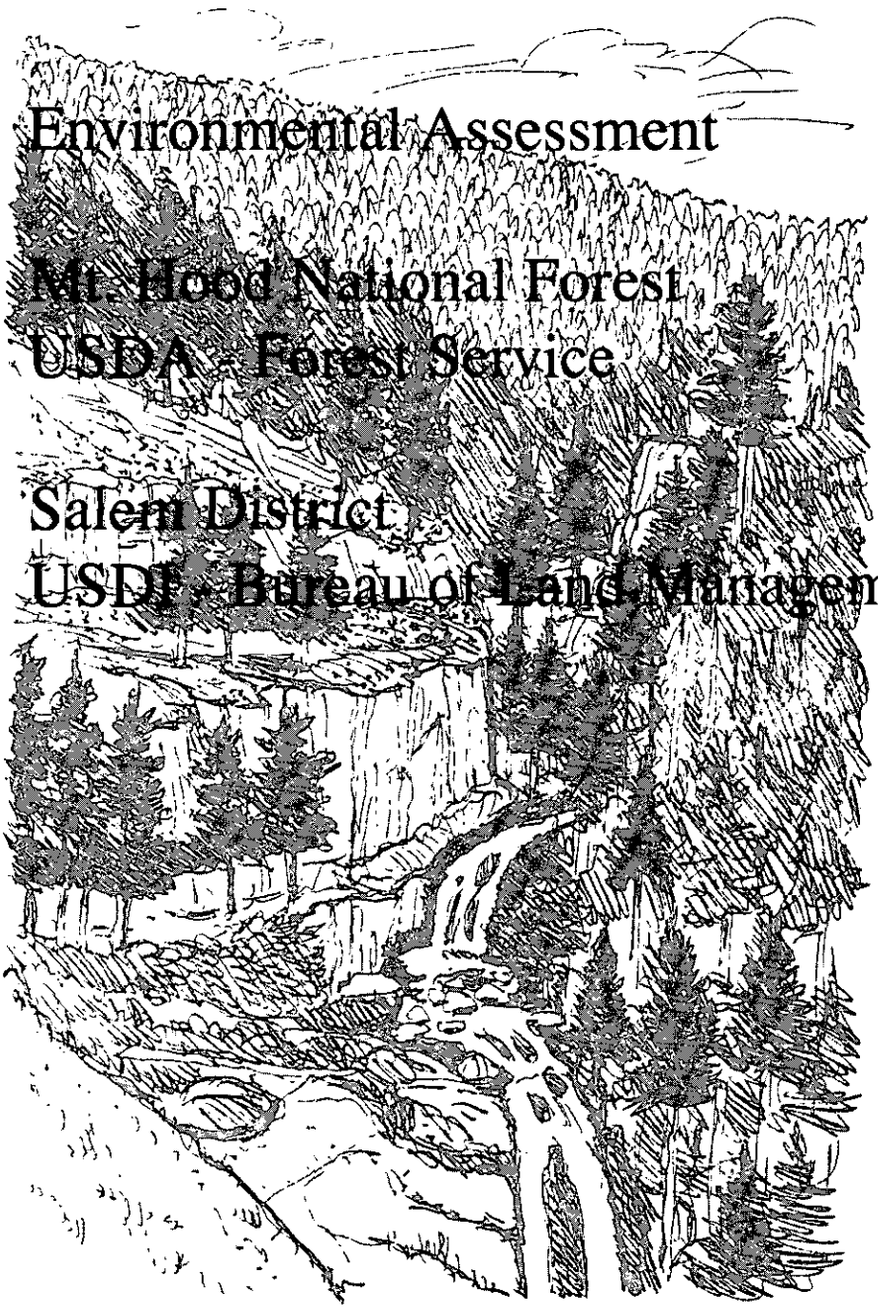
United States
Department of
Agriculture

Forest Service

**Pacific
Northwest
Region**

1992

Salmon National Wild and Scenic River



Environmental Assessment

Mt. Hood National Forest
USDA - Forest Service

Salem District
USDI - Bureau of Land Management

Salmon National Wild and Scenic River Environmental Assessment

USDA-FS, Mt. Hood National Forest
USDI-BLM, Salem District

SALMON WILD AND SCENIC RIVER INTERAGENCY PLANNING TEAM

USDA Forest Service
USDI Bureau of Land Management

August 20, 1992

Dear River Enthusiast:

We are pleased to present the results of a cooperative process involving the public, the Mt. Hood National Forest, and the Salem District Bureau of Land Management. This Environmental Assessment provides documentation of the planning process and analysis of various management options for the Salmon National Wild and Scenic River. Alternative D of this plan is our proposed preferred management strategy for the river. We feel Alternative D balances protection and enhancement of the river's important values and protects rights of those working and living along the river.

From the outset, the Bureau of Land Management and the Forest Service have worked with landowners, interested groups and individuals to develop the management plan for the Salmon River. Our intent was to develop a river management plan that protects and enhances the river's values, is clear and responsive to public issues and needs, and meets agency objectives.

We welcome your comments on the Environmental Assessment and management strategies for the Salmon River. You can write to one of the addresses below or call one of the river planners if you have questions or comments. In addition, we will be having a public meeting at the Lions Club on State Highway 26 in Welches, September 15, from 7:00 to 9:00, to allow you the opportunity to learn more about the plan and share your thoughts with us at that time.

Please reply with your comments regarding this assessment by October 9, 1992 to Paul Norman or Bob Ratcliffe at the address below. After we have reviewed these comments, we will select the preferred management strategy. We will notify you when we issue that decision as well as when we issue the implementation and monitoring plans for the Salmon River.

Forest Service
Mount Hood National Forest
2955 N.W. Division Street
Gresham, OR. 97030
(503) 666-0700

Bureau of Land Management
Salem District
1717 Fabry Road S.E.
Salem, OR. 97306
(503) 375-5646

Paul Norman
Mt. Hood National Forest
2955 N.W. Division
Gresham, OR 97030
(503) 666-0731 or 666-0704

Bob Ratcliffe
Salem District BLM
1717 Fabry Road SE
Salem, OR 97306
(503) 375-5669

Additional copies of this document are available upon request. Call Paul Norman if you would like a copy sent to you. Thank you for your continuing interest in the future of the Salmon River.

Van Manning
Salem District Manager
Bureau of Land Management

Judith E. Levin
Forest Supervisor
Mt. Hood National Forest

Salmon National Wild and Scenic River

Environmental Assessment

Deciding Officials:

Judy Levin, Acting Forest Supervisor
Mt. Hood National Forest
2955 N.W. Division
Gresham, OR 97030

Van Manning, District Manager
Salem District, Bureau of Land Management
1717 Fabry Road
Salem, OR 97305

For Further Information:

Paul Norman
Mt. Hood National Forest
(503) 666-0700

Bob Ratcliffe
Salem District, Bureau of Land Management
(503) 375-5669

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Chapter 1

Need for the Proposal

Introduction

In 1968, Congress passed the National Wild and Scenic Rivers Act (P.L. 90-542), thus establishing a nationwide system of outstanding free-flowing rivers. The Act also provides for the protection of river values for each river in the system, through the development of a river management plan.

The Omnibus Oregon Wild and Scenic Rivers Act of 1988 (P.L. 100-557) amended the 1968 Act, adding parts of 40 Oregon rivers to the national system. The Salmon River was designated in its entirety, from its headwaters on the south slope of Mt. Hood to its confluence with the Sandy River near Brightwood. The Mt. Hood National Forest is responsible for the administration of the upper 25.5 miles of the river with the Salem District of the Bureau of Land Management (BLM) responsible for the remaining 8.0 miles of the river.

Under the Wild and Scenic Rivers Act, designated rivers were classified as wild, scenic or recreational, depending on the level of development and access present at the time of designation. Wild rivers are the most natural appearing and the least accessible. Little or no development is present, such as roads or campgrounds. Scenic rivers have shorelines that are largely undeveloped with few access points. More types of land uses and developments are compatible with management goals on a scenic river than on a wild river. On river segments with the Recreational designation, the shoreline is more developed and the road parallels the river more closely and may even dominate the landscape. There may be some development along the banks, and some existing impoundments or diversions.

Due to the differingt level of existing development, the Salmon River as described in the Omnibus Oregon Wild and Scenic Rivers Act was divided into five segments:

Segment 1. The 7-mile segment from its headwaters to the south boundary line at section 6, township 4 south, range 9 east as a **recreational river**, to be administered by the U.S. Forest Service.

Segment 2. The 15-mile segment from the south boundary line at section 6, township 4 south, range 9 east to the junction with the South Fork of the Salmon River as a **wild river**, to be administered by the U.S. Forest Service.

Segment 3. The 3.5-mile segment from the junction with the South Fork of the Salmon River to the Mt. Hood National Forest boundary as a **recreational river**, to be administered by the U.S. Forest Service.

Segment 4. The 3.2-mile segment from the Mt. Hood National Forest boundary to Lymp Creek as a **recreational river**, to be administered by the BLM.

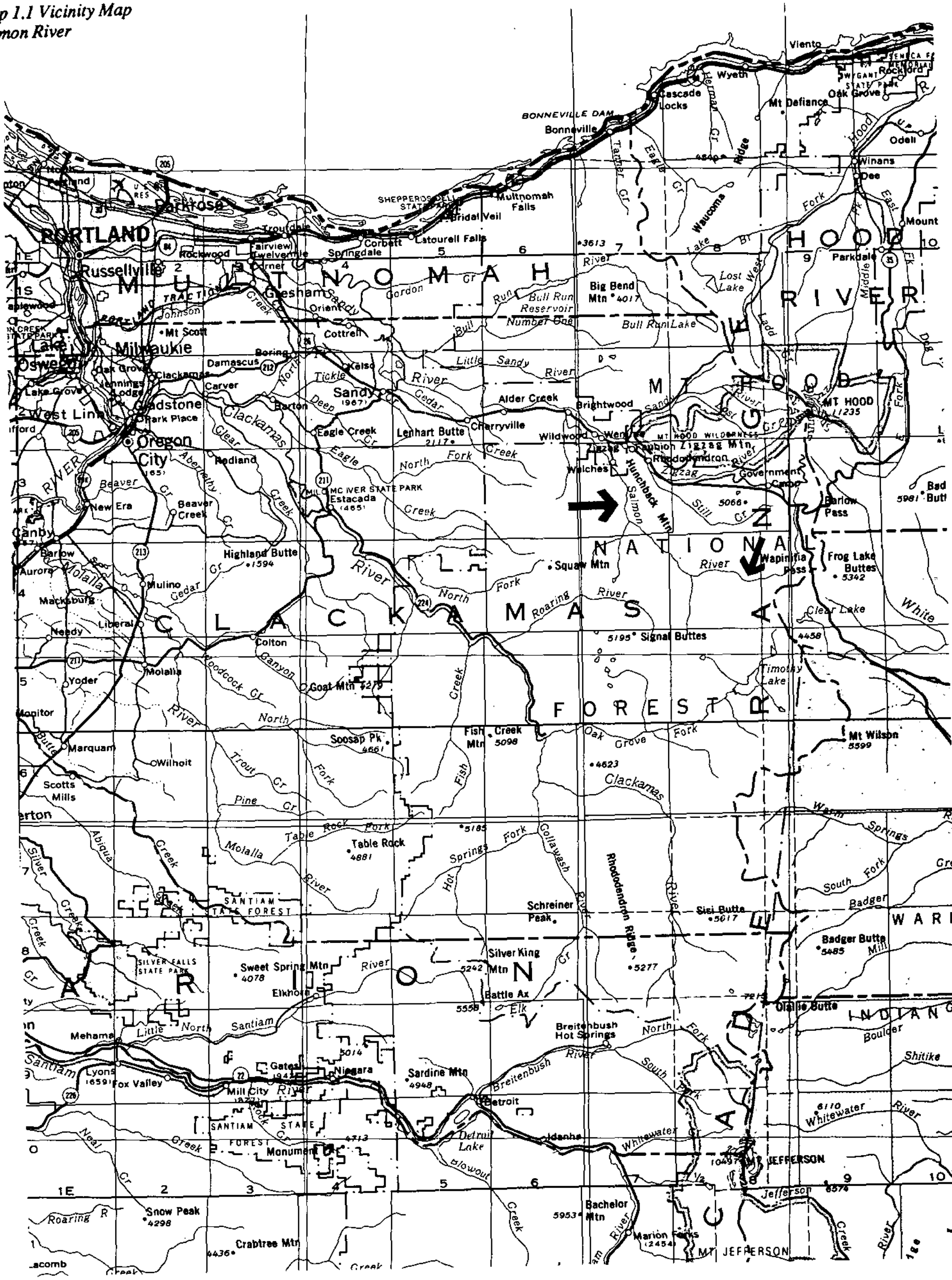
Segment 5. The 4.8-mile segment from Lymp Creek to its confluence with the Sandy River as a **scenic river**, to be administered by the BLM.

Purpose and Need

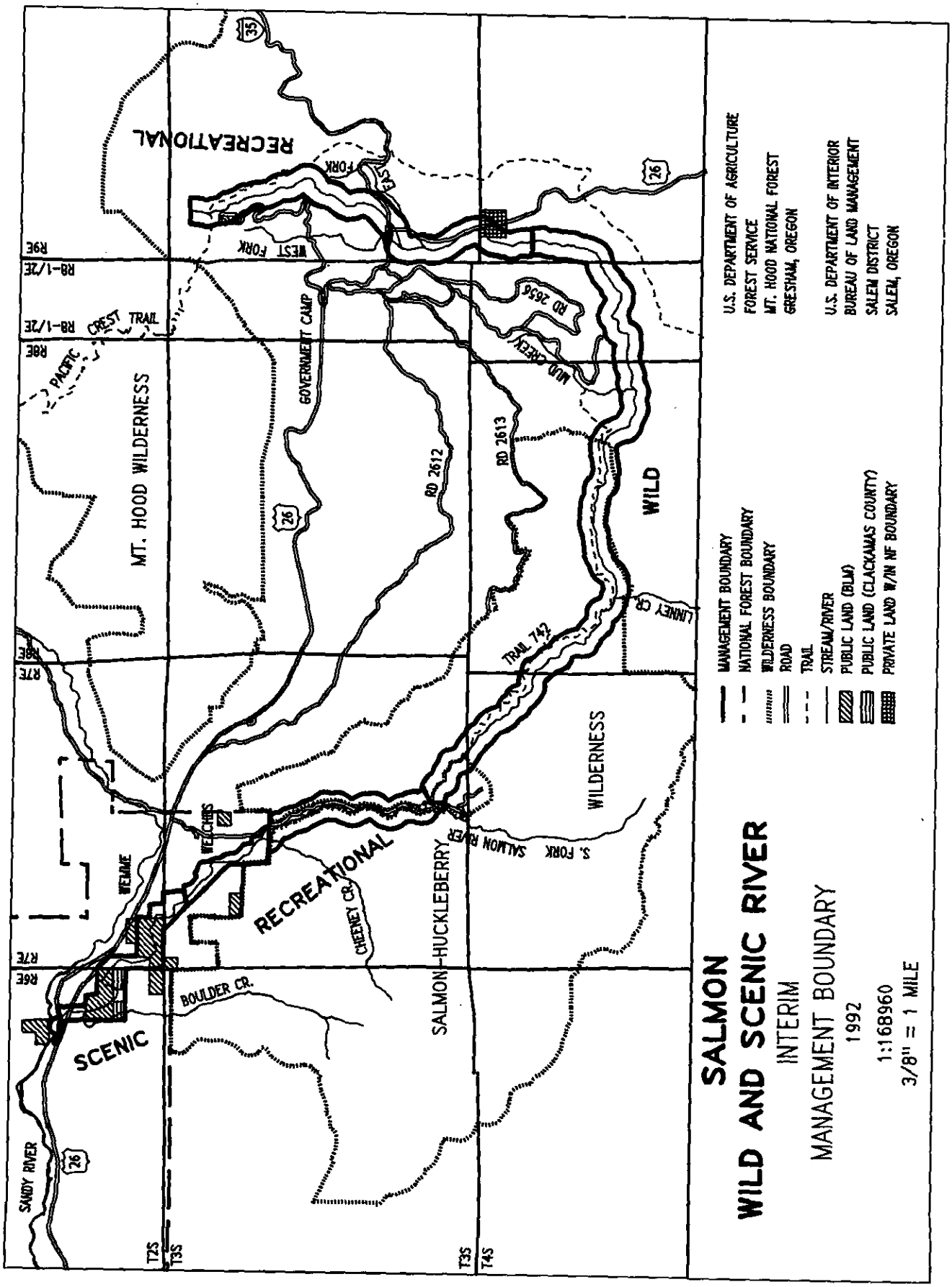
The Salmon River was designated by Congress as a national wild and scenic river in 1988. The Wild and Scenic Rivers Act requires the BLM and the Forest Service to develop a management plan for the river within three years of the date of designation. The Salmon River Management Plan will provide for protection and enhancement of resource values in the river corridor and will accommodate public uses consistent with protecting and enhancing identified river values.

This environmental assessment accompanies the river management plan and describes the planning process and environmental analysis done by the river planning team. The environmental assessment also describes alternative methods for managing the river and documents the environmental effects of each alternative. The selected alternative is the foundation of the management plan.

Map 1.1 Vicinity Map
Salmon River



Map 1.2 Interim Management Boundary

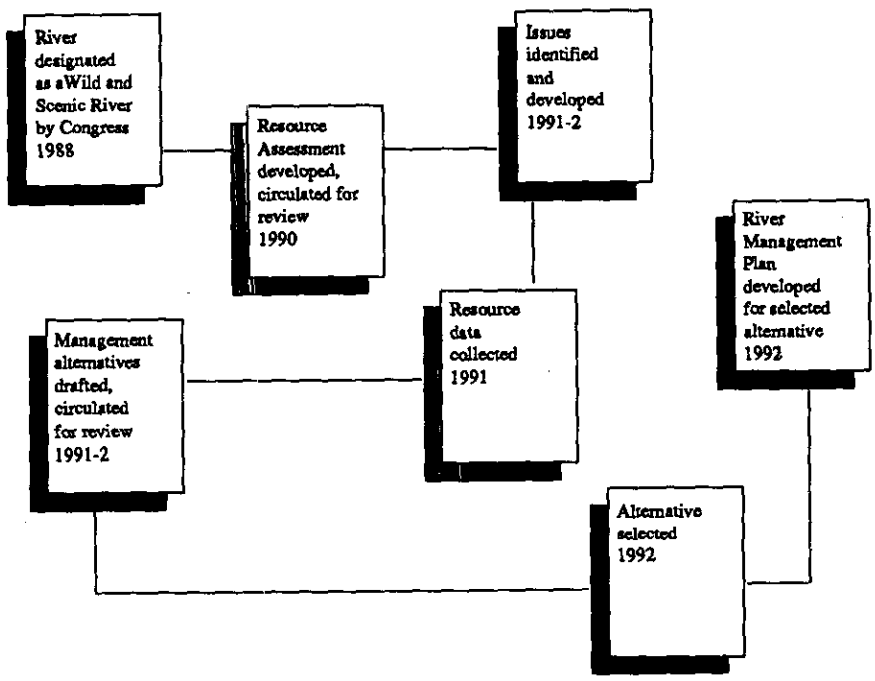


Planning Process

In developing a management plan for the Salmon River, the Forest Service and the BLM followed National Environmental Policy Act requirements, including establishing an interdisciplinary team and involving the public. Resource specialists for each of the outstanding values were members of the interdisciplinary team, and several others served as consultants to the team. Outside experts (from universities, other agencies, and the public) were involved in the preparation of the resource assessment and the environmental assessment. A list of interdisciplinary team members and consultants, along with their qualifications, is in Chapter 5.

The National Environmental Policy Act of 1969, as amended in 1975, directs all federal agencies to consider environmental impacts of a proposed action, involve the public in decision making, and disclose environmental impacts to the public. The Act also requires that environmental analysis be interdisciplinary and issue-driven and that direct, indirect and cumulative effects be identified. The following figure describes the steps used in developing the river management plan.

Figure 1.1 The River Management Planning Process



Public involvement has been and continues to be a critical part of the river management planning process. Private citizens, interest groups, state and local governments, other agencies, and the Confederated Tribes of Warm Springs were all consulted throughout the development of the resource assessment and management plan. In addition to mass mailings, two public meetings were held and a working group was established at the time issues and draft alternatives were being developed.

In November 1990, the Mt. Hood National Forest and the Salem BLM held a public meeting in Welches to introduce the planning process and solicit public comment. Invitations were mailed to all landowners in the quarter-mile river corridor and to approximately 100 other interested citizens and groups. About 60 people attended the first meeting.

In the draft resource assessment released in 1990, the team identified outstanding values for the river. As a result of public comment, the Forest Service and BLM did not change any of the findings, but additional information was added to the resource assessment.

In September 1991, a working group was set up to discuss issues and proposed alternatives with the river planning team. Members represented a variety of interests and viewpoints and met seven times from September until January, 1992. Their input was incorporated largely into Alternatives C and D.

The draft alternatives were presented at a second public meeting in February, 1992. About 40 people attended the meeting. No new issues were identified, but additional changes were made based on the input from that meeting, and from reviews of draft chapters of this document. Details on public involvement are contained in Chapter 5.

Agency Jurisdiction

The Wild and Scenic Rivers Act requires that a comprehensive river management plan be prepared to set final boundaries and protect and enhance the values for which the river was designated. The plan also provides goals, desired future condition, and standards and guidelines for the Salmon River. It provides the necessary direction for the river corridor and adjacent areas that affect the corridor.

The river management plan should be compatible with local and statewide planning goals, and may also be coordinated with planning for affected adjacent federal lands. The jurisdiction of some other agencies (such as U.S. Fish and Wildlife and Oregon Department of Fish and Wildlife) are discussed in Chapter 2 under appropriate resource values.

U.S. Forest Service

The management plan for the Salmon signifies an amendment to the 1990 Mt. Hood National Forest Land and Resource Management Plan (also called the Forest Plan). The Forest Plan provides direction for management programs, practices, uses and protection measures on the Mt. Hood National Forest. The environmental assessment for the Salmon River is tiered to the final Environmental Impact Statement for the Forest Plan.

The Forest Plan recognized the five designated wild and scenic rivers on the Forest with a special management area designation: (B-1) Designated Wild and Scenic Rivers. The standards and guidelines for B-1 management areas, as well as the Salmon River Resource Assessment, have guided the interim management of the Salmon River, pending completion of this management plan.

The Forest Plan is already being implemented but will be amended to incorporate the river management plan and any changes to its standards and guidelines for B-1 lands.

Two levels of planning exist for the Mt. Hood National Forest. The first level of planning is programmatic and is represented by the Forest Plan and its amending documents, such as this one. The second level of planning is the project level. Individual project plans, such as a timber sale or construction of a campground, are tiered to programmatic plans and must achieve those goals and objectives.

Bureau of Land Management

The management plan for the Salmon tiers to the BLM Salem District Resource Management Plan (RMP). The RMP provides direction for all resource management programs, practices, uses, and protection measures on the Salem District. Currently the Salem District RMP recognizes and addresses the special river designation and does not conflict with actions proposed under any of the alternatives discussed in Chapter 3. The river plan will guide any actions the BLM would undertake in managing lands under its jurisdiction in the river corridor.

Ceded Lands, Confederated Tribes of Warm Springs

Members of the Confederated Tribes of Warm Springs exercise reserved treaty fishing rights at "usual and accustomed" fishing sites on the Columbia River and its tributaries, which includes the Salmon River. These reserved rights are addressed in the treaty with the Confederated Tribes of the Warm Springs Reservation of Oregon (*Treaty with the Tribes of Middle Oregon*, June 25, 1855, 12 Stat. 963.)

These rights were reserved by, not granted to, the treaty tribe. In essence, "the right of taking fish at all usual and accustomed places" guarantees that members of the treaty tribe shall have the right of access to, and fishing from, all salmon and steelhead-bearing locations on the Columbia River as well as its tributaries, including the Salmon River.

Other rights reserved in the Treaty of 1855 include the right of erecting temporary buildings for curing fish, together with the privilege of hunting, gathering roots and berries, and pasturing horses and cattle on open and unclaimed land.

Although the Salmon River is not within the ceded area as identified in the Treaty of 1855, it is within the "usual and accustomed" area of resource utilization at the time of the treaty. The treaty reserves to the signers of the treaty rights to perform traditional subsistence and sacred activities within these usual and accustomed areas.

Land Conservation and Development and County Comprehensive Planning

The authority to regulate and control land use and development activities on private lands rests with local, county, and state governments and not the federal government. The federal government does not have the authority to zone or regulate uses of private lands under the Wild and Scenic Rivers Act. However, Oregon state law does require that individual counties adopt comprehensive plans that are compatible with specially designated natural areas, including federally designated Wild and Scenic Rivers and state designated scenic waterways. Goal 5 directs counties and cities to resolve conflicting land uses in natural areas.

Salmon River Watershed

Oregon Land Use Planning Act

The statutory basis for Oregon's state-wide land use planning program is primarily derived from the Oregon Land Use Planning Act of 1973 (ORS Chapter 197) and other city and county land use authorities (ORS Chapters 92,196, 197, 215, 221 and 227).

The Oregon Land Use Planning Act created a state-level program to set policy for and to coordinate the administration of land use planning by all levels of government in Oregon. The act established the Land Conservation and Development Commission (LCDC) to oversee management of the state planning program. The Commission is a seven-member board appointed by the Governor, subject to Senate confirmation.

Department of Land Conservation and Development (DLCD)

DLCD is the administrative arm of the Commission and is responsible for implementation of the state planning act through review of over 275 city and county comprehensive plans and land use regulations. DLCD reviews the plans for consistency and compliance with the mandatory statewide planning requirements (called goals). The statewide planning goals, and the process for developing, approving, amending and implementing them, form the foundation for Oregon's land use management program. The goals establish important procedural guidance for all comprehensive plans statewide, require the protection and management of land, water, coastal and ocean resources, and directs cities and counties to address a variety of land use concerns appropriate to urban and rural areas.

The planning goals are mandatory and have the force of law. They are binding upon local governments, special districts, and state agencies when those bodies make decisions involving land use. ORS 197 declares that all of the goals are of equal importance. The goals provide both prescriptive and instructive guidance for carrying out planning, management, and regulatory responsibilities at both the state and local levels.

Goal 5

Goal 5 requires cities and counties to adopt programs as elements of their comprehensive plans with the following directives:

- Ensure open space.
- Protect scenic and historical areas and natural resources.
- Promote health and visually attractive environments in harmony with the natural landscape.

The scope of the natural resources encompassed by Goal 5 is broad and includes potential and approved federal wild and scenic rivers and state scenic waterways. To comply with Goal 5, cities and counties must follow three steps: inventory the resource; identify conflicting uses which potentially impact designated river values; and develop and implement land use regulations to resolve conflicting uses identified. This would include a program to coordinate changes in land use along rivers with applicable state and federal agencies (state parks, BLM, and Forest Service). The resource values identified in the inventory will have to be protected by mandatory plan policies and zoning requirements.

Oregon Department of Transportation

ODOT is responsible for planning, designing, constructing and maintaining state highways for the safety and benefit of the public. ODOT requires authorization to use National Forest lands for highway rights-of-way, waste areas, and material sources for highway construction, reconstruction, and maintenance.

The memorandum *Understanding Title 1500—External Relations,* 1535.13-1, contains the coordination and responsibilities between the Forest Service and ODOT for survey, design, plan approval, and construction authorization for both new and reconstruction activities. It also includes responsibilities for maintenance, signs, access, and landscape management.

ODOT informs the Forest Service and BLM on planned highway construction, highway relocations, and highway betterment projects that could have an impact on federal lands. ODOT can request an environmental assessment from the agencies regarding resource impacts and current management related to the proposed highway improvement project.

In addition to construction and reconstruction responsibilities, ODOT maintains (in coordination with the Federal Highway Administration) Highway 26 within the existing road prism to preserve and perpetuate the highway. It also has the authority and responsibility for installation and maintenance of all signs within the highway right-of-way and determines access points onto the highway.

Oregon Water Resources Department

The WRD is responsible for managing and allocating the state's water resources. The Water Resource Commission typically develops policy through the preparation of basin plans for each of Oregon's 18 river basins.

The WRD issues water rights on all waters in the state and enforces the exclusion of dams, impoundments, and placer mining in scenic waterways and on tributary streams with scenic waterway boundaries. Minimum perennial streamflows are administrative designations established by the Water Resources Commission.

Division of State Lands

Under state law, the Division of State Lands (DSL) is responsible for the management of the beds and banks of navigable waterbodies (ORS 274.005-274.590). DSL is the administrative arm of the State Land Board (the Board), composed of the Governor, Secretary of State, and State Treasurer. Under constitutional and statutory guidelines, the Board is responsible for managing the assets of the Common School Fund. These assets include the beds and banks of Oregon's navigable waterways and are to be managed for the greatest benefit of the people of this state, consistent with the conservation of this resource under sound techniques of land management. Protection of public trust values of navigation, fisheries, and public recreation are of paramount importance, too.

State ownership to the beds of navigable waterbodies was granted to Oregon in 1859 as an incidence of statehood and is an inherent attribute of state sovereignty protected by the U.S. Constitution. The beds of non-navigable waterbodies remained in the ownership of the United States or its grantees. The navigability of the Salmon River from its confluence with the Sandy River (river mile 0) to Green Canyon Campground (river mile 10), and possibly further upstream, has not been established. Currently, the federal government, Clackamas County, and private property owners claim ownership of the river's bed and bank. This river plan does not propose to address the issue of navigability. Rather, this river plan is intended to provide a management philosophy for the above segment of the river, as well as the remainder of the river.

The original federal test for determining navigability was established in the Daniel Ball case over 100 years ago. This U.S. Supreme Court admiralty case clarified that rivers "are navigable in fact when they are used, or susceptible of being used, in their ordinary condition, as highways of commerce . . ." Interpreting this requirement, subsequent court decisions have adopted this test for title purposes and have ruled that a waterbody is navigable if it was capable of use, at the time of statehood, as a public highway for transporting goods or for travel in the customary modes of trade and travel on water.

DSL has determined that there may be sufficient evidence to support a claim of navigability and state ownership for the beds and banks of the Salmon River at least from its confluence with the Sandy River (river mile 0) to Green Canyon Campground (river mile 10), and possibly further upstream. The position of the Forest Service and BLM is that the navigability of the river has not been established.

For purposes of managing the above portion of this river (where navigability has not been established), any nonfederal activities or land uses, such as new utility or transportation corridors and boat ramps or similar facilities that impose into or cross a waterway below ordinary high water, will require an easement from the State Land Board. Existing nonfederal facilities will require an easement at such time as they undergo major structural alteration, replacement, or relocation. In addition, removal of sand and gravel requires a royalty lease, and any nonfederal use that occupies any area of submerged or submersible land requires a waterway lease.

Further, the DSL also administers the state's Removal-Fill Law, which protects Oregon's waterways from uncontrolled alteration. The law requires a permit for fill or removal of more than 50 cubic yards of material within the state's waterways. The permit-review process involves coordination with the natural resource and land use agencies from the local through the federal levels. Within Oregon Scenic Waterways, special authorization is needed from the Board and DSL for "any alteration of the beds and banks" of the Salmon River within the plan area (ORS 390.835).

