.

FUNGI

Of the 234 species listed in the ROD, 4 are documented in the Salmon River Watershed: *Thaxterogaster pinque* (common false truffle), *Gymnomyces* sp. nov. #Trappe 5052, *Martellia* sp. nov. #Trappe 311, *649* (rare, endemic false truffles) and *Oxyporus nobilissimus* (rare, endemic polypore). 24 fungi have been seen but not documented. Many of the rest have potential habitat in the watershed.

Dr. Trappe recently (4/10/95) named the false truffles listed above. *Gymnomyces* #5052 and *Martellia* #311 have been determined to be the same species, *Gymnomyces abieties*. This species was previously recorded under other names and is more common than once thought. Dr. Trappe will recommend its removal from the rare list. *Martellia* #649 has been described as *Martellia nondistincta*. The only known location is at Phlox Pt. Collections were made on Sept. 16, 1995.

Gymnomyces sp. nov. #Trappe 5052, rare endemic false truffle *Martellia* sp. nov. #Trappe 311, 649, rare endemic false truffles Appendix J2, pp 148-149
Survey strategies 1,3

Site-specific Distribution of Species and Habitat:

Known Sites: T3S R9E sec 7
Phlox Pt. Picnic area.

Recommended mitigation: Withdraw 160 ACRES containing site from ground disturbing activities (ROD, p C-5)
Minimize recreational impacts, establish buffer around known locations (Appendix J2, p149)
From Dr. Trappe: Minimize use of area. Light camping probably OK. Winter recreation OK. Identify areas of similar habitat (pers. comm. 4/10/95).

Potential Habitat: 5,000 - 6,000 ft elev. in mature to old growth mountain hemlock and silver forest. False truffles are found under the humus/debris layer, sometimes in clumps, often singularily.

Important Habitat Elements and Ecological Functions Needed:

Mycorrhizal partner - may be mountain hemlock and silver fir
Humus layer - level of acceptable disturbance is uncertain

Potentially Threatening Management Activities:
Camping, picnicing - trampling and soil compaction could be detrimental
Cutting trees - loss of hosts, soil compaction, humus disturbance

Interactions with Populations in Adjacent Watersheds:
Not known.

Conditions Limiting Populations Within Watershed:
Not known.

Conditions Limiting Interaction of Populations Between Watersheds:
Not known.

Oxyporus nobilissmus, noble polypore
Appendix J2, pp 185-186
Survey strategies 1,2,3

Site-specific Distribution of Species and Habitat:
Known Sites: T3S R9E sec 20
Past Pioneer Woman's Grave on Rd 220
Base of large noble fir snag

Recommended mitigation: ONE-SQUARE MILE BUFFER WITH POLYPORE NEAR CENTER (Appendix J2, pg. 186).

Potential Habitat: On large diameter noble fir stumps, snags, and less commonly, on live trees. May also occur on large diameter Abies spp and western hemlock. Aspect is usually N/NW/W, gentle slope, and 3,000-4,000 ft elev.

Important Habitat Elements and Ecological Functions Needed:
Big, old Abies - stands with natural distribution of very large Abies procera stumps, snags, and live trees (200+ years?).

Potentially Threatening Management Activities:
Logging - big, old Abies and Tsuga heterophylla are not common.

Interactions with Populations in Adjacent Watersheds:
Closest known existing population is on Larch Mtn in the Multnomah Creek drainage. Extant population documented from Sandy watershed, BLM land, North Mtn. area. Need more information.

Conditions Limiting Populations Within Watershed:
Not known, need more information.

Conditions Limiting Interaction of Populations Between Watersheds:
Not known, need more information.

LICHENS

68 species of lichens are listed in Table C-3; 26 of these have been documented in the Salmon Watershed by Mark Boyll. Mark has not given me all the site

locations at this time. 3 species have 1,3 ratings: *Pseudocephallaria rainierensis, Hydrothyria venosa*, and *Hypogymnia o.ceanica.* The other species have 4 ratings.

Pseudocephallaria rainierensis (rare, endemic, nitrogen-fixing lichen)
Appendix J2, pp 228-232
Survey strategies 1,3

Site-specific Distribution of Species and Habitat:
Known Sites: T, R sec.

Recommended mitigation: Clumps of old growth trees, 10-40 acres in size for microclimate and dispersal. 200 yr+ retention trees with large lateral branches and emergent crowns.

Potential Habitat: Mature to old-growth forest below 4,000 ft.

Important Habitat Elements and Ecological Functions Needed:
200 yr+ conifers/mature forest - provides appropriate bark roughness, microclimate, and dispersal conditions.

Potentially Threatening Management Activities:
Logging - may remove habitat.

Interactions with Populations in Adjacent Watersheds:
Not known, need more information.

Conditions Limiting Populations Within Watershed:
Not known, need more information.

Conditions Limiting Interaction of Populations Between Watersheds:
Not known, need more information.

Hydrothyria venosa (aquatic lichen)
Appendix J2, pp 241-243
Survey strategies 1,3

Site-specific Distribution of Species and Habitat:
Known Sites: T, R sec.

Recommended mitigation: Protect from reductions in water quality and quantity. Lichen "appears to be more sensitive to stream sediment than are salmon". (Appendix J2, pg. 243)

Potential Habitat: Clear, cold streams with stony bottoms from old growth or pristine forest at mid- to high elevations.

Important Habitat Elements and Ecological Functions Needed:
Clear, clean streams - sensitive to sediment and pollution including acid rain.

Potentially Threatening Management Activities:
Logging and road building - sediment generators.

Interactions with Populations in Adjacent Watersheds:
Not known, need more information.

Conditions Limiting Populations Within Watershed:
Not known, need more information.

Conditions Limiting Interaction of Populations Between Watersheds:
Not known, need more information.

Hypogymnia oceanica (rare oceanic-influenced lichen)
Appendix J2, pp 243-246
Survey strategies 1,3

Site-specific Distribution of Species and Habitat:
Known Sites: T, R sec.
Salmon-Huckleberry Wilderness, Trail #793a

Recommended mitigation: Protect, monitor and conduct additional surveys. Other site for this species exists away from the ocean on the Willamette NF.

Potential Habitat: Cool, moist old growth forest.

Important Habitat Elements and Ecological Functions Needed:
Not sure.

Potentially Threatening Management Activities:

Interactions with Populations in Adjacent Watersheds:
Not known, need more information.

Conditions Limiting Populations Within Watershed:
Not known, need more information.

Conditions Limiting Interaction of Populations Between Watersheds:
Not known, need more information.

BRYOPHYTES

23 bryophytes are listed in Table C-3. Only 1 species is documented, *Scouleria marginata*, and it received a 4 rating.

VASCULAR PLANTS

Allotropa virgata, sugar stick
Appendix J2, pp 249-253
Survey strategies 1,2
Site-specific Distribution of Species and Habitat:
Known Sites: In forested areas near Salmon River Meadows and Summit Meadows. Specific locations not known.

Potential Habitat: Mesic forests in the watershed with well-drained soils, well-developed humus layer and coarse woody debris.

Important Habitat Elements and Ecological Functions Needed:

- Undisturbed forest floor - sugar stick is a mycotroph (non-photosynthetic plant with underground fungal connections to other plants)
- Rich humus/coarse woody debris - source of nutrients, home for fungal partners.
- Fire - FEIS panel members noted that known sites have past fire history.
- Long-stand rotations - slow to establish, need to allow for development of habitat.

Potentially Threatening Management Activities:

- Logging/thinning - repeated mechanical disturbance, reduction in coarse woody debris and habitat fragmentation may be detrimental to species.
- Fire suppression - threat noted by FEIS panel members.

Interactions with Populations in Adjacent Watersheds:
Not known, need more information

Conditions Limiting Populations Within Watershed:
Not known, need more information

Conditions Limiting Interaction of Populations Between Watersheds:
Not known, need more information

Corydalis aquae-gelidae, Cold-water corydalis (PNW endemic)
Appendix J2 pp 271-274
Survey Strategies: 1,2

Site Specific Distribution of Species and Habitat:
Known Sites: T4S R8E sec 20,21
Linney Ck/Draw Ck confluence to Linney Ck confluence with Salmon River. First reported in 1988 by Lois Kemp. Documented update by Larry Scofield (BLM) in 1992. Growing along stream banks/water's edge. Actual population size not exactly known, estimated to be in hundreds. Population considered "outlier" by Goldenberg (1990).

T3S R7E sec 21 Salmon River, north of Green Canyon Campground. Reported in 1991 by Matthew Clark, BLM. On gravel bar near bank. Not known if still exists. Report made in August when identity could have been confused with *C. scouleri*. 12 plants.

Potential Habitat: Salmon River and tributaries, cold springs. See Appendix J2 for specific habitat requirements.

Important Habitat Elements and Ecological Functions Needed:

- Cold water - average substrate temp of 10 C
- Gravel/sand substrate - >50% gravel with coarse sand
- Perennial flow - usually

- High canopy - not tolerant of understory competition or dense shade
- cm water - seedlings will not establish if depth is greater
- Bumblebees - pollination

Potentially Threatening Management Activities:

- Fish habitat improvements
- Sediment-producers such as roads, trail crossings, timber sales etc.
- Canopy removal, riparian vegetation removal
- Hydrologic regime alterations from dams, culverts, diversions etc.

Interactions with Populations in Adjacent Watersheds:
Not known at this time, need more information.

Conditions Limiting Populations Within Watershed:
Not known at this time, need more information.

Conditions Limiting Interaction of Populations Between Watersheds:
Not known at this time, need more information.

Coptis trifolia, threeleaf goldthread
Appendix J2, pp 270-271
Survey strategies 1,2

Site-specific Distribution of Species and Habitat:
Known Sites: T4S R8E sec 25, Jackpot Meadow.

Potential Habitat: Brushy, shaded edges of wet meadows. Sites may include unnamed meadows in Mud Ck drainage, Redtop Meadow, Salmon River Meadow.

Important Habitat Elements and Ecological Functions Needed:

- High water table - found in bogs, forest wetland, seeps, wet meadows
- Partial shade - all our sites have partial shade
- More information needed

Potentially Threatening Management Activities:
Grazing - trampling and browsing by stock (deer use a related species, *C. asplenifolia*, as forage).

Interactions with Populations in Adjacent Watersheds:
Not known. The two other sites in Oregon are in the Miles Creek and Clackamas River watersheds. The sites in Oregon represent the disjunct southern edge of this plant's distribution. *Coptis trifolia* is common from Vancouver Island north.

Conditions Limiting Populations Within Watershed:
Not known, need more information.

Conditions Limiting Interaction of Populations Between Watersheds:
Not known, need more information.

Cypripedium montanum, mountain lady's slipper

Appendix J2, pp 280-283
Survey strategies 1,2

Site-specific Distribution of Species and Habitat:

Known Sites: Listed to be in the Salmon River Watershed (SCAA database). Location not known.

Potential Habitat: Multi-story forest with open understory, about 30-60% canopy cover. (Based on observations of Bear Springs sites.)

Important Habitat Elements and Ecological Functions Needed:

- Fungal symbiont - needed for plant establishment, may be more important than habitat conditions.
- Natural fire cycle - suspected to be important for establishment
- Canopy cover - about 30-60%
- Undisturbed forest floor - long establishment time, slow-growing

Potentially Threatening Management Activities:

- Fire suppression
- Hot fires due to unnaturally high fuel levels
- Logging
- Horticultural collection.

Interactions with Populations in Adjacent Watersheds:

Closest known sites are on Bear Springs in White River watershed. Interactions not known.

Conditions Limiting Populations Within Watershed:

In decline on west side of Cascades, perhaps due to fire suppression (see Appendix J2). Good possibility that there are not any sites in the Salmon River watershed at this time.

Conditions Limiting Interaction of Populations Between Watersheds:

Not known, need more information.

OTHER PLANT SPECIES OF CONCERN

TERRESTRIAL MODULE C1 ,2 3. Questions

Species which were outside the scope of the EIS and which are deemed to be at risk.

Listed below are plant species on our sensitive plant list or the Oregon Natural Heritage Program list with documented occurrences in the Salmon River Watershed. Plants on our sensitive plant list that are also C3 species are not listed below. See document entitled "Salmon River Watershed Analysis: Fungi, Lichens, Bryophytes and Vascular Plants" for information on those species.

Of the species listed below, all except fir clubmoss live in wet meadows. Most sites are in the Salmon River Meadows complex. The importance of wet meadows in the Salmon River Watershed as a special botanical habitat needs to be strongly emphasized in the watershed analysis process.

MTH 94 / FWS 93 / ONHP 95 / ODA
Carex buxbaumii, Buxbaum's sedge / inv. / 4
Carex livida, pale sedge / sens. / 2
Eriophorum polystachion, cotton grass / inv. / 4
Huperzia occidentale, fir clubmoss / sens. / 2
Scheuchzeria palustris var. americana, / sens. / 2 /*scheuchzeria*
Sisyrinchium sarmentosum, pale blue-eyed grass / sens. / C2 / 1 / C
Utricularia minor, lesser bladderwort / sens. / 2
Vaccinium oxycoccus, wild cranberry / inv. / 4

The following questions from the Terrestrial Module are addressed below for each species listed in the table above:

- C1. What is the basis for concluding that viability of the species is at risk?
- C2. What are the activities or trends in population or habitat that place the species at risk?
- C3. What is the role of this watershed in the maintenance of the species population?

Carex buxbaumii, Buxbaum's sedge

Pepper Meadows, T3S R8E sec 11
Peeled Cedar Meadow, T3S R8E sec 36
Jackpot Meadow, T4S R8E sec 25

This sedge is known from small wet meadows in the Mud Creek area and from Jackpot Meadow. No other sites are known on the Mt. Hood NF. The species range is circumboreal with southernmost collections from central California on the west coast. Hitchcock states that it is "widespread, but seldom collected". Our sites are the only ones documented from Clackamas Co. Loss of wet meadow and bog habitat may account for placement of this species on the MTH Inventory List and ONHP List 4.

In the Mud Creek area, Buxbaum's sedge grows in a wet meadow associated with Pepper Timber Sale. 2 nearby meadows in the sale area did not have this sedge. These meadows were scheduled for prescribed burning and pothole blasting. The Buxbaum's sedge meadow was dropped from the project. No activities have been proposed at its other location in Mud Creek, Peeled Cedar Meadow below Trillium Lake. At Jackpot Meadow it grows at the opposite end of the meadow from a C3 species, *Coptis trifolia*.

Grazing in Jackpot Meadow may be impacting this sedge. During a visit to this meadow in 1993, we had a hard time locating the sedge as the area was trampled and grazed by cows.

At the most recent ONHP meeting to review their list, a move was made to drop Buxbaum's sedge off the list. It was felt that while uncommon, the population was stable in Oregon. Instead this sedge was moved from List 3 to List 4 due to recreation threats at some locations.

Carex livida, pale sedge

Salmon River Meadows, T4S R9E sec 7

Three sites have been documented for this species on the Forest; one is in Salmon River Meadows, but has not been relocated since the first record by Lois Kemp in 1987. The other two sites are in wet meadows in the Bull Run Watershed.

Hitchcock lists its range as somewhat circumboreal. On the west coast it extends into Washington, with a few sites in Oregon, and into northwest California. Besides the Mt. Hood populations, other sites are located in the Siskiyous.

The reason for the disappearance of pale sedge from Salmon River Meadow is not known. Prescribed fires burned through its location in 1989 and 1992 possibly negatively impacting the population. Not all the wet meadows in the watershed have been surveyed for pale sedge. It would be important to the population distribution in Oregon to relocate pale sedge in the Salmon River Meadows or in other wet meadows in the watershed.

Pale sedge is listed as sensitive due to the few known sites in Oregon.

Eriophorum polystachion, cotton grass

Salmon River Meadows, T4S R9E

Cotton grass is found scattered on the west side of the Oregon Cascades in Clackamas, Lane and Marion Counties. Its larger range is circumboreal in cold wet meadows. Cotton grass is considered stable but uncommon. Its distribution may be limited by the amount of suitable habitat. The Salmon River watershed is important to this species because it contains many cold wet meadows.

Huperzia occidentale, fir clubmoss

Draw Ck, T4S R8E sec 27; T4S R8E sec 34

Huperzia occidentale (formerly Lycopodium selago) is circumboreal in its distribution and nears the southern end of its range on our Forest. It is well . The populations in Draw Ck are significant in that they are the only sites in the Salmon River Watershed. Habitat is not limiting and more sites are expected to be found with further surveys, especially in the Salmon-Huckleberry Wilderness.

Historically, it may have been more abundant. Fir clubmoss favors mature-old growth riparian forest and prefers an undisturbed forest floor/streamside with well developed humus layer and woody debris. Past logging practices have altered riparian forest that might have been good habitat.

Riparian reserve guidelines should protect and help to improve its habitat.

Scheuchzeria palustris var. americana, scheuchzeria

Salmon River Meadows, T4S R8 1/2E sec 13
This variety of scheuchzeria grows from the west to the east coast of northern North America in boggy meadows, often with *Sphagnum spp.* Scheuchzeria is listed as a sensitive species because while more common elsewhere, it is rare in Oregon. Despite its rarity, a population may have hundreds of individuals. Two other sites are known for this species on the Forest, at Dinger Lake and near Little Crater Lake.

In 1992 a prescribed fire burned the shrubby edges of its meadow location but did not come near the scheuchzeria population. Only light grazing occurs now in this and associated meadows. In the past, Salmon River Meadows was heavily grazed. It is not known how grazing has shaped the species composition in these meadows.

As with some of these other species, the species may be limited in its distribution in part by lack of suitable habitat. The Salmon River watershed is important to this species by containing areas of suitable habitat.

Sisyrinchium sarmentosum, pale blue-eyed grass

High Rock, T5S R8E sec 6

Pale blue-eyed grass only has a few sites on our Forest. These sites are in the southern edge of its range. Earlier, its distribution was thought to be confined to Klickitat and Skamania counties in Washington.

This pretty member of the iris family lives in wet meadows and openings along streams and lakes. The largest site on the forest at Little Crater Lake appears stable despite grazing. It has been speculated that light grazing may be beneficial by reducing competition. The status of the High Rock site is not known and should be monitored in the near future.

Pale blue-eyed grass is the only one of the "other species" in this watershed to have a List 1 rating. Therefore maintaining and inventorying for this species in the watershed is important. Riparian reserve guidelines should adequately protect its habitat at High Rock.