Nothing set forth herein shall limit the ability of the Forest Service and BLM to administer this segment of river.

As with any jointly managed resource, jurisdiction is not as important as care for the resource. The DSL, Forest Service, and BLM will continue to work together to ensure that the public trust interest and the purpose of the Wild and Scenic Rivers Act are met.

Clackamas County Comprehensive Planning

Clackamas County has an approved comprehensive plan in place. This plan addresses federal Wild and Scenic Rivers protection in a number of ways. First, all development must meet the general standards for the unincorporated area of Clackamas County described in the General Provisions of the comprehensive plan. The General Provisions set forth restrictions and considerations for natural hazards, slopes, stream corridors, wildlife and fish habitat, cultural and historic resources, and natural drainage channels. Secondly, development and land uses are regulated through specific zoning classifications. Specific restrictions and regulations apply for each classification.

Values and Issues

The resource values and the issues are the "drivers" of plan development. The purpose of the River Management Plan is to protect and enhance the river values and to address issues related to the management of the river. The Congressional Record named the following values as outstanding for the Salmon: scenery, fisheries, and botany/ecology.

Early in the planning process, the planning team evaluated the river values and determined which values were the "outstandingly remarkable values" through development of a resource assessment. As a result, recreation, wildlife, and hydrology were added to the list of outstandingly remarkable values. In addition, specific issues were identified by the public as important that also needed to be addressed in the planning process.

Table 1.1 Summary of Salmon River Values and Issues

Outstandingly Remarkable Values	Issues
scenery recreation fisheries wildlife hydrology botany/ecology	hydrology and water quality recreation use and access fisheries timber harvest law enforcement wildlife vegetation grazing

Summary of the Resource Assessment

The resource assessment represents the initial phase of the development of the management plan for the Salmon River and serves as the foundation for the plan. The purpose of the assessment is to document those river-related values or features that are truly outstandingly remarkable values and those, while not outstandingly remarkable, that are significant and contribute substantially to the river setting or to the function of the river ecosystem. A complete copy of the Resource Assessment is contained in Appendix A.

To qualify as an outstandingly remarkable value, the river-related value must be a unique, rare, or exemplary feature that is significant at a regional or national level. As a basis for regional comparison, geographic regions defined in the State of Oregon Comprehensive Outdoor Recreation Plan (SCORP) were used. The Salmon River is within SCORP Region 7, which contains the most heavily populated area of the state and incorporates Columbia, Clackamas, Multnomah, and Washington counties. It is located in the northern Willamette Valley and is bordered on the east by the Cascade Range. This region also contains the Clackamas, Roaring, and Sandy Wild and Scenic Rivers. The Columbia River forms its northern boundary.

The first step in developing a river management plan is to evaluate the resources and values associated with the river and river corridor, and to determine the level of significance of these river-related values. The findings in the assessment process are based on existing scientific data and informed professional judgment. The resource assessment methodology uses specific guidelines that provide an objective determination of the importance of river values, as well as a degree of standardization and consistency between different rivers and river segments.

Scenery

The upper river corridor includes impressive close-up views of Mt. Hood from the upper river area near Timberline Lodge and views of Mt. Hood and the surrounding area as well as the scenic diversity in the Red Top Meadows and Salmon River Meadows areas. Further downstream, in river segment 2, the river flows through a narrow river canyon with basalt cliffs on both sides of the river as well as a series of six waterfalls in a short three-mile section of the river. The visual diversity provided by these features qualifies scenery as an outstandingly remarkable value in the upper river corridor.

Recreation

The Salmon River provides a wide variety of recreational opportunities along its length, including hiking, sport fishing, nordic and alpine skiing, camping, and highly-developed resort facilities. It is this wide variety of high-quality recreational opportunities that makes recreation an outstandingly remarkable value for the length of the river.

Fisheries

The lower Salmon River provides extremely important and productive anadromous fish spawning and rearing habitat. Rare native anadromous species are found in the river. The river is also a nationally renowned summer steelhead fishery that draws anglers from outside the state of Oregon.

Wildlife

The entire river provides important wildlife habitat in terms of optimal summer and winter range for big game species, and important habitat for federally listed threatened and sensitive species. The uniqueness of the upper meadow complexes and the diversity they provide for wildlife, as well as the diversity of wildlife species found elsewhere along the river make this value outstandingly remarkable.

Hydrology

The presence of six waterfalls in a three-mile segment is a feature of the Salmon River that is not found along many other rivers in the state. These features, as well as the high quality of the water found in the river, make hydrologic values outstandingly remarkable.

Botany/Ecology

The Red Top/Salmon River meadows complex is an area along the Salmon River of great ecological diversity and productivity. This complex contains a wide variety of rare and unique plant communities, including the largest population of one plant, known as *Scheuchzeria*, in the state of Oregon, where its presence is rare. In addition, the number and variety of life zones and plant communities found along the river are unique with regard to other rivers in the area. Because of these, botanical and ecological values were found to be outstandingly remarkable.

Summary of Issues

The National Environmental Policy Act defines issues as "...unresolved conflicts regarding alternative uses of available resources." These can be identified by the public or within the agencies. A considerable number of issues were compiled from consultation with the public and other agencies. Other issues and concerns were identified by the Forest Service and the BLM as management issues.

These issues reflect federal environmental laws and mandates, and land management goals as defined in the Forest Plan. Both sets of issues are summarized in the next section.

Summary of Public Issues

Timber Harvest

The level and type of timber harvest may affect other resource values, including scenery, water quality and wildlife. Harvest on private or county lands needs to be addressed. There is concern that existing controls won't adequately protect the river.

Hydrology and Water Quality

Management activities and private users may affect ground and surface water quality and natural hydrologic function. Water needs of residents need to be considered when setting in-stream flow requirements for other resources.

Recreation Use and Access

Increased recreational use could affect recreational experience, private property owners, fish and wildlife, wilderness, and riparian vegetation. There is a need to look at limiting or expanding access along entire river, to look at conflicts between types of recreationists, and to look at acquiring easements if needed.

Fisheries

Fish habitat and populations could be affected by management activities, recreationists and private land owners. There is a need to protect and enhance endemic stocks of fish, to consider enhancement of habitat along mainstem and tributaries, and to recommend changes in state's fishing regulations to protect native fish.

Law Enforcement

Litter, trespass, and poaching are problems. An increase in public education and/or law enforcement in the corridor is needed.

Wildlife

Management activities and private land practices may affect wildlife populations and habitat. Protection of wildlife values in upper river meadows is needed.

Vegetation

Management activities, grazing and private land uses may decrease populations of threatened, endangered and sensitive plant species. Riparian vegetation is at risk from recreation use.

Grazing

Grazing activities in Salmon River Meadows have the potential to adversely affect important river values.

Summary of Management Goals

Forest Service and BLM management goals are as follows:

- Protect integrity of wilderness areas and associated wilderness values.
- Provide opportunities for a wide range of recreation opportunities along the river corridor.
- Help to reduce conflicts between recreationists and private property owners and reduce trespass on private property.
- Protect and enhance habitat for fish and wildlife species. Protect and enhance the stream channel conditions that provide high-quality fish habitat.
- Maintain and/or enhance the integrated ecological functions of rivers, stream, floodplains, wetlands, and associated riparian areas.
- Emphasize user education and information. Establish as few regulations as possible and ensure that any regulations established are enforceable and enforced.
- Develop a partnership among landowners, county and state governments, and federal agencies in determining the future of the Salmon River and sharing in management responsibilities for the river.
- Seek to restore natural ecological and hydrologic functioning along the river.
- Protect the river's free-flowing character, and protect and enhance its outstandingly remarkable values.
- Protect threatened, endangered, and sensitive species of plants, fish and wildlife found in the corridor.
- Protect and enhance the quality of river water. Maintain acceptable levels of water temperature, suspended sediment, chemicals, and bacteria.
- Strive for a balance of resource use and permit other activities to the extent that they protect and enhance the quality of the river's outstandingly remarkable values.
- Consider the needs of local communities regarding economic development.

How this Document is Organized

Chapter 2 Affected Environment contains a more complete description of the resource values and uses in the designated portion of the Salmon River corridor, as well as a summary of the current plans and policies relevant to the planning mandates discussed in Chapter 1.

Chapter 3 Alternatives contains descriptions of actions that could take place in the corridor, assuming the current management described in Chapter 2 were pursued over the next 10 years. Where current management is not sufficiently specific, or potentially at odds with the planning mandates described in Chapter 1, additions or changes are proposed. These proposals are expressed in terms of "Alternatives," with continuation of current management described as Alternative A - No Action.

Chapter 4 Environmental Consequences includes the evaluation of the effects of the Alternatives described in Chapter 3, on the values and conditions described in Chapter 2.

Chapter 5 Consultation with Others includes a list of persons and agencies consulted.

The Appendices provide support information to the main document and include the resource assessment, public mailing list, glossary, information on the Recreation Opportunity and Wilderness Resource Spectrum, and costs associated with each alternative.

Chapter 2

Affected Environment

Introduction

This chapter describes the character and resources of the designated Salmon River corridor, for one-quarter mile on each side of the river and adjacent lands. The current conditions, as well as any known trends, are described to acquaint readers with the corridor and to provide a basis for assessing the consequences of various alternatives presented in Chapter 3.

The Salmon River is located to the west of the Cascade Range and to the south of the Columbia River Gorge. From its origins on Mt. Hood, the river flows for 33 miles, through the Salmon-Huckleberry Wilderness and through eight miles of mixed BLM, Clackamas County and private lands, to its confluence with the Sandy River at Brightwood. The entire river is designated as a federal Wild and Scenic River.

The Salmon Drainage incorporates portions of two major physiographic zones, the Cascade Mountain range and the Columbia Basin. The headwaters of the Salmon receive ample rainfall and snow with over 100 inches of precipitation a year.

The corridor contains great faunal, floral and topographic diversity, with alpine environments, narrow basalt canyons, and wide floodplains with associated wetlands.

The communities of Brightwood, Zigzag, Wemme, Welches, Rhododendron and Government Camp are situated along or near Highway 26 in the vicinity of the river.

Existing conditions are described first for river resources identified as outstandingly remarkable in the 1990 *Salmon River Resource Assessment*. Key issues or resources identified by the public are then described, followed by four other topics that are not tracked throughout the rest of this document.

Botany/Ecology

The Salmon River flows through a wide variety of life zones from its headwaters to its mouth, ranging from high alpine life zones at its headwaters to westside Douglas-fir forest types along the lower river. Along the way, the river flows through a variety of life zones and plant communities, including a large subalpine meadow complex, important riparian areas, narrow basalt canyons, and old-growth Douglas-fir forests. The number and variety of life zones and plant communities in a relatively short stretch of river are remarkable in comparison with several other rivers in the four-county area.

Plant Communities

The Salmon River begins on the slopes of Mt. Hood as ice melting from the Palmer Glacier. This is a true alpine environment characterized by low-growing plants such as penstemon, lupine and sedge. The river descends rapidly into a deeply incised canyon, cut into unconsolidated volcanic debris and mudflow deposits. The canyon sideslopes here are quite unstable with numerous fresh slides apparent. The river floodplain is narrow with a thin band of riparian vegetation including devil's club, shooting star, lady fern, monkey flower and Sitka alder. Upland plant associations include mountain hemlock with big and Alaska huckleberries, beargrass, queen's cup beadlily, and fool's huckleberry in the understory.

Below Highway 26, the river flows adjacent to Red Top and Salmon River Meadows and numerous smaller meadows downstream. The stream gradient is quite low in this area due to the wide, flat, valley-filling mudflow deposits. These meadows are wet to very wet.

The Salmon River Meadows/Red Top Meadows area is unique ecologically. There are few, if any, other meadow complexes of the size and diversity of plant communities found in that elevation zone throughout the central Cascades. These plant communities include wet sedge meadows with lodgepole "islands," willow thickets, and cranberry/kalmia communities. This diversity makes this area extremely important habitat for a wide variety of fish and wildlife.

Downstream from the meadows the river continues to flow through the mudflow surface, meandering across the wide, tree-covered valley. Upland plants include Pacific silver fir, with Alaska huckleberry and bunchberry dogwood in the understory. Riparian species include Sitka alder, red alder, salmonberry, stinkcurrant, lady fern, streamside dogwood, monkey flower, violets, and several sedges, rushes, and grasses. Numerous small wetlands and seeps are found in the forest near the stream.

Near the Salmon-Huckleberry Wilderness boundary, the river enters a steep-walled canyon carved into hard, basalt bedrock. The upland plant associations are predominantly silver fir and western hemlock types. There are also open grassy knolls found in the corridor above the river, especially in the wild segment of the river. Most of the timbered uplands consist of stands about 100 years old, which regenerated following wildfires.

The lower portions of the river provide excellent opportunities to easily observe old-growth Douglas-fir communities that are along the river, especially in segment 3 along the Old Salmon River Trail #742, and the lower end of segment 2 just upriver of the Salmon River Trailhead by the upper bridge.

There are important small wetland areas along the river in segments 4 and 5, as well as one oxbow that provides important habitat for wildlife species. One of the wetlands (segment 5) is in the Wildwood Recreation Site administered by the Bureau of Land Management (BLM). The BLM is in the process of developing an interpretive trail near this wetland area to provide education on the ecological values of wetlands.

In the lower two segments, plant communities and riparian areas have been heavily impacted, primarily on private land, by the high level of development along the river, reducing the value of the riparian area for wildlife and fish species.

Threatened, Endangered and Sensitive Plants

A population of *Scheuchzeria palustris* var. *americana*, common name Scheuchzeria, is found in the Salmon River Meadows Complex. This population consists of thousands of plants and is the largest known population in Oregon. This plant is on the R-6 Regional Forester's list of sensitive plants and is also listed as threatened by the Oregon Natural Heritage Program. While the plant does have a wide range from Alaska to California, across North America, and in the eastern hemisphere, it is very rare in Oregon.

Another sensitive species, *Corydalis aquae-gelidae* (coldwater corydalis) occurs along and adjacent to portions of the Salmon River, primarily near the confluence of Linney Creek and Salmon River. This plant is on the Regional Forester's list of sensitive plants, is a federal candidate category 2 species and is listed as threatened by the Oregon Natural Heritage Program. The plant may be at other locations along the river, but extensive surveys have not been done to confirm its presence.

Cultural Resources

Prehistoric

Although there is presently no specific archaeological evidence of aboriginal use of the Salmon River Valley, the area may have been visited by people as early as 10,000 years ago. Columbia River occupation has been established to that date near The Dalles (Cressman, 1960). Aboriginal occupation of the Salmon River prior to Euro-American contact was most likely the result of specific seasonal use by small autonomous bands. Anadromous fish may have been harvested from the Salmon River as far upstream as Final Falls. Meadows and subalpine areas would have been used for hunting and for harvesting plants, roots, and berries. There are three such naturally occurring areas along the Salmon River that would have supported a diversity of fauna and flora important for human subsistence:

- Salmon River Meadows
- Red Top Meadows
- the three forks of the Salmon above Red Top Meadows up to Timberline Lodge

A typical scenario in the fall may have included a berry processing camp located on a river terrace, from which some band members departed each day for the berry fields and others left to hunt elk and deer. Still others may have remained in camp to process berries, and to fish for resident trout.

The Salmon River drainage may also have encompassed aboriginal travel corridors and campsites for traveling bands. It is well documented that The Dalles area was an important trading center prior to Euro-American contact and attracted peoples as far away as northern California, Montana, and the Great Basin. One popular trail from the Willamette River to The Dalles was up the Sandy River, over Lolo Pass, skirting the north flank of Mt. Hood and descending down the Hood River. Daniel Lee used this existing trail when he transported cattle from the Methodist mission in the Willamette valley to the newly-established mission in Wascopam (The Dalles) in 1838 (Lee, 1844). Many pioneers subsequently used this trail to drive their livestock across the mountains while floating their other belongings down the Columbia River (Barlow, W., 1912).

Another aboriginal trail may have been located on the south flank of Mt. Hood and was probably the precursor of the historic Barlow Road. It undoubtedly crossed the Salmon River near its headwaters high on Mt. Hood (Palmer, 1847). The lower river area could have supported numerous aboriginal bands as they either traveled across the Cascades or exploited the fishery and other natural resources in the area.

Historic

The first documented Euro-American settler in the area was Daniel Lee. Daniel Lee was the nephew of Jason Lee, a Methodist missionary in the Willamette valley. The Lees established another mission in 1838 at Wascopam (later called The Dalles). In 1838, Daniel Lee traveled to the Willamette mission and returned with 14 head of cattle using an Indian trail across Lolo Pass (Lee, 1844).

Samuel K. Barlow and a party of Oregon Trail pioneers reached The Dalles in 1845 and decided to attempt a crossing of the Cascades south of Mt. Hood rather than float down the Columbia River as was the custom of the time. After an arduous journey to Oregon City on this overland route, Barlow returned in 1846 to improve his route and to establish the Barlow toll road. The toll road was used by many travelers to the Oregon territory and many pioneer journals documented this final segment of the Oregon Trail. The Barlow Road crosses the Salmon River on the south side of Mt. Hood near the present day junction of Highways 26 and 35. The Barlow Road again comes into proximity to the Salmon River near the Sandy

River confluence. A 0.2 mile length of what has been identified as the south alternate route of the Barlow Road lies in the Wildwood Recreation area administered by the Bureau of Land Management. It is listed on the National Register of Historic Places (Banks, 1986). The entire length of the Barlow Road on Forest Service-administered land between the towns of Rhododendron and Tygh Valley has been nominated for listing on the National Register of Historic Places.

Another important historic travel route within the Salmon River corridor is the Oak Grove Wagon Road. This wagon road was built in 1869, providing settlers in the Juniper Flat-Wapinitia area access to the Willamette Valley. It crossed the Salmon River between Red Top Meadows and Salmon River Meadows, skirted the north end of Mud Creek Ridge, and proceeded to Summit Meadows where it joined the Barlow Road.

At the turn of the century, sheep grazing on Forest lands was common. Many of the same huckleberry fields that were carefully maintained by Native Americans also supported herbaceous plants important for grazing. Sheepherders took advantage of this resource using similar ecological practices as the aboriginal Native Americans that preceded them. Archaeological evidence verifies that sheep grazing occurred on the south slopes of Mt. Hood, the Sherar Burn, and Mud Creek Ridge above the Salmon River.

The recreation potential of the Cascades was soon identified as the populations of Portland and the Willamette Valley grew. Early recreationists made their way to Mt. Hood to camp, hunt, and fish. The south side of Mt. Hood was an established climbing route as early as the 1880s. Samuel Welch built his hotel resort on the banks of the Salmon River in 1890.

The Forest Service also recognized the potential for skiing as early as the late 1920s when plans for a proposed ski lodge on the south slope of Mt. Hood were drawn (Griffin, 1978). In conjunction with the Works Progress Administration, the Forest Service began construction of Timberline Lodge in 1936. The Lodge was dedicated by President Franklin D. Roosevelt in 1937. Today it is listed on the National Register of Historic Places as an Historic Landmark. Crossing the Salmon River just east of Timberline Lodge is the historic Timberline Trail, which was built in the 1930s by the Civilian Conservation Corps and completely encircles the mountain. It was constructed to provide recreationists access to the wonders of Mt. Hood's alpine environment.

Increased grazing, logging and mining activities on forest land led to the creation of Forest Reserves to protect these resources from overuse. The Cascade Range Forest Reserve was created in the 1890s, out of which the Mt. Hood National Forest was established in 1924. Management in the early days of the Forest Service focused on fire suppression and overseeing grazing permits. Trails and guard stations were built throughout the Forest. The Skyline Trail was an important early administrative trail located along the crest of the Cascades. The trail crossed the Salmon River near Mud Creek and is still used today as a recreation trail. Guard Stations were built at Salmon River Meadows, near the confluence of Linney Creek and at the present-day location of Green Canyon Campground.

Native American Traditional

No extensive ethnographic study has been undertaken for the Salmon River to date. The locations of traditionally significant sacred sites, subsistence gathering areas, or medicinal plants are unknown.

On a 1990 field trip, elders of the Confederated Tribes of Warm Springs identified the Sherar Burn area on the north slopes of the Salmon River as traditional Native American berry fields. The people maintained the fields by periodically burning off encroaching overstory vegetation.

Elders of the Confederated Tribes of Warm Springs have also identified a traditional campsite on a Salmon River terrace that is now part of the Welches golf course (Walton, 1992). This was a site where Indians returning to the Warm Springs reservation from the hops fields of the Willamette Valley would camp and wait for the huckleberries to ripen. From this point, smaller groups would make their way to the traditional huckleberry fields on Zigzag Mountain and Huckleberry Mountain, in Sherar Burn, and in the Wind Creek Basin.

Although the Salmon River is not within the ceded area as identified in the Treaty With the Tribes of Middle Oregon of 1855, it is within the "usual and accustomed" area for hunting and gathering. The treaty reserves rights to the signers of the treaty to perform traditional subsistence and sacred activities within these usual and accustomed areas.

Rhododendron and Bear-grass

Fisheries

Introduction

Information on fisheries and fish habitat in the Salmon River drainage has been gathered from a variety of sources. Biologists from the Oregon Department of Fish and Wildlife (ODFW), Portland General Electric (PGE), BLM, and Mt. Hood National Forest have contributed substantial data on habitat, native species distribution, and historical abundance, as well as fisheries management in the drainage area. However, most of the data were gathered throughout the upper Sandy River basin above the Marmot Dam (operated by PGE) and therefore are not specific to the Salmon River drainage. Data on exact population numbers, areas of use, and/or population trends within the Salmon River drainage do not exist for many of the species present. The Oregon Natural Heritage database also yielded documentation of sightings and distribution of various species. Local residents and groups have provided information on historical habitat condition and species distribution, as well as habitat changes due to prior land use activities and natural events such as fires and floods.

Several habitat and population surveys were conducted in 1991-92 for selected fish species by the ODFW, BLM and the Forest Service. Annual spawning surveys are being conducted within the drainage to determine the distribution and relative numbers of the native stock of coho salmon, a state and Forest Service listed sensitive species. An inventory of salmonid habitat and habitat use is being completed for the entire drainage in 1992.

The Mt. Hood National Forest uses salmonids (salmon, steelhead, trout, and char) as a management indicator group for aquatic habitats. Because of their value as game fish and their sensitivity to habitat changes and water quality degradation, they have been selected to monitor trends in the streams and lakes of the Mt. Hood National Forest. Although there are other fish species present in the river (sculpins and dace, for example), population trends are not known. Much more information exists on salmonids, making this group a better choice for monitoring aquatic environments.

The Salmon River supports both anadromous (sea-run forms) and resident species of salmonids. Within these species are distinct stocks, some native to the upper Sandy basin and some introduced. The native stocks are unique in that they have adapted to the special conditions found in the Salmon River and the upper Sandy River basin. In general, the populations of native stocks of Sandy Basin salmonids are much reduced from historical levels due to habitat degradation, hydroelectric dam operation, and heavy fishing pressure in the ocean and lower Columbia River. The ODFW has developed a Wild Fish Policy to protect these stocks, which includes winter steelhead, spring chinook and coho salmon. High-quality habitat is critical for maintaining these stocks; the Salmon River is exceptional in the quality and diversity of fish habitat present.

Habitat

The drainage can be divided into two major sections: the lower 14 miles, which is inhabited by anadromous salmonids (salmon and steelhead), and the upper 20 miles, which is inhabited by resident salmonids (trout and char). Final Falls, at river mile 14, prevents upstream migration of anadromous fish.

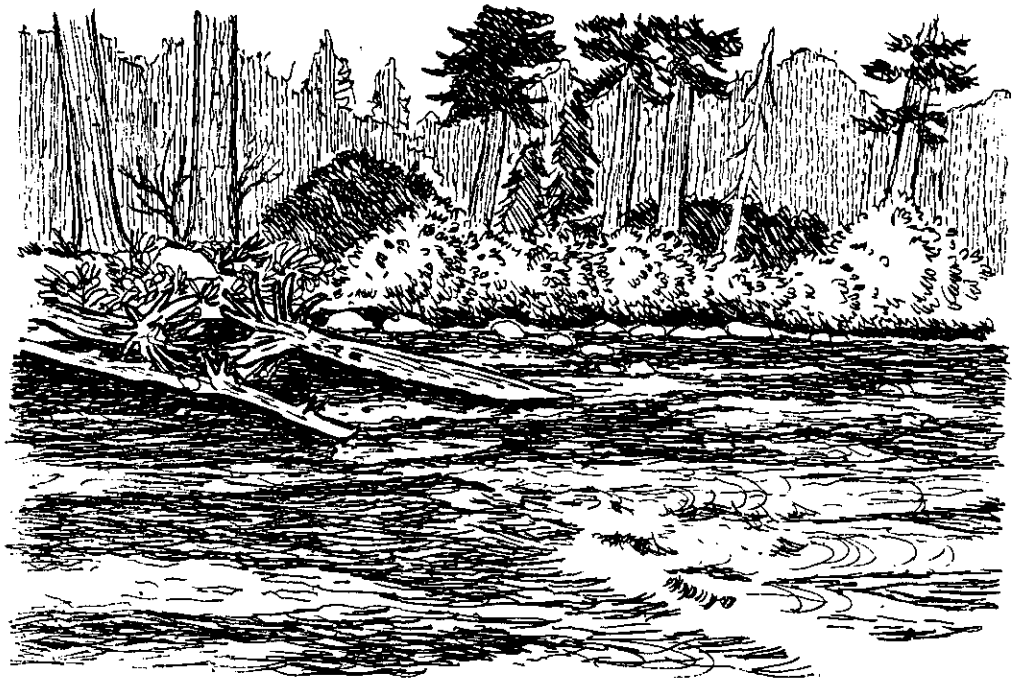
The lower seven miles of the stream basin are in private, county, BLM, and state ownership. This includes tributaries such as Crystal Creek, Lymp Creek, the lower two miles of Boulder Creek, and numerous other small unnamed tributaries. Privately-held stream reaches have experienced a high level of development, typically logging and/or construction of individual homes, condominiums, and resorts. County and state lands are typically used for commercial forestry, with varying degrees of stream protection. The main BLM holding associated with the Salmon River is at Wildwood Park, which was logged several decades ago and is now reforested with a mixed second-growth stand of hardwoods and conifers.

Virtually all of the rest of the Salmon River Basin lies in Mt. Hood National Forest. The drainage is offered a high degree of protection under the Land and Resource Management Plan. Most of the basin is in wilderness or viewsheds. Redtop, Summit and Salmon River Meadows are protected as Key Site Riparian Areas. Less than 10 percent of the basin is in land allocation with timber emphasis (only on minor tributary systems). Fish habitat management objectives call for maintaining habitat capability, monitoring and evaluation of fish stocks to determine limiting factors, and improving habitat, where degraded, to increase fish production.

Habitat conditions for salmonids in the drainage are generally good. Water quality is excellent for the production of salmonids, being usually clear and cool in the summer. (This is a contrast to some of the other large tributaries of the Sandy system which contain large amounts of glacial flour in the summer.) Habitat surveys of the mainstem and tributaries have identified a great diversity of habitat types, ranging from low-gradient, wide, meandering river channels to small, high-gradient, glacier-fed creeks. The typical habitat for the basin is a moderate-sized stream with boulder and rubble substrate, riffle dominated, with frequent large pools present due to the presence of bedrock outcrops, large boulders, or old-growth trees that have fallen into the stream. (This habitat favors the production of trout and steelhead.) Small meandering alpine meadow streams (resident cutthroat and brook trout), large mainstem glides and pools (chinook salmon) and small low-gradient tributaries, wetlands and backwaters (coho salmon) are also well distributed in the drainage.

Fish habitat has been degraded in some areas. Large floods in 1964 and the 1970s scoured the channel and swept much of the large woody material out of the system. Following these floods, the U.S. Army Corps of Engineers, the Forest Service, and other public agencies and private individuals removed any remaining large logs and boulders from the lower mainstem channel, from the mouth up to the confluence with the South Fork of the Salmon. The channel was deepened and straightened throughout this area, cutting off meanders, oxbows and side channels. Substantial habitat was lost, and the diversity and quality of habitat in the lower river was also impacted.

Fish Habitat Logs



On private lands, many small low gradient tributaries and wetlands that were prime habitat for coho salmon have been channelized, drained and filled over the years. There are few remaining examples of the large wetland complexes that used to exist in the Welches area. (One prime example of this excellent coho habitat is in the Wildwood Recreation Site.) Large logs have been removed from the channel and floodplain of the lower mile of Cheeney Creek, and road construction has triggered landslides in some areas. This has also happened to a lesser extent on lower Boulder Creek.

Heavy recreational use along the lower five miles on National Forest land has impacted streambanks and riparian vegetation at several sites. Dispersed campsites have become established at prime fishing areas along the river, contributing to soil compaction, bank erosion, damage to old-growth trees, and loss of vegetation and large woody debris along and in the stream channel.

The Miller Road pit site located on Clackamas County and public (BLM) land is also being degraded by uncontrolled recreational use. Trash dumping, poaching of fish and wildlife, and destruction of riparian trees and vegetation are some of the activities presently occurring.

Initial construction and ongoing maintenance of Highway 26 have also affected the Salmon River and some of its tributaries. Highway culvert crossings of the mainstem and West Fork Salmon River block upstream fish passage. Large cutfaces and fill slopes are generally difficult to revegetate, and erosion of these slopes are a chronic source of sediment in streams. The large cutslopes above Salmon River meadows are a graphic example, with ditchlines flowing into Ghost Creek and into the heart of the main meadow area. Maintenance of the ditchlines periodically undercuts the slopes and contributes to slope instability. During winter periods, sand is spread on the highway by State Highway Division maintenance crews to improve traction. Some of this material is recovered in the spring, but most of the sand and silt is washed off the highway surface by rain and snow-melt, or is thrown off the surface during snow plowing. Large quantities of sediment annually wash into the stream channels at road crossings or where the road parallels the stream or associated wetlands. This situation is most noticeable at the crossing of the East Fork and along the mainstem below Red Top Meadow, but is also present at the West Fork and mainstem crossings near the Highway 35 junction.

Only one impoundment, Marmot Dam (operated by PGE), is located between the Salmon River and the Pacific Ocean. This dam, located on the central reaches of the Sandy River, is equipped with a fish ladder for returning adults and with screens to aid the downstream migration of smolts. These facilities were improved in 1983; both downstream and upstream passage conditions are considered good at this time. PGE inventories fish runs to the upper Sandy basin by using a system that photographs each fish entering the fishway.

Fish habitat improvement projects have been implemented in the South Fork of the Salmon by the Forest Service. These projects include providing fish passage at a waterfall and placing large boulders and logs to develop additional spawning areas and hiding cover. The projects are intended to improve the quality of the spawning and rearing habitat for coho and spring chinook salmon, as well as winter steelhead and resident trout. Abundant opportunities exist for further rehabilitation of habitat on the lower mainstem and the tributaries in this area (especially Cheeney, Boulder, and the unnamed tributaries at Mt. Hood R.V. Village and the Resort at the Mountain golf course). Pool creation and restoration of side channels are some of the opportunities identified. The Mt. Hood Land and Resource Management Plan identifies rehabilitation work on Boulder, South Fork, and Cheeney Creeks that is planned for implementation from 1995 to 2000.