Utricularia minor, lesser bladderwort

Redtop Meadows, T3S R9E sec 30
Lesser bladderwort is a carnivorous floating aquatic plant. Besides Redtop Meadows, it grows in Enid Lake in the Zigzag Watershed and also in shallow waters on Bear Springs and Clackamas RD. Its distribution is listed as circumboreal and is not common in Oregon.

This aquatic plant grows in quiet shallow waters that are often acid and draw down in the summer. It flowers infrequently and vegetative propagules are probably dispersed by waterfowl.

No impacts are occurring to its habitat in Redtop Meadows. Riparian reserve guidelines should adequately protect these plants.

Vaccinium oxycoccus, wild cranberry

Salmon River Meadows, T4S R8 1/2E sec 13
Jackpot Meadow, T4S R8E sec 24

Wild cranberry is circumboreal in distribution and grows in sphagnum bogs. On the west coast of North America, its range ends in Oregon. On the Mt. Hood NF it can be found in cold boggy meadows in the Bull Run, Salmon and Zigzag watersheds. Wild cranberry may be locally abundant but is listed as an inventory species because its habitat type is uncommon. The populations in the Bull Run and Zigzag watersheds seem stable and well-protected. Impacts from grazing in Salmon River and Jackpots Meadows have not been investigated.

NOXIOUS WEEDS AND OTHER INVASIVE NON-NATIVE SPECIES

The attached noxious weed lists for Zigzag and Bear Springs Ranger Districts show weeds that are either "New Invaders" or "Established Infestations" or "Potential Invaders". Direction for the control of noxious weeds can be found in several documents: Mt. Hood NF Land and Resource Management Plan, Mt. Hood NF Noxious Weed Management Plan and the Environmental Assessment for the Management of Noxious Weeds on the Mt. Hood NF.

Based on a roadside weed survey of the district in 1992 and personal observations, the following New Invaders and Established Infestations occur in the Salmon River Watershed:

- *Centaurea diffusa*, diffuse knapweed
- *Centaurea maculosa*, spotted knapweed
- *Cirsium arvense*, Canada thistle
- *Cytisus scoparius*, Scotch broom
- *Hypericum perforatum*, St. Johnswort
- *Senecio jacobaea*, tansy ragwort

Generally noxious weeds in the Salmon River Watershed grow in high traffic areas along roadsides and on disturbed ground. Except for an infestation of tansy ragwort in the middle of the watershed, noxious weeds are concentrated in the upper and lower sections. Occurrences tend to be light and patchy rather than dense. Though specific noxious weed surveys have not been done in the Salmon/Huckleberry and Mt. Hood Wilderness areas, noxious weeds do not appear to be a problem. Information on the known species in the watershed is given below.

NEW INVADERS AND ESTABLISHED INFESTATIONS

Centaurea diffusa, diffuse knapweed
Centaurea maculosa, spotted knapweed

The noxious weeds of highest concern in this watershed are the knapweeds due to their New Invader status. If left uncontrolled they have the potential for forming monocultures, displacing native vegetation and forage species in grazing allotments. The largest populations are on the east side of the Cascades with some creeping over to the west. Presently our infestations are limited to roadsides in the Hwy 26/35 corridor. Treatments have included hand-pulling and weed-eaters. These methods are costly and time-consuming because persistent annual treatment is necessary. The biocontrol agent, *Urophora quadrifasciata* (seedhead gall fly), is available for control but like all agents works slowly to control knapweed. For specific locations such as new satellite sites or areas where biodiversity is especially threatened, herbicide applications may be a desirable treatment.

Cirsium arvense, Canada thistle

This weed is dispersed in the upper and lower sections of the watershed. It appears in open disturbed areas such as timber sale units, skid roads and roadsides. Canada thistle will occupy space used by native plants but usually disappears as shade and native species cover increases. It is difficult to control manually as it readily resprouts from root fragments. The biocontrol agents *Urophora carduii* (stem gall fly) and *Ceutorhynchus litura* (crown/root weevil) are available for release on dense populations.

Cytisus scoparius, Scotch broom

Scotch broom is most prevalent in the lower portions of the watershed in open pastures, lots and along roadsides from the Welches area downstream. Originally from the mediterranean, it has been cultivated over time for its attractive flowers, form and hedgerow/erosion control capabilities. Left to its own devices, broom can form a monoculture effectively suppressing native vegetation. It is well established on the west side of the Cascades and is creeping east.

Control measures on federal land has included hand-pulling, cutting, and the biocontrol agent *Apion fuscirostre* (seed weevil). Private landowners may include herbicides in their tool box. Recent studies on control methods have shown cutting when drought stressed and herbicides as being most effective.

Hypericum perforatum, St. Johnswort

St.Johnswort is a widespread invader of disturbed areas in the watershed. Most commonly it grows along sandy, gravelly roadsides. It is not aggressive in displacing native vegetation like knapweed or Scotch broom. St. Johnswort is listed because it contains compounds that are toxic to white-haired animals if eaten and is therefore is a threat to livestock. Like Canada thistle, it will disappear over time with increased shade and ground cover.

Control can be achieved by the biocontrol agent, *Chrysolina quadrigema* (leaf beetle). Hand-pulling may not be effective as St. Johnswort can resprout from rhizomes.

St. Johnswort is a popular medicinal herb with many applications including depression, aches and burns and is harvested as a special forest product in the watershed.

Senecio jacobaea, tansy ragwort

Any livestock owner west of the Cascades can identify tansy ragwort. This weed is toxic to lethal to livestock. It will actively invade pastures and disturbed areas with the potential to form large stands. In the watershed it grows along roadsides and in clearcuts. A conspicuous population exists along the 5850 road in the Linney Creek area of the watershed where no other weeds are mapped. This site is recommended as a high priority for survey and treatment.

Biocontrol of tansy has been highly successful through the use of two agents, the cinnabar moth, *Tyria jacobaeae,* and the flea beetle, *Longitarsus jacobaeae.*

The cinnabar moth has been reported to munch on native Senecios however. Handpulling can be effective if done persistently on at least an annual basis. In some situations where cost and threat of further spread are of concern, herbicides could be considered.

POTENTIAL INVADERS

Of the potential invaders, the scariest one is *Lythrum salicaria*, purple loosestrife. This aggressive wetland weed can completely dominate a wetland within a couple of years. Habitat and forage are lost for waterfowl and other wildlife. Purple loosestrife can easily spread by seeds and root/stem fragments. Mechanical and chemical control methods have not been successful. A biocontrol agent is currently being tested for release.

THE WET MEADOW COMPLEXES IN THIS WATERSHED SHOULD BE CONTINUALLY MONITORED FOR PURPLE LOOSE-STRIFE INVASION.

INVASIVE NON-NATIVE SPECIES

A list of non-native plants is included with the species list for the watershed. Below are 5 species that are aggressive in displacing native plants. Plants such as these do not get listed on the State or Federal noxious weed lists because they are not usually associated with economic losses. However, these species have the potential to cause much more damage to the watershed than some of the noxious weeds listed in the section above.

Geranium robertianum, herb robert

This pretty pink geranium is a perfect weed as it can flower and fruit all year long. It prefers shade and is becoming more and more abundant along forested trails in the lower part of the Salmon River watershed. Herb robert starts along disturbed trail and road edges and spreads outwards crowding out native plants. In the Columbia Gorge, it has spread rapidly on trail systems and through the forest after the Falls Fire.

Hedera helix, English ivy

This high climbing vine is a threat to trees, native epiphytes and surronding ground cover. Forest Park in Portland is horrifying example of how aggressive English ivy can be. In the Salmon River watershed it appears to be confined to the Salmon River road and lower. An effort should be made to prevent its spread further into the watershed.

Polygonum cuspidatum, Japanese knotweed

There are no reports of this giant bamboo-like plant on the Forest yet. In BLM field notes it shows up in the lower watershed on BLM and private land. Like bamboo, Japanese knotweed grows extremely fast and forms monocultures when established. Riparian areas provide ideal habitat.

Rubus discolor, Himalayan blackberry
Rubus laciniatus, evergreen blackberry

Blackberries haven't reached Forest Service land in the watershed yet. Largepatches are growing on adjacent private land and the potential for establishment is great. Unvegetated, disturbed ground invites invasion of these aggressive shrubs. Once established, control and eradication is extremely time consuming and expensive. Forest Service land in the watershed should be continually monitored for infestations. A cooperative effort with private adjacent land owners to control their blackberries is recommended.

RIPARIAN RESERVE SPECIES

Below is a modified version of Appendix 2: Bryophytes, Lichens, Fungi and Vascular Plants which lists the species that are known or could potentially occur in riparian areas within the Salmon River Watershed.

(* = C3 table species; S = Mt. Hood NF sensitive species; + = common and may occur outside riparian reserve)

BRYOPHYTES

Kurzia makinoana *
Marsupella emarginata var. aquatica *
Scouleria marginata *
Tritomaria exsectiformis *

LICHENS

Cetrelia cetrariodes *
Collema nigrescens *
Dermatocarpon luridum *
Hydrothyria venosa *
Leptogium burnetiae var. hirsutum *
Leptogium cyanescens *
Leptogium rivale *
Leptogium saturninum *
Leptogium teretiusculum *
Platismatia lacunosa *
Ramalina thrausta *
Usnea longissima *

FUNGI

Galerina sphagnicola *
Helvella compressa *
Helvella crassitunicata *
Helvella elastica *
Helvella maculata *
Polyozellus multiplex *
Phlogiotis helvelloides
Rickenella setipes *

VASCULAR PLANTS

Adiantum pendatum
Asarum caudatum +
Botrychium minganese *S
Cimicifuga laciniata

Coptis trifolia *S
Corydalis aquae-gelidae *S
Gymnocarpium dryopteris
Habenaria saccata
Isopyrum hallii
Lysichiton americanum +
Menziesia ferruginea
Mitella breweri
Mitella caulescens
Mitella ovalis
Mitella pentandra
Poa laxiflora
Streptopus amplexifolius
Streptopus roseus
Taxus brevifolia
Tiarella laciniata
Tiarella unifoliata
Vaccinium membranaceum +
Viola glabella +

MODIFICATION OF RIPARIAN RESERVES

BRYOPHYTES, LICHENS AND FUNGI: Very little is known about the ecology of most of these species. Their distribution in the Salmon River Watershed is poorly known and surveys are difficult. It would be wise to maintain the recommended riparian buffers and not reduce widths since there is potential for their occurrence.

VASCULAR PLANTS: The ecology and distribution of the C3 Table species and sensitive species has been discussed in documents for questions B and C in the Terrestrial Module (see ----------). Some of the other species listed above are common and can occur outside riparian reserves (species with a +). Decreases in riparian reserve widths may not be detrimental to these individual species or their population as a whole in the watershed. The other vascular plants either are not that common or seem very strongly associated with riparian reserves in the Salmon River Watershed. Present riparian reserve widths assure adequate habitat for these species.

Appendix E - Wildlife

WILDLIFE GUILDS & ASSOCIATED SPECIES WITHIN SALMON R. WATERSHED

Guild	Species	Common name	Class	TES	Introduced	FEMAT	Snags
LAKEA	ANAAM	AMERICAN WIGEON	B				
LAKEA	CYCO	TUNDRA SWAN	B				
LAKEA	TRME	GREATER YELLOWLEGS	B	NHP2			
LAKEA	PHALO	RED-NECKED PHALAROPE	B				
LAKEARE	RAPR	SPOTTED FROG	A	C1			
LAKERE	BOLE	AMERICAN BITTERN	B				
LAKERE	CALMA	WESTERN SANDPIPER	B				
LAKERE	CAMI	LEAST SANDPIPER	B				
LAKERE	LISC	LONG-BILLED DOWITCHER	B				
LAKERE	PORCA	SORA	B				
LAKERE	RALI	VIRGINIA RAIL	B				
LKRVA	DICO	COPE'S GIANT SALAMANDER	A	RFS		Y	
LKRVA	RACAT	BULLFROG	A		IN		
LKRVA	ANAC	NORTHERN PINTAIL	B				
LKRVA	ANCL	NORTHERN SHOVELER	B				
LKRVA	ANCR	GREEN-WINGED TEAL	B				
LKRVA	ANDI	BLUE-WINGED TEAL	B				
LKRVA	ANST	GADWALL	B				
LKRVA	RFS	COMMON LOON	B	RFS			
LKRVARG	ARHE	GREAT BLUE HERON	B				
LKRVARG	AYCO	RING-NECKED DUCK	B	NHP4			
LKRVARG	BUAL	BUFFLEHEAD	B	ORS			
LKRVARG	HALE	BALD EAGLE	B	T			
LKRVARG	PAHA	OSPREY	B				Y
LKRVARG	POPO	PIED-BILLED GREBE	B				
LKRVARG	CASCA	BEAVER	M				
LKRVARG	LUCA	RIVER OTTER	M				
LKRVARM	DITE	PACIFIC GIANT SALAMANDER	A				
LKRVARM	AISP	WOOD DUCK	B				Y
LKRVARM	BUIS	BARROW'S GOLDENEYE	B	ORS			Y
LKRVARM	CEAL	BELTED KINGFISHER	B				
LKRVARM	MERME	COMMON MERGANSER	B				Y
LKRVARM	SOBE	PACIFIC WATER SHREW	M				
LKRVARM	SOPAL	WATER SHREW	M				
LKRVRE	ACMA	SPOTTED SANDPIPER	B				
LKRVRE	AGPH	RED-WINGED BLACKBIRD	B				
LKRVRE	CHVO	KILLDEER	B				
LKRVRE	GAGA	COMMON SNIPE	B				
LKRVRE	GETR	COMMON YELLOWTHROAT	B				
RIVA	ASTR	TAILED FROG	A	ORS		Y	
RIVARML	RHYCA	CASCADE TORRENT SALAMANDER	A	ORS		Y	
RIVARML	CIME	AMERICAN DIPPER	B				
RIVARML	HIHI	HARLEQUIN DUCK	B	C2			
RIVRE	ICVI	YELLOW-BREASTED CHAT	B				
RIVRML	PLDU	DUNN'S SALAMANDER	A				
SPCL	CICY	NORTHERN HARRIER	B				
SPCL	FAPE	PEREGRINE FALCON	B	E			
SPCL	GRCA	SANDHILL CRANE	B	RFS			
SPCL	HIPY	CLIFF SWALLOW	B				
SPCL	HIRU	BARN SWALLOW	B				
SPCL	PADO	HOUSE SPARROW	B		IN		
SPCL	MUMU	HOUSE MOUSE	M		IN		
SPCL	MYOCI	WESTERN SMALL-FOOTED MYOTIS	M				
SPCL	NECI	BUSHY-TAILED WOODRAT	M				
SPCL	PLTO	TOWNSEND'S BIG-EARED BAT	M	C2			
SPCL	RANO	NORWAY RAT	M		IN		
TLC	AQCH	GOLDEN EAGLE	B				
TLC	BUJA	RED-TAILED HAWK	B				

Guild	Species	Common name	Class	TES	Introduced	FEMAT	Snags
TLC	BUVI	GREAT HORNED OWL	B				
TLC	CATAU	TURKEY VULTURE	B				
TLC	CEEL	ELK	M				
TLC	STRNE	GREAT GRAY OWL	B				
TLGG	COBR	AMERICAN CROW	B				
TLGG	CORCO	COMMON RAVEN	B				
TLGG	CANLA	COYOTE	M				
TLGG	FECO	MOUNTAIN LION	M				
TLGG	FERU	BOBCAT	M				
TLGG	URAM	BLACK BEAR	M				
TLGG	URCI	GRAY FOX	M				
TLME	BULA	ROUGH-LEGGED HAWK	B				
TLME	VUVU	RED FOX	M				
TLML	ACGE	NORTHERN GOSHAWK	B	C2			
TLML	DRPI	PILEATED WOODPECKER	B	ORS			Y
TLML	STOCCA	NORTHERN SPOTTED OWL	B	T			
TLML	STVA	BARRED OWL	B				Y
TLML	GUGU	WOLVERINE	M	C2			
TLML	MAAM	MARTEN	M	ORS		Y	Y
TLML	MAPE	FISHER	M	C2		Y	Y
TMC	FASP	AMERICAN KESTREL	B				Y
TMC	STVU	EUROPEAN STARLING	B		IN		Y
TMC	TYAL	BARN OWL	B				Y
TMC	EPFU	BIG BROWN BAT	M				Y
TMC	LANO	SILVER-HAIRED BAT	M			Y	Y
TMC	MYOCA	CALIFORNIA MYOTIS	M				Y
TMGG	ACCCO	COOPER'S HAWK	B				
TMGG	ACST	SHARP-SHINNED HAWK	B				
TMGG	AEAC	NORTHERN SAW-WHET OWL	B				Y
TMGG	CHMI	COMMON NIGHTHAWK	B				
TMGG	COAU	NORTHERN FLICKER	B				Y
TMGG	MEGA	WILD TURKEY	B		IN		
TMGG	PECA	GRAY JAY	B				
TMGG	DIVI	VIRGINIA OPOSSUM	M		IN		Y
TMGG	ERDO	PORCUPINE	M				
TMGG	LACI	HOARY BAT	M			Y	
TMGG	MUFR	LONG-TAILED WEASEL	M				
TMGG	MUVI	MINK	M				
TMGG	MYEV	LONG-EARED MYOTIS	M			Y	Y
TMGG	MYVO	LONG-LEGGED MYOTIS	M			Y	Y
TMGG	MYYU	YUMA MYOTIS	M				Y
TMGG	ODHE	BLACK-TAILED & MULE DEER	M				
TMME	FACO	MERLIN	B	NHP2			
TMME	SPGR	WESTERN SPOTTED SKUNK	M				
TMML	PIAR	BLACK-BACKED WOODPECKER	B	ORS		Y	Y
TMML	PITR	THREE-TOED WOODPECKER	B	ORS			Y
TSC	CACAS	CASSIN'S FINCH	B				
TSC	COBO	OLIVE-SIDED FLYCATCHER	B				
TSGEM	DEPET	YELLOW WARBLER	B				
TSGEM	EMTR	WILLOW FLYCATCHER	B				
TSGEM	ICGA	NORTHERN ORIOLE	B				
TSGEM	PAAT	BLACK-CAPPED CHICKADEE	B				Y
TSGEM	PAIL	FOX SPARROW	B				
TSGEM	THBE	BEWICK'S WREN	B				
TSGEM	TRAE	HOUSE WREN	B				Y
TSGG	AMGR	NORTHWESTERN SALAMANDER	A				
TSGG	AMMA	LONG-TOED SALAMANDER	A				
TSGG	ANFE	CLOUDED SALAMANDER	A	ORS			
TSGG	BAWR	OREGON SLENDER SALAMANDER	A	ORS		Y	