Although much of the lower river can be reached from paved roads and major trails, there is no access available for persons with disabilities. There are few accessible sites for salmon/steelhead angling within the entire Sandy basin. Many opportunities exist to create high-quality fishing sites that are fully accessible to all anglers, notably along the Salmon River road on National Forest land and at the Clackamas County/BLM pit site.

Fish Stocks

The Salmon River and its tributaries below the falls are very important for its anadromous fishery value. The river is nationally renowned for its summer steelhead fishery and anglers come from outside Oregon to fish along the river. This section of the river also contains winter steelhead, coho salmon, spring chinook salmon, cutthroat and rainbow trout, as well as nongame fish. Above the falls, the river contains cutthroat, rainbow and brook trout (sculpin are the dominant nongame species.) Some of these salmonid stocks are native to the upper Sandy River, while others have been introduced and are naturally sustaining through wild reproduction. Still other stocks are regularly supplemented with hatchery-reared stock released by ODFW to improve recreational fisheries on the Salmon and Sandy Rivers.

Little information is available on actual fish numbers in the Salmon drainage; salmon and steelhead counts passing Marmot Dam are presented to give a point of reference. Information is also presented from ODFW's *Sandy River Subbasin Salmon and Steelhead Plan*, 1990; and PGE's *Hydroelectric Development and Fisheries Resources on the Clackamas, Sandy and Deschutes Rivers*, 1989. It is assumed that most of the returning summer steelhead and spring chinook are bound for the Salmon River, and that a significant portion of the other anadromous runs also originates there.

Summer Steelhead

Summer steelhead were introduced to the Sandy basin in 1975, from eggs obtained from the Skamania Hatchery on the Washougal River in southwest Washington. The stock has been planted in Still Creek, and Zigzag and Salmon Rivers. The introduction of this stock has created a very popular and successful fishery throughout the lower Sandy mainstem and into the Salmon River. Average adult return to the upper Sandy has averaged 3,200 fish since introduction of the stock, with a peak in 1987 of 5,395 fish. Most of these fish return to the Salmon River. The stock was introduced to the basin with the assumption that there would be little to no success in natural reproduction and no negative interactions with the native winter steelhead.

The run has been maintained with annual smolt outplanting in the Salmon and other upper Sandy tributaries (averaging 70,000 for the upper Sandy). The smolts are adipose fin-clipped as a fishery management tool and to allow evaluation of the hatchery stock. Increasing annual returns of non-fin-clipped summer run steelhead have indicated that there is successful reproduction of this stock and that it may be establishing a natural spawning population in the Salmon River. Whether there is any interaction between juveniles of this stock with the native stock is unknown. The ODFW has called for an evaluation of the success of summer steelhead reproduction and its impacts.

Winter Steelhead

The existing stock of winter steelhead of the Salmon River and upper Sandy basin is primarily derived from native upper Sandy late-run stocks. Prior to 1964, early-run Clackamas stocks (Big and Eagle Creek stocks) were released throughout the upper Sandy basin. More recently, stocking was limited to below Sleepy Hollow bridge (below the confluence of the Salmon and Sandy Rivers). Since 1989, no hatchery stocking of winter steelhead has occurred above Marmot Dam. The native stock returns to the river from December to March, and spawns from March through May. (Due to later spawning periods, fry of this stock emerge later than summer run stock, and may be at a disadvantage because of the age/size difference between the two stocks.) Adult returns to the upper basin have been fairly stable, averaging around 3,000 fish for the past 30 years. This stock significantly contributes to one of the most popular and successful steelhead fisheries in Oregon.

Spring Chinook

The spring chinook salmon population of the upper Sandy basin is composed of two stocks, a native early-run and the later-run Willamette stock, which has been planted in the Sandy since the mid-1970s. The native run, historically abundant, has been decimated by a number of factors: by early hatchery egg-taking operations (the first hatchery in Oregon was located near the mouth of the Salmon River, operating from 1898 to 1912), by high harvest levels in commercial and recreational fisheries, and most significantly by early operations at Marmot Dam. Water withdrawal from the Sandy River, starting in 1912, dewatered long reaches of the river until 1974. The diversion canal was unscreened until 1951, and much of the smolt production was diverted into and killed by the turbines of the Bull Run power generating facilities during this period.

The native run is presently very small and and it is unknown whether are not sure the run still exists. The stock is listed as possibly extinct in the recent evaluation of the Pacific coast salmon and steelhead stocks published by the American Fisheries Society (Nehlsen, Williams, and Lichatowich, 1991). Less than 100 fish a year returned over Marmot Dam during most of the period from 1955 to 1970. Both salmon and steelhead were trapped below Marmot Dam from 1913 to 1955 (no fish were allowed above the dam from 1938-1952). Runs in the lower Sandy River were supplemented with Willamette, McKenzie, and Columbia River stock during this time period.

Hatchery stock returns have gradually increased with returns over Marmot Dam ranging from 700 to 1,500 fish since 1986. The Salmon River run is annually supplemented with smolt introductions. In the upper Sandy basin, the hatchery smolts are unmarked, so it is impossible to determine the hatchery and natural production contributions. Hatchery introductions have increased over this period. However, spawning surveys on Still Creek and Salmon River suggest an increase in spawning in the upper basin correlated with increased escapement, and smolt trapping on Still Creek has documented large numbers of naturally produced fry and smolts from that system. It appears that natural production is increasing and contributing significantly to the increased run size. What effect the increased production of the hatchery derived stock has on any remnant native run is unknown, but the potential for interbreeding and hybridization is very high due to overlap of spawning periods in September.

Coho

The coho salmon run is also composed of two stocks: a native late-spawning stock (November to February) and an early spawning hatchery stock (September to November) derived from mid-basin Sandy River fish (Cedar Creek). The late-run stock is listed by the State of Oregon and the Forest Service as a sensitive species. It is listed as high risk of extinction in the AFS stock evaluation. It appears that habitat degradation, overfishing in a mixed-stock fishery with the more numerous hatchery stocks, and competition/hybridization with outplanted hatchery stocks have contributed to coho decline. At times, ocean-rearing conditions are also impacted by El Nino, with poor upwelling and warm temperatures; this condition appears to affect coho disproportionately, due to their southerly ocean migration pattern and short residence period in the ocean. This stock is at critically low levels, with very few counted at Marmot Dam in recent years. (ODFW average index spawning counts for this stock have declined from 22.8 fish/mile in the 1960s to about 3 fish/mile in the 1980s.)

The early spawning stock was outplanted from Cedar Creek Hatchery (Sandy River basin) in the 1980s as adults, pre-smolts and smolts in the upper Sandy basin to supplement declining native coho stocks. Although it appears that coho pre-smolt supplementation has been largely ineffective, there seems to have been some success in increasing escapement to the upper basin with this stock. Unfortunately, as with spring chinook, the fish are not marked and the relative contribution of hatchery-raised fish, naturally produced early-run and native late-run fish to the upper basin escapement is unknown. Counts at the dam have increased from 283 in 1977 to about 1,500 in 1985 to 1987. Virtually all stocking of coho has been limited to below Marmot Dam since 1990.

Cutthroat Trout

The cutthroat trout population in the Salmon River drainage is composed of at least two native stocks: an anadromous (sea-run) form that is likely present in the lower 14 miles of mainstem and associated tributaries (below impassable barriers); and a resident stock that is present throughout the drainage, particularly above barriers such as Final Falls or the falls on the South Fork of the Salmon.

The sea-run stock is currently listed as a sensitive species by the state of Oregon. It is classified as coastal cutthroat by the ODFW, and populations have been in severe decline throughout its range. The AFS report lists the stock as in moderate danger of extinction. Most of the sea-run production has been in the lower Sandy basin, but there has been a run of these fish into the upper basin. High-quality cutthroat habitat present in the Salmon River and its tributaries indicates the drainage may be one of the more important production areas for this fish.

Historically the sea-run stock appears to have been present in the Salmon drainage in significant numbers; there are numerous reports by anglers of large cutthroat caught in the Salmon River until recently. However, adult fish returns passing Marmot Dam have plummeted; very few are observed above the dam. Whether these fish spawn in Salmon River is unknown. Cutthroat smelts continue to be observed in the downstream fish trap at Marmot Dam in diminishing numbers. It appears that degradation of habitat in the Sandy Basin and operation of the diversion at Marmot Dam (causing low river flows and diverting smelts into the unscreened canal) have historically contributed to this stock's decline. The fish are also relatively easy to catch and the adult fish are prized by anglers. The few remaining fish present may be "fished out" in the heavy recreational fishing on the Salmon.

The resident form is well-distributed throughout the drainage, but several factors may be limiting its numbers in some areas. It, too, is easily caught, and areas near roads and development may be literally "fished out" in a short period of time. It does not compete well for food and space with some other salmonid stocks and may be displaced from its habitat; this appears to be the case with introduced Eastern brook trout in Mud Creek and in the mainstem in the Salmon River meadows area. Cutthroat also readily hybridize with rainbow trout; this probably happened in areas accessible to anadromous fish where both species were naturally present. The introduction of hatchery strains of rainbow trout to Trillium Lake (along with brook trout) allowed their spread into Mud Creek, Salmon River mainstem and other tributaries. Where they are present, hybridization with cutthroat has likely occurred. For these reasons, the refuge habitat provided in remote drainages above migration barriers is especially important for sustaining this stock of fish.

Rainbow Trout

Rainbow trout are also present above and below Final Falls. Rainbow were present historically below the falls in both resident and anadromous (steelhead) forms. It is likely that they were not present above the falls prior to stocking programs. Rainbow trout from several sources have been used by hatcheries to develop stock for outplanting into the upper Sandy basin. Due to excellent access, attractive environment, nearby campgrounds, and excellent fishing, the lower Salmon River and Trillium Lake have attracted heavy use by anglers.

Resident trout populations were likely heavily impacted by intensive fishing decades ago. For this reason, the ODFW has supplemented trout populations with catchable-size fish at several points on the river and at Trillium Lake (currently, catchable rainbow are only released at three sites on the Salmon River, near Green Canyon Campground, and Wildwood Park). This practice has become a regular program, and many people fish specifically for these stocked fish. It appears that if these stocked fish are not quickly harvested, they do not usually survive through the following winter. Although the majority of these fish are harvested, a few of these fish may successfully overwinter. These fish compete with resident and juvenile anadromous fish for food and space, and there is a small possibility of interbreeding with native stocks, changing the genetic make-up of the populations. This does not appear to be a significant problem at this time.

Other Stocks of Interest

The bull trout is a candidate for federal threatened or endangered species listing and is listed as a sensitive species by the state of Oregon and the Forest Service. There are historic reports of bull trout in the Salmon River drainage, but their presence has not been confirmed. Suitable habitat and isolation exist to support this species in Salmon River tributaries such as Mack Hall Creek, South Fork, and Cheeney, Copper, and Wolf Creeks.

Lower Columbia River fall chinook salmon are listed by the state of Oregon as sensitive species and are identified at high risk of extinction by the AFS report. This stock was apparently present in the Salmon River until Marmot Dam was constructed. The fish were not able to adapt to pressures from egg-take for hatcheries, intensive fisheries, and the extended periods of low mainstem flows, poor upstream passage conditions and high smolt mortality that were imposed by dam operations from 1912 through 1951 and later. The fish are now found only in the lower reaches of the Sandy River. There are two stocks present there: an early spawning hatchery-derived "tule" stock, and the native late-spawning "bright" stock (the stock referred to in the AFS text).

Eastern brook trout are present in the upper Salmon River drainage in Mud Creek and upstream through the Salmon River meadows complex. This introduced char is likely descended from hatchery stocks used for supplementing the fishery in Trillium Lake. Habitat in the streams of this area is optimum for this species, with cool stream temperatures, braided low-gradient meandering channels and high levels of cover provided by overhanging and emergent vegetation. These fish are successful competitors for food and space, and have likely displaced the native cutthroat from significant areas of former habitat.

Stock Management

Anadromous fish stocks in the Salmon River are managed under guidelines established in the ODFW *Sandy River Subbasin Salmon and Steelhead Plan* (1990). The plan outlines a strategy for protection of native populations of salmon and steelhead, while continuing to provide for a high level of consumptive recreational fishing that has been present on the Sandy. Fisheries management is also guided by the Northwest Power Planning Council's (NWPPC) Program and their subbasin plan for the Sandy River. Forest Service management activities are conducted in accord with the *Columbia River Basin Anadromous Fish Habitat management Policy and Implementation Guide* (PIG) and the *Salmon Summit Agreement* (SSA).

To comply with the ODFW Wild Fish Management Policy, stocking of coho and winter steelhead has been eliminated from the upper Sandy Basin. (Stocking of summer steelhead, spring chinook, and catchable trout still occurs in the Salmon drainage.)

Several fishing regulations have also been introduced for the Sandy and Salmon Rivers to encourage natural reproduction and protect emigrating smolts, including:

- Fly fishing only on the mainstem reach from the Forest Service Road 2618 bridge upstream to Final Falls.
- A late opening date for trout season.
- Catch and release of wild unmarked steelhead (barbless hook regulations).
- Seasonal closures for protection of native salmon and steelhead returning adults.

There is still some public concern that overly high levels of harvest of smolts and sea-run cutthroat may be occurring, and that competition and/or interbreeding may result. Similar concern exists for resident cutthroat in the upper drainage.

Future objectives of the subbasin plan for spawning escapement in the upper Sandy basin (above Marmot Dam) are summarized below.

Species	Existing Escapement	Future Escapement Goal
Coho (early + late)	1,400 fish (1987)	1,300 fish
Winter steelhead	3,000 fish (1990)	4,500 fish
Summer steelhead	0	0
Spring chinook	1,500 fish (1987)	2,500 fish

Strategies proposed in the plan to achieve increases in escapement include improved juvenile bypass facilities at Marmot Dam, habitat improvement in the upper Sandy basin, and changing hatchery practices and releases.

Usual methods for population management of resident game fish include stocking programs coupled with fishing regulations (and in some cases, public access management.) For instance, the winter trout season was closed years ago by ODFW to protect sea-run cutthroat. Besides the stocking practices and fishing regulations mentioned previously, an eight-inch minimum size limit and a five fish daily limit are currently in effect for trout on streams in the Salmon River drainage.

Resident populations appear stable under current conditions of access and stocking, although anecdotal evidence suggests that cutthroat populations have diminished in some areas due to overfishing and species competition. Increasing public access to remote stream reaches without special regulations for protecting native populations may exacerbate this trend. Currently, there are no regulations in effect specifically for the protection of sea-run cutthroat, which is probably harvested indiscriminately in the resident trout fishery in both juvenile and adult forms. These fish are afforded some protection by late opening of trout seasons, five fish bag and eight-inch minimum size limits.

Hydrology, Water Quality and Quantity

Originating from Palmer glacier on the south face of Mt. Hood (elevation 11,345), the Salmon River evolves from a high-gradient, high-energy stream at its headwaters, to a moderate-gradient, meandering river in its lower reaches (Figure 2.1). From its origin, the river carves a 35-mile arc, flowing south from Mount Hood and eventually turning north and entering the Sandy River near the town of Brightwood. Overall average stream gradient for the Salmon's entire length is three percent or 154 feet per river mile. Major tributaries to the Salmon River include the West Fork Salmon River, Ghost Creek, Mud Creek, Linney Creek, Copper Creek, South Fork Salmon River, Cheeney Creek, and Boulder Creek. The Salmon River has no water impoundments and is considered free-flowing throughout its length. The Salmon River Watershed encompasses approximately 116 square miles or 74,240 acres.

Varying geology and topography in the Salmon River drainage system have produced hydraulic features such as waterfalls, wetland meadows, and oxbow river channels in places along the stream course. A complex of wetland meadows called Red Top Meadows is located in segment 1, downstream from the Highway 26 river crossing. These meadows appear to have a substantial affect on the water quality and flow in the upper portion of the Salmon River. The stream and several tributaries meander slowly through these meadows, allowing sediments to settle out of the water. An intricate cycling of organic matter adds nutrients to the stream, influencing stream productivity. The meadows may also act as a "sink," where water is detained and slowly released to the stream as base flow. The overall contribution to the drainage as a whole is not known; however, the meadows are believed to be valuable in maintaining favorable flow conditions.

The lower section of segment 2 contains a series of six waterfalls ranging in height from 15 to 75 feet occurring within a three-mile stretch of river. (See the Geology section for more information on these waterfalls). A widening of the river valley and lower stream gradients in segments 3 and 4 have allowed the river to meander over many years forming bends and eventually cutting them off to form oxbows. These lower segments also contain several small adjacent wetland areas. Some stretches of river below the Forest Service boundary have been channelized and straightened for flood control, limiting further meandering.

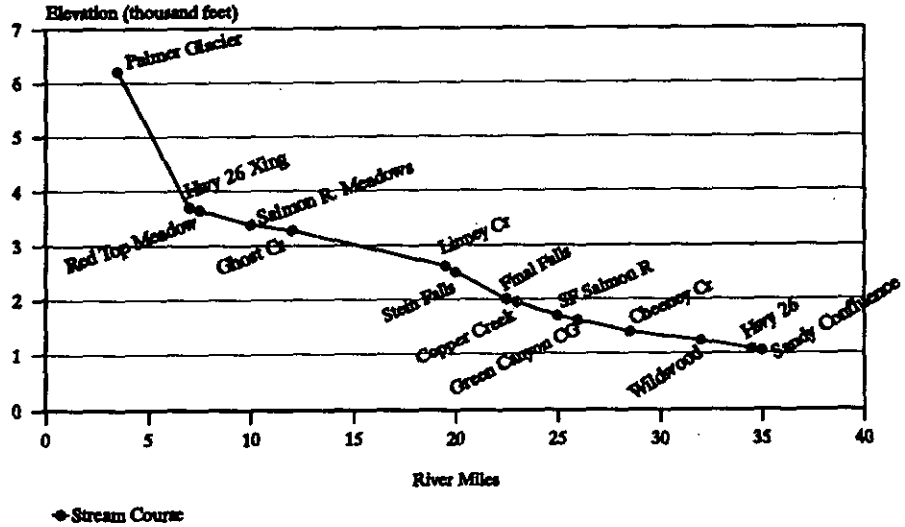
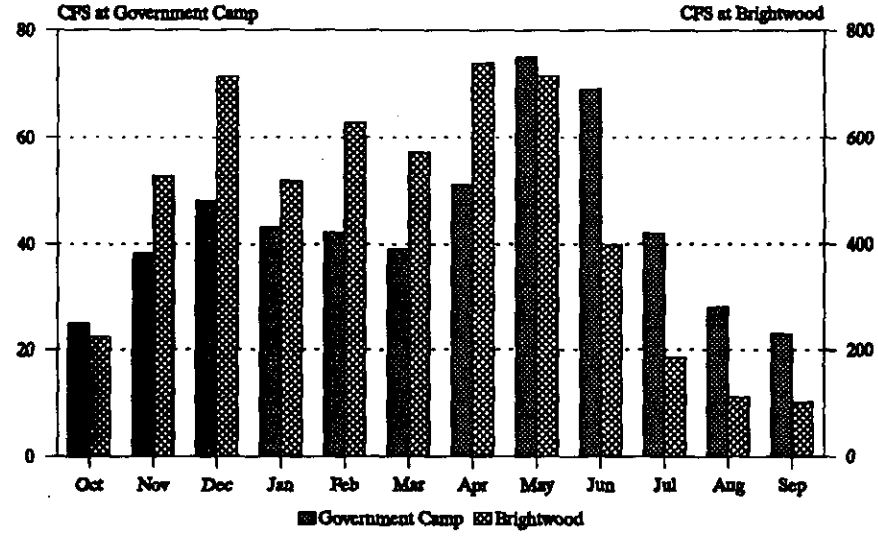


Figure 2.1 Salmon Wild and Scenic River Profile

Annual precipitation in the Salmon River Watershed ranges from about 110 inches at the source to about 75 inches near the mouth, with the greatest precipitation occurring from November to January, and the least occurring in July and August. Mt. Hood sustains a snowpack year round in its highest elevations, which directly affects stream discharge in the Salmon River by providing water storage over the winter and supplementing flows in the summer (Figure 2.2). Average daily discharges measured near Government Camp in segment 1 for the years 1910 to 1987 range from a low of 24 cfs in September to a high of 75 cfs in May. Average daily discharges measured at a station in segment 4 above Boulder Creek near Brightwood, for the period of 1936 to 1952, range from a low of 103 cfs in September to a high of 738 cfs in April. The data illustrate that average discharges are influenced substantially by rates of snow accumulation and snowmelt within the watershed.

In the upper watershed, near Government Camp, average daily discharges gradually increase during the months of October through December. The average daily discharges level out or decrease slightly during the colder months of January and February, reflecting periods of snow accumulation, then increase to maximum levels from March through June, peaking towards the end of May or early June as a result of spring snowmelt. A similar pattern of stream discharge is observed in the data measured at Brightwood. However, there is much more variability in the flows, reflecting the dominance of rainfall and transient snow in much of the lower elevation portions of the watershed. The peak spring runoff also occurs about one month earlier, due to earlier loss of snowpack in the lower elevations.

Figure 2.2 Stream Discharge in the Salmon River



Average or mean discharge figures, by themselves, may be misleading. Major peak discharges associated with rain or snow events are dramatically illustrated in the streamflow records for both the Government Camp and Brightwood stations. Peak flows of 1,300 cfs and 11,700 cfs have been recorded during the month of December at the Government Camp and Brightwood stations, respectively. Similar peaks have occurred with regularity over the periods of record, primarily during the months of November through February. These peak flows have the potential to dramatically affect stream channel characteristics, aquatic habitat, and riparian features. Overall, the Salmon River appears to have coped well with these peak flows. Channel stability characteristics, aquatic habitat, and riparian conditions are judged to be among the best on the Forest, based on observation by agency hydrologists.

Low flows may affect water availability and the aquatic ecosystem during unusually dry years. For the period of record at the Government Camp station, extreme low flows of 10 cfs in were recorded in late November, while low flows of 59 cfs were recorded at the Brightwood station in September, November, and December.

All waters within Oregon are publicly owned and controlled by the state, in accordance with state laws. With few exceptions, a permit from Oregon Water Resources Department (WRD) must be obtained to claim rights to surface water or groundwater. This includes both the instream uses and diversions of surface waters. State laws recognize prior appropriation as the basis for water right allocation. During periods of water shortage, the permittee with the oldest water right has priority over junior claims. In addition, a water right can be attached to the land where the permit was established, and transferred to subsequent owners. An established water right can be canceled by the state after five consecutive years of nonuse.

Table 2.1 Water Use Summary for the Salmon River Basin

	Domestic	Agriculture	Recreation	Industrial	Municipal	Fish
CFS[1]	8.4	2.39	0.13	0.17	25.0	2.10
AFT[2]	0.00	0.70	0.00	0.00	0.00	453.0

[1] Cubic feet per second (total 38.14)
[2] Acre feet (total 453.7)
Source: Oregon Water Resources Department, Water Resources Information System (WRIS)

The Oregon Department of Environmental Quality (ODEQ) has divided the state into 19 subbasins and developed water quality criteria for each. The criteria encompass physical and chemical characteristics including: pH, water temperature, dissolved oxygen, fecal coliforms, turbidity, and other parameters. There is a lack of water quality information about the Salmon River at this time, and work is being done by BLM and the Forest Service to develop baseline data for the river segments. The ODEQ publication *1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution* lists the Salmon River as moderately high water quality impacted by observation for turbidity, nutrients, sediment, erosion, and insufficient stream structure. The term "by observation" denotes a lack of actual data, the rating based on professional observation.

Concern has been raised regarding timber harvest in the Linney Creek drainage and subsequent impacts to water quality on the Salmon River, although no data exist. It is thought that the tributaries to the river within the Salmon-Huckleberry wilderness help regulate water quality, since most originate in and flow through undisturbed areas. Water quality in these tributaries appears to be very good based on the limited information available. Agriculture and forestry practices, recreation, and urban developments within the watershed affect water quality in the Salmon River by contributing nonpoint source pollution and runoff. As development within the basin increases, baseline water quality data tied to a continuing monitoring program will be vital in protecting Salmon River water quality.

Recreation

National Forest Lands

The river and adjacent area provide a wide variety of recreational opportunities throughout its length. These activities range from more primitive types of recreation such as hiking, fishing, and backpacking, to those that take place at highly-developed resort facilities such as skiing and golfing.

The river corridor itself contains four classes of the Recreation Opportunity Spectrum (ROS). The area where the river is actually within the Salmon-Huckleberry Wilderness is within the the semi-primitive non-motorized opportunity class. It is here where the most primitive recreation opportunities are found. Most of the river corridor is within the roaded natural opportunity class. The rural opportunity class is found along the river on the upper portion of the river in the Wapinitia residential area to the north of Salmon River Meadows and also along portions of the lower river where many individual residences are found. Timberline Lodge and the community of Welches is where the urban opportunity class is found.

Within the wilderness itself, parts of the river corridor and Salmon River Trail #742 are contained within the three classes of Wilderness Resource Spectrum (WRS) found on the Forest. The WRS classification applies specifically to wilderness management and takes precedence over the ROS system. The WRS classification system should not be confused with the ROS classification system. A summary of both the ROS and WRS classification systems can be found in the Appendix.

Under the WRS classification system, the majority of the river in the wilderness is found within the primitive trailed classification. It is this area that provides the most primitive recreational opportunities within the wilderness. Below that, for approximately 1.5 miles, the river is within the semi-primitive trailed classification. The last mile of river within the wilderness is contained within the transition classification and it is here that wilderness users can expect the greatest level of recreational use within the wilderness. Most recreational use takes place along the Salmon River Trail itself. In those locations where the trail is away from the river, actual use on the river is much lower.

Fishing and Hunting

The river is very well known by anglers as a prime anadromous fishery in the lower portion of the river below Final Falls. Fishing use is heavy at many locations, which sometimes results in conflicts between private landowners and anglers. Fishing is restricted to fly fishing only above the bridge on the Salmon River Road #2618 to Final Falls in order to improve the quality of the fishing experience, and add diversity to fishing in the general area. This restriction improves survival of juvenile anadromous fish and resident trout that are caught and released. It also helps protect adult spring chinook, since few of these fish are caught with fly fishing gear. The upper portion of the river above the series of waterfalls receives low to moderate fishing use for resident species.

Some hunting occurs in the river corridor, primarily in the upper one-third of the river. Hunting use is estimated to be light.

Skiing

Recreation facilities found along the river are highly varied. Timberline Lodge is a year-round ski area and resort located adjacent to the river within the National Forest. This resort draws recreationists from around the Pacific Northwest and throughout North America. Timberline Lodge and ski area annually attracts over 1,000,000 nonskiing visitors in addition to an estimated 200,000 alpine and nordic skiers (based on Forest Service use estimates). At Timberline, portions of the ski area and ski runs are within the interim river corridor. There is the potential to expand ski runs to provide new advanced skiing opportunities. There is also a

limited amount of nordic skiing taking place in the lower end of segment 1 and the upper end of segment 2. There is a high potential for new nordic ski trails and sno-parks to be developed in this portion of the corridor, depending on direction provided in this plan and on demand for such opportunities.

Camping

Green Canyon Campground is the only publicly-owned developed campground located on the river. This 15-unit campground is quite popular because of its proximity to the river and the presence of several large old-growth trees located throughout the campground. The water system for the campground does not meet the new drinking water quality standards at this time, although development of a new system is being considered. Until a new water system is in place, campers will be allowed to camp free of charge although no garbage service or water will be provided. A picnic area that is part of the campground could potentially provide space for more campsites if an adequate water supply is developed.

Other areas along the lower river within the Forest boundary as well as an area to the north of the Highway 26 and 35 junction could provide suitable locations for new developed campgrounds if the need were identified.

Dispersed Camping

River Access and Trails

Salmon River trail #742, a National Recreation Trail, parallels the river for most of segment 2 and all of segment 3. Most of the 17.5 miles of this trail is in the interim river corridor. This trail receives moderate use on the upper end of the river above the dispersed camping area known as Rolling Riffle. This area is immediately adjacent to the trail and is approximately two miles upriver from the trailhead where the Salmon River Road crosses the Salmon River. Below Rolling Riffle, the trail receives heavy use by hikers and anglers alike because of easy access and the fact that the trail is within site of the river most of its length making hiking along the trail more enjoyable. The portion of the trail that parallels the Salmon River Road is known as the Old Salmon River Trail and it is this section of the trail that receives the heaviest use. No sanitation or garbage facilities are located by any of the dispersed campsites, and litter and sanitation are problems during peak periods.

There are numerous dispersed campsites along the trail, primarily at the lower end, that are popular with anglers and other recreationists. Some of the areas along the trail have a high concentration of sites in one location, such as the area known as Rolling Riffle and the area around the bridge where the Salmon River Road 2618 crosses the river at the upper end of segment 3. Several of the sites are located right next to the river, with associated damage such as soil compaction, lack of vegetation, and bank erosion. Another dispersed camping area that is heavily impacted is at the junction of the trail from Linney Creek campground with the Salmon River Trail in segment 2 of the river. This area also has problems with compaction and lack of adequate vegetation within the riparian zone of the river.

Several trails enter the corridor and tie into the Salmon River trail. In addition, Boulder Ridge Trail #783, Bonanza Trail #786, and Salmon Butte Trail #791 all provide linkages between the Salmon River and the Roaring River drainages. The Bonanza Trail is closed to public access at this time because of private land issues along the river. Access has not yet been developed to reopen this trail. Alternative ways to develop access to this trail are being investigated.

Opportunities exist for reopening abandoned trails or developing additional new trails, including loop trails, along the south and east sides of the river in segments 2 and 3.

The Pacific Crest National Scenic Trail crosses the river near its headwaters and receives very heavy day use from the Timberline Lodge area. Use is low on the Jackpot Meadows Trail #492, which crosses the corridor in segment 2. This trail is part of the historic Skyline Trail.

Wilderness

The river flows through the Salmon-Huckleberry Wilderness for approximately seven miles, providing hikers and campers with the opportunity for a primitive recreation experience. The pristine character of this section of river provides a contrast to higher development levels above and below the wild segment of the river. In segment 3 of the river, the west bank of the river is also the wilderness boundary and this "recreational" segment is surrounded by wilderness to the east and west.

Boating Use

The river receives light use by kayakers and drift boaters. There is some drift boat use by anglers on the lower reaches of the river. From Green Canyon Campground to the mouth, there is also light use of the river by kayakers, estimated to be approximately 50 person/days per year. This use is primarily by expert kayakers during high water flows when the river offers a challenging experience.

Recreation Trends, Use Levels and Conflicts

The lower three segments of the river, as well as a portion of the upper segment, are within a one to two hour drive from the Portland metropolitan area, the most heavily populated portion of the State of Oregon. State Highway 26, part of the Mt. Hood Loop, crosses the river in segments 1 and 5. This highway and the many roads that tie into the highway provide easy access to the river. Due to easy access and the fact that the river provides such a variety of recreation opportunities, recreation demand is high along the Salmon River. In addition, recreation use is projected to increase in the future due to increasing populations in the Portland metropolitan area. In segments 4 and 5, there is much private land along the river and trespass by anglers and other recreationists is common. Litter is also a big problem at many public access points, especially where garbage cans are not available.