Guild	Species	Common name	Class	TES	Introduced	FEMAT	Snags
TSGG	BUBO	WESTERN TOAD	A	ORS			
TSGG	ENES	ENSATINA	A				
TSGG	PLVE	WESTERN RED-BACKED SALAMANDE	A				
TSGG	PSRE	PACIFIC TREEFROG	A				
TSGG	RAAU	RED-LEGGED FROG	A	C2			
TSGG	RACAS	CASCADES FROG	A				
TSGG	TAGR	ROUGH-SKINNED NEWT	A				
TSGG	BOCE	CEDAR WAXWING	B				
TSGG	BOUM	RUFFED GROUSE	B				
TSGG	CAGU	HERMIT THRUSH	B				
TSGG	CARPI	PINE SISKIN	B				
TSGG	CARPU	PURPLE FINCH	B				
TSGG	CAUS	SWAINSON'S THRUSH	B				
TSGG	CHVA	VAUX'S SWIFT	B				Y
TSGG	COFA	BAND-TAILED PIGEON	B				
TSGG	COSO	WESTERN WOOD-PEWEE	B				
TSGG	COVE	EVENING GROSBEAK	B				
TSGG	CYST	STELLER'S JAY	B				
TSGG	DENCO	YELLOW-RUMPED WARBLER	B				
TSGG	DENI	BLACK-THROATED GRAY WARBLER	B				
TSGG	DEOB	BLUE GROUSE	B				
TSGG	EMHA	HAMMOND'S FLYCATCHER	B				
TSGG	GLGN	NORTHERN PYGMY-OWL	B	ORS			Y
TSGG	IXNA	VARIED THRUSH	B				
TSGG	JUHY	DARK-EYED JUNCO	B				
TSGG	LOXCU	RED CROSSBILL	B				
TSGG	MELME	SONG SPARROW	B				
TSGG	MOAT	BROWN-HEADED COWBIRD	B				
TSGG	MYTO	TOWNSEND'S SOLITAIRE	B				
TSGG	NUCO	CLARK'S NUTCRACKER	B				
TSGG	OTKE	WESTERN SCREECH-OWL	B				Y
TSGG	PARGA	MOUNTAIN CHICKADEE	B				Y
TSGG	PARU	CHESTNUT-BACKED CHICKADEE	B				Y
TSGG	PHME	BLACK-HEADED GROSBEAK	B				
TSGG	PIEN	PINE GROSBEAK	B	NHP3			
TSGG	PIER	RUFOUS-SIDED TOWHEE	B				
TSGG	PILU	WESTERN TANAGER	B				
TSGG	PIVI	HAIRY WOODPECKER	B				Y
TSGG	RECA	RUBY-CROWNED KINGLET	B				
TSGG	RESA	GOLDEN-CROWNED KINGLET	B				
TSGG	SELRU	RUFOUS HUMMINGBIRD	B				
TSGG	SICAN	RED-BREASTED NUTHATCH	B				Y
TSGG	SICAR	WHITE-BREASTED NUTHATCH	B				Y
TSGG	SIPY	PYGMY NUTHATCH	B	ORS			Y
TSGG	SPNU	RED-NAPED SAPSUCKER	B				Y
TSGG	SPPAS	CHIPPING SPARROW	B				
TSGG	SPRU	RED-BREASTED SAPSUCKER	B				Y
TSGG	TABI	TREE SWALLOW	B				Y
TSGG	TATH	VIOLET-GREEN SWALLOW	B				Y
TSGG	TRTR	WINTER WREN	B				
TSGG	TUMI	AMERICAN ROBIN	B				
TSGG	VERU	NASHVILLE WARBLER	B				
TSGG	VIGI	WARBLING VIREO	B				
TSGG	VIHU	HUTTON'S VIREO	B				
TSGG	VISO	SOLITARY VIREO	B				
TSGG	WIPU	WILSON'S WARBLER	B				
TSGG	ZEMA	MOURNING DOVE	B				
TSGG	APRU	MOUNTAIN BEAVER	M				
TSGG	LEAM	SNOWSHOE HARE	M				

Guild	Species	Common name	Class	TES	Introduced	FEMAT	Snags
TSGG	MIOR	CREEPING VOLE	M				
TSGG	MUER	ERMINE	M				
TSGG	PEMA	DEER MOUSE	M				
TSGG	PRLO	RACCOON	M				Y
TSGG	SCIGR	WESTERN GRAY SQUIRREL	M				Y
TSGG	SCOR	COAST MOLE	M				
TSGG	SOBA	BAIRD'S SHREW	M				
TSGG	SOMO	DUSKY SHREW	M				
TSGG	SOVA	VAGRANT SHREW	M				
TSGG	SPLA	GOLDEN-MANTLED GROUND SQUIRR	M				
TSGG	SYBA	BRUSH RABBIT	M				
TSGG	TADO	DOUGLAS' SQUIRREL	M				Y
TSGG	TATO	TOWNSEND'S CHIPMUNK	M				
TSGG	ZATR	PACIFIC JUMPING MOUSE	M				
TSGG	CHBO	RUBBER BOA	R				
TSGG	DIPU	RINGNECK SNAKE	R				
TSGG	ELCO	NORTHERN ALLIGATOR LIZARD	R				
TSGG	EUSK	WESTERN SKINK	R				
TSGG	SCOC	WESTERN FENCE LIZARD	R				
TSGML	CEAM	BROWN CREEPER	B				Y
TSGML	DEOC	HERMIT WARBLER	B				
TSGML	DETO	TOWNSEND'S WARBLER	B				
TSGML	PIPU	DOWNY WOODPECKER	B				Y
TSGML	CLCA	WESTERN RED-BACKED VOLE	M				
TSME	APCO	SCRUB JAY	B				
TSME	CATR	AMERICAN GOLDFINCH	B				
TSME	EUCY	BREWER'S BLACKBIRD	B				
TSME	PSMI	BUSHTIT	B				
TSME	STCAL	CALLIOPE HUMMINGBIRD	B				
TSPE	ANSPI	AMERICAN PIPIT (WATER PIPIT)	B				
TSPE	ERAL	HORNED LARK	B				
TSPE	MELI	LINCOLN'S SPARROW	B				
TSPE	OPTO	MACGILLIVRAY'S WARBLER	B				
TSPE	PASA	SAVANNAH SPARROW	B				
TSPE	PASAM	LAZULI BUNTING	B				
TSPE	PHCO	RING-NECKED PHEASANT	B		IN		
TSPE	SICU	MOUNTAIN BLUEBIRD	B				Y
TSPE	SIME	WESTERN BLUEBIRD	B	ORS			Y
TSPE	VECE	ORANGE-CROWNED WARBLER	B				
TSPE	ZOAT	GOLDEN-CROWNED SPARROW	B				
TSPE	ZOLE	WHITE-CROWNED SPARROW	B				
TSPE	MAFL	YELLOW-BELLIED MARMOT	M				
TSPE	MILO	LONG-TAILED VOLE	M				
TSPE	MITO	TOWNSEND'S VOLE	M				
TSPE	PHIN	HEATHER VOLE	M				
TSPE	SCTO	TOWNSEND'S MOLE	M				
TSPE	SPBEE	CALIFORNIA GROUND SQUIRREL	M				
TSPE	THMA	WESTERN POCKET GOPHER	M				
TSPE	COLCO	RACER	R				
TSPE	PICA	GOPHER SNAKE	R				
TSPE	THOR	NORTHWESTERN GARTER SNAKE	R				
TSPE	THSI	COMMON GARTER SNAKE	R				
TSPL	EMDI	PACIFIC SLOPE FLYCATCHER	B				
TSPL	GLSA	NORTHERN FLYING SQUIRREL	M				Y
TSPL	NEGI	SHREW-MOLE	M				
TSPL	PHELO	RED TREE VOLE	M	C-3		Y	
TSPL	SOTR	TROWBRIDGE'S SHREW	M				

Class:
A = amphibian
B = bird
M = mammal
R = reptile

Introduced:
IN = introduced species

Snags:
1 = snag dependent species

FEMAT:
Y = less than 80% probability of achieving outcome A under Option 9

TES:
T = Federally threatened species
E = Federally endangered species
C2 = Federal candidate species
RFS = Forest Service sensitive
NHP1-4 = Oregon Natural Heritage Program listed
ORS = Oregon State sensitive

ANALYSIS OF MT. HOOD FOREST PLAN ALLOCATIONS FOR PILEATED WOODPECKER AND PINE MARTEN AREAS (AN IMPLEMENTATION STEP OF THE NORTHWEST FOREST PLAN)

To: Forest Plan ID Team
: Laura Ceperley, Planning Staff

From: Project '95

INTRODUCTION

On page C-3 of the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD), under item 2, it is stated:

> "Administratively withdrawn Areas that are specified in current plans and draft plan preferred alternatives to benefit American martens, pileated woodpeckers, and other late-successional species are returned to the matrix unless local knowledge indicates that other allocations and these standards and guidelines will not meet the objectives for these species".

In June 1994, the Mt. Hood N.F. Project 94 group recognized that a forest wide analysis was needed to address the distribution and disposition of the Mt. Hood Forest Plan's B5 pileated woodpecker and pine marten land allocations as they occur in the matrix allocations. This document (with associated maps) represents that analysis.

The purpose of the B5 management areas as stated in the Mt. Hood Forest Plan (p.FOUR-240-1) is to:

> "Provide Forestwide mature or old-growth forest habitat blocks of sufficient quality, quantity and distribution to sustain viable populations of pileated woodpecker an pine marten. A secondary goal is to maintain a healthy forest condition through a variety of timber management practices."

A methodology (screening process) was developed to assess the relative importance of individual B5 areas in the matrix based on their respective contribution to achieving and maintaining a "functional and interconnected old growth ecosystem" (ROD p.5).

This analysis was completed across the Mt. Hood NF portions of the Willamette and Deschutes Provinces. It serves as a basin scale, cursory analysis of providing habitat for these late seral species. Site specific analysis for some watersheds on Forest are available, but are not included within this report. Results for this analysis report are expected to be useful in future Forest planning activities at the Forest scale and in future initiation or iteration of analysis at the watershed scale.

This report should be considered analysis. It is not a series of recommendations or decisions. It is intended to provide data from which a recommendation for a decision can be made.

OBJECTIVES

1) Implement the ROD, provide analysis to help clarify land allocations regarding pileated woodpecker and American marten on the Mt. Hood National Forest.

2) Analyze the contribution of each identified B5 management area to providing a functional and interconnected old-growth forest ecosystem, particularly as it relates to habitat for the pileated woodpecker and the American marten.

3) Identify B5 management areas that are either not warranted or whose retention as a designated management area is warranted.

ASSUMPTIONS

1. Refinement of this analysis will take place during ecosystem analysis.

2. This analysis only addresses terrestrial late-seral associated vertebrates. Riparian dependent species are covered by Riparian Reserves.

4. Focus will be primarily at the watershed landscape scale or greater.

5. Critical Habitat Units as designated by US Fish and Wildlife Service for the northern spotted owl are not counted on to contribute late seral habitat.

6. Wilderness, and other congressionally withdrawn areas, as well as, land allocations administratively withdrawn from programmed timber harvest, will provide late seral habitat (now and in the future) that are well distributed across the land allocations.

7. It is assumed that the contribution of other standards and guidelines will benefit late seral species (eg. riparian reserves, survey and manage strategy, green tree retention).

THE PROCEDURE

This analysis procedure started by "screening out" any B5 area that was in reserved land allocations. The result was map that consisted of B5 areas in the matrix allocation. There are a total of 448 B5 management areas on Forest; 240 are found in the matrix allocation and this analysis focused only on those 240 B5 areas. The 240 B5 areas in the matrix allocation were then taken thorough the three screens described below. The procedure evaluates the respective contributions of the B5 areas to accomplishing the ROD objective of providing for a "functional and interconnected old-growth forest ecosystem." (ROD. p.5)

Screen 1. Relation to the Northwest Forest Plan Land Allocations

The 240 B5 areas were reviewed for their relationship to the Northwest Forest Plan land allocations. B5 areas in the matrix that were immediately adjacent to late successional reserves, congressionally reserved areas and administratively withdrawn areas were screened out due to the desired future conditions afforded by these land allocations. It is assumed that these withdrawn areas regardless of their current condition will progress to a late seral stage in the future. Out of 240 B5 areas in 24 watersheds that entered screen 1, 25 B5 areas in 13 watersheds progress to Screen 2. Refer to Table 1, Screen 1.

Screen 2. Accumulations of Riparian Reserves

B5 areas that entered this screen were assessed for their proximity to riparian reserves, specifically stream orders 3 and 4. It was determined that B5 areas that were within areas of large concentrations of riparian reserves would be dropped from the matrix. This screen also focused on connectivity of the B5 area to each other and other land allocations. Out of 23 B5 areas that entered screen 2, 21 B5 areas in 13 watersheds progress to Screen 3. Refer to Table 1, Screen 2.

Screen 3. Existing Local Knowledge

Screen 3 captured existing local knowledge at the field level. Screen 1 thru 2 were based on province, basin and forest scale mapping and modeling with inherent relative error. Screen 3 used the same concepts as screen 1-2 but took advantage of local data with greater resolution. For example, a given B5 area could be "screened out" by screen 1 based solely on it's juxtaposition to a wilderness area; without regard to existing habitat conditions within the wilderness. Screen 3 provided the opportunity to efficiently gain further clarification of the analysis results by tapping knowledgeable individuals and gleaning from existing field analysis and mapping; i.e. without a further, more detailed analysis process.

One additional criterion was applied in Screen 3, existing knowledge of American marten presence within or near the designated B5 area. Local interdisciplinary discretion was used in applying this criterion.

Results

Based on this analysis, B5 areas were separated into two categories: A) those that should be returned to the matrix. Out of 240 B5 areas, 219 are identified to not be retained with the B5 designation. B) B5 areas which should be retained, at least in the short term, because of their strategic contribution to late seral habitat conditions at the landscape level.

Out of 240 B5 areas in the matrix, 21 are identified for retention. Refer to Table 2 for a listing of individual areas by watershed.

The 21 B5 pileated woodpecker and pine marten management areas (Table 2) should be further analyzed in Ecosystem Analysis (formerly Watershed Analysis). Criteria to consider include:

*amount and distribution of Late Seral (LS) habitat within the watershed (using more refined data).

*quality of LS habitat within the watershed not subject to programmed timber harvest, e.g. interior habitat, standing or down coarse woody debris.

*proximity to riparian reserves and unmapped 100 acre spotted owl late successional reserves.

*projected rate of removal of existing LS habitat.

*presence of high quality LS blocks and potential for relocating the B5.

TABLE 1

ILLUSTRATION OF WATERSHEDS AND B5 MANAGEMENT AREAS PROGRESSING THOUGH SCREENS

WILLAMETTE PROVINCE

# WATERSHED NAME	SCREEN 1	SCREEN 2	SCREEN 3	RETAIN ?
LOWER COLUMBIA RIVER BASIN:				
1 BULL RUN RIVER	7			0
2 SANDY RIVER	4			1
3 ZIGZAG RIVER	3			0
4 SALMON RIVER	15			0
5 COLUMBIA GORGE TRIBS EAST	3			0
6 LITTLE SANDY RIVER	2			0
7 GORDON-THOMPSON CREEK	2			0
WILLAMETTE RIVER BASIN:				
8 LOWER CLACKAMAS R.	12			0
9 SOUTH FORK CLACKAMAS RIVER	1			0
10 OAK GROVE FORK CLACKAMAS RIVER	24			4
11 COLLAWASH RIVER	20	2		1
12 UPPER CLACKAMAS R.	30	2		1
13 FISH CREEK	5			1
14 EAGLE CREEK	4			0
15 NORTH FORK CLACKAMAS RIVER	4			1
16 HOT SPRINGS FORK CLACKAMAS RIVER	7			1
SUBTOTAL OF WATERSHEDS:	9	0	0	7
SUBTOTAL B5 MGT. AREAS "SCREENED OUT":	**143**	**4**	**0**	**10**

NOTE: The numbers in the SCREENS 1-3 reflect the individual B5 areas in the matrix that were screened out. The numbers in the RETAIN? column reflect B5 areas to be retained in the watershed.

DESCHUTES PROVINCE

# WATERSHED NAME	SCREEN 1	SCREEN 2	SCREEN 3	RETAIN ?
MIDDLE COLUMBIA RIVER BASIN:				
17 WEST FORK HOOD R.	12			2
18 EAST FORK HOOD R.	20			0
19 MILL CREEK	2			1
20 MILES CREEKS	2			2
21 MIDDLE FORK HOOD R.	1			2
DESCHUTES RIVER BASIN:				
22 WHITE RIVER	20			3
23 BADGER-TYGH CREEK	8			0
24 ROCK-THREE MILE CR.	7			1
TOTAL WATERSHEDS: (total of 24)	11	0	0	13
TOTAL B5 MGT. AREAS "SCREENED OUT": (total of 240)	215	4	0	21

TABLE 2

B5 AREAS RECOMMENDED FOR RETENTION AND FURTHER ANALYSIS IN ECOSYSTEM ANALYSIS

WILLAMETTE PROVINCE

WATERSHED NAME	PINE MARTEN CODE	WOODPECKER CODE
LOWER COLUMBIA RIVER BASIN:		
SANDY RIVER		9081W
WILLAMETTE RIVER BASIN:		
OAK GROVE FORK/ CLACKAMAS RIVER		3171W, 2041W, 2101W 3111W
COLLAWASH RIVER		5111W
NORTH FORK CLACKAMAS RIVER	5021M	
FISH CREEK	5261M	
UPPER CLACKAMAS RIVER	3281M	
HOT SPRINGS FORK COLLAWASH RIVER		5131W

DESCHUTES PROVINCE

WATERSHED NAME	PINE MARTEN CODE	WOODPECKER CODE
MIDDLE COLUMBIA RIVER BASIN:		
WEST FORK HOOD RIVER	6211M 6161M	
MILL CREEK		6061W
MILE CREEKS	1011M	1081W
MIDDLE FORK HOOD RIVER	6131M	6081W
DESCHUTES RIVER BASIN:		
ROCK-CREEK THREE MILE CREEKS	1031M	
WHITE RIVER		2011W 2061W 2111W
TOTAL B5 AREAS TO RETAIN : (21 areas in 13 watersheds)	8	13

SALMON RIVER — (all 3 EAUs) — associated w/ 'sett habitat

2/16/94 SPECIES ASSOCIATED WITH SPECIAL AND UNIQUE HABITATS

Species	Species_description	EAU	Special_habitat
HIPY	cliff swallow	120	BRIDGES
HIRU	barn swallow	120	BRIDGES
MYVO	long-legged myotis	120	BRIDGES
MYYU	Yuma myotis	120	BRIDGES

Count of Species Associated with BRIDGES : 4

Species	Species_description	EAU	Special_habitat
DIVI	Virginia opossum	114	BUILDINGS
EPFU	big brown bat	114	BUILDINGS
HIPY	cliff swallow	114	BUILDINGS
HIRU	barn swallow	114	BUILDINGS
LANO	silver-haired bat	114	BUILDINGS
MUMU	house mouse	114	BUILDINGS
MYEV	long-eared myotis	114	BUILDINGS
MYOCA	California myotis	114	BUILDINGS
MYVO	long-legged myotis	114	BUILDINGS
MYYU	Yuma myotis	114	BUILDINGS
PADO	house sparrow	114	BUILDINGS
RANO	Norway rat	114	BUILDINGS
STVU	European starling	114	BUILDINGS
TYAL	barn owl	114	BUILDINGS

Count of Species Associated with BUILDINGS : 14

AGPH	red-winged blackbird	114	SHRUB_WETLAND
AISP	wood duck	114	SHRUB_WETLAND
ANAAM	American wigeon	114	SHRUB_WETLAND
ANAC	northern pintail	114	SHRUB_WETLAND
ANCL	northern shoveler	114	SHRUB_WETLAND
ANCR	green-winged teal	114	SHRUB_WETLAND
ANCY	cinnamon teal	114	SHRUB_WETLAND
ANPL	mallard	114	SHRUB_WETLAND
APRU	mountain beaver	114	SHRUB_WETLAND
ARHE	great blue heron	114	SHRUB_WETLAND
BOCE	cedar waxwing	114	SHRUB_WETLAND
BOUM	ruffed grouse	114	SHRUB_WETLAND
BRCA	Canada goose	114	SHRUB_WETLAND
BUBO	western toad	114	SHRUB_WETLAND
BULA	rough-legged hawk	114	SHRUB_WETLAND
CAGU	hermit thrush	114	SHRUB_WETLAND
CALAT	coyote	114	SHRUB_WETLAND
CAPI	pine siskin	114	SHRUB_WETLAND
CASCAN	beaver	114	SHRUB_WETLAND

Species	Species_description	EAU	Special_habitat
CATR	American goldfinch	114	SHRUB_WETLAND
CAUS	Swainson's thrush	114	SHRUB_WETLAND
CEAL	belted kingfisher	114	SHRUB_WETLAND
CEEL	elk	114	SHRUB_WETLAND
CHMI	common nighthawk	114	SHRUB_WETLAND
CHVA	Vaux's swift	114	SHRUB_WETLAND
CICY	northern harrier	114	SHRUB_WETLAND
COBR	American crow	114	SHRUB_WETLAND
COFA	band-tailed pigeon	114	SHRUB_WETLAND
CORCO	common raven	114	SHRUB_WETLAND
COVE	evening grosbeak	114	SHRUB_WETLAND
DENCO	yellow-rumped warbler	114	SHRUB_WETLAND
DENI	black-throated gray warbler	114	SHRUB_WETLAND
DEPE	yellow warbler	114	SHRUB_WETLAND
DIVI	Virginia opossum	114	SHRUB_WETLAND
EMHA	Hammond's flycatcher	114	SHRUB_WETLAND
EMTR	willow flycatcher	114	SHRUB_WETLAND
EPFU	big brown bat	114	SHRUB_WETLAND
ERDO	porcupine	114	SHRUB_WETLAND
EUCY	Brewer's blackbird	114	SHRUB_WETLAND
FACO	merlin	114	SHRUB_WETLAND
FAPE	peregrine falcon	114	SHRUB_WETLAND
FUAM	American coot	114	SHRUB_WETLAND
GETR	common yellowthroat	114	SHRUB_WETLAND
GRCA	sandhill crane	114	SHRUB_WETLAND
HALE	bald eagle	114	SHRUB_WETLAND
HIHI	harlequin duck	114	SHRUB_WETLAND
HIRU	barn swallow	114	SHRUB_WETLAND
ICVI	yellow-breasted chat	114	SHRUB_WETLAND
JUHY	dark-eyed junco	114	SHRUB_WETLAND
LACI	hoary bat	114	SHRUB_WETLAND
LUCA	river otter	114	SHRUB_WETLAND
LYRU	bobcat	114	SHRUB_WETLAND
MELI	Lincoln's sparrow	114	SHRUB_WETLAND
MELME	song sparrow	114	SHRUB_WETLAND
MEMEP	striped skunk	114	SHRUB_WETLAND
MILO	long-tailed vole	114	SHRUB_WETLAND
MIOR	creeping vole	114	SHRUB_WETLAND
MOAT	brown-headed cowbird	114	SHRUB_WETLAND
MUVI	mink	114	SHRUB_WETLAND
MYOCI	western small-footed myotis	114	SHRUB_WETLAND
MYVO	long-legged myotis	114	SHRUB_WETLAND
MYYU	Yuma myotis	114	SHRUB_WETLAND
NECI	bushy-tailed woodrat	114	SHRUB_WETLAND
ODHE	mule deer and black-tailed deer	114	SHRUB_WETLAND
OPTO	MacGillivray's warbler	114	SHRUB_WETLAND

Species	Species_description	EAU	Special_habitat
OTKE	western screech-owl	114	SHRUB_WETLAND
PAAMO	lazuli bunting	114	SHRUB_WETLAND
PAAT	black-capped chickadee	114	SHRUB_WETLAND
PAIL	fox sparrow	114	SHRUB_WETLAND
PECA	gray jay	114	SHRUB_WETLAND
PHME	black-headed grosbeak	114	SHRUB_WETLAND
PIER	rufous-sided towhee	114	SHRUB_WETLAND
PILU	western tanager	114	SHRUB_WETLAND
POPO	pied-billed grebe	114	SHRUB_WETLAND
PRLO	raccoon	114	SHRUB_WETLAND
PSRE	Pacific treefrog	114	SHRUB_WETLAND
RAAU	red-legged frog	114	SHRUB_WETLAND
RAPA	Cascade frog	114	SHRUB_WETLAND
RECA	ruby-crowned kinglet	114	SHRUB_WETLAND
SCOR	coast mole	114	SHRUB_WETLAND
SERUF	rufous hummingbird	114	SHRUB_WETLAND
SIME	western bluebird	114	SHRUB_WETLAND
SOBA	Baird's shrew	114	SHRUB_WETLAND
SOBE	Pacific water shrew	114	SHRUB_WETLAND
SPPA	chipping sparrow	114	SHRUB_WETLAND
SPPU	spotted skunk	114	SHRUB_WETLAND
STVA	barred owl	114	SHRUB_WETLAND
TABI	tree swallow	114	SHRUB_WETLAND
TATH	violet-green swallow	114	SHRUB_WETLAND
THBE	Bewick's wren	114	SHRUB_WETLAND
THSI	common garter snake	114	SHRUB_WETLAND
TUMI	American robin	114	SHRUB_WETLAND
URAM	black bear	114	SHRUB_WETLAND
VECE	orange-crowed warbler	114	SHRUB_WETLAND
VIGI	warbling vireo	114	SHRUB_WETLAND
VIHU	Hutton's vireo	114	SHRUB_WETLAND
WIPU	Wilson's warbler	114	SHRUB_WETLAND
ZAIR	Pacific jumping mouse	114	SHRUB_WETLAND
ZOAT	golden-crowned sparrow	114	SHRUB_WETLAND
ZOLE	white-crowned sparrow	114	SHRUB_WETLAND

Count of Species Associated with SHRUB_WETLAND : 100

CHMI	common nighthawk	114	TALUS
EUSK	western skink	114	TALUS
FECO	mountain lion	114	TALUS
LEAR	rosy finch	114	TALUS
LYRU	bobcat	114	TALUS

Species	Species_description	EAU	Special_habitat
MAFL	yellow-bellied marmot	114	TALUS
MAPE	fisher	114	TALUS
MILO	long-tailed vole	114	TALUS
MUER	ermine	114	TALUS
MYOCI	western small-footed myotis	114	TALUS
NECI	bushy-tailed woodrat	114	TALUS
PEMA	deer mouse	114	TALUS
PLDU	Dunn's salamander	114	TALUS
PLVE	western redback salamander	114	TALUS
SCOC	western fence lizard	114	TALUS
SPLA	golden-mantled ground squirrel	114	TALUS
SPPU	spotted skunk	114	TALUS
TATO	Townsend's chipmunk	114	TALUS
THOR	northwestern garter snake	114	TALUS
URAM	black bear	114	TALUS

Count of Species Associated with TALUS : 20

ACMA	spotted sandpiper	114	WET_MEADOW
AEAC	northern saw-whet owl	114	WET_MEADOW
AMGR	northwestern salamander	114	WET_MEADOW
AMMA	long-toed salamander	114	WET_MEADOW
ANAAM	American wigeon	114	WET_MEADOW
ANAC	northern pintail	114	WET_MEADOW
ANCL	northern shoveler	114	WET_MEADOW
ANCR	green-winged teal	114	WET_MEADOW
ANCY	cinnamon teal	114	WET_MEADOW
ANDI	blue-winged teal	114	WET_MEADOW
ANPL	mallard	114	WET_MEADOW
BOLE	American bittern	114	WET_MEADOW
BRCA	Canada goose	114	WET_MEADOW
BUBO	western toad	114	WET_MEADOW
CAAU	turkey vulture	114	WET_MEADOW
CALAT	coyote	114	WET_MEADOW
CAMAU	western sandpiper	114	WET_MEADOW
CAMI	least sandpiper	114	WET_MEADOW
CAPI	pine siskin	114	WET_MEADOW
CEEL	elk	114	WET_MEADOW
CHMI	common nighthawk	114	WET_MEADOW
CHVA	Vaux's swift	114	WET_MEADOW
CHVO	killdeer	114	WET_MEADOW
CICY	northern harrier	114	WET_MEADOW
COAU	northern flicker	114	WET_MEADOW

Species	Species_description	EAU	Special_habitat
COBR	American crow	114	WET_MEADOW
CORCO	common raven	114	WET_MEADOW
CYCO	tundra (whistling) swan	114	WET_MEADOW
DEOB	blue grouse	114	WET_MEADOW
DIPU	ringneck snake	114	WET_MEADOW
EMHA	Hammond's flycatcher	114	WET_MEADOW
EPFU	big brown bat	114	WET_MEADOW
FACO	merlin	114	WET_MEADOW
FAPE	peregrine falcon	114	WET_MEADOW
FASP	American kestrel	114	WET_MEADOW
FECO	mountain lion	114	WET_MEADOW
FUAM	American coot	114	WET_MEADOW
GAGA	common snipe	114	WET_MEADOW
GRCA	sandhill crane	114	WET_MEADOW
GUGU	wolverine	114	WET_MEADOW
HALE	bald eagle	114	WET_MEADOW
HIRU	barn swallow	114	WET_MEADOW
JUHY	dark-eyed junco	114	WET_MEADOW
LOSC	Long-billed dowitcher	114	WET_MEADOW
LYRU	bobcat	114	WET_MEADOW
MELI	Lincoln's sparrow	114	WET_MEADOW
MILO	long-tailed vole	114	WET_MEADOW
MIOR	creeping vole	114	WET_MEADOW
MIRI	water vole	114	WET_MEADOW
MITO	Townsend's vole	114	WET_MEADOW
MOAT	brown-headed cowbird	114	WET_MEADOW
MUFR	long-tailed weasel	114	WET_MEADOW
MUMU	house mouse	114	WET_MEADOW
MUVI	mink	114	WET_MEADOW
MYEV	long-eared myotis	114	WET_MEADOW
MYOCA	California myotis	114	WET_MEADOW
MYOCI	western small-footed myotis	114	WET_MEADOW
MYVO	long-legged myotis	114	WET_MEADOW
NEGI	shrew-mole	114	WET_MEADOW
ODHE	mule deer and black-tailed deer	114	WET_MEADOW
OTKE	western screech-owl	114	WET_MEADOW
PEMA → PASA	deer mouse → savannah sparrow	114	WET_MEADOW
PLTO	Townsend's big-eared bat	114	WET_MEADOW
POCA	Sora	114	WET_MEADOW
PRLO	raccoon	114	WET_MEADOW
PSRE	Pacific treefrog	114	WET_MEADOW
RALI	Virginia rail	114	WET_MEADOW
RANCA	Cascade frog	114	WET_MEADOW
RAPR	spotted frog	114	WET_MEADOW
SCOR	coast mole	114	WET_MEADOW
SCTO	Townsend's mole	114	WET_MEADOW

Species	Species_description	EAU	Special_habitat
SERUF	rufous hummingbird	114	WET_MEADOW
SOBA	Baird's shrew	114	WET_MEADOW
SOBE	Pacific water shrew	114	WET_MEADOW
SOVA	vagrant shrew	114	WET_MEADOW
SYBA	brush rabbit	114	WET_MEADOW
TABI	tree swallow	114	WET_MEADOW
TAGR	roughskin newt	114	WET_MEADOW
TATH	violet-green swallow	114	WET_MEADOW
THSI	common garter snake	114	WET_MEADOW
TRME	greater yellowlegs	114	WET_MEADOW
TUMI	American robin	114	WET_MEADOW
URAM	black bear	114	WET_MEADOW
VUVU	red fox	114	WET_MEADOW
ZATR	Pacific jumping mouse	114	WET_MEADOW

STELCA → calliope hummingbird

Count of Species Associated with WET_MEADOW : ~~85~~ 87

NOTE: Species listed above do not necessarily occur within these special habitats over the entire EAU. Species may be limited to certain plant communities or counties within the EAU boundary.

MEMO

Date: June 2, 1995

To: Nancy Lankford, Columbia Gorge R.D.
Carol Hughes, Zig Zag R.D.
John Wells, Bear Springs R.D.

From: Ray Bosch, U.S. Fish and Wildlife Service

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL | # of pages ▶ 1

To	From Ray Bosch
Dept./Agency	Phone # 231-6179
Fax #	Fax # 231-6195

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Subject: Critical Habitat and Wilderness Areas

At the watershed analysis meeting of May 18, the subject of spotted owl critical habitat and wilderness areas, specifically the Salmon-Huckleberry, was brought up. At the time, I was unsure as to the designation of critical habitat included within the wilderness area. I had assumed that the acres of forested habitat that are/were capable of becoming suitable spotted owl habitat within the wilderness were designated as critical habitat. Carol Hughes had, however, provided documentation that this is not the case, and that critical habitat was designated only for lands outside of the wilderness. I agreed to investigate the matter and provide some response.

I discussed the matter with Gary Miller of our office, head of our Endangered Species program. He confirmed that the designation of critical habitat did not generally include the wilderness areas, because of the fact that existing management of these areas is consistent with the management and recovery of the northern spotted owl. The concept is similar to that of LSRs not being designated within Congressionally Reserved Allocations (e.g., wilderness areas) because of existing mandated management. For the Salmon-Huckleberry, then, only the "keyhole" is designated as critical habitat (plus other areas surrounding the wilderness).

However, a major consideration of the designation of the critical habitat outside of the wilderness is the management of the wilderness itself. It is assumed that management of the wilderness is consistent with management of spotted owls. Any decisions to manage wilderness (e.g., prescribed fire plan, including human ignition fires for prescriptive purposes) needs to evaluate the potential impacts to spotted owls, since this changes the environmental baseline under which critical habitat was designated. This does not preclude the use of fire as a tool to manage ecosystem processes within the Salmon-Huckleberry (or any other wilderness); it merely identifies an important component of the wilderness that must be considered in any decision to manage it.

I hope that this provides some help and clarification for this issue. Please call me at 503-231-6179 if you have any additional questions regarding this matter.

Appendix F - Aquatic Conservation Strategy Consistency Review - Wapinitia Grazing Allotment

RECORD OF DECISION (ROD) CONSISTENCY REVIEW FOR THE
WAPINITIA GRAZING ALLOTMENT ENVIRONMENTAL ASSESSMENT (EA)
JUNE 28, 1995

Review conducted & prepared by: Dan Fissell - Range Conservationist
Chris Brun - Fish Biologist
John Wells - Wildlife Biologist

Approved by: /s/Di Ross for
Barbara Kennedy
Acting District Ranger

Date: 6/28/95

Record of Decision (ROD) Consistency Review
for the Wapinitia Grazing Allotment EA

INTRODUCTION

The need for this document arises from a couple of situations that have occurred within the past two years. First the need to update and revise the Wapinitia Grazing Allotment permit through the NEPA process (as identified in the Mt.Hood Forest Plan), and secondly the completion of the Presidents Forest Plan. The process proposed is to:

1) Conduct a consistency review between the Wapinitia EA and The Presidents Forest Plan (ROD), which this document does.
2) Issue the allotment permit for a 3 year term, in order to have all three Watershed Analysis completed that make up this area.
3) At the end of the three year term, make the necessary changes and or amendments to the Wapinitia EA.

TRANSITION STANDARDS and GUIDELINES REVIEW (ROD A-7)

The ROD provides for implementation of the following interim procedures in order to realize the goals and objectives of the management strategy while making project decisions with reasonable promptness that do not preclude long-term options or impair resources sought to be protected:

1. **WATERSHED ANALYSIS** - In the initial years of implementation for interim procedures, the process for watershed analysis is expected to evolve to meet long-term goals described in these standards and guidelines. However, some projects proposed for the first few years of implementation are in areas that require watershed analysis prior to approval of the projects (i.e., Key Watersheds, Riparian Reserves, and inventoried roadless areas). In FYs 1994-96, watershed analysis done for these projects may be less detailed than analyses that are completed in later years. Regardless, analysis done during the initial years (FY 1994-96) will comply with the following guidance:

A. The goal of this analysis is to determine whether the proposed actions are consistent with the objectives of the Standards and Guidelines (S&Gs).