BLM, County, and Private Lands

The lower Salmon River corridor below the USFS boundary (recreational designated segment) provides a wide range of recreation opportunities. The portion of the Salmon River within the heavily visited Mt. Hood Corridor offers recreational opportunities ranging from semi-primitive nonmotorized to roaded natural and developed recreation opportunities. The lower river area is easily accessible from Highway 26 and is within an hour's drive of the Portland metropolitan area. For most of the lower eight miles, the corridor's recreational setting is characterized by a mostly natural appearing environment with slight to moderate evidence of the sights and sounds of people. Residential development is evident, but generally harmonizes with the natural environment. Concentration of recreationists is low to moderate, with a few facilities and areas provided for concentrated or large group use. There are equal opportunities to interact with other recreationists or to commune with nature. Opportunities for challenging and risky activities are limited except for whitewater kayaking during high flow periods. Opportunities for nonmotorized boating are present but limited. No motorized boating opportunities exist.

The lower river is well known for its anadromous sport fishery, especially for steelhead. The majority of recreation activities are day use in nature, including bank fishing, picnicking, driving for pleasure, swimming, nature study, kayaking, golfing, biking, and hiking. Overnight camping opportunities exist at only one location below the National Forest boundary, a large private campground complex called Mt. Hood R.V. Village. Organized sports and developed recreation activities are available at Wildwood Recreation Site and the private resorts.

Camping

Green Canyon Campground provides primitive facilities with opportunities for tent camping, solitude, and privacy. Mt. Hood R.V. Village offers a full range of amenities including facilities for recreational vehicle camping.

Day Use

The BLM operates the 480-acre Wildwood Recreation Site. The site provides day use recreation facilities including nature trails, picnic areas, a bridge (access to the Salmon-Huckleberry Wilderness trail system) and two large group picnic shelters with adjacent playgrounds and ballfields. Private recreation opportunities exist at two locations. Mt. Hood R.V. Village offers overnight camping hookups along with extensive recreation facilities including a swimming pool, trails, visitor information center, and meeting rooms. Part of the Resort at the Mountain recreation complex lies within the interim wild and scenic river boundary and includes several golf courses.

River Access and Trails

Off the Mt. Hood National Forest, public river access is available only at Wildwood and several bridge crossing right-of-ways. However, anglers and others have used private lands with and without permission of the landowners, especially the Miller Road quarry area. No public trails exist along the river with the exception of those at Wildwood Recreation Site.

Recreation Management

Oregon State Police Game Officers occasionally patrol the lower river area. The BLM employs one full-time park ranger and two to four seasonal rangers to operate and maintain Wildwood Recreation Site. Forest Service personnel do not patrol the river below the Forest boundary. A cooperative visitor information center is operated out of the Mt. Hood R,V. Village complex. No interpretive materials are available for the lower Salmon River. No interpretive or informational signing other than that provided by Oregon Department of Transportation along Highway 26 exists within the lower river corridor.

Recreation Trends, Use Levels, and Conflicts

The entire Mt. Hood corridor is witnessing a steady and increasing demand for recreation opportunities and facilities. Based on recreation use estimates and trends at the Wildwood Recreation Site and on the Mt. Hood National Forest, recreation use on the lower Salmon River can be expected to increase by about three to six percent each year. Rough recreation use estimates for the river below the Forest boundary during 1991 are about 130,000 to 150,000 visitor days, which do not include the private recreation resorts. However, since recreation use on the lower Salmon is primarily related to fishing, use levels rise and fall in direct relation to fishing quality, size of runs, regulations and seasons.

Almost all recreation-related conflicts on the lower river involve anglers and private lands. Incidents of trespass have increased with increased use as have problems with litter. Traditional conflicts between angler groups exist, primarily between those who follow a catch-and-release philosophy and those who do not. Illegal household and commercial trash dumping is sometimes (although wrongly) associated with recreation. Incidents of dumping appear to have increased as costs for county land fill use have increased.

Wildlife

A complete survey of documented or suspected animals within the designated river corridor does not exist. However, there is substantial information from formal surveys and field observations to document a wealth of species. Many different species are present, largely due to a wide variety of environments found in the river corridor. Wildlife presence is also heavily influenced by the amount of human activity; some species benefit from human presence and disturbance, while others do not.

The Salmon River flows through remote canyons and old growth, as well as heavily used recreation areas, early successional plant communities and even suburban zones. The Salmon River/Red Top Meadows complex was recognized as outstandingly remarkable in the Resource Assessment due to the wide variety of vegetation, the number and size of meadow/wetlands present and the diversity of wildlife species supported, including relatively rare Roosevelt elk and sandhill cranes. Tables 2.2 and 2.3 summarize the management indicator species and the threatened, endangered and sensitive species that may occur or are known to occur on the Zigzag Ranger District.

Nesting surveys for greater sandhill crane in Salmon River/Red Top Meadows are completed annually by the Forest Service. Winter track surveys are conducted in the upper drainage for wolverine, pine marten and other mammals. Extensive monitoring of Northern spotted owls has been conducted for several years.

Although much information has been recently collected, it does not provide a complete picture of fish and wildlife population status and it does not eliminate the need for further baseline data, especially considering the number of threatened, endangered, and sensitive species present. This is especially true for Roosevelt elk, which appear to be composed of at least two distinct population segments and are also at reduced population levels.

The American peregrine falcon (a federal endangered species), the northern spotted owl and the bald eagle (federal threatened species) are protected under the Endangered Species Act, 1973 (ESA). These species are provided special consideration on private and public lands as defined by the law. One of the purposes of the ESA is to provide for the conservation of habitat that threatened and endangered species require. Section 7 of the Act directs federal agencies to ensure that actions they authorize, fund, or carry out will not jeopardize the continued existence of endangered or threatened species nor result in the destruction or adverse modification of designated critical habitat. Section 9 of the Act defines applications to private, state and other nonfederal agencies and lands. Section 9 defines prohibitions which include significant habitat modification or degradation that may injure or kill wildlife or prevent species recovery by significantly impairing activities such as breeding, feeding, or sheltering.

The U.S. Fish and Wildlife Service (USFWS) has the authority and responsibility to administer the ESA on both private and public lands. Future assessment of recovery and impacts will depend on available baseline information and monitoring of threatened and endangered species and their habitat. Typically this type of information is more readily available on public than private lands. Established policies related to threatened and endangered species management also make the administration of the ESA more easily and consistently carried out on public lands.

In compliance with Section 7 of the ESA, informal consultation with the USFWS was initiated in April, 1992. Potential impacts to all known or suspected federal listed threatened, endangered, or sensitive plant and animal species have been addressed and mitigated in this document.

Birds

Alpine habitats at treeline near the river's headwaters support small populations of gray jays, gray crowned rosy finches, and mountain chickadees.

Subalpine areas, with their abundant springs, small meadows, and dense conifer stands, support a more diverse bird community including ruffed grouse, band-tail pigeon, Stellar's jay, rufous hummingbird, and mountain bluebird.

The large meadow complexes, besides providing habitat for large wading birds such as sandhill cranes and great blue herons, also provide excellent foraging habitat for migrating warblers, swallows, and flycatchers.

Steep canyons with mature to old-growth conifer stands characterize the central portions of the river, which provides excellent habitat for common flickers, hairy and pileated woodpeckers, and red-breasted sapsuckers as well as wrens, kinglets, nuthatches, chickadees, and river-dependent water ouzels and kingfishers.

The broad open valley bottom of the lower river also supports these species, and those that benefit more from open areas, such as starlings, rock doves, and finches.

The wetlands and oxbow found on the lower river in and near the Wildwood Recreation Site are home to many types of waterfowl, including wood duck, merganser, herons and mallards. Much of this area has been disturbed in the past by floods and flood control activities, but still provides relatively good habitat for these species.

Northern Bald Eagle

The northern bald eagle is managed as a threatened species by the state of Oregon and the federal government. No nest sites have been documented. Northern bald eagles have been seen on the Zigzag Ranger District and may use the drainage for foraging and migration. High-quality nesting habitat does not exist within the drainage, due to the lack of large open bodies of water near old-growth trees and the lack of a suitable food source. No bald eagle recovery sites are located within the drainage.

Peregrine Falcon

The American peregrine falcon is managed as an endangered species by both the state of Oregon and the federal government. It appears that the peregrine falcon has used the Salmon River drainage in the past. Suitable nesting habitat in the form of rock cliffs are available in the drainage. Waterfowl and songbirds migrating through the Salmon River drainage could be prey for migrating falcons. Currently, peregrine falcons are in the process of being reintroduced on the cliffs above Still Creek and Camp Creek drainages (in the upper Zigzag River basin). If the peregrine becomes re-established in the area, resident birds would likely use the Salmon River as foraging and nesting habitat. The recovery plan for the peregrine falcon does not specifically include any areas within the Salmon River drainage, but the drainage does offer opportunities for further hacking and other recovery projects.

Northern Spotted Owl

The northern spotted owl was recently listed as a threatened species under the federal Endangered Species Act of 1973. Intensive surveys for spotted owls have been conducted throughout the drainage on National Forest lands and have documented both individual and pair locations. Surveys have also been conducted on BLM lands and have identified additional birds and nest sites within the drainage.

Old-growth coniferous forest is the preferred nesting, roosting, and foraging habitat of spotted owls in Oregon. The owls favor multi-layered canopy structure: closed canopy, large diameter trees; abundance of dead or defective standing trees; and an abundance of logs and other material on the ground (Forsman, 1980; Forsman, 1982; Peterson, 1961). The Salmon River drainage provides suitable owl habitat throughout its length, especially on National Forest lands. Although high-quality nesting habitat (old growth) is not distributed evenly throughout this area, there is high-quality old-growth habitat in places, especially in the Salmon-Huckleberry Wilderness and the "wild" portion of the river. Suitable habitat for nesting and roosting is also present on BLM lands. The private landholdings in the drainage are generally not considered suitable habitat, due to past fires and logging activity.

River corridors are commonly used by young birds as they leave their nest territory. Continuous stands of coniferous trees along rivers provide refuge from predators and are an important characteristic of dispersal routes for young owls.

The upper river corridor and the lower half of the Salmon River drainage on the National Forest is in a Critical Habitat Unit (CHU) as identified by the USFWS. In managing CHUs, nesting, roosting, foraging, and dispersal habitats are protected. Any activity that would change the function of these habitats would constitute a "may affect" situation and must be referred to the USFWS for informal consultation. The lower half of the Salmon River drainage on the National Forest also comprises part of a Habitat Conservation Area for the spotted owl. The Forest Service manages these lands to be consistent with the 1990 Interagency Scientific Committee report addressing the conservation of the northern spotted owl.

On the lower river, the BLM monitors and protects nest sites located on BLM land. Specific management plans and recommendations for spotted owl habitat will be included in resource management plans currently being prepared by the BLM. The private lands in the lower reaches of the drainage do not contain critical habitat for the spotted owl.

Pileated Woodpecker

The pileated woodpecker is listed as a sensitive species by the state of Oregon. The woodpecker, a primary cavity excavator, is identified as a management indicator species for mature and old-growth forest-dependent species on the Mt. Hood National Forest. The woodpecker's ecological and biological needs appear to be best met in mature and old-growth communities.

In the Mt. Hood National Forest Management Plan, four areas within the Salmon River drainage were established to be managed specifically for the pileated woodpecker. These areas provide a core of 300 acres of suitable habitat within each 600-acre pileated woodpecker management area. Pileated woodpeckers require these large acreages of intact forest to forage for their preferred food source, the carpenter ant, and for other insects such as bark beetles. Pileated woodpeckers are frequently observed in the Salmon River corridor, and habitat conditions are generally excellent.

Sandhill Crane

A spring and summer resident in Oregon, the sandhill crane is identified as a sensitive species by the state of Oregon and the Forest Service. Cranes are usually found in prairies, marshes, mountain meadows, and grasslands (National Geographic Society, 1983; Peterson, 1961). This small isolated population appears to be on the northern limit of the species range. Historically sandhill cranes have used the meadow complexes in the upper river corridor. Suitable habitat currently exists in the form of large sedge meadows. Interspersed throughout the meadows are islands of small conifers, huckleberry, willow, and alder. These thickets provide good cover for nesting sites.

Plant succession appears to have accelerated, possibly due to fire exclusion and the reduction of beaver populations. The open sedge meadow is being invaded and gradually replaced by conifer trees. Although near optimum nesting conditions currently exist in some areas of Salmon River meadows, other areas in Salmon River meadows and adjacent meadows are being taken over by conifers and may not be suitable for sandhill crane reproduction. Currently, sandhill cranes nest and forage in portions of the meadows. Forest Service biologists are monitoring these birds and their meadow habitat, and are developing long-term habitat management recommendations for the species in cooperation with the Oregon Department of Fish and Wildlife.

Harlequin Duck

Harlequin ducks are identified as a sensitive species by both the state of Oregon and the Forest Service. Harlequin ducks inhabit turbulent mountain streams in coniferous forests; in winter, they prefer rocky intertidal areas along the Oregon coast (National Geographic Society, 1983; Peterson, 1961; Forest Service, PNW Research Station, 1985). Preliminary results from studies indicate that harlequin ducks prefer isolated areas with dense shrubs, woody debris, and meandering channels for brood rearing (Cassurer and Groves, 1989).

No surveys for harlequin ducks have been conducted in the Salmon River drainage, but Forest Service surveys have been conducted in Still and Camp Creeks, and in the Sandy River drainage. Anecdotal evidence has documented regular presence of harlequin on the Zigzag River. All these surveys have documented harlequin ducks foraging, loafing, or brood rearing. The Salmon River drainage provides suitable habitat for harlequin ducks; the ducks likely use the river during migration, and possibly for nesting and brood rearing as well.

Pine Marten

Similar to the pileated woodpecker, the pine marten has been selected as an indicator species for mature and old-growth forest by the Mt. Hood National Forest. It is listed as a sensitive species by the state of Oregon. Eight habitat management areas have been established for the pine marten within the drainage, which include a minimum of 160 acres of contiguous mature and/or old-growth forest habitat within a 320-acre managed area. Fallen trees and branches are an important component of marten winter habitat. The marten enters the snow-free area beneath the down logs to hunt tree squirrels. Marten also travel extensively above the ground on logs and branches in certain snow conditions. Its "shy" behavior makes it a rarely observed animal of the forest. Forest Service surveys have documented the pine marten in the upper Salmon River.

Mammals

White-footed vole

The white-footed vole is managed as a sensitive species by the state of Oregon and the Forest Service. Considered the rarest vole in North America, this species is restricted to the forests west of the Cascade crest in Oregon. It uses riparian forests as its preferred habitat, and red alder leaves are its preferred food. It is found in all successional stages (Burt, 1976; Ingles, 1965; FS, PNW Region, 1985). No surveys for the white-footed vole have been conducted in the drainage to date, and no anecdotal evidence has been located to indicate their presence. The drainage has the potential to support white-footed voles due to the presence of suitable habitat and food.

California Wolverine

The California wolverine is managed as a sensitive species by the Forest Service and has been proposed for listing as a threatened or endangered species by the federal government. Populations of wolverine in the Cascade Mountains are small and scattered. Habitat in Oregon is confined to remote, timbered areas generally ranging in elevation from 3,000 feet to timberline. Territories may encompass 10 to 80 square miles. Wolverine are believed to prefer areas of minimal human presence and high levels of solitude and seclusion (Burt, 1976; Ingles, 1965; Forest Service, PNW Research Station, 1985). A literature review conducted in June, 1990, confirmed large home ranges and an aversion to human presence to be characteristic of wolverine populations throughout their range. Wolverine are known to occur in the upper river corridor.

Black-tailed Deer and Elk

One of the more conspicuous wildlife species within the river corridor is the black-tailed deer. A larger animal, and much less common, is the elk. The meadow complex in the upper river corridor is a unique habitat area, providing high-quality habitat for fawning, calving, and rearing young. These meadows also provide high-quality summer range for adult big game as well; this habitat is critical to allow the animals to reach peak condition before they descend to low elevation areas to overwinter. The vegetation and wilderness setting of much of the drainage provides a good seasonal migration corridor, linking the high elevation deer and elk summer ranges with the lower elevation winter ranges.

Although no in-depth population data are available for either deer or elk in the drainage, hunter surveys indicate that the deer population is stable, currently supporting an early High Cascades special hunt, and archery and general season rifle hunts. The elk population is very small, likely composed of less than 50 animals, but is also subject to hunting during the general Cascades season. In the lower river, the most limiting factors appear to be little low elevation winter range (most of the areas are in private ownership and are heavily developed), poaching, and harassment by free-ranging dogs.

Owing to its location along the Cascade crest, the upper river meadows appear to receive summer use by big game from both sides of the Cascades. The meadows have high potential for supporting genetic interaction between several distinct populations. Although little is known of their migrations or genetic characteristics, it appears that both deer and elk populations from the White River (Deschutes basin), Clackamas, Hood River, and Sandy drainages could be migrating to and intermingling in this area.

Other Large Mammals

Bobcats, mountain lions (cougar), coyotes and black bears are present in the drainage and are observed occasionally along the Salmon River. Bear and cougar are managed as game species in Oregon, but only the black bear is common enough to be legally hunted in the Sandy basin under current ODFW regulations. The black bear is a generalist in its eating habits. It survives on a diet of insect larvae, carrion, young tree bark, and the abundant huckleberries and salmonberries found in the drainage. The bobcat is a predator of small game and the mountain lion preys predominantly on deer. Coyotes are predators of small game, but also scavenge for carrion. Approximately half of the drainage lies within the Salmon-Huckleberry Wilderness, allowing these species to exist without much human presence or harassment.

Beaver are present throughout the drainage, from the mouth up through the small spring areas above the confluence of the East and West Forks of the Salmon. Beaver are managed as a furbearer under ODFW regulations, and can be trapped for their pelts. The amount of trapping that occurs in the drainage is unknown. Beaver populations appear to be cyclical and relatively low in numbers, especially in the Salmon River meadows complex. The cause is unknown, but may be due to the intensity and duration of winter periods, disease, trapping levels, plant succession, and land use practices. Beaver will tolerate human activity, and can frequently be found in developed areas. Where animals are active on private lands and cause property damage, they may be removed by ODFW. Harassment by free-ranging dogs can also keep beaver populations low, even where habitat quality is otherwise good.

In their food gathering and dam building activities, beavers are a powerful force in controlling plant succession along streams and wetland areas. They move up and down stream systems, toppling and consuming streamside trees and plants, constructing dams, and flooding wetland areas. These occasional disturbances help maintain open meadow areas and enhance diversity of vegetation. Beaver ponds provide a high nutrient source for stream systems, and support several amphibian and fish species.

Amphibians

The red-legged frog, western pond turtle, painted turtle, and Cope's giant salamander are all managed as sensitive species by the Forest Service. Cope's giant salamander is found in cold streams, seeps, and sometimes in mountain lakes and ponds. The red-legged frog inhabits ponds, marshes, rivers, and streams in coniferous forests, where vegetation at the water's edge provides good cover. The western pond turtle inhabits ponds, marshes, rivers, and streams that typically have rocky or muddy bottoms. The painted turtle is an aquatic turtle that frequents ponds, marshes, small lakes, ditches and streams where the water is quiet or sluggish and the bottom is sandy or muddy. They are often seen sunning on mudbanks, logs, or rocks near water (Nussbaum, 1983; Stebbins, 1985). All these habitats exist within the Salmon River drainage, and these species could be present.

Other amphibian species of interest are the cascade frog and the spotted frog. They require similar habitats to the red-legged frog. The cascade frog is known to occur in Red Top Meadow and in a tributary of the Salmon River.

Table 2.2 Management Indicator Species on the Zigzag Ranger District

Species	Habitat	Listing	Population Trend
Cope's giant salamander	streams; seeps; moist, coniferous forests	sensitive	declining
Red-legged frog	ponds, marshes, rivers, and streams in coniferous forests; vegetation at water's edge	sensitive	declining
Western pond turtle	bodies of water with rocky or muddy bottoms	candidate (C-2)	declining
Painted turtle	bodies of water where water is quiet and bottom is sandy or muddy	sensitive	declining
Northern bald eagle	large open bodies of water near mature or old-growth coniferous forest	threatened	stable or increasing
American peregrine falcon	rock cliffs close to water	endangered	stable or increasing
Greater sandhill crane	prairies, marshes, mountain meadows or grasslands	sensitive	declining
Northern spotted owl	old-growth coniferous forest	threatened	declining
Harlequin duck	turbulent mountain streams in coniferous forests	sensitive	stable or declining
White-footed vole	riparian forests; found in all successional stages	candidate (C-2)	declining
California wolverine	remote timbered regions 3,000 feet to timberline	candidate (C-2)	declining
Pacific big-eared bat		candidate (C-2)	declining

Table 2.3 Threatened, Endangered and Sensitive Species on the Zigzag RD

Species	Habitat Type	Population Trend
Northern spotted owl	mature and old-growth forest	declining
Pileated woodpecker	mature and over-mature	stable or declining
Pine marten	mature and over-mature	stable or declining
Deer	early forest succession mature/old-growth	stable
Elk	early forest succession mature/old-growth	stable

Scenic Quality

The character of a landscape is the overall impression created by its unique combination of visual features (such as land, water, vegetation and structures) as seen in terms of form, line, color, and texture. There are several variable factors which affect how these elements (form, line, etc.) are perceived. One of the most important variables is the position of the observer, which greatly influences one's impression of a landscape scene.

The landscape character of Salmon River is described for each segment, with attention to the position of the viewer.

Segment 1

This segment is seven miles long, from the headwaters on Mt. Hood to the south line of Section 6, T4S, R9E. The Resource Assessment (1991) found that the scenic qualities in this segment met the criteria for outstandingly remarkable values.

For this segment, there are five primary travel routes and use areas from which people view the river area:

- Timberline Ski Area
- Timberline Highway (OR 173)
- Pacific Crest National Scenic Trail
- Highway 26 south of the junction with Highway 35
- Residential development in the northwest quarter of Section 6, T4S, R9E.

Timberline Lodge, located halfway up the slopes of Mt. Hood, provides visitors with spectacular views of the rugged 11,235-foot volcanic peak. To the south from Timberline, one can look directly over Salmon River in the lower half of segment 1, and across 44 miles of forested hills to Mt. Jefferson and the Three Sisters. Recent rectangular timber harvest units eight miles south of Timberline, and one-half mile from Salmon River in segment 2, have detracted from the quality of the views from this area.

On the access road to Timberline, (OR 173) there are at least two switchback curves which take the traveler within one-quarter mile of the river. Yet the river is not apparent because it lies so steeply below the level of the highway.

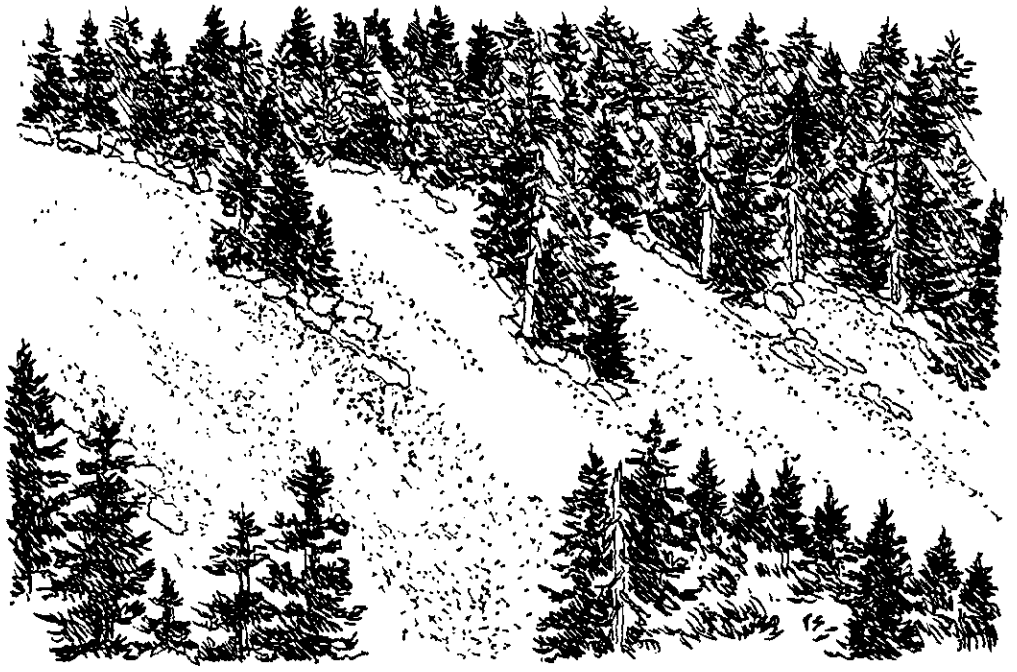
Although Timberline Lodge is a highly developed site located near the western rim of the Salmon River canyon, few visitors are aware of the river as a feature of the landscape. However, hikers on the Pacific Crest National Scenic Trail south of Timberline must cross the river without the aid of a footbridge, and follow the east rim of the canyon downhill for about two miles before leaving the river. The dense conifer forest along this stretch of the trail offers only an occasional glimpse of the river, which lies in a steep walled canyon of boulders and sand. The river surface is almost inaccessible between Timberline and Highway 26.

The steep, rocky river canyon ends just north of the junction of Highway 26 and Highway 35, and the river meanders to the south across a gentle, but narrow flat for the next three miles to Salmon River Meadows. Highway 26 runs very close to the river in this stretch, and is the major viewer position for this portion of segment 2. Red Top and Salmon River Meadows provide scenic diversity in open spaces and varied wetland vegetation, in contrast to the typical large tree conifer forest along the highway foreground. The river itself is not visually evident because it is narrow and obscured by tall grasses and shrubs in the riparian zone. Few people walk the river shoreline in the area of the meadows. There is no access off Highway 26 and no footpath to follow.

Salmon River crosses a 160-acre tract of private land in the northwest quarter of Section 6. There are several residences on both sides of the river shore for a distance of about one-quarter mile. The presence of the river makes this subdivision attractive for home sites. The homes along the river are relatively new, and generally employ materials and forms that complement the natural setting. The property is private, posted, and gated, and the residences are not visible from Highway 26 or the Pacific Crest Trail because of the heavy forest cover.

Within the river corridor, on public lands, the landscape is in a natural appearing condition. Views out of the corridor have been somewhat altered by timber harvest and highway construction.

Talus slopes along the upper river corridor



Segment 2

This segment is 15 miles long, from the south line of Section 6, T4S, R9E. to the junction with the South Fork of Salmon River. The Resource Assessment (1991) found the scenic qualities in this segment met the criteria for outstandingly remarkable values.

For this segment, there are five primary travel routes from which people view the river corridor:

- Highway 26
- Pacific Crest National Scenic Trail (PCNST)
- Sherar Burn Road 2613
- Devil's Peak Trail #793
- Salmon River Trail #742.

From Highway 26 there are brief views of Salmon River Meadows and the eastern slope of Mud Creek Ridge. The open meadow provides an interesting contrast to the nearly continuous conifer forest. Although there is some evidence of timber harvest south of the meadow and on top of Mud Creek Ridge, the general impression of the scene is natural appearing from the highway. The PCNST crosses Highway 26 at Wapinitia Pass. To the west the trail runs northeast/southwest near the top of a steep slope which overlooks Salmon River Meadows to the north. The recently harvested clearcuts below the trail open up spectacular views up the Salmon River corridor to Mt. Hood.

Within three miles downstream from Salmon River Meadows, the river flows into a narrow canyon containing many basalt cliffs, rock outcrops, and a series of waterfalls ranging from 15 to 75 feet high. Hikers on the Salmon River Trail #742 can hear the sounds of the river as it plunges through the canyon, but cannot see the river from the trail. Some hikers make their way to the cliffs to view the falls. This portion of segment 2 is within the Salmon-Huckleberry Wilderness, and exhibits a primitive, undisturbed character. The trail runs along the north side of the river, passing through a second-growth Douglas-fir forest which seldom allows sight of the stream.

The north slope of the canyon rises steeply to a long ridge which runs northwest/southeast. The high point of the ridge is Devil's Peak, which can be reached via the Sherar Burn road (2613) beginning at Summit Meadow and ending at Kinzel Lake. From various points along the road and trail #793, one has a panoramic view of the wild portion of Salmon River. The river canyon is steep and well-dissected by tributary streams. The sharp ridges and valleys are covered with fir forests, and many large rock outcrops are evident. Salmon Butte and Hambone Butte dominate the skyline about 2.5 miles south of the river. The valleys of Linney and Draw Creeks to the east are moderately altered by timber harvest (outside the river corridor), but the overall impression is natural appearing.

Segment 3

This segment is 3.5 miles long, from the junction with the South Fork of Salmon River to the Mt. Hood National Forest boundary. The Resource Assessment (1991) found the scenic qualities in this segment met the criteria for substantial values.

For this segment, there are two primary travel routes:

- Salmon River Road #2618
- Salmon River Trail #742

The road leaves Highway 26 near Zigzag and runs past the Mt. Hood Golf Course and upstream adjacent to the Salmon River, ending in the hills between the river and the South Fork Salmon River. Salmon River Trail #742 runs between the river shore and the road. The corridor consists of a narrow, gentle gradient between steep slopes on either side. The vegetation is large Douglas-fir/ hemlock with some bigleaf maple trees. There are numerous flat places along the stream where people stop for fishing and picnicking. The overall impression of the scene is nearly natural, with only minor disturbance from roads, campsites, and trailhead parking.

Segment 4

This segment is 3.2 miles long, from the Mt. Hood National Forest boundary to Lymp Creek.

Segment 5

This segment is 4.8 miles long, from Lymp Creek to its confluence with the Sandy River. Segments 4 and 5 have a similar landscape character, and differ only in classification; segment 4 is a recreational river, and segment 5 is a scenic river.

Approximately 60 percent of the 1,595 acres of land within the preliminary boundaries of segments 4 and 5 is in private ownership. The remainder is in public ownership under BLM or Clackamas County administration. The Resource Assessment (1991) found both segments had "substantial" scenic resource values.

For these segments, there are several public roads which provide access to the river at various points, including at least five bridges. These roads generally exit Highway 26 and run south to the river, then branch off or cross it. Welches Road leaves Highway 26 at Wemme, accesses the Mt. Hood Golf Course and Resort as well as numerous residences, and finally connects with Salmon River Road at the Forest boundary. Further downstream is Camp Arrah Wanna road, and then Wildwood Recreation site (BLM). Highway 26 crosses Salmon River near Brightwood, as does the old section known as the Brightwood Loop.

Leaving the Forest, the river valley changes from a narrow, steep canyon to a nearly flat flood plain about one mile wide. The Sandy River flows westward along the northern part of this plain, and Highway 26 lies in its center. To the south rise the steep and sharply-dissected foothills of the Salmon-Huckleberry Wilderness. Boulder Creek is the major tributary, joining Salmon River near Brightwood.

The vegetation is typical of the low elevation western hemlock/Douglas-fir forest. In the riparian zone there are Western redcedar, red alder, vine maple, and bigleaf maple. With the exception of the golf course and the playing fields at Wildwood, the vegetation is so dense that the surrounding mountains are seldom seen.