To determine consistency, each of the standards and guidelines associated with the land allocations were reviewed and those specific to the planning area were addressed. Those S&Gs follow.

1. STANDARDS AND GUIDELINES COMMON TO ALL LAND ALLOCATIONS (ROD C-2 to C-6)

a. **Current Plans and Draft Plan Preferred Alternatives**- The standards and guidelines from the current Forest & Resource Management Plan applies where they are more restrictive or provide greater benefits to late-successional forest related species than other provisions of these standards and guidelines.
Appropriate existing standards and guidelines of the Mt Hood National Forest Land and Resource Management Plan (1990) were incorporated in the Wapinitia Grazing Allotment Environmental Assessment (1993) during the planning process.

b. **Unmapped Late-Successional Reserves**- Within the matrix, unmapped Late-Successional Reserves are identified for 100 acres around known spotted owl activity centers.
The Wapinitia Grazing Allotment was surveyed to R6 protocol. There are known pairs within the allotment area (refer to the Wapinitia EA Analysis File, Wildlife Biological Evaluation - 5/93, page 3). The Risk Assessment was determined to be a "No Risk" to species or their habitat.

c. **Watershed Analysis**- Watershed analysis is required in all Key Watersheds and all roadless areas prior to resource management. Watershed analysis is required to change Riparian Reserves widths in all watersheds. The Wapinitia Grazing Allotment has portions of both Tier 1 and Tier 2 watersheds within the planning area. The proposed project does address management within riparian reserves. The consistency review will be conducted to ensure consistency between the Wapinitia Grazing Allotment Environmental Assessment and the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (ROD) and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. This review includes a check for consistency with the transition standards and guidelines (ROD A-7) and with the Aquatic Conservation Strategy (ACS) objectives (ROD B-11) as described in the ROD.

f. **Survey and Manage**- This S & G directs the District to "survey and manage" species listed in Table C-3. Of the species present, two vascular plant species (Corydalis aquae-gelidae and Coptis trifolia) are documented and known to occur in the planning area (refer to Wapinitia EA Analysis file - Botany Biological Evaluation for Wapinitia, 11/93, page 3). Corydalis is in survey strategy 1 and 2. Strategy 1 requires the use of all available information to design or modify activities that are implemented in 1994 to protect these known sites. Activities implemented in 1995 and later must include provisions for these known sites. The Wapinitia EA prescribes protection for the two known areas where this species has been documented to occur. However at this time the livestock do not enter this area because of steepness of terrain, which basically makes the area inaccessible. Monitoring of this species occurs annually, so if data indicates changes in management needed, the EA provides for mitigation measures for protection. Strategy 2 requires surveys for Table C-3 species prior to ground disturbing activities that are implemented in FY 1999 or later. The Coptis species is much in the same situation, in that it occurs in two known and documented areas, however, grazing by livestock at this time seems to not adversely affect this species, and monitoring is conducted annually.

g. **Manage Recreation Areas to Minimize Disturbance to Species**- The S & Gs direct the District to protect known fungi and lichen species within recreation sites. The Wapinitia EA is consistent with this S & G. There are no known sites of fungi and lichens listed in Table C-3, pg C-49 - C-61, Record of Decision within the Campgrounds that are within the Wapinitia Allotment.

B. **Existing information will be used to the greatest extent possible, with new information collected, to the maximum extent practicable, to fill crucial data gaps.**

The Wapinitia EA identified the existing condition of the planning area prior to implementation of the President's Plan. The Wapinitia EA provided analysis of alternative project implementation using existing and new data collected. No crucial data gaps were identified during the planning process in this intial analysis, however, as a result of the President's Plan, more specifically the Aquatic Conservation Strategy objectives (ASC), additional monitoring specifications will be developed to monitor not "retarding" or "preventing attainment " of these objectives. The data obtained from this monitoring program will be utilized in the next planning period expected in Fiscal Year 1998.

C. **Analysis will address the entire watershed, even though some areas may be analyzed at a lower level of precision, and the analysis of issues may be prioritized.**

For the purpose of the intial resource analysis of the Wapinitia Allotment EA, it is geographically made up of three watersheds; the White River, the Salmon River and the Oak Grove Fork of the Clackamas River. The White River and Salmon River watershed analysis are expected to be completed in the summer of 1995, however, the Oak Grove Fork of the Clackamas River is not expected to be completed until summer/fall of 1996.

D. **Information from the analysis will flow into the NEPA documentation for specific projects, and will be used where practicable to facilitate Endangered Species Act and Clean Water compliance.**

The Wapinitia EA identifed future desired conditions, existing conditions, issues, resource opportunities, and some culmulative effects analysis of implementation of these resource opportunities over time and space. The Wapinitia EA has been completed for the Wapinitia Allotment, and all pertinent information has been used to develop alternatives and analyze effects of grazing and its associated proposed resource projects.

E. **Restoration opportunities will be identified.**

A number of restoration/project opportunities have been identified in the Wapinitia EA, project implementation schedule. These included several projects aimed at improving watershed health and long-term aquatic sustainability, riparian diversity associated with vegetation, by constructing some riparian exclosures in identified key areas. Other opportunities are expected to be identified and addressed on an on-going basis.

2. **GREEN TREE RETENTION REQUIREMENTS** - N/A - does not apply to this project analysis.

3. **ASSESSMENT FOR LATE SUCCESSIONAL RESERVES** - Projects within LSR may proceed in FY 1994-96 using initial LSR assessments done at a level of detail sufficient to assess whether activities are consistent with objectives of LSR. The intial direction comming from the Watershed Analysis team, is that in the short term grazing in LSR's would not be inconsistent with management objectives because of current herbaceous vegetation occurring in

transitory range (clearcuts, and shelterwoods), however, the long term level of use would drop, due to achieving true LSR conditions, and the expected level of timber harvesting to decline.

2. LATE-SUCCESSIONAL RESERVES STANDARD AND GUIDELINES (ROD C-9 to C-21)

The objective of Late-Successional Reserves is to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth related species including the northern spotted owl.

Standards and Guidelines for Multiple-Use Activities Other Than Silviculture

The following standards and guidelines apply to Late-Successional Reserves and Managed Late-Successional Areas.

A. Range Management - Range-related management that does not adversely affect late-successional habitat will be developed in coordination with wildlife and fisheries biologists. Adjust or eliminate grazing practices that retard or prevent attainment of reserve objectives. Evaluate effects of existing and proposed livestock management and handling facilities in reserves to determine if reserve objectives are met. Where objectives cannot be met, relocate livestock management and/or handling facilities.

The Wapinitia Grazing Allotment contains approximately 40-50 acres of designated LSR, so the effects from grazing and/or range-related management does not appear to be significant.

3. RIPARIAN RESERVES STANDARDS AND GUIDELINES (ROD C-30 to C-38)

As a general rule, S&Gs for riparian reserves prohibit or regulate activities in riparian reserves that retard or prevent attainment of the ACS objectives. The following standards and guides apply to the Wapinitia Grazing Allotment.

Grazing Management

GM-1. Adjust grazing practices to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives. If adjusting practices is not effective, eliminate grazing.

The Wapinitia EA identified "Resource Protection" as one of the strategies for each of the key issues. More specifically, "streambank instability and sediment delivery to streams", "accelerated improvement in condition of degraded riparian areas" and "Threatened, Endangered and Sensitive Species/Habitat" protection. In order to acheive these objectives the EA identified certain mitigation measures that would need to be implemented, in order to control the timing, duration, and numbers of livestock within the areas of concern. They are, fencing off of some identified riparian areas and implementing a "deferred rest-rotation" system. However, all the necessary fencing will not get implemented immediately, so in order to lessen the impacts until some of this fencing does occur, the permittee is taking a reduction of 23% or 90 AUM's (30 cow/calf pairs).

GM-2. Locate new livestock handling and/or management facilities outside Riparian Reserves. For existing livestock handling facilities inside the Riparian Reserves, ensure that Aquatic Conservation Strategy objectives are met. Where these objectives cannot be met, require relocation or removal of such facilities.

There were no new livestock handling facilities designated by the Wapinitia EA, however, the existing livestock handling facility was discussed within the EA for possible movement. The current location of this facility is not within the riparian reserve, but the facility does allow access to a riparian reserve, but at this time monitoring studies indicate there is no problem with meeting this objective, since a seasonal restriction is in place for limited livestock access.

GM-3. Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will ensure Aquatic Conservation Strategy objectives are met.

The Wapinitia EA does not identify any livestock management such as trailing, bedding, watering, loading, and other livestock handling efforts to occur within the riparian reserves. The livestock handling facility (corrals) are located outside the reserves. However, some livestock trailing, bedding and watering does occur within some of the unfenced reserves.

AQUATIC CONSERVATION STRATEGY OBJECTIVES (ROD B-11)

The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within ther on public lands. The ROD identifies nine ACS objectives that focus on management of the riparian-dependent resources to maintain the existing condition or implement actions to restore conditions.

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8. Maintain and restore the species compostion and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

AQUATIC CONSERVATION STRATEGY (ROD B-9 to B-11)

The following section describes the Wapinitia Grazing Allotment Environmental Assessment's compliance with the Aquatic Conservation Strategy Objectives described in the Record of Decision for the President's Forest Plan (FEMAT). Due to the urgency of the request and inaccessability to a majority of riparian areas within the allotment due to snow levels an office based review was conducted. The Wapinitia Allotment E.A. and analysis file, stream surveys, aerial photographs, 1:24,000 topographic maps and consultation with Forest Service personnel familiar with the area were used to formulate the following report.

The nine ACS objectives primarily focus on maintaining and restoring functional processes that determine the physical and biological health of the Riparian Reserves. This includes the ecological status of vegetation, geomorphic and hydrologic development as well as structural integrity of both lotic and lentic systems.

The impacts of excessive livestock grazing within riparian areas are well documented (refer to Platts, 1991). In general livestock over-grazing can affect all components of riparian and aquatic systems by changing, reducing or eliminating riparian vegetation and altering physical stream processes. (Meehan,ed.,1991)

METHODOLOGY

Lotic Systems:

Over 35 miles of streams occur within the Wapinitia Allotment. Due to a lack of existing quantifiable information regarding channel condition, stream bank stability and condition of the riparian vegetation bordering the streams we chose to divide the streams into geomorphic reach breaks and assign specific channel types using David L. Rosgen's channel typing methodology (Rosgen, 1994). Other researchers have evaluated livestock grazing effects related to stream stability and sensitivity based upon Rosgen channel types (Swanson and Rosgen, unpublished). We chose to do the same rather than analyzing entire stream lengths as a whole. For a description of Rosgen stream channel types refer to Rosgen, 1994. "E" and "C" channels are highly dependent upon herbaceous and woody riparian vegetation for stream bank stability and very sensitive to disturbance whereas "A" and "B" channels are more stable and influenced by valley confinement and conifers.

We assigned a rating of "meets ACS", "does not meet ACS", or "unknown" based upon the channel type and availability of information. "A" and "B" channels were assumed to be not affected by livestock grazing whereas "C" and "E" channels were assumed to not meet ACS objectives unless they were fenced or there was existing information indicating that livestock were not impacting them. Where there was no information available regarding the condition of the channel an "unknown" determination was made.

STREAM	MEETS ACS	DOES NOT MEET ACS	UNKNOWN
Ghost Cr.	X*		
Salmon R.	X		
Inch Cr.	X		
Draw Cr.	X		
Linney Cr.	X		
Meditation Cr.	X		
Zygote Cr.	X		
Dinger Cr.	X		
Cooper Cr.	RM. 0.6-2.5	RM. 0.0-0.6	
Crater Cr.		RM. 0.0-0.09	
	RM. 0.09-1.8**		
			RM. 1.8-3.07
	RM. 3.07-4.9		
			RM. 4.9-5.4
East Fork Crater	X**		
Clear Cr.			RM. 7.8-11.8
NW Clear Lk. Trib.		RM. 0.0-0.4	
	RM. 0.4-1.0		
Middle Clear Lk. Trib.		RM. 0.0-0.1	
	RM. 0.1-1.0		
NE Clear Lk. Trib.		RM. 0.0-1.0	
	RM. 1.0-1.75		

*-The majority of Ghost Cr. within the allotment is an "E" channel but field reconnaissance by Botany, Range and Fisheries personnel revealed no adverse impacts from livestock grazing.
**-These reaches are either "E" or "C" channels but are excluded from livestock grazing.

Lentic Systems:

Six distinct meadows occur within the allotment. Two of these meadows (Little Crater Meadow complex and Salmon River Meadows) occur within A9 "key-site riparian areas". Excessive livestock grazing in meadows can reduce riparian vegetation that provides root masses which stabilize shorelines, filter fine sediment and provide for terrestrial and aquatic wildlife habitat. In order to determine if management of these meadows, in regards to livestock grazing, is consistent with the ACS we applied a method similar to that used for lotic systems. We assumed that livestock were entering the areas unless they were fenced out or existing information indicated otherwise.

WETLAND	MEETS ACS	DOES NOT MEET ACS	UNKNOWN
Little Crater Mdw.	X		
Salmon River Mdw.	X*		
Stringer Mdw.	X**		
Dry Mdw.		X***	
Jackpot Mdw.		X***	
Frying Pan Mdw.	X		

*- Although the meadow is not fenced it is very wet and boggy. Field reconnaissance by Botany, Range and Fisheries personnel did not reveal any livestock impacts to the meadow.
**- Stringer Meadow is similar to Salmon River Meadows in that it is very wet and boggy. No surveys, to the best of our knowledge for Fisheries have been conducted about its condition, although ocular estimation for utilization levels have been conducted by Range personnel.
***- Ocular estimation with some Condition/Trend monitoring data indicates probably less than 2% of these meadows combined do not meet, especially along the small intermittent streams that occur in each meadow system.

RECOMMENDATIONS:

Because this consistency review was conducted from the office there is an urgent need to evaluate the actual conditions of "C" and "E" stream channels and all wetlands within the Wapinitia Allotment in the field. This will allow us to complete the rating system with a higher degree of certainty. We recommend using the BLM's "Process for Assessing Proper Functioning Condition" for lentic and lotic riparian areas (technical manuals are referred to in the bibliography). This rapid assessment will allow us to identify whether or not the functional processes are present within these areas. If these processes are missing or non-functional we will have to determine if livestock grazing is the causal factor in preventing attainment of the ACS objectives and adjust grazing practices accordingly.

Construction of livestock exclosure fences around certain meadows and creeks where identified as mitigation measures in the Wapinitia Allotment EA. To date only Little Crater Meadows has been adequately fenced. Given budget uncertainties it is unlikely that the remaining exclosure fences will be constructed in the near future. The rationale made by the decision maker for this EA was to select an alternative that reduced livestock numbers by 23% and implemented a grazing strategy that promoted recovery of riparian resources given our current budget and personnel constraints. It was felt that this reduction and strategy is economically feasible in that all the fencing projects may not get completed in order to show an upward trend in recovery of

the riparian resources. The combination of reducing livestock numbers and the fencing projects are anticipated to accelerate this recovery process. If field reconnaissance reveals the absence or non-functionality of certain riparian processes such as adequate quality and quantity of riparian vegetation and stable streambanks resulting from over-grazing, alternative grazing strategies should be developed to allow those processes in question to recover and bring these areas into compliance with ACS objectives.

Utilization cages along with Condition/Trend monitoring studies are identified in the Wapinitia Allotment EA, to assess the condition of riparian areas not scheduled for livestock exclusion, such as the tributaries to Clear Lake. Use of these techniques, by themselves, may not be adequate to monitor for compliance with "eliminating impacts that retard or prevent attainment of ACS objectives" or the Mt. Hood LRMP definition of "Satisfactory Range Condition". Additional monitoring parameters to assess stream temperature, channel and streambank stability and riparian vegetation structure need to be implemented in addition to utilization cages and condition/trend studies to determine whether basic resource damage is or is not occurring.

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United States Department of Agriculture | Forest Service | Mt. Hood National Forest | Bear Springs Ranger District
Route 1, Box 222
Maupin, OR 97037
FAX 503-328-6228

Reply To: 2230 Date: June 28, 1995

Subject: Consistency of Wapinitia Allotment Grazing with Northwest Forest Plan ACS Objectives

To: Dan Fissell, Range Conservationist
Barlow Ranger District

You asked me to provide an evaluation of whether 1995 through 1997 grazing in the Wapinitia allotment is "consistent" and compatible with aquatic conservation strategy (ACS) objectives identified in the Northwest Forest Plan. I am happy to offer my judgement on this matter. However, I must be quick to explain that my conclusions are made without benefit of site-specific field familiarity and with only limited information available on grazing effects in the area. Also, no watershed analysis has been completed on any portion of the Wapinitia allotment, so there are no results available to use in support of a consistency finding.

Complying with ACS objectives means that the Forest Service "must manage the riparian-dependent resources to maintain the existing condition or implement actions to restore conditions (Record of Decision Attachment A, page B-10)." The Plan states that the decision maker, in determining consistency of a management action with the ACS objectives, is to ensure that action implementation "meets" or "does not prevent attainment" of ACS objectives. To assist the decision maker in making a finding, I will provide a thumbnail analysis for evaluating consistency with regard to 1995-1997 grazing and the ACS objectives.

As a place to begin, I include here a very brief description of existing range conditions within the allotment. Most of the range is in forest cover, of varying canopy density, which provides for more or less forage in the understory as fitting to the degree of "openess." Scattered natural meadows, including large named meadows such as Little Crater, Dry, Jackpot and Salmon River, are included within the allotment. These meadows provide a sizeable permanent source of forage. Over the past 40 years or so, forage within meadows and forest has been considerably augmented by "transitory range" made available by timber harvest, especially clearcutting. Transitory range forage is a temporary source which changes in location and time as a result of vegetation growth and cutting of forest stands. Forage from transitory range is anticipated to decline markedly in the future as timber cutting rates are reduced.

From information I have gathered, damage to streamside areas from livestock grazing is evident in the allotment though this degradation is scattered and quite localized. This degradation is typified by streambank sloughing and reduction or loss of plant cover where cattle traditionally congregate each summer. Where this damage has occurred, it is likely disproportionately higher in meadows than elsewhere. General overuse of forage has also occurred in some areas from year to year, but vegetation appears to recover well when rested from grazing.

A recently revised allotment management plan and accompanying environmental study completed in 1994 recognized these "hot spots" of degradation as well as the potential for future declines in forage. As a result, action was taken to reduce the number of animals grazed on the allotment and to protect sensitive areas from future deterioration by livestock. It is implementation of grazing under this new allotment plan which is being considered for consistency with ACS objectives. The term of the permit to be issued would be 3 years and would expire in December 1997.

Wapinitia allotment grazing, begining with the 1995 season, would be permitted at a level of 300 animal unit months (AUM's). The grazing period is scheduled to begin July 1 and would end September 30 of each year. The permittee would graze the same number of cattle throughout the grazing period, so this would mean that 100 cow/calf pairs (or the equivalent number of animals) would be grazed on the 26,324 acre allotment during each month of the 3 month season. The 300 AUM's is down from a 390 AUM level permitted prior to 1995.

Along with a reduced grazing level, the current allotment plan provides for improving riparian areas and meadows by stipulating that fences be built to exclude livestock use in sensitive areas. Although there are no time limits defined, grazing use would not be adjusted upward before completion of fence construction within critical areas.

With regard to the breadth of my judgement regarding consistency of proposed grazing with ACS objectives, I have focused on ACS objectives 1, 2, 8 and 9. The following summary of allotment management changes forms the basis for offering my judgement on consistency. Please keep in mind that my perspective is from a terrestrial system point of view. Here are the positive changes or attributes in grazing management to be implemented with the new allotment plan:

1. The number of animals to be grazed in the allotment is reduced (23 percent) from former levels. Range damage and/or deterioration was being reversed even at the former grazing levels.

2. Sensitive areas ("hot spots") are recognized in the new allotment plan and remedial actions are prescribed in the form of exclusion fencing and rest-rotation grazing.

3. Implemetation of the remedial actions has begun. Exclosure fencing is now (June 1995) being installed at Little Crater Meadows.

4. Range monitoring data collected at 3 locations within the allotment over the past 3 years show a "good" condition (the highest rating) and a stable trend, with one exception. In Dry Meadow, condition was downgraded from "good" to "fair" as a result of changes noticed last year in the ratio of forbs to grasses. This may be an artifact of the sampling methodology and plot location or a real change. In any case, a warning flag is raised that will, as I understand, be addressed with more focused monitoring in Dry Meadow and greater scrutiny of results.

5. The permit is being issued for 3 years rather than the customary 10 years to allow additional monitoring of conditions. This time frame will allow completion of watershed analysis and additional monitoring with which to more thoroughly assess condition trend.

6. Accountability of livestock on the allotment has been vastly improved with implementation of an ear tag monitoring system. Forest Service-issued ear tags are provided for the specific animals permitted on the range, thus allowing for easy identification of over-stocking.

7. The permitted grazing season begins after the nesting season of most birds which use the large meadows in the allotment.

With the above information in mind, it is my conclusion that proposed grazing under the new allotment management plan maintains the existing condition or improves conditions over the long term and thus meets, or at least does not prevent attainment of, ACS objectives 1, 2, 8 and 9. Riparian conditions would appear to be poised for improvement as a result of actions included in the new allotment plan and recent monitoring.

/s/ John T. Wells
JOHN T. WELLS
Wildlife Biologist

Appendix G - Heritage Overview

Salmon Watershed Heritage Overview

Zigzag Ranger District
Jeff Jaqua, District Archeologist

This overview is to be used as a resource in watershed analysis and by the watershed stewards. It is to be used in conjunction with the earlier prepared historic and prehistoric overviews of the District which follow this watershed overview. Generally for this watershed overview, discussion will begin at the headwaters and move downstream. Not all heritage sites are discussed.

SALMON RIVER

Silcox Hut was constructed in 1939 to serve as the upper terminal for the Magic Mile Chairlift. It was dedicated to Ferdinand Silcox, FS Chief from 1933-1939, in 1941. The building was placed on the National Register of Historic Places in 1985. The Friends of Silcox Hut undertook a rehabilitation of the hut which was completed in 1993.

The original Magic Mile Chairlift was constructed in 1939. As stated above, its upper terminal was Silcox Hut. The lower terminus was east of Timberline Lodge. Footings for the lift towers are still evident as is the power generation building for the lift. This original lift was replaced in 1962 with the second Magic Mile which was constructed west of the Lodge.

Joel Palmer, while scouting the route for the Barlow Road, may have crossed the Salmon River high on Mt. Hood. Common interpretations of his journals have him in this area. No physical evidence has been found to support this idea nor are there any sites recorded associated with this trek. Palmer went on to become an important figure in the history of Oregon.

American Indians traditionally harvested the nuts of the white bark pine at timberline. No associated sites or other evidence yet discovered. The white bark pine is not as abundant as it once was.

Timberline Trail was first conceived in the 1920s as an alpine trail for recreationists to access this unique environment. Construction was completed in the 1930s by the CCC though segments of the trail probably preceded that date. The trail was once called the "Round the Mountain Trail". It has been suggested that the trail is eligible for listing on the National Register of Historic Places and a nomination was once prepared . Neither the evaluation for eligibility nor the nomination have been formally submitted.
Timberline Lodge was constructed by the Works Progress Administration in conjunction with the Forest Service as part of the Depression-Era work relief programs of President Franklin D. Roosevelt. Construction of the Lodge was completed in 1938. Timberline

Lodge was listed on the National Register of Historic Places in November of 1973. Areas of significance noted in the nomination were the architecture of the Lodge, and the art and crafts displayed in the interior of the Lodge. In December of 1977 the national significance of the Lodge was recognized and the property was designated a National Historic Landmark.

The Eastleg Road, along with the Westleg Road, first provided access to timberline. It was constructed before Timberline Lodge was even conceived. The highest point on the mountain the road reached was Phlox Point. The road was purposely designed to go no higher in order to protect the fragile alpine environment from overuse. The road was extended in conjunction with the construction of Timberline Lodge. Construction of Timberline Road, which replaced the Eastleg and Westleg Roads as primary access to Timberline Lodge, commenced in 1949.

The historic files for the Phlox Point cabin are slim. It is believed that the cabin dates to 1931 when it was under permit to the Timberline Ski Club which would pre-date the historic Timberline Lodge.

The springs which presently are the domestic water source for Timberline Lodge were first developed in 1937-38 as an auxiliary source to supplement the primary source in Salmon River above timberline. The primary source was basically a diversion of surface water to an underground storage tank. This was soon found to be inadequate and the springs lower on the mountain were developed. These springs still provide domestic water for Timberline Lodge today.

The Barlow Road Historic District is listed on the National Register of Historic Places. It crosses the mainstem and the west fork of the Salmon in the vicinity of the Hwy 26/Hwy 35 intersection. Within the historic District are a number of significant features associated with the Barlow Road.

Salmon River, Still Creek, and Mud Creek all drain Summit Meadows. Summit Meadows was a landmark for the immigrants on the Oregon Trail. There are a number of features within the Salmon watershed portion of the Meadows of historic interest, none of which have been adequately researched or recorded. The Summit airstrip was constructed at the south end of the Meadows prior to 1930 by the Forest Service. The original Summit Guard Station was located in the Meadows before it was re-located in the 1930s to its present location near Government Camp. A CCC Camp was established in the Meadows which evolved into a highly developed camp to house the WPA workers constructing Timberline Lodge. In addition, a traditional American Indian campsite has been reported in the Meadows. The entire Summit Meadows should be carefully examined and recognized for its historic significance. Dispersed camping and other recreational activities in the Meadows continue to impact these sites and their heritage values are being degraded. The Oak Grove Wagon Road is a historic wagon road joining Summit Meadows with Salmon River/Wapinitia meadow and points east. It was built in the late 1800's but was never finished beyond Summit meadows to the west. Currently there is a powerline and

fiber optic cable buried in the road. The fiber optic cable is a main communication link between eastern Oregon and the Portland metropolitan area.

The Sherar Burn/Wolf Camp Butte area has long been recognized as a traditional American Indian locale for harvesting huckleberries. Sites have been recorded associated with this activity and others have been identified though not yet recorded. The same general area was also popular to sheepherders at the turn of the century. What is believed to be a corral associated with sheep herding was recently discovered and recorded within the watershed. The CCC, under the direction of the Forest Service, implemented timber management projects in the area in the 1930s including replanting, fire control, and snag removal. The intense human manipulation of this landscape over the years has contributed to the forest health issues being addressed today.

The original Devil's Peak Lookout was a log structure constructed in 1924. It sat directly on the ground but had a windowed cupola on the roof peak which provided some elevation for an observer. It was replaced in 1933 with a modified L-4 style lookout. The tower for this 1933 lookout was reconstructed in 1952. The lookout is not actively managed by the Forest Service but is regularly visited and used by recreationists. It has never been evaluated for its historic significance nor its eligibility for inclusion on the National Register of Historic Places. It's condition is poor and may present a public hazard if it is allowed to deteriorate further.

The earliest documented trail up the Salmon River appears to be one constructed prior to 1908 which began at the Forest boundary and went up the drainage a number of miles. This trail was later abandoned. The Forest Service proposed a new trail in 1920. It is unclear when this new trail was constructed but it was well established by 1934. It remains a very popular trail today.

SOUTH FORK SALMON RIVER

The Plaza Guard Station is at the headwaters of the South Fork near the Abbott Road. A cabin was constructed here that dates to at least 1912. A history of the site has not been recorded to my knowledge. It would have been an important administrative site given its location.

CHEENEY CREEK

There was gold mining interest in Cheeney Creek as early as the late 1800s. Bonanza Mine is a result of these interests. Efforts were less than satisfactory.

MUD CREEK

Mud Lake was impounded in 1937-38 to create Trillium Lake. One objective of this work seems to be have been to create a visual focus for visitors at Timberline Lodge. An earthen

dam and rock spillway were constructed. Trees from the planned impoundment area were cut for firewood at the Lodge. Cedar from here may have been used to build the benches for the amphitheater at Timberline Lodge. For reasons that are unclear, without further research, the lake was never fully impounded until 1960 when the Oregon State Fish and Game Department reconstructed the earthen dam. This reconstruction enlarged the lake from about 20 acres to 50 acres which is its current condition.

A number of peeled cedar trees have been discovered along Mud Creek downstream of Trillium Lake. These trees were probably peeled by American Indians in association with the berry harvesting done in the Sherar Burn area.

The historic Skyline Trail was located along Mud Creek. The current Jackpot Meadows trail #492 is a segment of this historic trail that ran the length of the Cascades crest from Mt. Hood to Mt. Jefferson and is displayed on a 1916 Forest Service map. This may be the same trail that was identified in an 1884 General Land Office Survey.

PREHISTORIC HERITAGE OVERVIEW
MT. HOOD NATIONAL FOREST
ZIGZAG AND COLUMBIA GORGE DISTRICTS

When considering human beings interaction with the landscape prior to European influences, think of how they may have utilized resources they either sought out or found on the landscape. To think of it another way, which resources would the landscape have provided for human exploitation. The Zigzag and Columbia Gorge Ranger Districts are of course located on the west side of the Cascades in a northwest maritime forest. The maritime forest can be further defined by using vegetative zones (Western Hemlock, Pacific Silver Fir, and Mountain Hemlock). The climatic conditions of a maritime forest provide for a relative environmental stability and the forest tends to achieve and remain in a mature state. The most diverse and productive condition of these forests (from a hunter/gatherer's point of view) would have been in something other than a mature state, where diverse food resources could be found. Ecologic disturbance processes, such as wildfire, floods, windstorms, all maintained meadows and immature stands within the forest which provided this diversity. Another resource potential of the landscape would have been rivers and streams. Generally, the native peoples would have patterned their activities to repeatedly take advantage of deer and elk which they would have found foraging in meadows and sub-alpine parklands. Huckleberries would have been a primary resource which are found in non-mature forests. Anadromous fish bearing streams such as the Sandy, Salmon, Eagle Creek (Clackamas River), and the Bull Run would have been exploited. Cedar bark was important to the northwest cultures and could be found in riparian areas throughout the forest at a range of elevations.

A variety of medicinal plants were harvested in a variety of ecosystems. There are no known or suspected quarry sites for lithic material on the Zigzag or the Columbia Gorge Districts. Though there is evidence of what may be "vision quest" sites on the Hood River District, few sites have been discovered on the Zigzag or Columbia Gorge Districts. Because at any given time much of the forest would have been in a mature state with dense vegetative cover, travel corridors tended to avoid valley floors and bottom lands where travel may have been difficult. Ridgelines tended to be more useful for travel.

Archaeological evidence will more likely be discovered not at the point of exploitation but rather at locations where native peoples came to access the resource. If the hunter's objective is to hunt a meadow, he will not camp in the meadow. To be economically efficient, the gathering of foodstuffs requires processing. Thus, berry camps and fishing camps are established and used repeatedly.

The climate we experience today, and which influences the character of the forest stands, is not necessarily the climate of the recent past. Thus, the forests which the native peoples exploited may have looked much different and thus the use patterns of the human population was also different.

14,500 to 11,500 B.P. was a time when the Mt. Hood glaciers were retreating. This was the end of the Pleistocene ice age. Mass sediment wasting from the retreating glaciers resulted in open parklands in the forest at lower elevations. Elk populations were established and hunters most likely exploited this resource. Human population was small.

Between 11,500 and 9,500 B.P. the forests continued to mature in the humid maritime conditions common to the west side of the Cascades. The forest closed and was probably similar to the forest matrix of today. The ungulates moved up to the upland habitats. The forest would not have been a terribly attractive place for the native people but the population was still relatively small and there was enough scattered meadows and sub-alpine parklands to make it worthwhile for small family groups of foragers to exploit them on a seasonal basis.

The climate became warmer and drier between 9,500 and 4,500 B.P. The forest became more open and less mature. The forests were more susceptible to fire. The resultant early and mid-successional vegetative conditions were attractive to hunter/gatherer exploitation and the regional human population flourished. This is the period when human use patterns became well established and a wide diverse range of resources were identified and developed. A certain dependency on particular resources like huckleberries developed and seasonal exploitation patterns were established. In short, times were good.

Beginning 4,500 years ago the climate changed again to a more humid type and the forest on the west side of the Cascades closed again. This must have been a trying time for the native peoples who had grown dependent upon the resources found in less mature forests. This change coupled with the relatively large human

population forced some societal and technological changes. No longer could people depend upon natural events to sustain their resource base but had to develop methodology which mimicked nature to manipulate their environment to their advantage. Thus the burning of the forest to promote huckleberry habitat.

This may have also been the time when the salmon resource was turned to as a means of sustaining a growing population. The development of the salmon resource in the northwest is often equated to the development of agriculture elsewhere in the Americas and growing population is identified as the impetus for both. People became at least semi-sedentary as resource utilization and management became more intensive, technology advanced, specialized skills developed, trading occurred and territories recognized.

By the time Lewis and Clark sailed down the Columbia, the native people and their cultures were decimated. From both direct and indirect contact with European explorers, traders, and finally trappers, the native populations had become exposed to diseases they had no natural immunity to. Population declines have been estimated as high as 75%. The society and culture that developed to support a growing population and reduced resources could no longer be sustained by the remaining population. The cataclysmic decline in population allowed for no opportunity for the people to naturally develop resource utilization patterns which would support their numbers.

HISTORIC HERITAGE OVERVIEW
ZIGZAG AND COLUMBIA GORGE DISTRICTS

The historic period on the Forest can be arbitrarily divided into 4 periods or phases:

1772-1840	Exploration and Fur Trade Phase
1840-1880	Emigrant Phase
1880-1910	Transition Phase
1910-present	Modern Development Phase

The Zigzag and Columbia Gorge Districts probably witnessed little activity from explorers and trappers. Exploration seemed to be limited to the Columbia River. Though trappers were in the country, the Willamette Valley was bountiful and met there requirements. There was probably limited effort made to venture into the Cascades during this period. In 1838 Daniel Lee undertook an overland trip from Wascopam (The Dalles) to his brother's mission in the Willamette Valley crossing Lolo Pass, following an aboriginal trail. On his return trip he herded 14 head of cattle back to Wascopam. This trail was later utilized by emigrants to drive livestock prior to the development of the Barlow Road.

The great immigration to the Oregon territory began in earnest began in 1843. The Barlow Road dates to 1845.

By 1880 the Willamette valley was becoming increasingly settled and people started to look toward the Cascades to provide for some of their needs. The Bridal Veil Logging Company was founded in 1886 and began logging Larch Mountain in response to growing lumber markets. Sheepherders recognized the grazing potential of the parcels of land previously burned by the Indians to enhance huckleberry growth. This "transition phase" was also the time when residents of the Willamette Valley recognized the recreation potential of the Cascades and ventured to the forest to camp, fish, hunt, and climb. President Harrison proclaimed the Bull Run watershed a Forest Reserve in 1892 and the first Bull Run water flowed into the city's water system in 1895.

Ever increasing lumber demands and the depletion of forests in the lowlands led to more logging in the foothills. A logging railroad spur from the Portland-Cazadero line near Barton was constructed which eventually led to Wildcat Mountain. Recreation use increased. The Timberline Cabin was constructed in 1916 at Camp Blossom which was already an established base camp for climbing Mt. Hood. The first permit for a recreation cabin along the Zigzag River was issued in 1915. The Mt. Hood Loop Highway was completed in 1925 and the Mt. Hood Recreation Area was established in 1926. The Oregon National Forest was created in 1907 which later became the Mt. Hood National Forest in 1924. Forest management priorities stressed fire suppression and administration of grazing permits.

The efforts of the CCC and the WPA during the Depression-era of the 1930s had significant impact on the forest landscape. Campgrounds and trails were constructed as well as administrative compounds and lookouts. Fire suppression methods were developed that resembled military actions. Reforestation was done in earnest of both harvested areas and burns.

The exploding housing market following World War II resulted in increased timber harvest and road construction.