From Highway 26, the Salmon River is not a visible feature of the travel route. At the Mt. Hood Golf Course, the open fairways and homesite clearings provide expansive views of the surrounding mountains. This kind of contrast between the cultural landscape of the resort and the wild and rugged mountains is highly valued by many people. But within a short distance, on another smaller roadway, others find seclusion, shade, and solitude in a sheltered retreat.

Because of the diversity of ownerships and interests, the landscape has been altered considerably. There has been timber harvest, some of which has resulted in large rectangular clearcuts. There is a large gravel pit about a mile south of Brightwood, where fishing is a primary use now. Wildwood public picnic site and Camp Arrah Wanna provide places to experience the outdoors safely, without changing the landscape character of the river.

Overall, the views from the river of the nearly natural appearing shoreline and foreground are enjoyed by those living near or visiting the river.

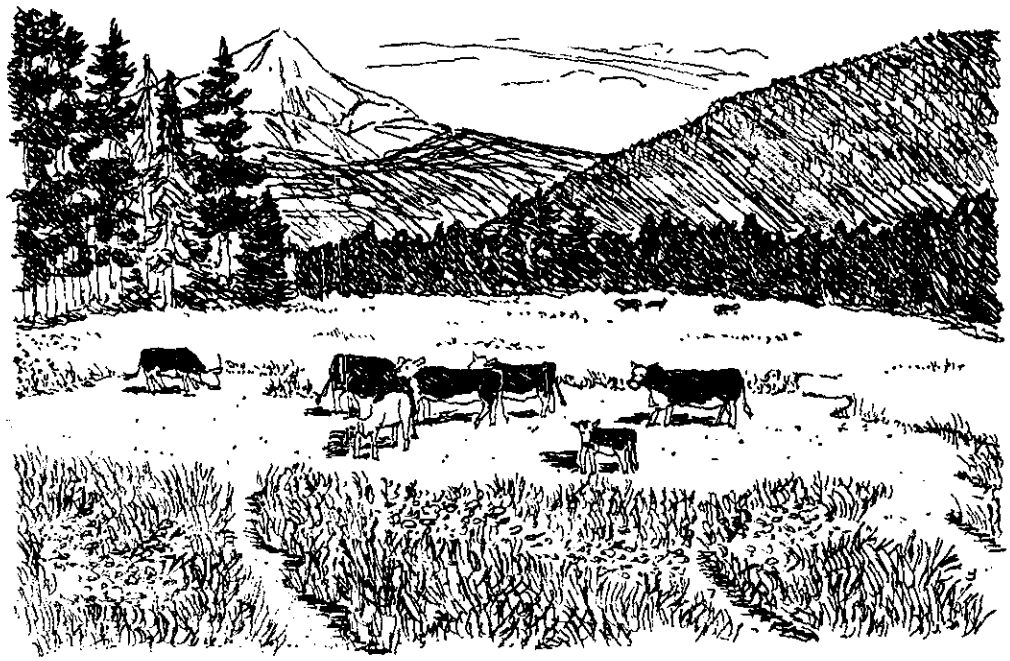
Grazing

The Salmon River Meadows area is part of the Wapinitia Range Allotment. This allotment is one of the six allotments on the eastern portion of the Forest which are managed to achieve full use of allocated forage as long as Forest Plan Standards and Guidelines are met. The entire allotment has one operator on it who is permitted to have 130 cow/calf pairs on the allotment. The grazing season runs from July 1 to September 30 of each year, but range-readiness actually determines what days the cattle are put on or removed from the allotment.

Grazing activities within the allotment, including the Salmon River Meadows area, are allowed by a special use permit and are managed through direction contained within the permit and the Wapinitia Allotment Management Plan (AMP), which is a part of the permit. The Bear Springs Ranger District, which currently administers the permit and AMP, is in the process of updating the AMP to better incorporate Forest Plan direction, including protection of Wild and Scenic River values and key site riparian values along the river and within the river corridor. Protection of these values is accomplished through limiting areas where salt blocks are placed, fencing, hauling water in dry seasons, and limiting times when the cattle are permitted to graze in sensitive areas. Additional monitoring will be done in accordance with Forest Plan direction to evaluate impacts of grazing on both remarkable river values and on riparian areas within the Salmon River Meadows area. If necessary, changes to grazing activities will be made to protect those values and areas.

The Salmon River Meadows area has been used for sheep and cattle grazing since the early 1900s. Up to 300 head of cattle have used the meadows annually. This use has dropped since 1945 with no grazing taking place during some years. Current grazing use in the Salmon River Meadows area is well below what is allowed both in the existing AMP and the Forest Plan.

Salmon River Meadows



Current standards limit cattle in the meadows area to graze up to a maximum of 30 percent of the current year's forage growth. Utilization studies in the meadows during the 1991 field season have shown use of five percent or less of available forage. Historically, the majority of the grazing use within the allotment has taken place in areas outside the river corridor. Because of the wetness of the meadows and lack of range readiness early in the field season, almost all grazing in Salmon River Meadows takes place in mid- to late August or September.

Geology

Much of the following information comes from *The Stratigraphy and Structure of the Columbia River Basalt Group in the Salmon River Area, Oregon* (Burck, 1986); *Recent Eruptive History of Mount Hood, Oregon, and Potential Hazards from Future Eruptions* (Crandell, 1980); unpublished mapping (Sherrod, 1992); *Geology of the Mount Hood Volcano* (Wise, 1968); and *Mt. Hood National Forest Soil Resource Inventory* (Howes, 1979).

The Salmon River takes a long circuitous route from the south slopes of Mt. Hood to its confluence with the Sandy River near the town of Brightwood. The river starts out heading south, then turns southwest, west, and finally northwest. The drainage pattern and valley shape are determined by the geology of the Salmon River area.

The Salmon River flows through parts of the two major rock units in the Oregon Cascades, the older Western Cascade Province and the younger High Cascade Province. The Western Cascade Province consists chiefly of dark-colored lava flows, light-colored pyroclastic flows, and related deposits. These rocks have undergone widespread low-grade metamorphism and local hydrothermal alteration. They have been deeply dissected by stream and glacial erosion. As indicated by the name, these rocks are exposed west of the Cascade crest. The rocks of the High Cascade Province form a plateau capping the Cascade Range. Included are the prominent Cascade volcanoes, such as Mt. Hood and Mt. Jefferson, but also many smaller and lesser known volcanoes. The rocks of the High Cascade Province are only slightly altered, dark-colored lava flows. The high plateau has been only slightly dissected by stream and glacial erosion. Surface deposits from glaciers and recent volcanic processes cover much of the High Cascade Plateau.

The smooth southern slopes of Mt. Hood are a result of a series of mudflows and pyroclastic flows that occurred during the recent eruptive periods of this volcano. These flows created a broad fan of volcanic debris that begins near the summit and extends down to Government Camp, from the Sandy River on the west to the White River on the east. Both Timberline Lodge and Government Camp are located on this fan of pyroclastic flow deposits and mudflow deposits. The soils that have formed on these deposits are loose, dark grayish-brown, gravelly sandy loams. In the upper Salmon River drainage the volcanic deposits date from 15,000 years ago to about 1,500 years ago. Because of the relatively steep channel gradients, the river channel on this broad fan is very narrow and deeply incised into the mountain side.

Some of the recent volcanic deposits advanced down the upper Salmon River valley and some have been reworked by glaciers. The recent deposits partially filled the upper valley and created the flat topography and poor-draining soils that characterize this area. Red Top Meadow and Salmon River Meadows are examples of areas where these recent volcanic deposits have accumulated and produced permanent or seasonally high water tables. The Salmon River Meadows area is underlain by up to 25 feet of volcanic deposits that are about 1,500 years old. The river in this area tends to be slow-flowing and meandering in character. The valley side slopes in this area are mantled with glacial till. The soils that developed on the till are medium dense, yellowish brown, gravelly silt loams.

Topographic highs formed by the young volcanic domes of Frog Lake Buttes south and southeast of Salmon River Meadows have forced the river to turn to the southwest and west. The recent Mt. Hood derived volcanic deposits end about 1.5 miles up river from the confluence with Mud Creek. Glacial deposits continue to near Mud Creek, which is where the glacier stopped. The Salmon River begins downcutting in this area and exposes the lava flows of the High Cascade plateau in its steep valley walls. The U-shaped valley of the upper Salmon River changes to a V-shaped valley. Near where Wolf Creek joins the Salmon, the river has crossed the western boundary of the High Cascade plateau and begins cutting through the older andesite rocks of the Western Cascade Province. Talus slopes and shallow soils are common in this area.

Near the confluence with Linney Creek the Salmon River suddenly turns to the northwest, following a major northwest-trending fault zone that extends over 14 miles to the Sandy River valley. Many northeast-trending faults terminate against this fault. Also at Linney Creek the bedrock changes to the Columbia River Basalt Formation (considered part of the Western Cascade Province). Faulting and erosion has exposed the Columbia River Basalt Formation for about a 4.5 mile segment of the Salmon River, from Linney Creek to Rolling Riffle Campground.

This is also the segment of the river where many waterfalls appear, including Stein, Split, Little Niagara, Vanishing, Frustration, and Final Falls. These waterfalls are caused by the river flowing across the upstream dip of the highly resistant individual lava flows of the Columbia River Basalt Formation and the vertical offsets associated with the northeast-trending faults. Approximately 440 feet of Columbia River Basalt are exposed in this area with 15 separate flows identified. These flows came into the Salmon River area 15 million years ago from the east, when the topography in this area was flat. Cascadian volcanism blocked the path of later Columbia River Basalt flows, and the flows were covered by thick accumulations of locally produced volcanic mudflows and minor lava flows of the Rhododendron Formation. Between the outcrops of Columbia River Basalt are colluvial soils and minor landslide deposits. The soil is a medium-dense, grayish-brown, gravelly silt loam.

Northwest of Rolling Riffle, the Salmon River valley continues to follow the northwest-trending fault zone and the valley walls are composed of the weak and easily erodible Rhododendron Formation with isolated outcrops of Columbia River Basalt. As a result the valley walls are not as steep, outcrops are infrequent, and the valley floor is wider. The valley slopes are mantled with colluvial soils and the valley floor is dominated by boulders, cobbles and gravels.

About one mile south of the town of Welches, the Salmon River valley widens to three-quarters of a mile before joining the even larger valley of the combined Sandy and Zigzag Rivers. From here to the confluence with the Sandy River, the Salmon River has been pushed to near the southwest wall of the valley due to the glacial deposits and mudflow deposits that have come down the Sandy River valley from Mt. Hood. Due to the low stream gradients and the relatively unconsolidated bed and bank material, the river has a meandering nature in this reach, and even contains oxbows. The most recent mudflows, forming the nearly flat surface of most of the valley, are about 250 years old. The soil that has formed on the mudflow deposits is very dense, dark gray to yellowish brown, cobbly coarse sand. About one-quarter mile north of Camp Arrah Wanna there is a small hill of Rhododendron Formation that rises 150 feet above the valley floor. This is an isolated remnant of the topography of the valley before most of the valley bottom was covered by the glacial deposits and mudflow deposits from Mt. Hood.

The last two miles of the Salmon River pass through glacial moraines that stretch across the valley. Protruding through the moraine at the last major bend in the river is an exposure of Columbia River Basalt. There is a privately-owned quarry (Miller Road Quarry) in this outcrop that is close to and visible from the river.

There are no other quarries within the river corridor. Some mining activity has taken place in the Salmon River valley in the past; however, at this time there are no active mining claims, no oil and gas leases, and no geothermal leases within the corridor. Oregon Department of Transportation uses an area north of the junction of Highways 26 and 35 for sand storage.

Socioeconomics

In general, the socio-economic environment is considered to be the residents and businesses within the preliminary Wild and Scenic management boundary. Although no specific data exists for this area, studies on the Mt. Hood Corridor as well as data on Clackamas County may give some indication of general trends for the region. In addition, Census tract #143.01 (the area in Clackamas County north of the Salmon River) may be used to generate information on the social environment of the Salmon River.

Recently released 1990 Census data show a nine percent population increase from 1980 in the area north of the Salmon River. During this period there was a 41 percent increase in housing units. This indicates that population growth is stabilizing after the rapid increase that occurred in Oregon in the 1970s. A high "quality of life," a temperate climate, and numerous job opportunities in the Portland Metropolitan area led to this substantial population increase. Between 1970 and 1980 Clackamas County grew by 45.7 percent, while the city of Sandy, located in Clackamas County, experienced an 88.1 percent increase in population (Oregon Employment Division, 1992). During this period, Multnomah County grew by 1.4 percent, while the city of Portland decreased in population by 3.1 percent. This indicates that the population growth during this period was entirely concentrated in the "bedroom communities" and unincorporated areas that surround the city of Portland.

A severe recession in 1981-1982 brought about a decline in the annual rate of population growth as compared to the 1970s. This recession was cyclical in nature, the result of a business downturn which left an inadequate demand for workers in the economy. Between 1980 and 1990 Clackamas County expanded by 15.3 percent, while the city of Sandy expanded by 42.9 percent. Population trends returned to prerecession patterns in the late 1980s as a result of Portland's strong economy in 1988-1990 (Oregon Employment Division, 1990).

In 1988, there were an estimated 6,500 residents in the Mt. Hood Corridor. The corridor consists of the communities along Highway 26 from Brightwood East to Government Camp. Of these residents, 58 percent are seasonal residents. The United States Forest Service forecasts that by the year 2000 the population will be 15,000 to 20,000 people. New residents will be drawn in by the many outstanding recreational opportunities as well as nearby urban amenities (University of Oregon, 1988).

Past trends have indicated that Clackamas county has had higher median family incomes than many other counties in the state, with many residents commuting to work in the Portland metropolitan area (1980 Census).

The majority of the people who do not commute work in jobs related to recreation and service. Alternating between a summer and winter job is common. In this type of employment, the pay is low and the work is seasonal (University of Oregon, 1988).

Economic Environment

The top industries, by employment, are as follows:

- manufacturing 19 percent
- professional and related services 17.4 percent
- retail trade 14 percent

Together, these three industries constitute 50 percent of the employment of the residents (1980 census). It is important to note that this information is based upon people who live in, but do not necessarily work in, the area north of the Salmon River.

The data on employment by industry in the Salmon River area are compatible with the overall industry earnings for Clackamas County in 1989. Services, the top earning industry for Clackamas County, accounted for 23.0 percent of earnings. Manufacturing accounted for 14.8 percent, and retail trade 14.1 percent (Oregon Employment Division, 1992). The fastest growing industry in Clackamas was wholesale trade, which increased by 19.6 percent from 1988 to 1989.

In the Mt. Hood Corridor, 40 percent of the community's commercial activity is generated by three ski areas. Businesses other than ski resorts (about 100 in the corridor) tend to be small, with 90 percent employing less than six people. A study conducted in 1988 revealed that nearly one-third of the businesses indicated that over 80 percent of their business is tourism-related. Over one-half indicate that over 60 percent of their business is tourism related. Tourism accounted for 73.3 percent of the gross revenue for businesses in the Mt. Hood Corridor in 1987. According to the businesses surveyed, tourism and outdoor recreation play a more significant role in the local economy than does timber. The timber industry accounts for only 13.5 percent of their gross revenue (University of Oregon, 1988).

Resources and facilities on national forest lands are important for generating revenue in the tourism and timber industry sectors. Non-commodity values in the Salmon River corridor contribute to the high-quality environment enjoyed by both residents and visitors.

Timber

Some timber harvest has taken place within and adjacent to the river corridor in the past, though it has not been extensive in the actual corridor itself. Most harvest has occurred adjacent to the upper river corridor along the East and West Forks of the Salmon, the Mud Creek area to the west of the corridor, and to the south of the river towards Clear Lake and Abbot Burn area. Little timber harvest has taken place elsewhere in the corridor on National Forest land, because of wilderness designation and other low- or non-timber harvest areas. Off the Forest, private landowners have cleared or harvested timber for residential and commercial development and for revenue. Clackamas County has also done some logging in the area. Cedar has been harvested for use as fence posts, rails, and shake shingles since the turn of the century.

On the Forest, commercial timber sales within and adjacent to the corridor have been taking place since the mid-1950s. Current silvicultural methods employed include clearcutting or shelterwood harvest. Plantations that are 30 to 40 years old are now being thinned to improve stand vigor. All harvested units are replanted as required by law with a variety of local tree species.

Forest Health

A spruce budworm infestation that began around 1986 is now spreading throughout the drainage. A natural agent, *Bacillus thuringiensis* (Bt), was sprayed in 1988 but not all buffer areas around the original infestation were treated. Extensive mortality has occurred in some of these untreated areas and the infestation is respreading throughout the Forest and river corridor. Another application of Bt is being considered for some areas in the upper river drainage.

Dwarf mistletoe is also found scattered throughout the corridor. There are also pockets of a variety of rootrot fungus found in and adjacent to the corridor. These fungi affect the strength and function of individual tree roots, making the trees more susceptible to windthrow and/or premature death. While these fungi are not present in epidemic proportions, they can be of concern in individual locations, especially in campgrounds and other recreation areas.

Other Forest Products

A variety of other products are found along the river corridor. These include beargrass plants (often used in floral arrangements), Christmas trees and boughs, trees for fence posts, poles and rails, and firewood, primarily from material left adjacent to timber harvest units. Huckleberries and mushrooms are also harvested in the area. Permits have also been sold to allow removal of smaller trees and shrubs for transplanting.

Other Resource Values

The following topics are described here to give the reader more background information, but are not analyzed for effects in Chapter 4 because they were not identified as key issues or as outstandingly remarkable river values.

Land Use

With the exception of the Wapinitia area, lands along the entire upper river are in public ownership and are administered by the Mt. Hood National Forest. The Wapinitia area comprises 160 acres of privately-owned land with approximately 35 homes currently situated. In addition, about 33 acres of private land exists within the interim boundaries along the east side of the lower river along the Salmon River Road below the forest boundary and above the mouth of Cheeney Creek.

Along the lower eight miles of the river, below the USFS boundary (Cheeney Creek), 60 percent of the land is in private ownership. The interim Wild and Scenic boundaries incorporate about 1,595 acres within the designated river corridor, as shown in the following table.

Table 2.4 Lower Salmon River Ownership in Acres (Interim Boundaries)

Private	Public	County	Total
960	515	120	1,595

There are six types of Clackamas County zoning classifications within the interim Salmon Wild and Scenic River boundaries. These zoning classifications fall into one of two general categories, one for rural residential or recreational uses on lot sizes of less than 20 acres and one for timber management on parcels of 20 acres or larger. About 800 acres or 83 percent of the private lands within the corridor are available for residential development or recreation uses (includes open space such as the golf course and recreational developments such as Mt. Hood R,V. Village). The remaining 160 acres are 20- to 40-acre or larger parcels that are zoned for timber resource uses.

The majority of the smaller residential/recreational parcels have already been developed, while others are currently unsuitable for building due to floodplain, wetland or slope restrictions. Approximately 200 homes and cabins exist in four developed areas or neighborhoods within the interim boundaries along the lower river. Approximately half to two-thirds of these homes are recreational properties or second homes and not the primary residence of the owner. The neighborhoods include the Abernethy Road and Bridge St. area, the Elk Park and Welches Road area, the Arrah Wanna and Crystal Creek Road area, and the Country Club Road and Brightwood area. These developed residential areas account for about 3.5 miles, or roughly 40 percent, of the river frontage on the lower river.

Timber, Agriculture and Grazing

The BLM-administered lands are managed for recreation and wildlife purposes. BLM lands along the Salmon have been administratively withdrawn from timber harvest. County lands within the interim boundaries are generally unsuitable for timber harvest due to steep terrain, riparian habitat and a predominance of hardwood species. Currently none of the land within the corridor on the lower river is used for agriculture or grazing purposes. As mentioned previously, about 160 acres of private land is zoned for timber management on the lower river. Private land timber harvest activities are reviewed by the Oregon Department of Forestry and are allowed within the Wild and Scenic River corridor. A 100-foot buffer is required along the Salmon River.

Clackamas County Comprehensive Planning

Clackamas County has in place an approved comprehensive plan. This plan addresses federal Wild and Scenic Rivers and State Scenic Waterways protection in a number of ways. First, all development must meet the general standards for the unincorporated area of Clackamas County described in the General Provisions of the comprehensive plan. The General Provisions set forth restrictions and considerations for natural hazards, slopes, stream corridors, wildlife and fish habitat, cultural and historic resources and natural drainage channels. Secondly, development and land uses are regulated through specific zoning classifications. Specific restrictions and regulations apply for each classification.

There are four primary classifications in effect for the land along the lower eight miles of the river and within the interim Salmon Wild and Scenic River boundaries:

- **Recreational Residential District** and **Hoodland Residential District:** The principal purpose of these classifications and their application is to maintain and enhance the natural environmental and living qualities of those areas which are recreational residential in character through conservation of natural resources and carefully controlled development. These areas are usually divided into parcels of two acres or less although some are up to 20 acres in size.

- **General Timber District** and **Transitional Timber District:** The principal purpose of these classifications are to designate, conserve, and protect areas for the continued use of lands for timber growing and production. They are also intended to conserve and protect watersheds, wildlife habitats, recreational, and other values associated with the forest. These areas are usually divided into parcels of 20 acres or greater in size.

In addition, any development within one-quarter mile of the Salmon River must also meet Principle River Conservation Area (PRCA) requirements. This overlay zoning places additional restrictions on the type of development that can occur near the river and provides specific guidelines to minimize or eliminate impacts to the river's natural and aesthetic resources. The purpose of the PRCA is to maintain the integrity of the rivers by minimizing erosion, promoting bank stability, maintaining and enhancing water quality and fish and wildlife habitats, and preserving scenic quality and recreation potentials. It sets standards for

development set backs, size and color of structures, and parameters for soil, slope, and vegetation factors.

Air Quality

Air quality and visibility in the Salmon River corridor are impaired at times from a variety of sources. Forest Service management activities have little impact on air quality and visibility due to the type of activity and their duration. The primary Forest Service activity that would affect air quality would be smoke from prescribed fires, but this is strictly regulated through the State of Oregon Smoke Management Plan. Other activities that could affect air quality such as field burning or light industrial operations occur on private land outside of the National Forest boundary, and these activities are not regulated as strictly as Forest activities. Recreation activities inside the river drainage could also affect air quality and visibility. The impacts would vary depending on the amount of activity and on weather conditions.

Air cleansing within the drainage is good with the local wind flows. At times the wind transports particles from other areas that would impair air quality and visibility. Inversions occasionally form over the drainage trapping haze, smoke and other airborne particles, but these inversions generally occur for short periods of time in the morning hours. No air quality or visual monitoring stations are in place in the river drainage and no data have been collected to determine the type and length of visual impairments.

Fire

The fire history within the drainage has been limited to small fires caused by lightning and human activity. Within the wilderness, most of the timbered uplands consist of stands about 100 years old which regenerated following wildfires.

Most recent fires have been suppressed with relatively small acreages burnt. The drainage on normal years is relatively moist and is not conducive to fire spread. The potential exists for large fires when weather and fuels conditions are dry. Fires can also enter the drainage from outside the river corridor, but downhill spread would depend on fire behavior and weather conditions.

Due to high recreation use on some stretches of the river, risk of fire is fairly high. This risk is somewhat lessened by road right-of-way clearing, and prevention activities, such as signing, patrols, public contacts, and restrictions during abnormally dry periods.

Wildland fire protection within the Forest is primarily shared by the Forest Service and the Oregon Department of Forestry. The Forest Service protects the drainage from the headwaters to the Forest boundary and the remaining portion is protected by the Oregon Department of Forestry. Within wild and scenic river corridors, suppression activities should not degrade river values if at all possible.

At this time, no prescribed natural fire policy exists for the river drainage, and the use of prescribed fire is limited to treating areas for fuels reduction as a result of timber sales.

For the private lands on the lower river, and as far east as Snowbunny Lodge, the Hoodland Fire District #74 responds to house and property fire calls. Bear Springs District and cooperators are available to respond to fire calls for the Wapinitia area.

Military Operations

No Military Flight Training Route (MTR) exists over the Salmon River Drainage. MTRs are present in both the Clackamas and White River drainages but do not overlap into the Salmon River corridor.

Chapter 3

Alternatives

Introduction

The alternatives represent a variety of ways to manage the river, and protect outstanding values while responding to public issues and management goals raised during scoping. Each alternative represents a reasonable strategy if implemented. None emphasizes one value over another to the extent that one or more would be seriously compromised, or that any environmental regulations would be violated. Timber harvest on public lands is about the same under all of the alternatives because of overlapping Forest Plan management areas that severely limit or preclude timber harvest (i.e., Wilderness).

Alternative A is the "no-action" alternative. It continues with current management direction for all lands within the river corridor. The other three alternatives offer strategies different from current direction or better define what management strategies will be emphasized along specific areas of the river.

River corridor boundaries change between alternatives in order to better protect the outstandingly remarkable values being emphasized and to reflect more logical placement with respect to natural landforms, and identifiable infrastructure such as roads.

Actions Considered but Eliminated From Further Study

The following action was proposed but not included in any of the alternatives: change the visual quality objective in the upper river segment from "partial retention" to "retention" within the upper recreational river segment.

This action was proposed to provide additional protection to scenic values in the upper river corridor where those values were found to be outstandingly remarkable. After evaluation, it was determined that the elimination of regulated timber harvest would better meet the objective of protection of scenic values, while still allowing timber harvest activities to take place in order to protect other river values such as recreation and wildlife. Because of that, regulated timber harvest was eliminated in alternatives C and D which were considered in detail.

Alternatives Considered in Detail

Four alternatives were considered in detail in this analysis. Alternative A is considered the No Action alternative, since it carries forward Forest Plan direction that is the current applicable land management direction for the river corridor. Alternatives B through D propose refinements or changes to current management based on different long-term visions for the river corridor. The alternative identified as "preferred" will be the 10-year management plan for the Salmon River corridor.

Actions Common to All Alternatives

- Continue inventories and surveys of fish and aquatic organisms on an as-needed basis.
- Meet Region 6/USFS direction for spotted owls and their habitat throughout the management area.
- Complete all habitat and species inventories required by the Forest Plan.
- Protect the river's free-flowing characteristics.
- Maintain the river's classifications of wild, scenic, and recreational.
- Allow existing developments within the river corridor to remain.

The following sections summarize the overall management direction/emphasis for each alternative, and briefly describe the management direction as it relates to specific resource areas. Actions proposed under each alternative are ones that would be compatible with the goals of that alternative. Site-specific analysis and further public involvement would be needed to implement most of the actions proposed.

At the end of the chapter, Table 3.1 gives a more detailed description of actions by resource value and alternative proposed in the management plan. This summary will enable the reader to easily compare differences between alternatives as they relate to specific resource values. Next, Table 3.2 briefly summarizes the outputs and effects of each alternative and is at the end of this chapter.

Alternative A: No Action

Alternative A focuses on furthering the intent of and implementing projects proposed under the 1990 Forest Plan on National Forest Land. On public lands managed by the Bureau of Land Management, current Resource Management Plan direction would apply. On state, county, and private lands, current land use direction for those lands would apply. This alternative would provide for a wide variety of activities while still protecting and/or enhancing river values for which the river was designated, protecting the river's free flowing characteristics, and maintaining the prescribed Recreational Opportunity Spectrum (ROS). This alternative is the No Action alternative, since it continues current land management direction for the area.

Goal

Continue with present management direction to protect and enhance the outstandingly remarkable values for which each river was designated and to protect its free-flowing characteristics.

Boundaries

Continue with interim boundaries for entire river. Average approximately 306 acres per river mile (one-quarter mile each side of river on National Forest; boundaries vary on lower river).

Access and Travel Management

No new public access to river would be developed. Some access points and multiple user trails would be closed or altered to prevent further resource degradation in accordance with Forest Plan direction. No additional limitation on seasonal use by vehicles would be placed, beyond current levels.

Recreation

Level or type of recreational services or facilities would not change. No new signing or visitor information would be provided. No expansion of existing facilities and no new facilities/trails would be constructed. Maintenance and improvements to meet legal requirements would take place. Current level of ranger patrols by Forest Service would be maintained. Current ROS classes would be maintained throughout the river corridor.

Water Quality/Quantity

Continue present management with one water flow gauge operated by USGS and occasional water quality testing by Oregon DEQ.

Wilderness

Wilderness direction developed in Salmon-Huckleberry management plan. All actions within the wilderness would meet current and future direction for the wilderness.

Fisheries

A few fish habitat rehabilitation projects would be undertaken on the river and tributaries based on site specific analysis. There would be no recommended changes to current management of fish populations on river. Some interpretation and environmental education activities would be provided.

Wildlife

Already approved habitat enhancement, such as field burning to improve forage in Salmon River Meadows, would continue. Minimal new enhancement activities along river would be undertaken.

Botany/Ecology

Existing botanical monitoring projects and evaluatation of effects to botanical values during planning and implementation of individual projects would continue.

Grazing

River plan would recommend that grazing continue in Salmon River Meadows under direction of the Wapinitia Allotment Plan. Effects of grazing to big game and to threatened, endangered, and sensitive plants and animals would be monitored. Allotment plan would modify grazing, if necessary, to protect river values.

Scenic Quality

No change from current Forest Plan standards. Private lands on lower river off Forest managed under State Forest Practices Act (100-foot buffer). All land development activities off National Forest must meet state and county zoning and land use regulations.

Private Land Regulation

State and county zoning regulations would apply. Scenic or conservation easements on private lands would not be pursued. Clackamas County Principle River Conservation Area zoning applies to one-quarter mile on each side of the river, with stipulations requiring set backs from river, vegetative screening, structure height, and types of development.