MESSAGE Dated: 12/02/98 at 11:06
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Priority: Normal Importance: Normal Sensitivity: None
Create Date: 12/02/98 11:06:58
Received Date: 12/02/98 14:06:12
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Contents returned on Non-Delivery	YES
Auto-Forward Allowed	YES
Auto-Reply Allowed	YES
Distribution List Expansion Allowed	YES
Disclose Envelope Recipients	NO
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Part 1

TO: DISTRIBUTION

Part 2

ARPA MESSAGE HEADER

Part 3

CEO document contents:

LAD
INTERIM Design Plan
SALMON Watershed
(9/97)

Process

This document is support to and tiered to Salmon Watershed Analysis. During watershed analysis the Conceptual LAD Plan (50-200 yrs. DFC) was developed. In order to reach that 50-200 year landscape design, an Interim LAD plan needed to be developed. The interim design planning team chose the "narrative process" to design each area rather than the "graphic process"(intricately and site specifically designing each area). The watershed was divided into sub-watershed areas with similar problems/opportunities which have distinct geographic boundaries and management needs. These planning areas are referred to as Interim Design Areas (IDA) and are delineated on the Interim Design Map.

The purpose of the Interim Plan is to guide site specific project planning which will begin to move the watershed toward the desired future conditions depicted in the Conceptual Plan (50-200 yrs. in the future depending on existing conditions). The Interim Plan will cover a planning period of 10 years and will be updated each year thus allowing adjustment to changes in management direction, etc. while continuing to look 10 years into the future.

The Interim Plan will include conceptual recommendations which set the framework for "what" is needed in each IDA for the near future. It will also include project recommendations which indicate the "where" and "how" management will proceed. Also included is the project priority list which will indicate the "when" and the relative importance of each project in the projected 10 year workload.

Monitoring

Monitoring and evaluation should be an integral part of all ecosystem management activities. Future funding prospects indicate that all activities

will not be intensively monitored; it is more likely that representative projects will be intensively monitored and the remaining projects evaluated at a more basic level. Project monitoring of activities will be initiated during project planning. Intensive monitoring will be identified at the implementation phase of the project in the Interim LAD process, especially where funding is separate from the activity. The watershed steward may qualitatively evaluate project implementation and effectiveness in an annual summary of activities.

Interim LAD Team

IDT: Shelley Butler -- Steward
Gary Loeffler -- Landscape Architect
Carol Hughes -- Wildlife Biologist
John Davis -- Silviculturlist

MDT: Jeff Uebel -- Fisheries Biologist
Bruce Haynes -- Recreation
Molly Sullivan -- Botanist
Carl Exner -- Forester
Sharon Traxler -- Transportation Planner
Jeff Jaqua -- Cultural

Alpine IDA

Conceptual Framework

Vegetation is expected to be in a natural condition; and will be different than that found in lower elevations (low growing shrubby and herbaceous with occassional scattered clumps of conifers).

Potential habitat for listed sensitive aquatic invertebrates is found in this IDA.

Potential habitat for Black-crowned Rosy Finch may be found in this IDA.

Project Recommendations

Survey existing and potential habitats for listed sensitive aquatic invertebrates.

Survey potential habitat for Black-crowned Rosy Finch.

Evaluate and monitor salting at Timberline Ski Area.

Monitor sewage drainfield and associated drainage at Timberline Ski Area.

Timberline Lodge Ski Area IDA

Conceptual Framework

In the alpine areas vegetation is expected to be in a natural condition; and will be different than that found in lower elevations (low growing shrubby and herbaceous with occassional scattered clumps of conifers).

Recreation and Wilderness users are impacting alpine areas: mountain climber sanitation; skier incursion into the Wilderness (unsanctioned salting); and summer hiker off-trail use.

Refer to Timberline Lodge Ski Area Master Plan (1975) and the current Ammended Master Plan (1997-8).

Integration of the human ecology and the biophysical ecology (ie. ski runs and riparian areas) in a comprehensive process including cumulative impacts is much needed. (Mt Hood Meadows Ski Area LAD process should provide a template.)

Potential habitat for Black-crowned Rosy Finch may be found in this IDA.

Project Recommendations

Develop and maintain seed and plant stock for ongoing restoration projects

Review Whitebark Pine studies for management techniques for regeneration etc. (there is tribal concern for the loss of pine nut foraging).

Develop ATM Plan (trails/roads) as part of the Master Plan discussed below

Develop a comprehensive Ski Area Master Plan including: riparian condition restoration; scenic condition (Palmer snow field contrasts); historic compatability evaluation; sewage and water capacity evaluations, etc.

Evaluate future use and maintenance standards for Glade (#661), and Mountaineers (# 788) trails (Proposed District Trail Management Plan would facilitate this).

Evaluate and monitor salting at Timberline Ski Area.

Monitor sewage drainfield and associated drainage at Timberline Ski Area.

Implement sediment/runoff control of Timberline parking lots.

Survey existing and potential habitats for listed sensitive aquatic invertebrates.

Survey potential habitat for Black-crowned Rosy Finch.

Upper Salmon IDA

Conceptual Framework

Late seral structure will mean the same as the NWFP ROD's "late successional" stage of development.

It is estimated that approximately 55% of this IDA is in late seral habitat; 20% is between 80 and 100 years of age; and 25% is < 80 years of age (IDA percentages are based on stand exams and field knowledge).

Huckleberry fields located in the Snowbunny and Passline areas are locally popular and potentially traditional (tribal).

Noble polypore, survey/manage species is located in this IDA and has a one square mile protection area in the general location of the Pioneer Women's Grave.

Timberline Ski Area salt monitoring program has a station located in this IDA.

Potential quality nordic ski trail development (possibly commercial) exists in this IDA.

This area has high quality calving/fawning habitat for deer and elk.

Draft Management Strategy for the California Wolverine (Gulo gulo luteus) does not identify this IDA as a key refugia block (Strategy to be completed in FY 98 by Hughes/Huff).

Potential habitat for listed sensitive aquatic invertebrates exists within this IDA.

A spotted owl critical habitat unit covers this IDA; USFWS must be consulted.

Check on PGE maintenance needs for its utility corridor.

There is a very small piece of the White River LSR in this IDA.

Project Recommendations

Continue to control noxious & non-native plant populations.

Develop and maintain seed and plant stock for ongoing restoration projects

Develop thinning projects to promote both mature and late seral structure and forest health in the IDA.

Evaluate and plan restoration needs (silvicultural) of West Fork riparian areas.

Survey for potential habitat of Noble polypore.

Roads will be obliterated and brought back to near original contours to solve drainage problems. (see attached ATM list).

Roads will be blocked or gated (see attached ATM list).

Evaluate and reconstruct roads and culverts as necessary to accommodate 100 year floods, fish passage and sediment/runoff control.

Survey existing and potential habitats for listed sensitive aquatic invertebrates.

Improve stream crossings (snow bridges) on Yellow Jacket Trail.

Hwy 26/35 Corridor IDA

Conceptual Framework

The Forest Service is a cooperating agency in the planning efforts with the Federal Highway Administration and ODOT concerning various management issues surrounding the corridor (width follows proposed ODOT R/W easement and ranges from 40-100').

Project Recommendations

Work with ODOT to develop a Vegetation Management Plan for Hwy 26/35 Corridor.

Coordinate with ODOT to install, maintain and monitor sand catchment basins; stabilize cut/fill slopes; and control runoff.

Complete Right-of-Way Project in conjunction with ODOT.

Complete Hyw 26 Corridor EIS Project.

Check on utility maintenance within the corridor.

Evaluate connectivity issues for culvert crossings on the East Fork, West Fork, Mainstem and other Salmon River tributaries.

Salmon Meadows IDA

Conceptual Framework

Watershed Analysis (p.4-21) found that within its Western Hemlock Zone it had only 10% in "late seral structure" which is well below the Range of Natural Conditions (50-65%).

Late seral structure will mean the same as the NWFP ROD's "late successional" stage of development.

It is estimated that approximately 50% of this IDA is in late seral habitat; 10% is between 80 and 100 years of age; and 40% is < 80 years of

age (IDA percentages are based on stand exams and field knowledge).

Huckleberry fields located along the PCT (tribal and locally popular).

This area is relatively undeveloped and provides high quality habitat for a wide variety of species, both terrestrial and aquatic.

Sensitive animal and plant species such as the sandhill crane and the lesser bladderwort are found in the meadow complex.

The Hyw 26 corridor has the potential to significantly impact the resources in this IDA.

Check on PGE maintenance needs for its utility corridor.

Project Recommendations

Continue to control noxious & non-native plant populations.

Develop and maintain seed and plant stock for ongoing restoration projects

Develop various thinning projects to promote mature and late seral structure and forest health in the eastern portion of the IDA.

Develop thinning project to enhance Huckleberry fields and improve access for tribal members.

Evaluate human impacts to meadow complex (including pre-settlement impacts, fire, beaver and sewage).

Evaluate and plan brook trout control within meadow complex.

Monitor water quality trends for the W&S River (A/US/SM/SHW/LSR/WW).

Implement Ghost Cr channel restoration.

Road 58240? will be obliterated and brought back to near original contours to solve drainage problems (see attached ATM list).

Check land line for Wapinitia (tennis court).

Survey roads, put into ATM and GIS for new district lands (SM, MS and RR).

Check on PGE maintenance on its utility corridor.

Monitor impacts of the Wapinitia Range Allotment.

White River LSR IDA

Refer to White River LSR assessment: T-Twin Landscape Unit.

Project Recommendations

Thin stands to promote late seral structure (insect/disease pockets).

Provide fuel break for LSR protection along Hwy 26.

(see LWD Ghost Cr project, SM IDA).

Mid Salmon IDA

Conceptual Framework

Watershed Analysis (p.4-21) found that within its Western Hemlock Zone it had only 10% in "late seral structure" which is well below the Range of Natural Conditions (50-65%).

Late seral structure will mean the same as the NWFP ROD's "late successional" stage of development.

It is estimated that approximately 5% of this IDA is in late seral habitat; 90% is between 80 and 100 years of age; and 5% is < 80 years of age (IDA percentages are based on stand exams and field knowledge).

Off-site stands and poor soils due to past fires have created the following problems: increased risk of catastrophic events (fire, insect attack); delayed late seral structure development; low quality snag habitat and future snag deficits; and deficient existing and future terrestrial and in-stream large down wood.

Huckleberry fields located within the Abbott burn are both traditional (tribal) and locally popular.

Sandhill cranes are located in Dry and Jackpot Meadows.

Large Cold-water Corydalis population is located in Linney Cr.

Ulota Meglaspora (moss) located in this IDA and in Roaring River IDA.

Rare II roadless area "B" is located in this IDA; projects may require additional analysis.

Project Recommendations

Continue to control noxious & non-native plant populations (tansey ragwort on Rd 5850).

Develop and maintain seed and plant stock for ongoing restoration projects

Begin restoration of off-site stands and poor soils; enhance late seral structure development; low quality snag habitat and future snag deficits; and deficient existing and future in-stream large wood material.

Evaluate and reconstruct roads and culverts as necessary to accommodate 100 year floods and fish passage.

Stabilize eroding cut/fill banks along Rd 5880.

Upgrade Linney Cr Rd (5800-240) to eliminate sedimentation.

Reduce sedimentation on Old Abbott Rd 5800-241; largest problem is at Frying Pan Lk (100 yr flood maint. not analyzed).

Obliterate Rd 5800-242 within riparian area.

Evaluate dispersed site at Dry Meadows for riparian restoration.

Implement channel restoration and fish habitat maintenance projects in Draw and String Cr.

Implement road drainage network reduction projects.

Fence Jackpot Meadows and locate water source out of meadows.

Rehabilitate old clearcuts to meet VQOs from Timberline Lodge.

Develop Basin Pt and Frying Pan Quarry rehabilitation plans (visual).

Survey new roads added to the district from Bear Springs and add to GIS.

Mud Cr IDA

Conceptual Framework

Late seral structure will mean the same as the NWFP ROD's "late successional" stage of development.

It is estimated that approximately 20% of this IDA is in late seral habitat; 20% is between 80 and 100 years of age; and 60% is < 80 years of age (IDA percentages are based on stand exams and field knowledge).

Huckleberry fields located along the ridgeline between Eureka Pk and Devils Pk are locally popular and are potentially traditional (tribal).

This IDA is one of the District's major timber producing areas.

Off-site stands, poor soils and past management (fuels) have created: increased risk of catastrophic events (insect attack); delayed late seral structure development; low quality snag habitat and future snag deficits; and deficient existing and future terrestrial and in-stream LWD.

Varied dispersed cultural sites exist in this IDA including: WPA/CCC air strip; peeled cedar trees; tribal hunting/gathering camps/sites, etc. (see also Mid Still Cr IDA, ZZ WA).

Provide mt. bike trail opportunities in this IDA.

The Mud Cr Quarry is an active and future rock source site.

The Campbell Group private land is on the Aquisition Plan and has potential for wetland habitat.

Check on PGE maintenance needs for its utility corridor.

Buried utility corridors that follow the old Wapanitia Wagon Rd and Trillium Lk Rd should be recognized.

Project Recommendations

Continue to control noxious & non-native plant populations.

Develop and maintain seed and plant stock for ongoing restoration projects

Implement stocking level control in areas of Stand Initiation.

Develop thinning project to enhance huckleberry fields.

Evaluate small wetlands for vegetative encroachment.

Control erosion problems created by drainage of the Mud Cr Quarry.

Evaluate restoration of natural drainage patterns of Rd 903.
[completed 1997]

Evaluate and reconstruct roads and culverts as necessary to accommodate 100 year floods and fish passage.

Roads will be obliterated and brought back to near original contours to slove drainage problems (see attached ATM list).

Obliterate Rd 2656-072 and associated spurs and improve drainage pattern.

Evaluate and plan brook trout control within Mud Cr.

Evaluate reconstruction of Trillium Lk dam to enhance fishing access and reduce sedimentation.

Evaluate Dry Fir Trail location.

Evaluate recreation impacts on WPA/CCC airstrip area including fisheries and hydrology (see District Dispersed Sites Plan [to be completed in '98]).

Develop Vegetation Management Plans for FS developed sites: Trillium CG.

Evaluate future use and maintenance standards for Trillium Lk Xcountry Loop Trail (Proposed District Trail Management Plan would facilitate this).

Roaring River LSR IDA

Refer to the Willamette Province LSR assessment developed by the LSR Assessment Team.

Huckleberry fields located within the Abbott burn are both traditional (tribal) and locally popular.

Boundary ridges between Salmon/Oak Fork has known cultural sites.

Upper reaches of String Cr are good big game habitat.

High Rock is a potential peregrine nest site.

Project Recommendations

Implement stocking level control in Stand Initiation areas to promote late seral structure.

Obliterate all roads except Rd 5880 and 5800-246 (Rds 5880-012 and -340).

Evaluate and plan riparian restoration on Linney and Tumbling Crs.

Evaluate High Rock Rd closure (but keep open for snowmobile winter use).

Salmon/Huckleberry Wilderness IDA

Conceptual Framework

Refer to Salmon/Huckleberry LAC process to direct management of recreation use.

Refer to Wilderness Implementation Schedule.

Vegetation in the uplands is mid seral and is evenaged due to fires with late seral structure in riparian areas; oak openings occur as special habitats.

Draft Management Strategy for the California Wolverine (Gulo gulo luteus) does identify this IDA as part of a key refugia block (Strategy to be completed in FY 98 by Hughes/Huff).

Included in this IDA is a very small A5 area north of the wilderness and west of the Still Cr LSR; management objectives would be very similar to wilderness.

Project Recommendations

Reduce non-native fish stock (brook trout) at Salmon and Plaza Lakes.

Control noxious weeds in Lower Cheeney Creek drainage

Plan and implement restoration of lower Cheeney Cr landslide and skid roads.

Evaluate dispersed campsites above SFork bridge (west bank) (see also District Dispersed Sites Plan).

Evaluate restoration of campsites along Salmon R near Linney Cr crossing and Rolling Riffle areas.

Evaluate campsites around Plaza Lk for restoration.

Evaluate trail location to access Salmon R below the falls.

Implement forthcoming Fire Management Plan including prescribed natural fire.

Key Hole IDA

Conceptual Framework

Manage this IDA for Deer/Elk Winter Range with proper cover/forage ratios.

The Salmon/Huckleberry inventoried Roadless Area is located in this IDA. (Appendix C LRMP FEIS 1990)

Project Recommendations

Continue to control noxious & non-native plant populations.

Develop and maintain seed and plant stock for ongoing restoration projects

Implement stocking level control in various stands.

Evaluate and reconstruct roads and culverts as necessary to accommodate 100 year floods and storm proofing.

Evaluate roads/skid trails for obliteration and restoration.

Create deer/elk forage habitat.

Lower Salmon IDA

Conceptual Framework

The riparian late seral DFC for this IDA is currently being met. However, Doug fir will not be a primary component as time goes on unless it is regenerated as Western Hemlock will eventually dominate.

Late seral structure will mean the same as the NWFP ROD's "late successional" stage of development.

It is estimated that approximately 95% of this IDA is in late seral habitat; and 5% is 80-100 years of age (IDA percentages are based on stand exams and field knowledge).

Inventoried deer/elk winter range occurs in this IDA.

The old Salmon River Trail has heavy dispersed camping, hiking and fishing use.

Dispersed camping is creating significant impacts to riparian areas.

Project Recommendations

Continue to control noxious & non-native plant populations.

Develop and maintain seed and plant stock for ongoing restoration projects

Stabilize eroding cut/fill banks along Rd 2618.

Continue enhancement of instream large wood habitat and monitor and maintain existing structures.

Evaluate and reconstruct roads and culverts as necessary to accommodate 100 year floods, fish passage and riparian restoration.

Separate vehicle and pedestrian traffic along Rd 2618 and mitigate riparian restoration (1/4 mile south and one mile north of Green Canyon).

Improve access to dispersed sites with heavy maintenance of spur trails to Salmon R Trail.

Evaluation and restoration of dispersed camping sites within the Riparian Reserves along Rd 2618 would include closing some sites and revegetating them; and controling vehicles in others (Complete a District Dispersed Sites Management Plan).

Develop Vegetation Management Plans for FS developed sites: Green Canyon CG.

Continue or expand Salmon Watch Education program with Oregon Trout.

Wildwood IDA

Conceptual Framework

Within the Wild & Scenic River boundary riparian restoration projects may be funded on private property (in association with BLM).

Recommended Projects

Continue ongoing riparian restoration and instream projects at The Resort At The Mountain golf cource.

Proposed Metzger property riparian and instream restoration project.

Work with BLM to complete facilities and education program for Cascade Stream Watch.