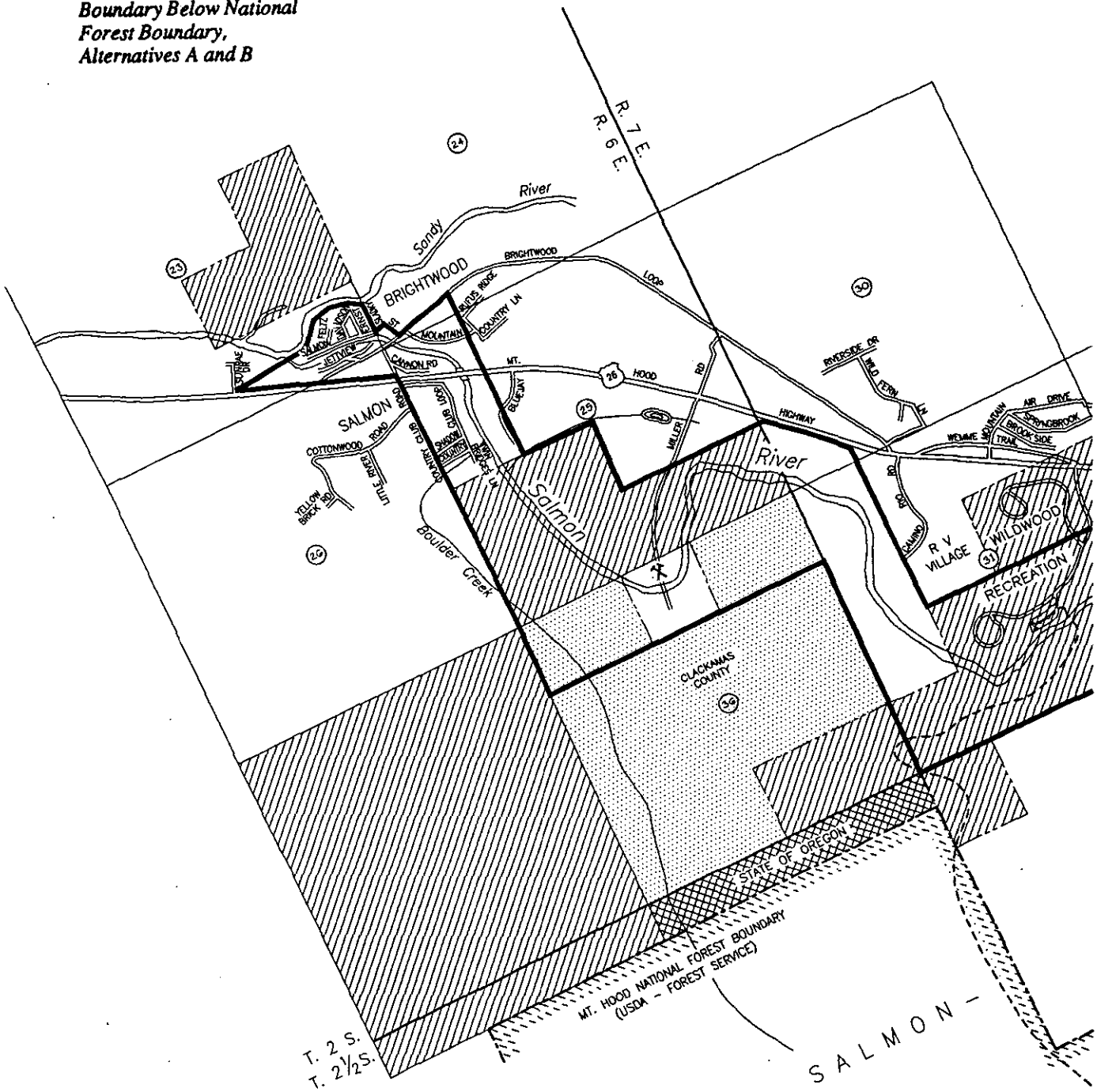
Alternative B

Alternative B emphasizes meeting existing and projected recreational demand on public lands while attempting to protect all outstandingly remarkable values. Access and facilities would be improved substantially in key locations to meet the needs of the public. Fisheries would be managed to provide a sizable sport fishery on some sections of the river but would emphasize native runs on others. Law enforcement would be higher to accommodate increased river use. Interpretation of river values would be emphasized.

Goal

Maximize public use opportunities on public lands while still protecting other river values.

Map 3.1 Proposed Management Corridor Boundary Below National Forest Boundary, Alternatives A and B



Salmon River – Designated Scenic River Segment Within the Wild and Scenic River System

Salmon River – Designated Recreational River Segment Within the Wild and Scenic River System

Proposed Wild and Scenic Management Boundary – Alternatives A and B

Public Lands (Administered by BLM)

Public Lands (Administered by USFS)

Public Lands (Administered by Clackamas County)

Private Lands

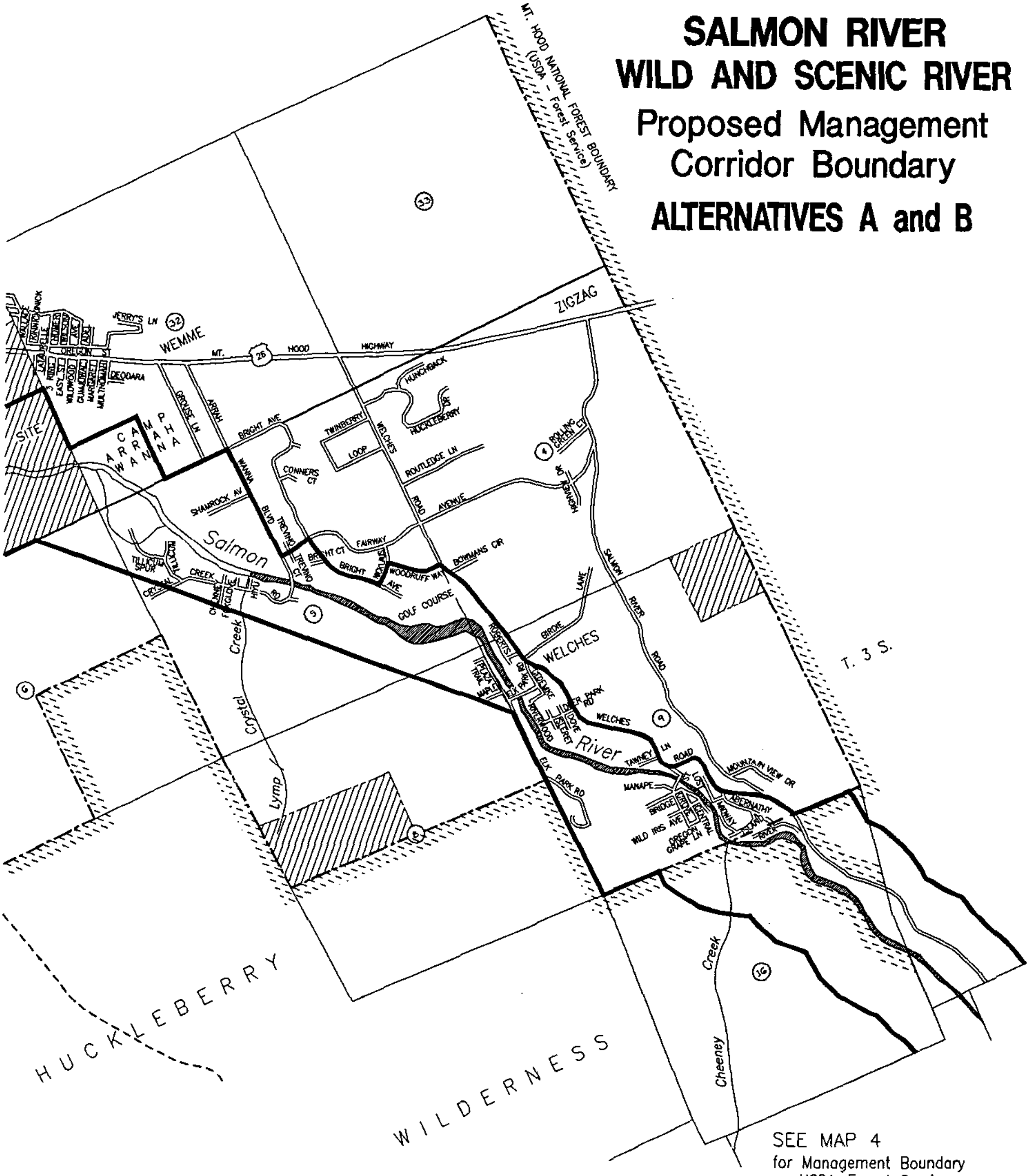
NORTH

0 1/4 1/2 3/4 1 Mile

SALMON RIVER WILD AND SCENIC RIVER

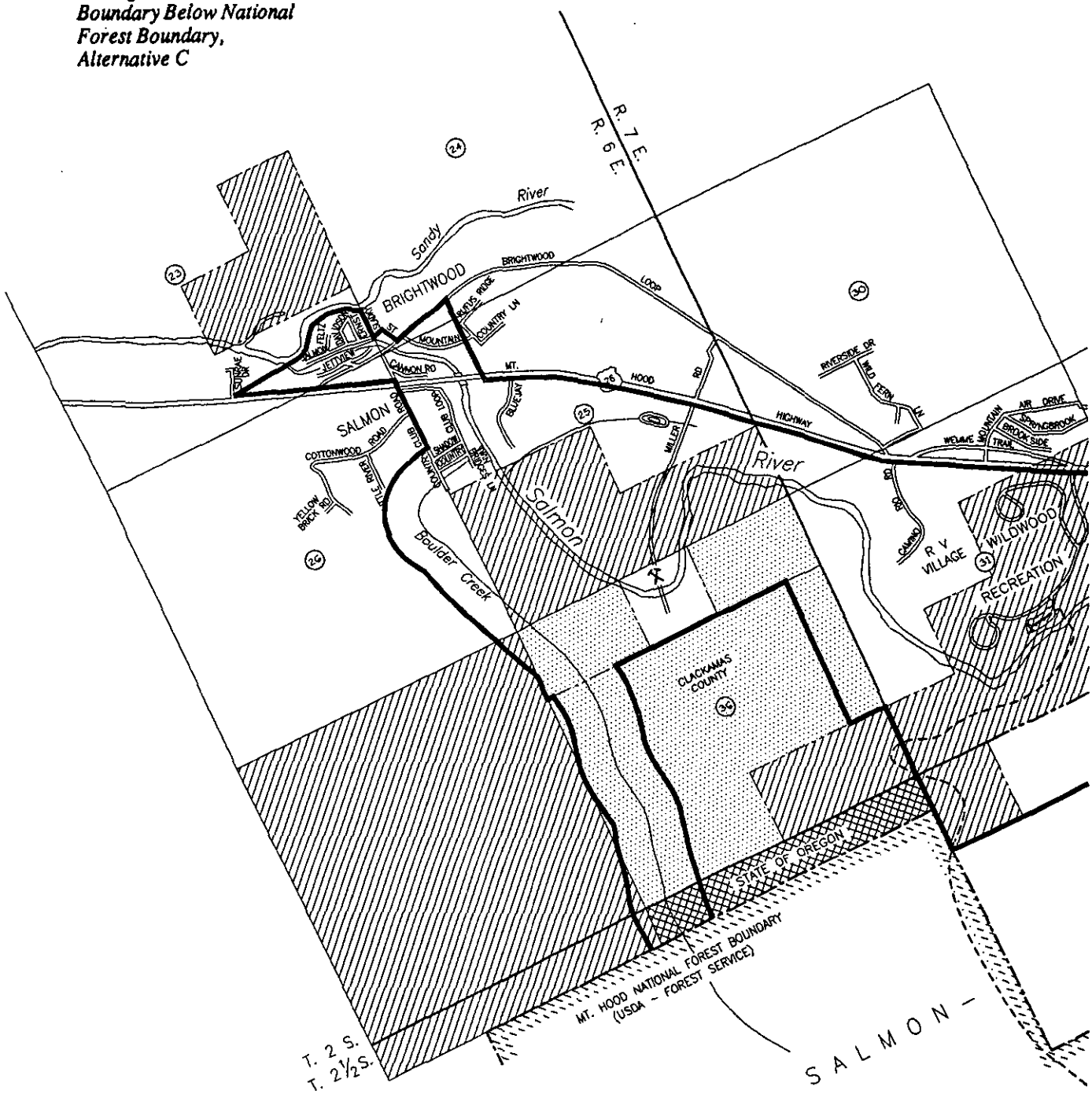
Proposed Management Corridor Boundary

ALTERNATIVES A and B



SEE MAP 4
for Management Boundary
on USDA-Forest Service

Map 3.2 Proposed Management Corridor Boundary Below National Forest Boundary, Alternative C



Salmon River – Designated Scenic River Segment Within the Wild and Scenic River System

Salmon River – Designated Recreational River Segment Within the Wild and Scenic River System

Proposed Wild and Scenic Management Boundary – Alternative C

Public Lands (Administered by BLM)

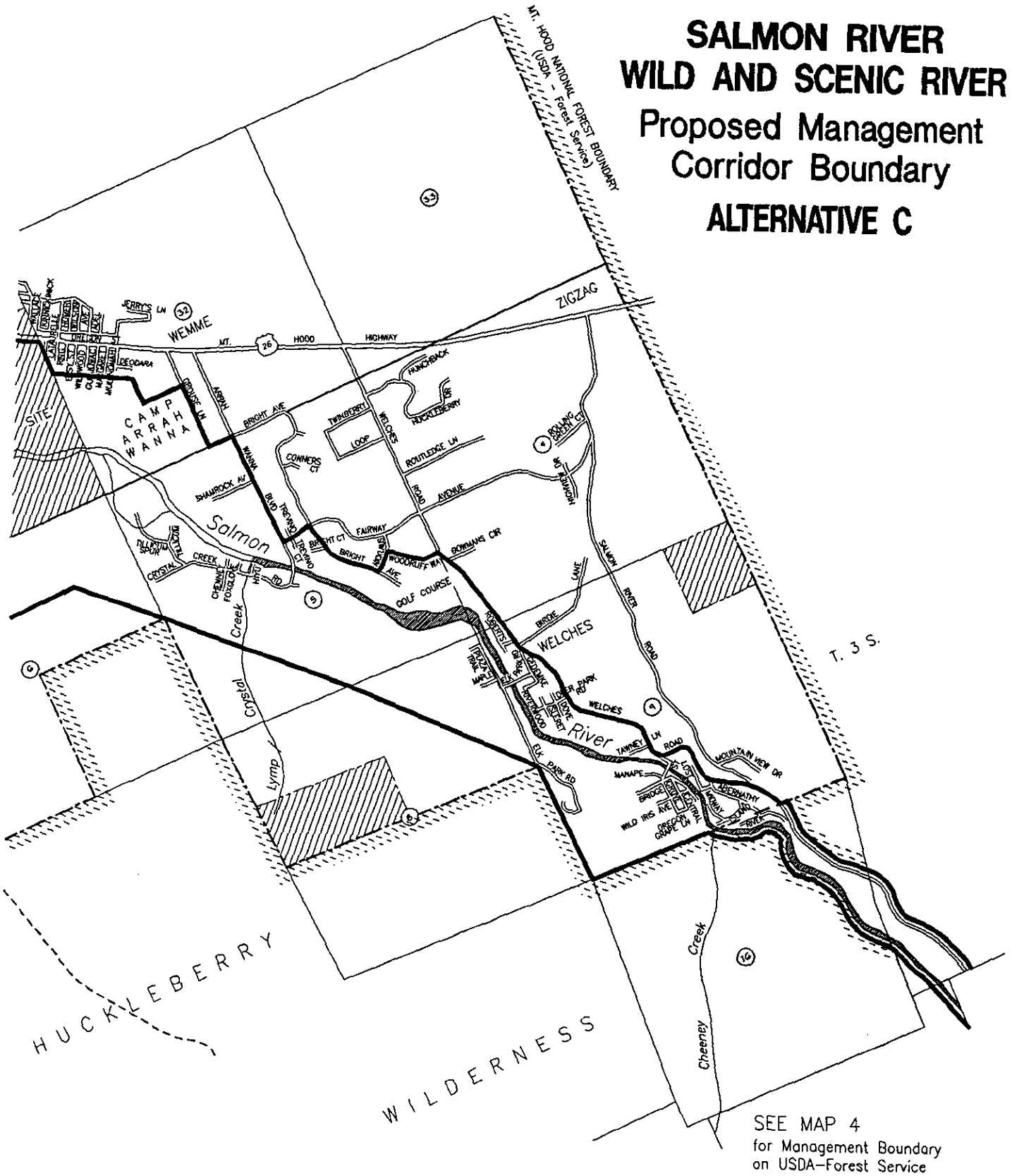
Public Lands (Administered by USFS)

Public Lands (Administered by Clackamas County)

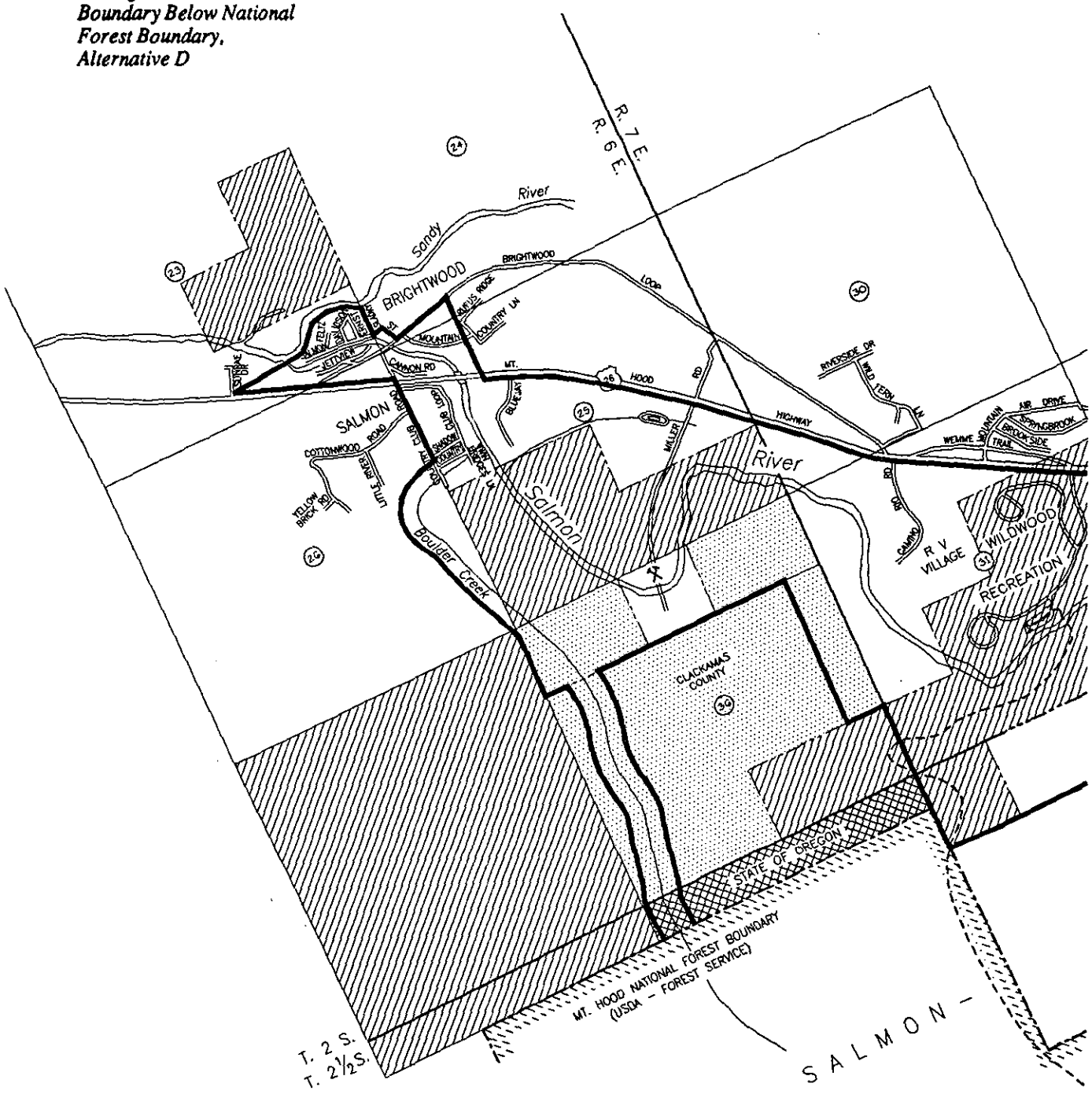
Private Lands

NORTH

0 1/4 1/2 3/4 1 Mile


SALMON RIVER
WILD AND SCENIC RIVER
Proposed Management
Corridor Boundary
ALTERNATIVE C
MT. HOOD NATIONAL FOREST BOUNDARY
(USDA - Forest Service)
ZIGZAG
WEMME
MT. HOOD HIGHWAY
CAMP ARRAH WANNA
SITE
Salmon
Crystal Creek
Lymp Creek
WELCHES
SALMON RIVER ROAD
River
T. 3 S.
HUCKLEBERRY
WILDERNESS
Cheeney Creek
SEE MAP 4
for Management Boundary
on USDA-Forest Service

Map 3.3 Proposed Management Corridor Boundary Below National Forest Boundary, Alternative D



Salmon River – Designated Scenic River Segment Within the Wild and Scenic River System

Salmon River – Designated Recreational River Segment Within the Wild and Scenic River System

Proposed Wild and Scenic Management Boundary – Alternative D

Public Lands (Administered by BLM)

Public Lands (Administered by USFS)

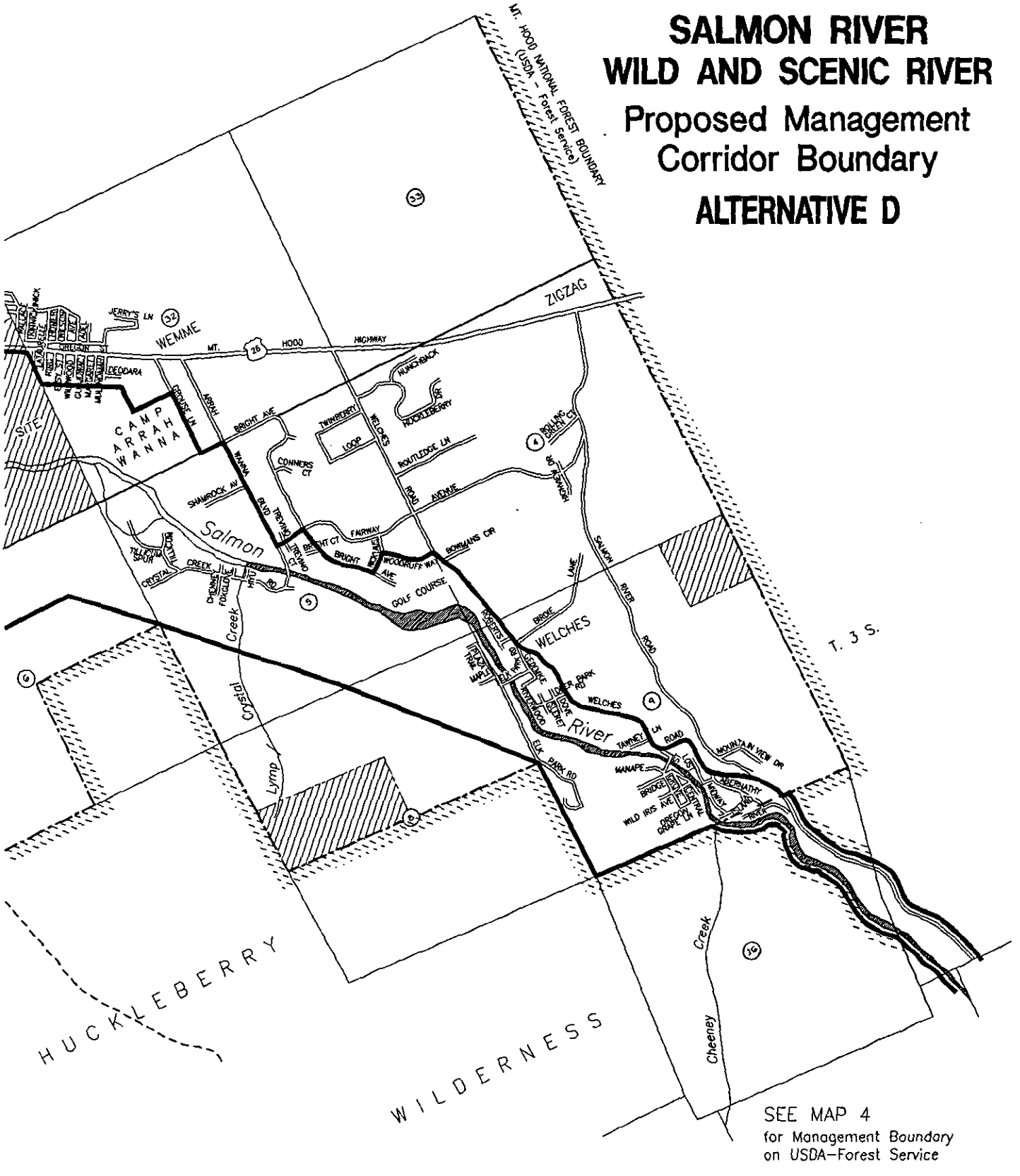
Public Lands (Administered by Clackamas County)

Private Lands

NORTH

0 1/4 1/2 3/4 1 Mile

SALMON RIVER
WILD AND SCENIC RIVER
Proposed Management Corridor Boundary
ALTERNATIVE D



Boundaries

Lower river boundaries outside National Forest boundary same as alternative A. Narrow river corridor to reduce overlap within Salmon-Huckleberry Wilderness while including other areas important to river's recreational values. Average approximately 242 acres per river mile.

Access and Travel Management

Increase public access to river on existing public land and on any additional land acquired on a willing seller basis, including Miller Road quarry. There would be no additional restrictions to access within and adjacent to corridor.

Recreation

Maximize recreation opportunities within corridor. Possible projects compatible under this alternative include improvements at Wildwood site for overnight camping, developing two new campgrounds, expanding Green Canyon Campground, developing an interpretive trail in Salmon River Meadows, developing new nordic trails and sno-park in upper corridor, providing additional toilet facilities in high-use areas, developing two barrier-free fishing piers along river, hardening dispersed camping sites along river, increasing interpretive signing in corridor, and providing additional information and services. Slight change to a more developed ROS class at specific locations in corridor. In the rest of the corridor, there would be no change in ROS class from current conditions.

Water Quality/Quantity

Same as alternative A, but in addition, BLM and USFS develop and implement water quality/quantity monitoring program. Work with State of Oregon agencies to identify minimum instream flow needs and notification procedures if pollution thresholds are exceeded.

Wilderness

Same as alternative A.

Fisheries

Fishery habitat improvement would be undertaken to improve existing sport fishery. ODFW enhancement of current hatchery releases/stocking program would be recommended. Interpretation and environmental education would be increased, especially at campgrounds and facilities such as Wildwood Park.

Wildlife

Same as alternative A.

Botany/Ecology

Same as alternative A, with a slight increase in monitoring around high use areas.

Grazing

Same as alternative A.

Scenic Quality

Same as alternative A.

Private Land Regulation

Same as alternative A unless easements are obtained on a willing seller basis that would give specific rights to the federal government.

Alternative C

Alternative C emphasizes enhancing scenic, ecological and other outstanding river values besides recreation. Fish, wildlife, plants, hydrology and scenic values would be protected and enhanced. Fishing emphasis would be on protection of native stocks. Recreation would not be pursued or encouraged where other values may be affected such as in the upper river meadows. Some access points and dispersed camping sites along the river would be closed or eliminated to reduce conflicts with wildlife or impacts to fisheries or botanical values.

Goal

Maximize enhancement of scenic and ecological values along river.

Boundaries

Lower river boundaries expanded at several locations to incorporate important wildlife and fishery habitat, and scenic resources. On theNational Forest, narrow the river corridor to reduce overlap within Salmon-Huckleberry Wilderness. The corridor in Salmon River Meadows area would be expanded to include the entire meadow complex. Portions of the East and West Forks of the Salmon River would also be included as key summer range for wildlife. Average approximately 320 acres per river mile.

Access and Travel Management

Decrease public access to river by eliminating smaller parking locations along Salmon River Road. Close Salmon River Road during winter where road crosses river to vehicular access to reduce wildlife harassment. Close secondary roads to vehicles during spring and early summer in upper river corridor to reduce wildlife harassment.

Recreation

No expansion of existing facilities and no new facilities/trails would be constructed. Remove dispersed sites along the river where resource problems exist or are in conflict with needs of other river values, and harden any remaining sites. No change in ROS classes from existing conditions.

Water Quality/Quantity

Same as alternative B, but in addition, actively pursue and conduct watershed enhancement opportunities to reduce non-point source pollution.

Wilderness

Same as alternative A.

Fisheries

Fish habitat improvement would be undertaken to enhance native (wild) stocks found in river. Recommend to ODFW actions to maximize recovery of wild fish populations, including eliminating release of current hatchery stock, possibly eliminating the summer steelhead fishery. Interpretation and environmental education would emphasize protection of wild stocks; the level of interpretation would be equivalent to alternative B. Emphasis would be both at dispersed sites and developed sites, such as Wildwood Park.

Wildlife

On National Forest, expand habitat enhancement activities in upper river corridor. Off Forest, pursue acquiring additional habitat areas (willing seller basis), and undertaking habitat improvement on lands important for big game winter range.

Botany/Ecology

Increase monitoring of impacts to botanical values throughout corridor. Provide educational materials on these values. Evaluate potential of Special Interest Area designation in Salmon River Meadows.

Grazing

Would recommend through the Wapinitia Grazing Allotment plan that grazing in the Salmon River Meadows area be significantly reduced or eliminated in order to reduce potential for conflicts with TES plants and animals, riparian values, and important big game species.

Scenic Quality

Change Visual Quality Objective (VQO) to retention as viewed from river and associated roads and trails in upper river corridor. Allow partial retention VQO for projects enhancing river values in corridor. Acquire scenic easements (willing seller basis) considered important for scenic quality. All activities off National Forest must meet state and county zoning and land use regulations.

Private Land Regulation

Same as alternative B but with increased assistance to county for planning, enforcement, and information to landowners.

Upper Meadows with Basalt cliffs

Alternative D

Alternative D emphasizes the enhancement of winter and summer recreational opportunities in specific locations along the river while other key areas, such as the Salmon River Meadows area, would be managed strictly for enhancement of ecological and scenic values. Access would be closed in some locations to protect riparian areas and other fragile habitats, and to reduce impacts on private lands. Fishery emphasis would be to continue to provide for a sport fishery similar to what currently exists, while providing for protection and enhancement of native stocks.

Goal

Provide for balanced protection and enhancement of all outstandingly remarkable river values.

Boundaries

Lower river boundaries same as alternative C but with more narrow buffers. Emphasize wildlife and fishery habitat in boundary expansion but not scenic resources. On National Forest, narrow river corridor to reduce overlap with Salmon-Huckleberry Wilderness. Salmon River Meadows and East and West Forks area would be the same as alternative C, but with less of West Fork included in corridor. Average approximately 312 acres per river mile.

Access and Travel Management

Public access to the river would slightly increase on existing public land and on any additional land acquired on a willing seller basis, including Miller Road quarry. The potential closure of secondary roads in the upper river corridor and close in spring and early summer would be evaluated, to reduce harassment of wildlife. Some access points would be closed or altered to prevent resource degradation.

Recreation

Additional recreation opportunities within corridor would be compatible under this alternative, including expanding Green Canyon campground, developing new nordic trails and sno-park in upper corridor, providing additional toilet facilities in high-use areas, developing one to two barrier-free fishing piers along river, identifying and hardening acceptable informal camping sites along river, eliminating some campsites where resource problems are present, and increasing interpretive signing and trails in corridor. There would be no change in ROS classes from existing conditions.

Water Quality/Quantity

Same as alternative C.

Wilderness

Same as alternative A.

Fisheries

Fishery habitat improvement would be undertaken to enhance native (wild) stocks found in river. Recommend to ODFW actions to increase recovery of wild fish populations, while still providing close to existing levels of consumptive fishing. Interpretation and environmental education would be at their highest level. Increasing public understanding and participation in fisheries conservation would be a major goal, to be pursued at dispersed sites and in developed sites such as Wildwood Park.

Wildlife

Same as alternative C.

Botany/Ecology

Same as alternative C.

Grazing

Same as alternative A.

Scenic Quality

Same as alternative C.

Private Land Regulation

Same as alternative C.

Comparison of Alternatives

The alternative descriptions that follow describe in greater detail those management actions that could take place if the alternatives were implemented. The reader should bear in mind that specific projects would still need additional site specific analysis prior to being implemented. The alternatives are shown in matrix form to allow easier comparison between specific alternatives.