Establish existing water uses for the area.

Check into Clackamas Co water needs planning process associated with future development.

Work with BLM on restoration of riparian areas (quarry, RV resort exchange property, etc.).

Project Priority List

Priority: H = high; M = Medium; L = Low; P = Plan; I = Implement
Project: V = vegetation; F = fish/roads; R = recreation; W = wildlife; O = other; E = eng/roads.

IDAs:

TLS = Timberline Ski Area AP = Alpine WR = White R LSR WW = Wildwood

SHW = Sam/Huck Wilderness H26 = Hyw 26 Corridor US = Upper Salmon R

RR = Roaring River LSR MS = Mid Salmon R MC = Mud Cr

SM = Salmon Meadows KH = Key Hole LS = Lower Salmon R

Project	IDA	Priority	FY 98	FY 99	FY 00	OUT YRS
V1) Noxious weeds/Non-natives	most	H	I	I	I	I
V2) Native seed/plant stock	most	H	I	I	I	I
V3) Stocking level control	most	H	MC	RR	US	I
V4) Survey Noble polypore	US	H	P			
V5) S Mead. human impct. eval.	SM	M	P	I		
V6) Huckleberry fields / restore	MC/US	M	MC		US	

V7) developd sites/veg plans	MC/LS	M				P
V8) Hyw 26 veg mangmt. plan	H26	L				P
V9) Off-site fir restoration	MC	M	P	I	I	I
V10) Eval. sm wetlnd encroach	MC	H	I			
V11) Regen. Whitebark Pine	TLS	L	P	I		
V12) Eval. restr. WFork riparian	US	H	P	P/I		

Priority: H = high; M = Medium; L = Low; P = Plan; I = Implement
Project: V = vegetation; F = fish/roads; R = recreation; W = wildlife; O = other; E = eng/roads.

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Project	IDA	Priority	FY 98	FY 99	FY 00	OUT YRS
E1) Close/reconst/restore roads (see ATM list)	most	H-L	P/I	P/I	P/I	P/I
E2) Reduce rd drain. network	most/MC	H	P	I		
E3) Replace culverts	most	H	I	I	I	I
E4) Hyw 26 sand catch. etc.	H26	H	I	I	I	I
E5) Oblit. Rd 2656-130	MC	H	I			
E6) Oblit. Rd 5800-242 (parts)	MS	H		I		
E7) Oblit. Rd 2656-072 + spurs	MC	H		P/I		
E8) Decom.Rds 5880-012,-240,-340	RR	M		P	I	I
E9) Eval. rds/skid trails oblit	KH	H	I			
E10) Eval. High Rock Rd closure	RR	L				P
E11) Stab. rd banks 2618	LS	H	P/I			
E12) Stab. rd banks 5880	MS	H		I		
E13) Control eros. Linney Cr Rd	MS	H			I	
E14) Control eros. Abbott Rd (small section on ZZ - most on CR)	MS	H			I	
E15) Control eros. Mud Quarry	MC	H	P/I			
E16) Restore fire trails	KH	H	I			

Priority: H = high; M = Medium; L = Low; P = Plan; I = Implement
Project: V = vegetation; F = fish/roads; R = recreation; W = wildlife; O = other; E = eng/roads

IDAs:

TLS = Timberline Ski Area AP = Alpine WR = White R LSR WW = Wildwood

SHW = Sam/Huck Wilderness H26 = Hyw 26 Corridor US = Upper Salmon R

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Project	IDA	Priority	FY 98	FY 99	FY 00	OUT YRS
F1) Channel restoration / fish	most	H	P/I	P/I	P/I	P/I
F2) Chan. rest. Dry/String Cr	MS	H		I		
F3) Survey aquat. inverts.	TLS/US/AP	H	P	P		
F4) Eval. disp. sites/Salmom R	LS/MC/US	M		P		
F5) Eval. disp. site Dry Mead.	MS	M	P			
F6) Non-native fish Salm/Plz Lks	SHW	L				I
F7) Eval. restor Cheeney landsld	SHW	H	P			
F8) Eval. disp.sites SFk bridge	SHW	M		P		
F9) Eval. disp.sites LinCr/RolR	SHW	M				P/I
F10) Eval. campsites at Plaza Lk	SHW	L				P
F11) Eval. rip. rest. Lin/Tumb Cr	RR/SHW	M		P		
F12) rip.rest. Res. at Mt golf c.	WW	H	I			
F13) rip.rest. Metzger prop.	WW	H	P			
F14) BLM quarry rest.	WW	H	P	I		
F15) Fence Jackpot Meadows	MS	H		I		
F16) Monitor TLS salting	TLS/AP	H	I			
F17) Mont. TLS drainfield	TLS/AP	H	I			
F18) Eval. brook trout control	SM/MC	M		P		
F19) Mont. water qual. W&SR	most	H	I			
F20) Salmon Watch Ed program	LS	H	I	I	I	I
F21) BLM Cascade Strm Watch	WW	H	I	I	I	I

Priority: H = high; M = Medium; L = Low; P = Plan; I = Implement
Project: V = vegetation; F = fish/roads; R = recreation; W = wildlife; O = other; E = eng/roads.

IDAs:

TLS = Timberline Ski Area AP = Alpine WR = White R LSR WW = Wildwood

SHW = Sam/Huck Wilderness H26 = Hyw 26 Corridor US = Upper Salmon R

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Project	IDA	Priority	FY 98	FY 99	FY 00	OUT YRS
R1) TLS Ski Area Master Plan	TLS	H	P	I		
R2) Devel. ATM Plan TLS	TLS	H	P	I		
R3) Salmon/Huck Wild. / LAC	SHW	H	I	I	I	I

R4) Mt. Lake rec. plans (Salmon/Plaza)	SHW	L				P
R5) Dist. Trail Mangmt. Plan (Trillium Lk Xcountry Loop T.)	MC	L	P	I		
R6) Devel. veg plan CGs-Tril.Lk	MC	M		P	I	
R7) Evl. trail access Salm. falls	SHW	L				P/I
R8) Heav. maint. SR Tr. spur trls	LS	M				P/I
R9) Eval. rec impct on WPA/CCC	MC	H	P			
R10) Separate ped/rd traf. R2618	LS	L				P/I
R11) Trillium dam fishing eros.	MC	H	P/I			
R12) Snowbridges-Yellowjacket T.	US	M				P/I
W1) Eval. deer/elk hab. needs	most	H	P			
W2) Create forage hab. D/Elk	KH	M	I			
W3) Survey for Rosy Finch hab.	A/TLS	H			I	

Priority: H = high; M = Medium; L = Low; P = Plan; I = Implement
Project: V = vegetation; F = fish/roads; R = recreation; W = wildlife; O = other; E = eng/roads.

IDAs:

TLS = Timberline Ski Area AP = Alpine WR = White R LSR WW = Wildwood

SHW = Sam/Huck Wilderness H26 = Hyw 26 Corridor US = Upper Salmon R

RR = Roaring River LSR MS = Mid Salmon R MC = Mud Cr

SM = Salmon Meadows KH = Key Hole LS = Lower Salmon R

Project	IDA	Priority	FY 98	FY 99	FY 00	OUT YRS
O1) Hyw 26 Right-of-Way project	H26	H	P			
O2) Hyw 26 Corridor EIS	H26	H	P			
O3) Provide fuel break/Hyw 26	WR	H	P			
O4) Mont. Wapinitia range alt.	SM	H	P			
O5) Check utility maint.	US/H26	M	I			
O6) Check Wapinitia landline	SM	M	I			
O7) Estb. ex. water rights	WW	M	P			
O8) Estb. Wapinitia water rights	WW	L				P
O9) Clack. Co. water futures	WW	M	P			
O10) Survey MBES > MZIG roads	SM/MS/RR	H	I			
O11) Rehab clearcts/frm TLL	MS	H	I			
O12) Devel. quarry rehab plans	MS	M	P/I			

SALMON ILAD PROJECT PRIORITIES

CODE	PROJECT	IDA	PRIORITY	1998	1999	2000	OUTYEAR
V1	Control noxious and non-native plant populations	MOST	H	I	I	I	I
V2	Obtain native seed/plant stock	MOST	H	I	I	I	I
V3	Stocking level control	MOST	H	MC	RR	US	I
V4	Survey for noble polypore	US	H	P	I	I	
V5	Survey Salmon Riv.Meadows/human impacts/Wapinitia	SM	M	P	I		
V6	Huckleberry field enhancement/restoration	MC/US	M	MC		US	
V7	Vegetation plans for developed sites	MC/LS	M				P
V8	Hwy 26 Veg Management plan/ODOT	H26	L				P
V9	Off-site fir restoration/Sherar Burn area	MC	M	P	I	I	I
V10	Eval. small wetland encroachments	MC	H	I			
V11	Regen Whitebark Pine	TLS	L	P	I		
V12	Eval. Restoration/West Fork riparian area	US	M	P	P/I		
E1	Close and reconstruct/restore roads	MOST	H-L	P/I	P/I	P/I	P/I
E2	Road obliteration/recontoured to solve drainage problem	MOST/MC	H	P	I		
E3	Replace culverts	MOST	H	I	I	I	I
E4	HWY 26 Sand catchments/ODOT	H26	H	I	I	I	I
E5	Oblit. Rd 2656-130	MC	H	I			
E6	Oblit. Rd 5800-242 (parts)	MS	H		I		
E7	Oblit. Rd. 2656-072 + spurs	MC	H		P/I		
E8	Oblit. Rds. 5880-012, 340	RR	M		P	I	I
E9	Evaluate road and skid trail obliteration	KH	H	I			
E10	Evaluate High Rock rd closure	RR	L				P
E11	Stabilize road banks 2618	LS	H	P/I			
E12	Stabilize road banks 5880	MS	H		I		
E13	Control erosion Linney Creek Road	MS	H			I	
E14	Control erosion Abbott Road	MS	H			I	
E15	Control erosion at Mud Creek quarry	MC	H	P/I			
E16	Restore fire trails	KH	H	I			

SALMON ILAD PROJECT PRIORITIES

CODE	PROJECT	IDA	PRIORITY	1998	1999	2000	OUTYEAR
F1	Channel restoration for fish	MOST	H	P\I	P/I	P/I	P\I
F2	Channel restoration Dry/String Creek	MS	H		I		
F3	Survey for aquatic invertebrates	TLS/US/AP	H	P	P		
F4	Evaluate dispersed sites/Salmon River	LS/MC/US	M		P		
F5	Evaluate dispersed sites/ Dry Meadows	MS	M	P			
F6	Evaluate non- native fish/Salmon and Plaza Lakes	SHW	L				I
F7	Eval/Restore Cheeney landslide	SHW	H	P		I	
F8	Evaluate dispersed sites/ South Fork bridge	SHW	M		P		
F9	Evaluate dispersed sites/ Linney Creek/Rolling Riffle	SHW	M				P/I
F10	Evaluate campsites at Plaza Lake	SHW	L				P
F11	Evaluate riparian restoration/ Linney Creek/Tumbling Cr.	RR/SHW	M		P	I	
F12	Riparian restoration at Resort at the Mountain	WW	H	I	I	I	
F13	Riparian restoration at Metzger property	WW	H	P			
F14	BLM Quarry restoration	WW	H	P	I		
F15	Fence Jackpot Meadows (grazing issues)	MS	H		I		
F16	Monitor TLL salting	TLS/AP	H	I	I	I	I
F17	Monitor TLL drainfield	TLS/AP	H	I			
F18	Evaluate brook trout control	SM/MC	M		P		
F19	Monitor water quality/ Wild and Scenic river	MOST	H	I	I	I	
F20	Salmon Watch Educational program	LS	H	I	I	I	I
F21	BLM Cascade Streamwatch	WW	H	I	I	I	I
R1	TLL Ski Area Master Plan	TLS	H	P	I		
R2	Develop ATM plan for TLL	TLS	H	P	I		
R3	Salmon/ Huckleberry Wilderness LAC	SHW	H	I	I	I	I
R4	Salmon/Plaza Lake recreation plan	SHW	L				P
R5	District Trail Management Plan (Trillium Lake XC Loop)	MC	L	P	I		
R6	Develop Veg. Mgmt. plans/ Trillium Lake/Gr. Canyon	MC	M		P	I	
R7	Evaluate trail access to Salmon River falls area	SHW	L				P/I
R8	Spur trail maintenance to improve access/Salmon R. trail	LS	M				P/I
R9	Evaluate rec. impacts to WPA/CC site/ Summit Meadows	MC	H	P			
R10	Separate pedestrian/rd traffic Rd. 2618	LS	L				P/I

SALMON ILAD PROJECT PRIORITIES

CODE	PROJECT	IDA	PRIORITY	1998	1999	2000	OUTYEAR
R11	Trillium dam erosion caused by fishing access	MC	H	P/I			
R12	Snowbridges on Yellow Jacket Trail	US	M				P/I
W1	Evaluate deer and elk habitat needs	MOST	H	P	I	I	
W2	Create forage habitat for deer and elk	KH	M	I	I	I	
W3	Survey for Rosy Finch habitat	A/TLS	H			I	
O1	Hwy 26 Right of Way Project	H26	H	P		I	
O2	Hwy 26 Corridor EIS	H26	H	P			
O3	Provide fuel break/ HWY 26 (south of CJ's)	WR	H	P			
O4	Monitor Wapintia Range allotment	SM	H	P		I	
O5	Check utility corridor maintenance (PGE- phone)	US/H26	M	I			
O6	Check Wapinitia landline	SM	M	I			
O7	Establish water rights status within watershed	WW	M	P			
O8	Establish Wapinitia water rights	WW	L				P
O9	Evaluate Clackamas County water needs for future	WW	M	P			
O10	Survey roads MBES/MZIG for inclusion into ATM	SM/MS/RR	H	I			
O11	Rehab. clearcut visuals from TLL	MS	H	I		I	
O12	Develop quarry rehab plans	MS	M	P/I			

PROJECT PRIORITY LIST

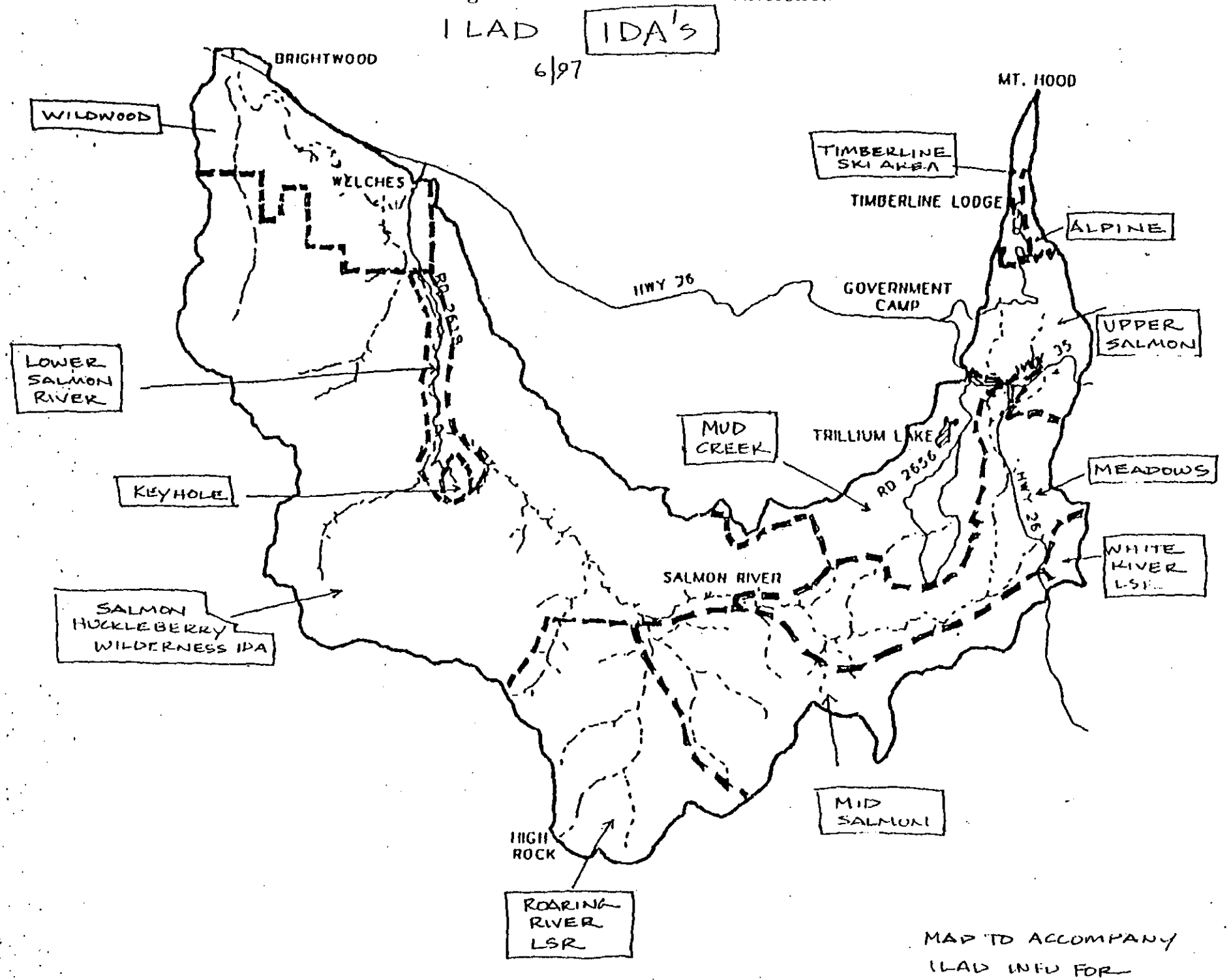
Project Priority: **H** = High **M** = Medium **L** = Low

Project Code **V** = Vegetation
F = Fish/Roads
R = Recreation
W = Wildlife
E = Engineering/roads
O = Other

IDA'S

AP = Alpine
H26 = Hwy 26 Corridor
KH = Keyhole
LS = Lower Salmon River
MC = Mud Creek
MS = Mid Salmon
RR = Roaring River
SHW = Salmon/Huckleberry Wilderness
SM = Salmon Meadows
TLS = Timberline Ski Area
US = Upper Salmon
WR = White River LSR
WW = Wildwood

Figure 1-1 Salmon River Watershed



MAP TO ACCOMPANY ILAD INFO FOR SALMON WATERSHED