Table 3.1 Salmon Wild and Scenic River Management Alternatives

	Alternative A	Alternative B	Alternative C	Alternative D
KEY PLANNING ISSUES:	**GOAL:** No action alternative. Continue with present management direction and manage under existing laws and authorities. **INTENT:** Continue current management and operations. No additional federal funding or management would occur within the corridor. Existing jurisdictions and authorities would remain in place. No change to the existing forest plan, BLM operations or county planning and zoning.	**GOAL:** Maximize the public use potential and opportunities of the river corridor while still protecting other river values. **INTENT:** Seek to enhance and develop existing and potential public use opportunities within the river corridor. This would include maximizing recreation sites, trails and access to the full extent possible under each river classification. Existing recreation sites would be expanded or improved to accommodate greater number of visitors. New trails, campgrounds, and public access sites would be developed as long as they would not significantly or permanently degrade other resources.	**GOAL:** Enhance all natural resource values, increase the natural character of the river where possible. **INTENT:** Enhance scenic and ecological values of the river corridor and provide public access and recreation opportunities only when they are not in conflict with natural values. The focus of management would be to enhance watershed and stream characteristics, fisheries, wildlife and scenery while exercising greater control over public use to emphasize resource protection.	GOAL: Provide for the balanced protection and enhancement of all outstandingly remarkable river values. Maintain the natural character of the river, enhance fish habitat and other natural values, and improve management of public use activities. **INTENT:** This alternative would seek to maintain and enhance important river-related values such as fisheries, wildlife, and water quality while improving management of current recreation opportunities. Existing recreation sites would be improved to a limited degree so as not to encourage greater use but to channel existing recreation use to appropriate areas to reduce impacts and crowding.
BOUNDARIES	Continue with current interim boundaries for entire river. (1/4 mile each side on USFS, boundary varies on lower) Average 295 acres per river mile Total acres: 9,880 (approx.)	Upper River (USFS): Widen boundaries in the Salmon River Meadows area and upper river to add greater protection to scenic and other recreation values. Narrow boundaries in Salmon-Huckleberry Wilderness to reduce overlapping administration with wilderness designation. Lower River: Same as alt. A Average 241 acres per river mile. Total acres: 8,076	Upper River: Narrow river corridor to reduce overlap within the Wilderness as in Alt. B. Expand boundaries to incorporate portions of the East and West forks of the Salmon and Salmon River Meadows area to provide additional protection to wildlife habitat. Lower River: Expand boundaries in Cedar Ridge, Wildwood, Crystal Ck. and Boulder Ck areas to provide protection to wildlife and fisheries habitat. Average 325 acres per river mile. Total acres: 10,880	Upper River: Same as Alt. C but with narrower boundaries in the East and West Forks. Lower River: Same as Alt.C but with narrower buffers on Boulder Ck. Average 315 acres per river mile. Total acres: 10,540
ADMINISTRATION	Continue with current jurisdictions (County, State and Federal), no formalized coordinated management beyond what currently exists.	Develop joint BLM and USFS management agreement through river plan. Work cooperatively with state and county governments where appropriate through development of memoranda of understanding.	Same as Alt. B.	Same as Alt. B with a citizens river oversight work group of local and regional interests.
EASEMENT ACQUISITION	None	Focus on easement acquisition to provide additional recreational access and for visual resource management priorities.	Expand easement acquisition to maintain scenic qualities of the river near the Mt. Hood corridor and to improve protection of watershed, fish, wildlife and other values.	Acquire public access, and scenic and conservation easements from willing sellers for a few high priority locations for fish, wildlife and scenic values.

	Alternative A	Alternative B	Alternative C	Alternative D
PUBLIC USE Recreation Experience and Opportunities Summary	* Continue current level or type of recreational services, facilities and management. * Provide no new signing or visitor information. *Do not expand existing facilities or construct new facilities or trails. * Continue current management for recreation use and maintain existing levels of ranger patrols on USFS and BLM lands. No additional management activities or patrols would take place on other lands. * Use current state and county regulations, enforcement and procedures to address problems of trespass, vandalism, litter, dumping, and fire on lower river below USFS boundary.	* Maximize public use opportunities within the corridor through the expansion and improvement of existing facilities and access areas or the development of new campgrounds and trails. * Provide additional information, signing and services to visitors. * Increase recreation management efforts including more frequent ranger patrols on USFS and BLM lands and increased monitoring of use levels and impacts. * Develop MOUs with Oregon State Police to allow State Police cadets to help enforce state and county regulations; primarily fishing regulations, litter, dumping, and fire along lower river.	Same as Alt. A.	Same as Alt. B except * De-emphasize ranger patrols, and minimal and new visitor information, signing and services. No new campgrounds would be developed, some access locations would be closed for rehabilitation and others improved for parking, sanitation and signing.
RECREATION Facilities	* Develop no new river recreation facilities, campgrounds or trails. * Expand or improve existing facilities (i.e. Green Canyon Campground or Wildwood Recreation Site) only if funding were made available under current site management plans.	* Expand Green Canyon Campground expansion by about 50% if suitable water source can be developed. * Develop walk-in campground (15 - 20 sites) on USFS lands about one mile below Green Canyon. * Develop a limited-facility public campground at Wildwood Recreation Site. * Acquire (through willing seller purchase or exchange) the Miller Road quarry site on the lower river. Reclaim area and develop recreation and sanitation facilities. * Develop group camping facility at the old Salmon River camp ground near junction Hwy 26/35. * Construct barrier-free fishing facilities for the disabled along the river at up to 3 locations.	Same as Alt. A.	Same as Alt B. except: * Do not develop new Wildwood Campground or walk-in campground below Green Canyon. * Do not develop group camping facilities at the old Salmon River camp ground.

	Alternative A	Alternative B	Alternative C	Alternative D
RECREATION Management and Monitoring	* Provide no additional river recreation management (patrols, signing, information or presence) would occur on public lands or in cooperation with county/state on private lands. * Monitor recreation use/impacts as required by Forest Plan on USFS lands. No additional recreation monitoring would take place. * Establish carrying capacity for recreation along the river only where specified in specific existing recreation site plans.	* Channel recreation use to appropriate locations and encourage resource protection practices through additional signing and information. * Increase levels of agency/ranger patrols, visitor contact and enforcement by the USFS and BLM during high use periods. * Utilize Oregon State Patrol Cadets to help enforce fishing and other regulations on lower river if funding available. * Expand season of use for USFS campgrounds and BLM Wildwood Recreation site for early spring and late fall fishing. * Develop and implement a comprehensive recreation monitoring program and visitor use survey. * Continue river clean-up efforts in coordination with county and others.	Same as Alt A. *but also:* * Institute a campfire closure along Salmon River Trail. * Close Salmon River Meadows road to motorized vehicle access year-round except for administrative use. * Discourage camping near river.	Same as Alt B. except: * Reduce agency presence and patrols. * Evaluate need to institute a campfire closure along the Salmon River Trail. * Close Salmon River Meadows roads to vehicle access except for administrative use. * Continue current seasons of use at USFS campgrounds and BLM Wildwood Recreation Site. * Develop a less comprehensive recreation monitoring program and visitor use survey than alternative B.
RECREATION Public Access and Trails	* Reconstruct existing trails when necessary as funding allows. * Close and rehabilitate existing dispersed camping sites along river in riparian areas where resource damage is present. * Do not provide new public access along the river. * Do not develop any new trails or trailhead facilities.	* Reconstruct and realign existing trails when necessary as funding allows. * Pursue development of sno-park and associated nordic ski/bike trails in upper river area near Hwy 26 & 35 junction. * Pursue development of a parking area and wildlife interpretive trail and viewing area in Salmon River Meadows area on USFS land. * Provide signing and improve spur trail to overlook for Final Falls. Place warning signs at terminus. * Pursue development of extension of Salmon River Trail #742 to Timberline Lodge via Mud Creek Ridge. * Improve existing parking/trailhead areas along Salmon River road, provide sanitation and signing as appropriate.	Same as Alt. A but also: * Close all small pull-outs along Salmon River Road and rehabilitate multiple user trails from those pull-outs. * Provide for improvement of existing parking/trailhead areas along Salmon River road, provide sanitation and signing as appropriate. * Study the feasibility of a river trail/greenway from Wildwood to the quarry, work with interested landowners. * Identify and evaluate dispersed camp sites along the river and harden acceptable locations to minimize user impacts. Close and rehabilitate all unacceptable locations where resource damage is excessive and sites are within the riparian zone. * Discourage camping near the river.	Same as Alt.B except: * Do not allow development of a parking area and wildlife interpretive trail in Salmon River Meadows area on USFS land. * Identify and evaluate dispersed camp sites and access points and harden acceptable locations to minimize user impacts at heavily used sites along the river. Close and rehabilitate locations where resource damage is excessive and sites that are within the riparian zone. * Discourage camping in the riparian zone.

	Alternative A	Alternative B	Alternative C	Alternative D
RECREATION Public Access and Trails (continued)		* Evaluate smaller pull-outs on Salmon River road and close those where resource damage is extensive, rehabilitate multiple trails from closed pull-outs. * Develop a barrier-free wetlands interpretive trail at Wildwood. * Study the feasibility of developing a river trail/greenway connecting Wildwood to the Miller Road quarry. * Seek to acquire new public access at the old quarry area (see Facilities section). * Continue to accommodate mountain bike use on old Salmon River trail below Fly Fishing Bridge. *Pursue access to Bonanza Trail if easement can be acquired on a willing seller or donation basis.	*Close Salmon River Road to vehicles at the upper (Fly Fishing) bridge during the winter.	
RECREATION Interpretive Facilities, Services and Public Information	* Create no new informational materials or signing. * Do not expand educational or interpretive efforts beyond that which is currently in place or will be implemented at existing USFS and BLM recreation sites or by the ODFW.	* Develop a comprehensive interagency interpretation/public information and education plan for the entire river corridor. * Develop an interpretive panel and overlook on the east end of the Timberline parking lot. * Pursue development of wildlife viewing area and interpretive trail near Salmon River Meadows. * Develop an old growth interpretive trail along lower Salmon River Trail or Old Salmon River Trail. * Develop a wetlands interpretive trail at Wildwood. * Develop a river recreation brochure and map. * Develop interpretive materials concerning the river.	* Develop a comprehensive interagency interpretation/public information and education plan for the entire river. * Use some signing to direct recreationists to public access and recreation sites and inform visitors about private lands, resource protection and fishing.	Same as Alt. B except: * Do not develop a wildlife viewing area or interpretive trail in Salmon River Meadows. * Further evaluate the potential of an old growth interpretive trail along lower Salmon River Trail or Old Salmon River Trail. Develop if compatible with river values. * Limit interpretive and information signs to existing recreation sites and trailheads. Do not promote the area in printed information but provide information on river values and their use protection.

	Alternative A	Alternative B	Alternative C	Alternative D
RECREATION Interpretive Facilities, Services and Public Information (continued)		* Work with local businesses to provide recreation and interpretive information and displays. * Use limited signing to direct recreationists to public access and recreation sites and inform visitors about private lands, resource protection and fishing. * Pursue development of an environmental education and interpretive center on public lands along the lower river focusing on fisheries and wetlands.		
WILDERNESS	* Develop wilderness direction in Salmon-Huckleberry Wilderness Management Plan. All management actions within the wilderness must met current and future direction for the Wilderness.	Same as Alt A.	Same as Alt A.	Same as Alt A.
HYDROLOGY Water Quantity	* Continue USGS and WRD flow monitoring at one gauging station location on upper river. *Provide no additional monitoring beyond USGS gaging at upper end of river. * Wild and Scenic Rivers Act recognizes (does not effect) existing water rights and Federal policy is to operate under the umbrella of state law for water rights and allocation.	Same as Alt A except: * Develop a flow monitoring program in conjunction with water quality monitoring plan. * Work with state agencies (WRD, ODFW, DEQ) by supplying monitoring data and assist in determining instream flow needs. * Encourage ODFW and State Parks to apply for minimum instream water rights for fish and recreation values.	Same as Alt. B	Same as Alt. B
HYDROLOGY Water Quality	* Provide no additional monitoring beyond occasional testing done by Oregon Department of Environmental Quality.	* Develop a monitoring program for water quality. * Develop water quality parameters and thresholds for limits of acceptable change. * Establish an action plan outlining notification procedures and mitigation measures if pollution levels are exceeded.	Same as Alt B but also: * Work with county and state agencies on enforcement of existing water quality laws, zoning codes and development regulations. * Review effects and notify agencies of problems, review development proposals and submit recommended measures for mitigation.	Same as Alt. C.

	Alternative A	Alternative B	Alternative C	Alternative D
HYDROLOGY Water Quality (continued)			* Pursue and conduct watershed enhancement opportunities to reduce non-point source pollution including, but not limited to: – Review ground and surface water management practices at major recreation sites and resorts and make recommendations. – Rehabilitate trails, campgrounds and roads to reduce runoff and sediment if necessary. – Work with ODOT, BLM, USFS and county to install sediment traps to collect road/highway sediment, stabilize road fill and sand/gravel storage, and improve drainage under state and county highways and roads. – Work cooperatively with organizations and agencies to identify and conduct educational and other watershed enhancement activities. – Develop, publish and distribute a River Landowners Stewardship Handbook to help inform landowners.	
HYDROLOGY Wetlands, Riparian and Floodplain Areas	* Continue current county and state land use zoning and regulations.	Same as Alt A. but also: * Develop a program to establish baseline information of wetlands and riparian areas and monitor impacts and changes periodically, and at least every five years. * Work with Clackamas County and state agencies on enforcement of existing regulations by alerting agencies of problems identified through monitoring or inventory. * Seek watershed enhancement opportunities and provide technical assistance and funding for projects.	Same as Alt. B but also: * Pursue cooperative and voluntary opportunities for rehabilitation projects. * Develop and provide technical information to landowners/county about appropriate and environmentally sound riparian area/shoreline management techniques. * Work with the county and private landowners to discourage development within the 100 year flood plain. * Provide information and assistance to landowners and county to restore natural hydrologic functioning within the floodplain. * Work with the county to update zoning ordinances to establish and enforce 50 ft. vegetative buffer for the entire river.	Same as Alt. C. except:: * Do not establish and enforce riverside vegetative buffer of 50 ft. for the entire river.

	Alternative A	Alternative B	Alternative C	Alternative D
FISH Habitat Management and Monitoring	* Continue improvement of anadromous fish habitat on tributaries and mainstem of river and in wetlands on federal lands, emphasizing wild stock production. *Monitor fish habitat and fish populations in accordance with existing state and federal management plans.	Same as Alt. A but also: * Work cooperatively (ODFW, BLM, USFS, PGE, Clackamas County, private landowners and organizations) to improve anadromous habitat on the mainstem, lower Boulder Creek, Cheeney Ck., Wildwood wetlands (and associated springs and tributaries) and other tributaries. Actions would emphasize protection of hatchery release stock and improvement of the sport fishery. Actions would include: -- Increase diversity with log and boulder placement to create pools, hiding cover etc. -- Protect/enhance and restore side channel habitat. -- Work with landowners where opportunities exist to restore meanders, oxbows and flood channels. -- Create alcove/off channel rearing areas. -- Restore impacted areas in riparian zones and promote retention of large conifers along the river. -- Improve juvenile fish passage at Marmot Dam. -- Increase public education/interpretation to emphasize fisheries conservations.	Same as Alt B. except: * Emphasize wild stock production in all actions. * Develop an intensive habitat monitoring program to provide feedback on habitat protection/improvement measures on both public and private lands. * Acquire lands for protection and enhancement of the mainstem Salmon, Boulder Creek and other important unnamed tributaries. * Initiate interpretation and education efforts to conserve wild fish; emphasize developed recreation and dispersed sites.	Same as Alt. C except: * Increase public information, interpretation and education to emphasize conservation of the fisheries resources.
FISH Stock Management	* Recommend that ODFW maintain current management of existing mix of hatchery and wild stocks.	* Recommend that ODFW increase fisheries available for sport fishing consumption by increased release of hatchery stock.	* Recommend that ODFW undertake actions to maximize the recovery of wild fish populations, including: -- Eliminate hatchery releases in the drainage; -- Mark hatchery released salmon/steelhead in Sandy Basin; -- Develop regulations allowing consumptive sport fishing only on hatchery stock; -- Require catch and release of or closure on harvest of native and wild stocks; -- Gather information on remaining native species to determine status, distribution, habitat use and limiting factors. -- Do not stock anadromous species on upper river (above Final Falls).	* Recommend that ODFW encourage rehabilitation and improved production of native/wild salmonids while providing close to existing levels of consumptive fishing. Actions include: -- Provide public education to encourage catch and release of native/wild stocks; -- Mark hatchery released salmon in Sandy Basin; -- Enact catch and release regulations for native species, especially sea-run cutthroat. -- Limit releases of anadromous hatchery fish above Marmot Dam to spring chinook and summer steelhead; -- Do not allow stocking of anadromous species on upper river (above Final Falls); -- Use non-reproducing hatchery stocks if possible;

	Alternative A	Alternative B	Alternative C	Alternative D
FISH Stock Management (continued)			-- Make recommendations for lower Columbia River and ocean fisheries to protect/restore salmon/steelhead runs (such as reduction or elimination of gill net fishery, modifying ocean commercial and sport fishing regulations); -- Increase monitoring of fish populations to determine if management actions are effective at enhancing native/wild populations and minimizing competition between native and hatchery stocks; -- Allow hatchery stocking of non-reproducing resident fish in Trillium Lake.	-- Reduce levels of summer steelhead stocking; consider further increase of minimum size limit for resident trout; -- Make recommendations for lower Columbia River and ocean fisheries to protect salmon/steelhead runs (such as reduction or elimination of gill net fishery, modifying ocean commercial and sport fishing regulations); -- Increase monitoring of fish populations to determine if management actions are effective at enhancing native/wild populations and minimizing competition between native and hatchery stocks. -- Allow hatchery stocking of non-reproducing resident fish in Trillium Lake.
BOTANICAL/ ECOLOGICAL VALUES and GRAZING	* Maintain monitoring and inventory as directed by the Forest Plan or as a result of a proposed development. * Continue to allow grazing under direction of the Wapinitia Allotment Management Plan (AMP). AMP would recognize and contain measures to protect river values in corridor.	* Monitor plant communities in the Alpine/subalpine zone and around high use recreation areas and sites throughout the corridor. * Acquire and rehabilitate Miller Road Quarry area. * Continue grazing as in alternative A.	* Monitor plant communities in the Alpine/subalpine zone and around high use recreation areas and sites. * Recommend grazing be eliminated within the river corridor through AMP modifications. * Seek opportunities with universities and other organizations to develop a systematic botanical survey of the entire river corridor. * Evaluate the potential of Special Interest Area (SIA) designation for Salmon River Meadows area. * Monitor recreation caused impacts to habitat in the alpine/sub-alpine areas during the summer use season. * Inventory and monitor habitat and populations of coldwater corydalis along Linney and Draw Creeks. * Inventory and monitor ecological habitat in Salmon River/Red Top Meadows. * Provide educational material to landowners concerning the identification and conservation of listed (TES) species, wetland and riparian species and their habitats.	Same as Alt. C except: * Continue grazing as in alternative A. Establish partial grazing exclosures in Salmon River Meadows and adjacent meadows complex to monitor impacts to rare, and sensitive plant populations. * Monitor and reduce grazing if necessary to protect plant communities and wildlife habitat through direction in AMP.

	Alternative A	Alternative B	Alternative C	Alternative D
BOTANICAL/ ECOLOGICAL VALUES and GRAZING (cont)			* Protect and enhance populations of coldwater corydalis or other important listed species/communities through landowner conservation agreements, willing seller easements or purchase.	
WILDLIFE	* Enhance meadow habitat and forage areas in the East and west Forks and Salmon River/ Red Top Meadows area by using a combination of techniques including flooding, burning or grazing. * Monitor effects of grazing on TE&S species found in the Salmon River Meadows for conflict with big game. Modify grazing use through Allotment Management Plan if necessary. * Evaluate the need to restrict motorized vehicle access to upper river corridor during critical calving/fawning seasons. * Protect tree snags in old growth stands. * Monitor and evaluate recreation use impacts and effects to wildlife as identified in Forest Plan, identifying mitigation measures and corrective actions necessary. * Consult with U.S. Fish and Wildlife Service before proceeding with any management actions potentially affecting TE&S habitat or populations.	Same as Alt A. but also: * Develop wildlife interpretive trail or viewing area near Salmon River Meadows area. * Impose no additional restrictions on motorized vehicle access in upper river corridor.	* Enhance meadow habitat and forage areas in East and West Forks and Salmon River/ Red Top Meadows area by using a combination of techniques including flooding, and burning but not grazing. * Recommend grazing be eliminated as in botanical section. * Restrict motorized vehicle access to upper river corridor during critical calving/fawning seasons. * Enhance habitat and manage for healthy populations of beavers in Salmon River and Red Top Meadows. * Maintain or increase habitat diversity in meadows by planting native berries, hardwoods and conifers. * Close and rehabilitate all dispersed campsites in riparian areas as in Recreation Section, Public Access and Trails. * Minimize summer visitor use and close vehicle access to Salmon River Meadows to protect nesting habitat. * Conduct habitat improvement on river to create high quality forage for deer/ elk (consistent with wilderness plan where appropriate). * Emphasize protection of winter range on lower river on public lands and work with landowners to improve habitat/range on private lands. * Close Salmon River Road to vehicles at the upper (Fly-fishing) bridge during the winter. * Limit recreational use in riparian area if necessary to maintain travel corridors for wildlife during critical seasons.	Same as Alt. C. except: * Monitor and manage grazing activities as in Botanical/Ecological section. * Evaluate dispersed campsites in and adjacent to riparian areas would be evaluated for impacts to wildlife. Close and rehabilitate areas found to have unacceptable impacts. * Do not close Salmon River road to vehicle use as in alternative C.

	Alternative A	Alternative B	Alternative C	Alternative D
WILDLIFE (continued)			* Pursue establishment of hacking site for peregrine falcons in corridor. * Pursue acquisition of Cedar Ridge and Miller Road quarry area for important big game winter range. * Limit and control Off-road vehicle access in the Cedar Ridge (Miller Quarry) area to protect winter range and decrease disturbance.	
CULTURAL RESOURCES	* Complete cultural resource inventories and assess effects of any proposed action or project that may potentially affect cultural resources and implement mitigation measures as per Forest Plan and other legal direction. * Evaluate cultural resources that may be affected by project activities and determine their eligibility to the National Register. * Protect cultural resources considered eligible for the National Register of Historic Places or conserve values. Monitor eligible or unevaluated properties as directed under the Forest, BLM and County plans. * Pursue opportunities to manage for huckleberry resources in traditional Native American areas.	Same as Alt. A but also: * Develop cultural resource interpretive efforts in conjunction with the comprehensive interpretive plan (see recreation section) at the Barlow Road area (Hwy 26 & 35); Timberline Lodge parking lot/ overlook; Salmon River Meadows Guard Station; Linney Creek Guard Station; Green Canyon CG; and Wildwood.	Same as Alt. A	Same as Alt. B except: * Do not develop guard station interpretive efforts at Salmon River Meadows or Linney Creek.
SCENIC QUALITY Timber Management	* Monitor compliance with Forest Plan and state forestry practices. No change to existing VQO standards. * Encourage reshaping of existing clearcuts south of the river (Salmon sale) to enhance scenic quality with the following restrictions: -- Minimal additional acres to be cut; -- Views from Timberline, Salmon River Meadows and river taken into consideration; -- No cutting below access road at base of units and; -- Immediate replanting take place.	Same as Alt. A, but also: * Acquire scenic easements on private lands from willing sellers within the corridor considered important for maintaining scenic quality. * Provide technical assistance to private landowners to reduce visual impacts of proposed timber harvests on non-federal lands.	Same as Alt. B but: * Eliminate regulated timber harvest within the river corridor for the upper Recreational segment on National Land. Timber harvest activities could occur only to protect, enhance, or restore river values and meet current VQO prescribed for river. * Work with Oregon Department of Forestry (DOF) to establish a federal/state notification and review procedure for proposed harvests on private land.	Same as Alt C. (incorporates all actions under Alternatives A, B and C)

	Alternative A	Alternative B	Alternative C	Alternative D
SCENIC QUALITY and LAND USE **Residential, Community and Recreational Development**	* Continue current state and county land use regulations and zoning regulations. Maintain present levels of enforcement and development review procedures.	Same as Alt. A but also: * Develop Memorandum of Understanding (MOU) between county and federal agencies to coordinate review procedures concerning proposed development and zoning changes or variance/conditional use permits * Provide cooperative funding for a new river planning liaison position within the county planning department to review development activity, and providing technical assistance and information. * Develop a river landowner's stewardship handbook outlining conservation and enhancement techniques and guidelines, Wild and Scenic River information, local/county/state ordinances and regulations, and sources for information and technical assistance. * Work with ODOT, county, and utilities to improve appearance of roads, road cuts and fill and rights-of-ways as viewed from river through screening and design considerations and recommendations.	Same as Alt B but also: * Work with county to adopt ordinance to require sellers (and realtors) to notify buyers of private lands within the corridor of federal/state or special county river zoning designations, regulations and restrictions. * Review county zoning ordinances for compliance with Wild and Scenic River plan and effectiveness in implementation. Make any recommended changes to the Principle River Conservation Area zoning ordinance or zoning regulation enforcement. * Provide landowners with additional wetland, riparian, shoreline information and any pertinent and appropriate wildlife, cultural and botanical information.	Same as Alt. C.

Table 3.2 Summary of Outputs and Effects for the Salmon River

Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Botany/Ecology				
Habitat Quality (lower river)	Slight alteration[1]	Slight alteration	Increased enhancement[2], low alteration	Low alteration
Habitat Quality (upper river)	Slight to medium alteration	Medium alteration	Increased enhancement, low alteration	Low alteration
TES Plant Levels	Slight to medium alteration	Medium to high alteration	Increased enhancement, low alteration	Low alteration
Wetlands Protection	Medium alteration	Medium alteration	Increased enhancement, low alteration	Low to medium alteration
Alpine/Subalpine Riparian Protection	Medium alteration	Slight alteration	Increased enhancement, low alteration	Low alteration
Monitoring Level	Low	Low to moderate	High	High
Cultural Resources				
• Protection and/or conservation of Cultural Resource Values	High	High to moderate	High	High
Fisheries				
Habitat Quality				
• Lower, private reaches	Moderate to high decrease	Stable	Moderate increase	Moderate increase
• Upper Forest Service reaches	Stable	Stable	High increase	High increase
• Wild fish population levels	Slow decrease	Moderate to high decrease	Moderate to high increase	Moderate increase
• Consumptive fishing opportunities	Stable	derate increase	Stable	Stable
• Population/habitat monitoring effort	Slight increase	Slight increase	Moderate increase	Moderate increase
Hydrology				
• Water Quality	Stable or slight decrease	Slight improvement	Moderate improvement	Moderate improvement
• Water quantity, low flows	Possible decrease	No change	No change	No change
Recreation				
Recreation Facilities	Moderate	High	Low	Moderate to high
Developed Facilities	No expansion or new developed sites.	Expand 1 existing campground. Develop 3 new campgrounds. Develop 3 fully-accessible fish access.	Same as A.	Expand 1 existing campground. Develop 2 fully accessible fish access.

Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Management/Monitoring				
• Patrols/management presence	Low	High	Moderate	Moderate
• Monitoring	Low to moderate	High	Low	High
• Clean-up/maintenance	Low	High	Low	High
Public Access and Trails				
• Access to river				
On forest	Moderate to high	High	Low to moderate	Moderate to high
Off forest	Low to moderate	Moderate	Low	Moderate
• Trails/Trailheads	No new trails/trailheads	1-1/2 miles interp trail 9-10 miles new hiking trail 1 new sno-park 6-8 miles new nordic trail[3] 2-3 miles new mtn. bike trail[3] 3 outhouses at trailheads	2 outhouses at trailheads	1/2 mile of interp. trail 1/2 mile new hiking trail 1 new sno-park 4-6 miles new nordic trail[3] 1-2 miles new mtn. bike trail[3] 2 outhouses at trail heads
Dispersed Camping Opportunities (on WPS Land Only)	Moderate to high	High	Low	Moderate
Interp. Facilities/Public Information	Low	High	Low to moderate	Moderate to high
Impacts to Wilderness Character	Low to moderate	Low to moderate	Low	Low
Wildlife				
Effects on Big Game Habitat				
• Winter range	Moderate to high decrease	Moderate decrease	Moderate increase	Moderate increase
• Calving/fawning	Slight decrease	Slight decrease	Moderate increase	Moderate increase
• TES species habitat quality	Stable to slight increase	Moderate decrease	Moderate increase	Moderate increase
• Habitat diversity	Slight increase	Slight increase	High increase	High increase
• Population/habitat monitoring efforts	No effect	Slight increase	Moderate increase	High increase
Scenic Quality				
Segment 1: Recreational (USFS)	Upper: Slightly altered Lower: Natural appearing	Upper: Slightly altered Lower: Natural appearing	Natural appearing	Natural appearing
Segment 2: Wild (USFS)	Natural appearing	Natural appearing	Natural appearing	Natural appearing
Segment 3: Recreational (USFS)	Slightly altered	Slightly altered	Slightly altered	Natural appearing
Segment 4: Recreational (BLM/Private)	Moderately altered	Moderately altered	Slightly altered	Moderately altered

Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Segment 5: Scenic (BLM/Private)	Moderately altered	Slightly altered	Slightly altered	Slightly altered
Grazing				
• Grazing recommendations for Salmon River Meadows	Continue with monitoring	Continue with monitoring	Recommend elimination	Continue with monitoring
Geology				
• Changes to geologic features	No change	No change	No change	No change
Socioeconomics				
• Dollar returns to Clackamas County	$6,467,580	$6,459,315	$6,446,627	$6,447,497
Timber				
• Reduction in ASQ	0	114 MBF/yr	290 MBF/yr	277 MBF/yr
Other				
Acres within boundary				
• USFS	8350	6546	8477	8240
• BLM/Private	1530	1530	2403	2300
• Total	9880	8076	10,880	10,540
Average acres per mile	295	241	325	315
Probable Fed. Fee Ownership	0 acres	60 acres	320 acres	240 acres
Probable Fed. Scenic Easement	0 acres	80 acres	470 acres	320 acres

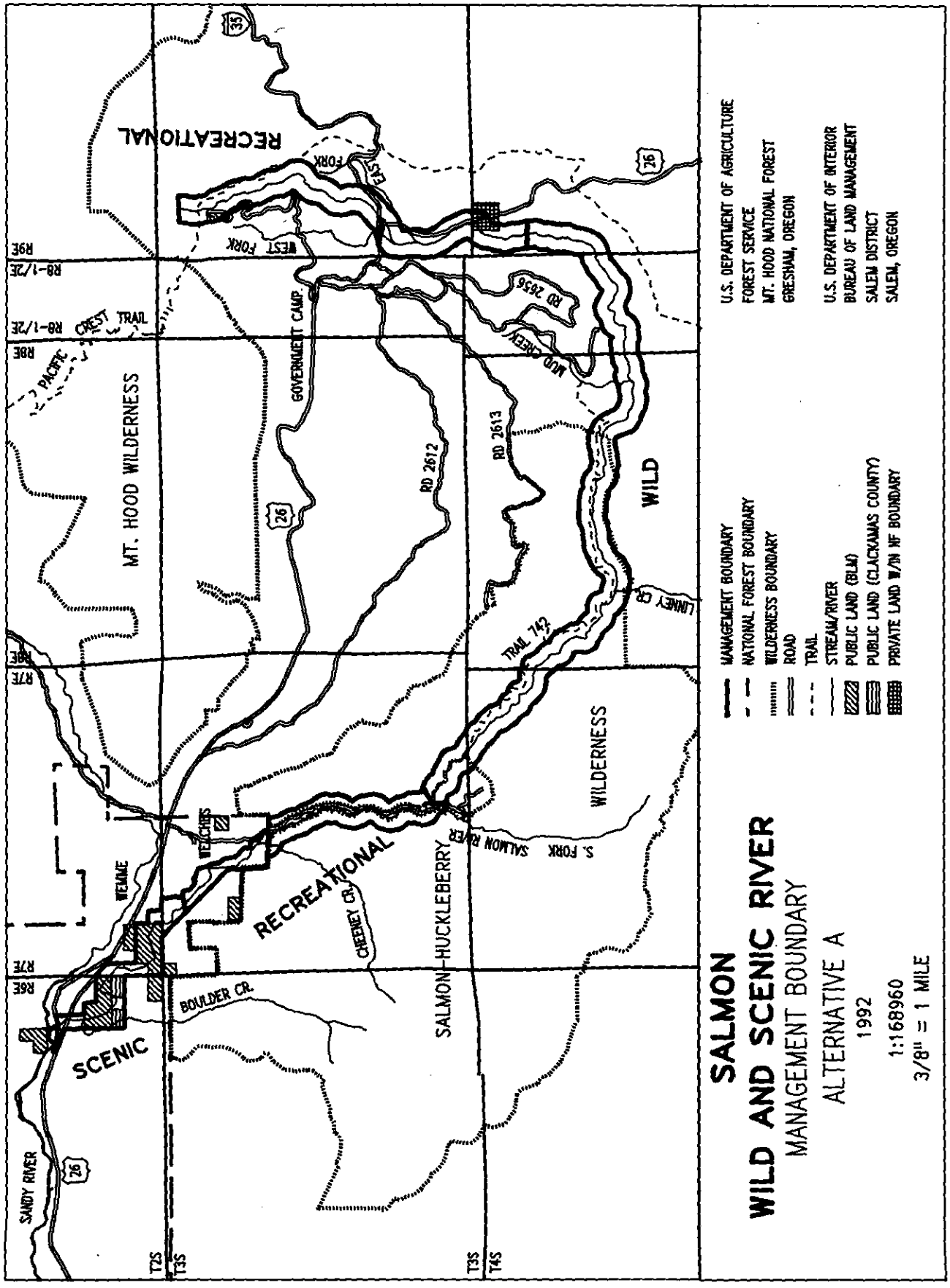
[1]"Alteration" means degradation of habitat.

[2]"Enhancement" means increased protection of habitat.

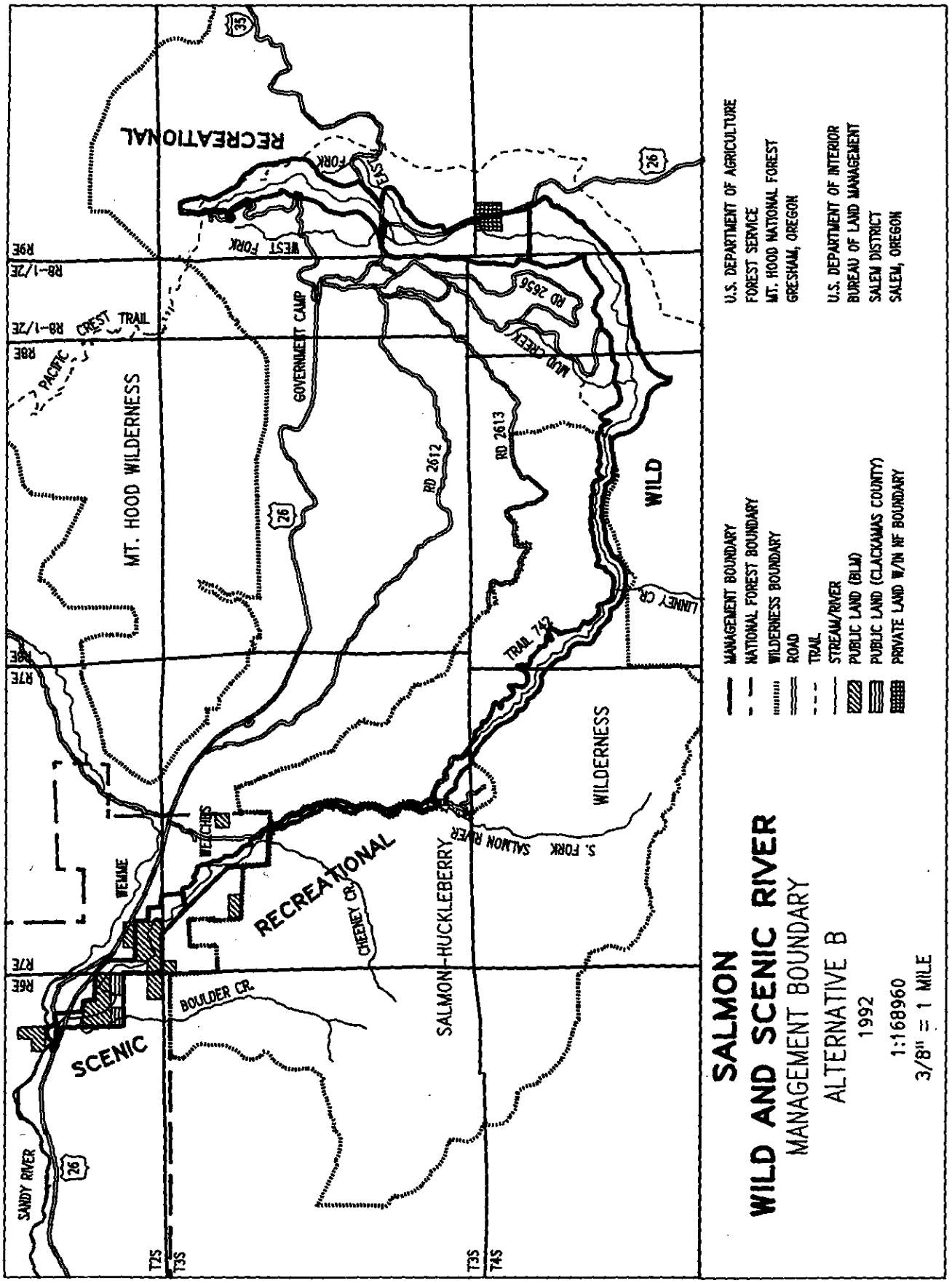
[3]Includes trail mileage outside corridor, but passes through corridor.

[4]Allowable sale quantity.

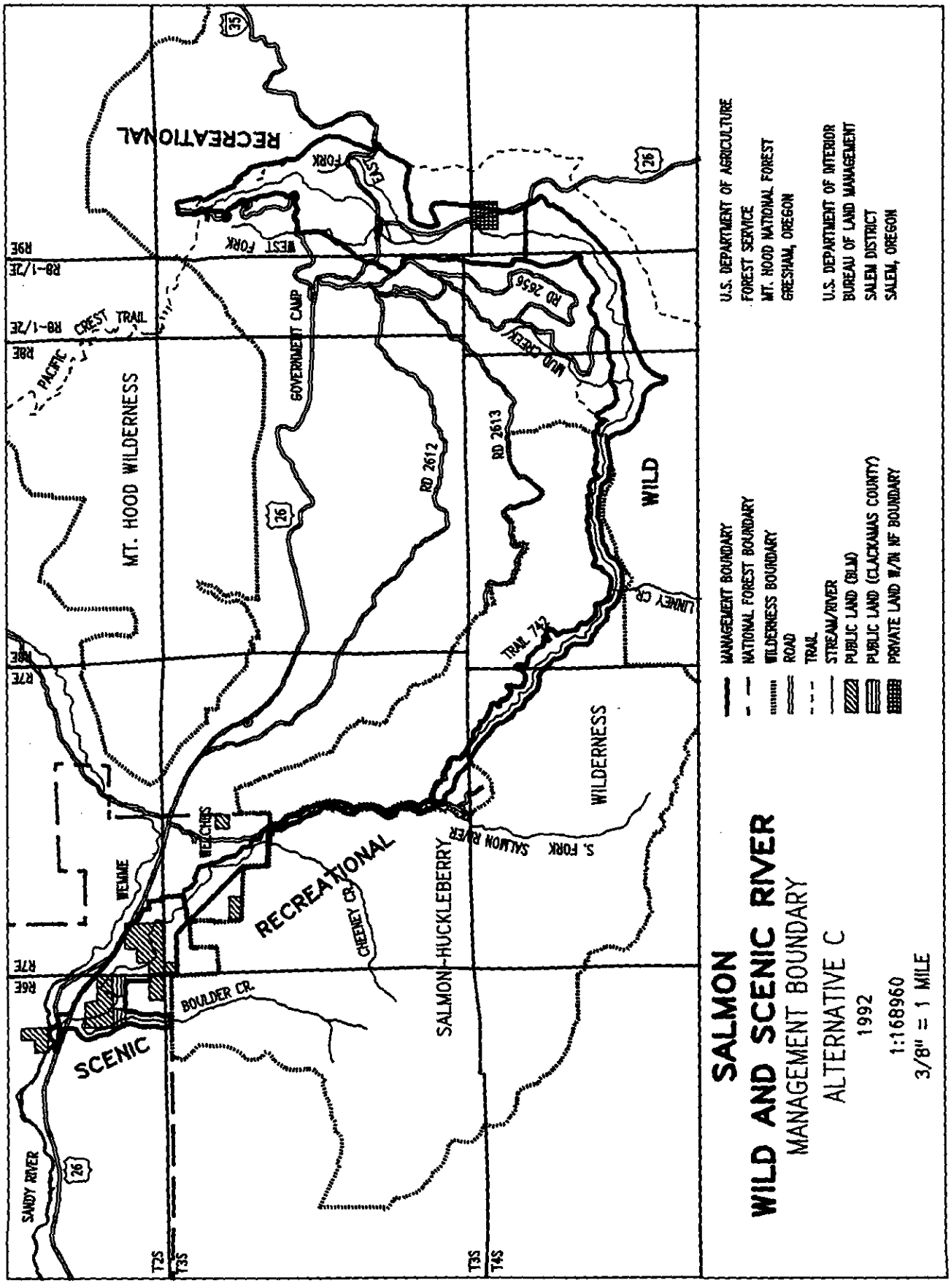
Map 3.4 Management Boundary Alternative A



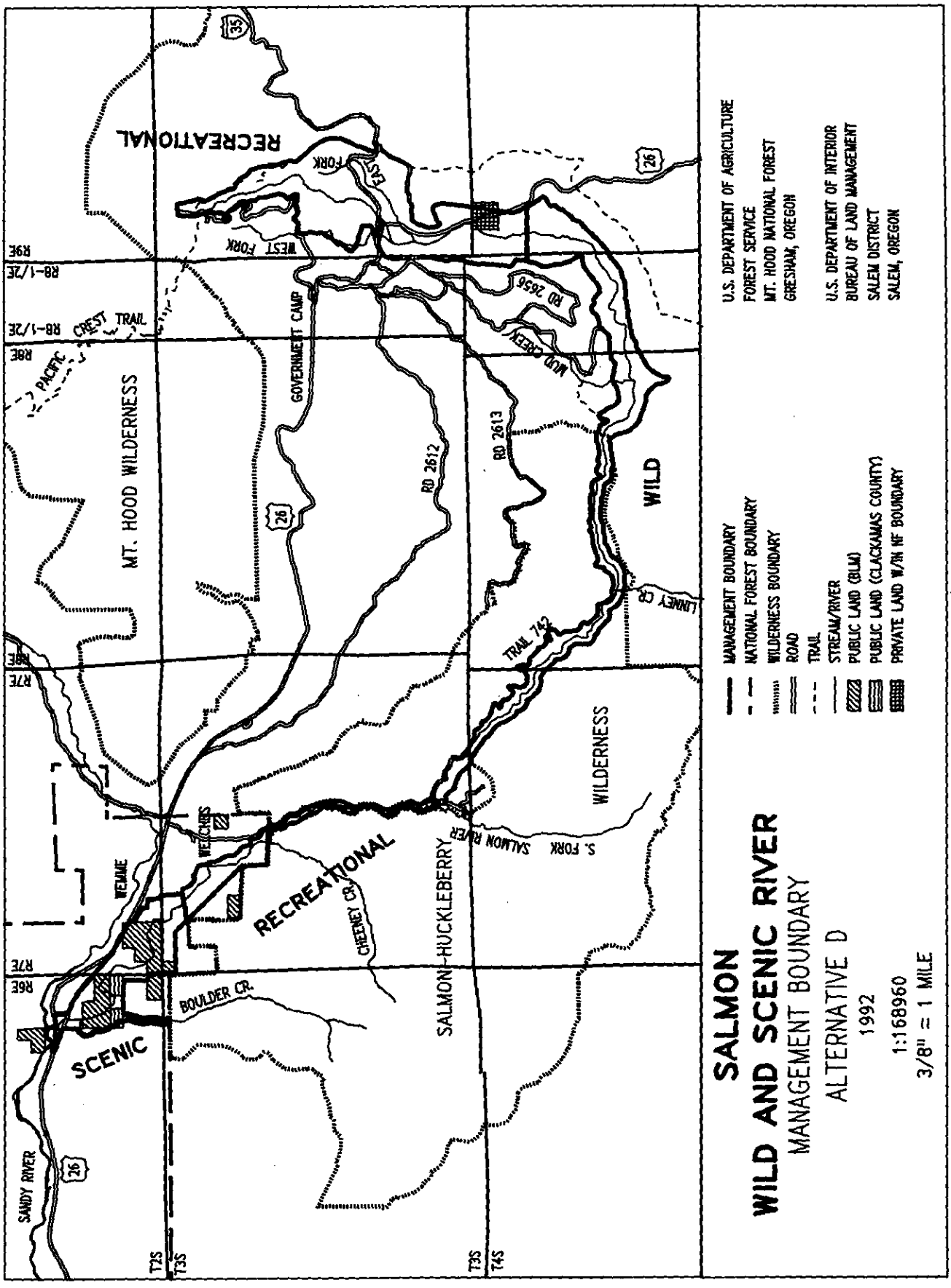
Map 3.5 Management Boundary Alternative B



Map 3.6 Management
Boundary Alternative C



Map 3.7 Management Boundary Alternative D



Chapter 4

Environmental Consequences/ Effects of Implementation

Introduction

This chapter forms the scientific and analytic basis for comparing alternatives. The effects that each alternative would have, if implemented, are analyzed and displayed. Short-term, long-term, direct, indirect and cumulative effects are considered. (Required disclosures on compliance with national laws and executive orders are at the end of the chapter).

Botany/Ecology

Trends for plants and associated habitats are difficult to adequately assess. Habitats within alternative boundaries and the protective measures of each alternative are important, but may not address biological processes on a community scale. Impacts to most plants and habitat on the Salmon River are cumulative, originating both within and outside the designated river corridor. The effects of implementing alternatives on private lands will be based in the future on the observed trends of private land management.

Alternative A

In general, diversity would be reduced on private land because residential activities would likely dominate the river corridor. Land fragmentation would likely occur on private lands where natural forest and meadows are broken up into smaller parcels of land and/or converted to other uses. This alternative, more than any other, would provide less connectedness to adjacent lands on the lower river. The collection of baseline information on plants and communities is less likely to occur on private land. Therefore, the assessment of future activities on private lands and associated impacts on threatened, endangered, or sensitive species are not as likely to be monitored.

On public lands, current grazing practices would continue with no technical monitoring program to determine potential threats to rare and sensitive plants and wetland communities. Fragile alpine and subalpine plant zones would not receive detailed (or minimum) monitoring for the protection of flora in high recreational use areas. Important inventories for *Corydalis aquae-gelidae* and other riparian/wetland rare species would not be scheduled. The protection and enhancement of rare plant communities would be curtailed. The acquisition and rehabilitation of disturbed zones would not occur, and educational programs to encourage conservation efforts by landowners would be reduced.

The impacts of this alternative are dependent on state and county regulations curtailing private land practices and on management activities of various state and federal agencies.

Alternative B

Recreational use along the Salmon River could be negligible or substantial, depending on private land management and public access to the river. However, high-use recreation sites in alpine and subalpine zones would be monitored to prevent negative impacts.

Presently, the Salmon River is an important component of the region's recreational opportunities, providing a full spectrum of settings from wilderness areas to fully developed recreational resorts all within an hour's drive from Portland. Increased recreational use anywhere along the river is likely to impact fragile ecosystems including habitat alteration from off-road vehicle use, trails, litter, and the general impact of human presence. However, the degree of impacts or plant community displacement would be related to the amount and timing of human activity.

An increase in public use of fragile areas such as Red Top Meadows, Salmon River Meadows, or the riparian zones of Linney Creek Campground could cause unfavorable impacts to sensitive and rare plant species. Successional plant communities could also be altered by human activity. On the other hand, degraded areas such as Miller Road Rock Quarry could be restored under this alternative.

Alternative C

This alternative would provide for the protection, inventory, and monitoring of rare plant species and fragile plant communities along the Salmon River corridor. It would emphasize the re-establishment of natural ecological processes. Using only natural ecological processes would result in slower change, but would ensure the continuance of known and unknown ecological relationships and communities. Although fire is a natural ecological process, wildfires would not likely be left to burn due to the close proximity of private lands. However, "prescribed fires" where needed could boost the ecological health of selected areas. If natural processes are allowed to occur, some late successional and old-growth plant communities would persist within the designated river boundary. Any increases in late successional communities would provide some balance with the early successional stages found on private lands. Connectedness between the lower river and adjoining uplands would be maintained under this alternative.

Although some public use would occur under this alternative, there would be less overall impact on plant communities because use would be concentrated in existing recreation areas. Recreational impacts to alpine and subalpine plant communities and habitats would be monitored. There would also be an evaluation of the Salmon River Meadows complex for possible designation as a special botanical area. Grazing would be prohibited within the river corridor to protect plant communities and wildlife habitat. Partial grazing enclosures would be established in Salmon River Meadows to monitor impacts to rare plant populations. The protection of wetlands and riparian species and habitats would be enhanced, and public education would be emphasized to some degree. Rare wetland and riparian plants such as coldwater corydalis would be inventoried throughout the river corridor and monitored where it exists. An extensive plant survey program could be undertaken. The conservation of rare plant species could be enhanced through landowner conservation agreements, willing seller easements, or fee title acquisitions. Rare habitats like Red Top Meadows would also be inventoried and monitored.

This alternative would result in fewer impacts to plants and animals and their habitats as a result of less human activity, and would allow more options in the future for managing biological diversity.

Alternative D

This alternative would maintain, protect, and enhance the biological values of the Salmon River by limiting other uses to a level that would not degrade these values. For example, recreational development would be planned to minimize impacts to the natural environment. The river would remain in a generally natural appearing condition by limiting facility development and by controlling access on public lands. Grazing in Salmon River Meadows would be modified to protect plant communities and wildlife habitat by reductions or changes in the allotment requirements.

Monitoring would be undertaken at fragile sites throughout the river corridor, such as Red Top Meadows, Salmon River Meadows, the Linney Creek corydalis site, and the alpine/subalpine zones in the river's headwaters. Opportunities for the conservation of natural values on private lands could be pursued as in alternative C.

Cumulative Effects

Increased human settlement has occurred along the Salmon River, as has recreational use. Associated with humans are pets, roads, fences, and other structures and activities that function as barriers to natural plant and animal communities. Successional diversity has been reduced on the Lower Salmon by residential development, so that early-to-mid-successional plant communities now dominate the landscape. The lower river (and the upper river in general) will continue to be influenced by recreational and residential growth in the Mt. Hood corridor. On private lands, some decrease in numbers and suitable habitat for some native plants, and sensitive plants in particular, can be expected to decrease unless suitable measures are taken.

Exotic and noxious plants and animals are likely to be introduced into the corridor with increased human settlement and land conversion. These introduced species often out-compete native species. The results of this type of competition and loss of native species probably have greater ramifications than is currently understood. Miller Road Rock Quarry is an example of an area along the river with rampant exotic weed problems.

Increased recreational use outside public lands is likely to impact public lands with or without restrictive buffers and wide boundaries. Impacts may include ecological alteration from off-road vehicle use, trails, litter, and general human presence.

Many of the sensitive plants in the river corridor require unique habitats and are not able to adapt to rapid changes in habitat. Coldwater corydalis is probably sensitive to river sedimentation or increased water temperatures. Grazing at Salmon River Meadows and adjacent wetlands needs to be studied to determine impacts and threats to rare plant species. Increases in recreation use and grazing could disturb habitats and populations of rare plants. Also, except in the wilderness portion of the river, the conversion of late successional plant communities to early successional are expected to continue, but mostly on private lands. Monitoring for adverse effects to plants and their habitats will be critical to the understanding of cumulative effects.

Cultural Resources

There are a number of cultural properties and points of interest either within the river corridor or immediately adjacent. Native American use, historic pioneer emigration, sheep grazing, early recreation activities, and land management activities have all left evidence of their occurrence. Both the Barlow Road and Timberline Lodge are on the National Register of Historic Places (NRHP). The Timberline Trail is eligible for inclusion on the NRHP but is not currently on the register. The Barlow Road crosses the three forks of the Salmon River near the junction of Highways 35 and 26 while the Timberline Trail crosses the Salmon River on Mt. Hood just above Timberline Lodge. Timberline Lodge is just outside of the river corridor. Its operation and maintenance as a National Historic Landmark would not be affected by any river management strategies. Other identified cultural properties are the Welches Hotel, the Oak Grove Wagon Road, and the Skyline Trail. Three Forest Service guard stations were also situated within the river corridor, but there is no readily visible evidence of these structures.

Other cultural resources likely exist in or adjacent to the Salmon River corridor. Much of the river is within the Salmon-Huckleberry Wilderness Area and has not been subject to cultural resource inventories. Cultural resource inventories that have been completed along the Salmon River have been conducted for proposed projects only. All alternatives would allow for a systematic survey of areas outside of proposed project areas.

Alternative A

Under Alternative A, the Salmon River would be managed under existing laws and authorities of land management agencies with jurisdiction in the river corridor.

Current standards and guidelines of the 1990 Mt. Hood Forest Plan would be followed on National Forest lands under all four alternatives. A cultural resource inventory would be conducted for any proposed project or activity within the river corridor that might affect properties eligible for the National Register of Historic Places. All proposed projects would also be assessed for their effect on National Register, eligible, or unevaluated properties. Any identified cultural resources within the river corridor would be evaluated to determine their eligibility to the National Register.

The Confederated Tribes of Warm Springs have expressed interest in enhancing the huckleberry resources on their usual and accustomed areas within the Mt. Hood National Forest. Opportunities to manage for huckleberry resources in traditional areas would be compatible under all four alternatives.

Alternative B

The goal of alternative B is to maximize public use potential and opportunities of the river corridor. Unidentified cultural resources face the greatest potential threat of disturbance under this alternative. Increased public use opportunities could introduce a greater number of recreationists who may deliberately or unintentionally have an adverse effect on cultural resources within the river corridor. These potentially adverse effects would be mitigated under this alternative by implementing an extensive interpretive program for the public at key recreation sites.

Cultural resources would be one theme of interpretive efforts at the Barlow Road area near the junction of Highways 35 and 26, Timberline Lodge parking lot, Salmon River Meadows, Linney Creek, Green Canyon Campground, and at the Wildwood Recreation Area. This interpretive effort would not only serve as a recreational opportunity but would also be used to educate visitors on the importance of cultural resources and the need for protection. Agency presence could also be increased in the corridor with use of law enforcement and recreation site personnel. This increased presence should reduce the potential for adverse impacts.

Traditional Native American fishing use in the river corridor could be affected under this alternative, as an increase in consumptive fisheries is being proposed. See alternative B under Fisheries.

Alternative C

The goal of alternative C is to enhance the ecological and cultural attributes of the river and increase the scenic value of the river where possible. Projects would be proposed to enhance natural qualities of the river which also would coincide with preserving traditional Native American use of the resources within the river corridor. Since public use opportunities would not be developed as in alternative B, the number of visitors expected would be less and potential for associated impacts would also be reduced. Agency presence and interpretive efforts would be reduced.

Assuming that inclusion within the river corridor alone would provide for a greater level of protection for cultural resources, alternative C would provide more protection than the other alternatives by including in the boundary Salmon River Meadows, and segments of the East and West Forks of the Salmon River. Both of these areas are high-probability areas for the presence of cultural resources. Easements would be sought to protect scenic qualities and to improve protection of watershed, wildlife, and other natural values. Although the focus of these easements may not be necessarily for protection of cultural resources, it may be a secondary benefit.

Actions to maximize recovery of wild fish populations would be undertaken, which would substantially decrease opportunities for fish harvest, possibly eliminating the hatchery summer steelhead run.

Alternative D

The goal of this alternative is to protect river values while improving public use opportunities. Recreation projects would not necessarily increase use but would be undertaken to channel existing use to appropriate areas and reduce impacts. Some agency presence could be expected, but less than in alternative B. Cultural resource themes would be included in interpretive efforts at the Barlow Road area near the junction of Highways 35 and 26, the Timberline Lodge parking lot, Green Canyon Campground, and at the Wildwood Recreation Area. Interpretive efforts and some agency presence could be implemented, both of which could sensitize the public to cultural resource protection issues.

As in alternative C, projects would be proposed to enhance natural qualities of the river which also would coincide with preservation of traditional Native American use of the resources within the river corridor. Unique to this alternative is the establishment of an ad hoc citizens group of local and regional interests which would assist in overseeing the river.

Wild fisheries stock would be emphasized as in alternative C. However, maintaining existing levels of consumptive fishing would be compatible under this alternative.

Fisheries

Predictions of population trends for fish under different management scenarios are very difficult to make with any accuracy. Salmonid populations tend to be cyclic, responding to a complex set of environmental and human-caused factors. Habitat changes which would occur under each of the proposed alternatives are potentially important, but the population changes that would be expected to occur as a result of habitat change may be influenced by other factors, such El Nino, large floods, droughts, disease, pollution, and fish harvesting. Most of these are difficult to assess or predict, and may occur far outside a particular drainage. Implementation of measures to protect fish habitat and populations may be quite variable on private land, as would adoption of new fishing regulations and management strategies by the Fish and Wildlife Commission.

Most of the measures proposed for public lands would require separate NEPA analysis to adequately assess the full effects of implementation. The following assessment of effects on fisheries assumes full implementation of all measures proposed in each alternative. Also assumed is that the broad environmental and socio-political conditions continue along observed trends and patterns.

Alternative A

The focus of this alternative would be to implement existing regulations and policies. Existing levels of consumptive fisheries would be accommodated while attempting to maintain or increase the production of wild salmonids. Under this alternative, wild anadromous salmonid production could decrease with stable to slightly declining trends in production of wild resident salmonids over time. Consumptive fisheries would also likely decline overall.

Fish habitat conditions on National Forest and BLM lands should be generally stable in the long-term, showing improving trends in some localized riparian areas previously impacted by logging activities in Cheeney, Mud, and Linney Creeks. Some habitat improvement activities would be implemented as specified in the *Mt. Hood National Forest Land and Resource Management Plan* (1990) and some improvements could occur on BLM and other lands. Grazing would continue as provided for in the Wapinitia Allotment plan, and would be regularly monitored for any adverse impacts to river values. Analysis for the Salmon River drainage in the Forest Plan shows a slight decrease for aquatic habitat stability in the first decade, followed by stable conditions for the next four decades.

However, any improvements in habitat could be offset by impacts likely to occur on private and other public lands within the drainage (mostly in the lower reaches, in anadromous fish habitat). Under this alternative, the boundary of the management area outside National Forest lands would not include the lower reaches of Boulder, Lymp, and Crystal Creeks, and would encompass the last area of the lower drainage under any of the alternatives. Much of the unnamed tributary drainage in Wildwood Recreation Area would be excluded, which contains significant amounts of high-quality coho habitat. Fish habitat in the lower drainage would likely be degraded, since management and development activities would only be constrained by county ordinances and state regulations. The effectiveness of habitat protection provided by these measures is directly dependent on the level of enforcement, and there is no provision for additional personnel or funding for enforcement of zoning ordinances and other land use controls under this alternative.

Since there are no special recommendations for management of public access or consumptive fishing in this alternative, fish habitats and populations are likely to be impacted by constantly increasing recreation use. There would be more recreation use in riparian areas on both public and private lands, with impacts to vegetation, soils, and stream channels. There could be increased fishing pressure (legal and illegal), resulting in increased harvest of wild fish and a greater need for hatchery supplementation. It is unlikely that the ODFW could meet the demand for consumptive fishing on the river due to cost and the agency's wild fish policy. There are no provisions for increased enforcement of fishing or camping regulations. Impacts would likely be most severe in the lower drainage (anadromous habitat), where access is easiest and closest to the Portland metropolitan area.

Although initially meeting Forest Service policies, the NWPPC Subbasin Plan, ODFW's wild fish policy and the Sandy Subbasin Salmon and Steelhead Plan, this alternative would eventually shift population composition further toward hatchery-derived stocks for all anadromous and resident species and away from the goal of wild fish protection. Attainment of escapement goals set in the Salmon and Steelhead Plan would be slow and difficult to ensure, considering the variation of land management on private lands outside the corridor boundary.

Alternative B

Wild gamefish populations would likely decline under this alternative and consumptive fisheries opportunities would likely remain stable or increase. With the increased services and facilities accommodated under this alternative, public use levels would be the highest of all the alternatives. Fisheries management would focus on consumptive fisheries of non-native fish, such as early-returning summer steelhead, hatchery-derived spring chinook and catchable trout. Fish catch (both consumptive and non-consumptive) could increase dramatically, and fish mortality likewise would be the highest under this alternative. This would likely occur in the lower, more accessible portions of the drainage, but there could be increased harvest in the more remote areas as well. (Alternative B calls for new trail construction in Salmon River Meadows and around the Old Salmon River campground near the Highway 26/35 junction.) To support increased harvest, supplementation would be necessary. This would result in the gradual replacement of wild fish with hatchery stocks. The ODFW might not be able to increase stocking to meet demand due to costs and agency regulations.

This alternative likely would not meet the ODFW's wild fish policy or the Salmon and Steelhead Plan or the other agency management plans/directions. Populations of wild spawning stocks such as winter steelhead and coho salmon would likely decrease due to competition and incidental catch, and could not be supplemented under the conditions of this alternative. Resident and anadromous native cutthroat trout would also likely become more limited in total numbers and distribution.

Habitat degradation would be considerably more widespread than at present, and could be more extensive under this alternative. Some likely impacts would be ground compaction, bank erosion, loss of riparian vegetation and down woody debris along the stream channel. This would be most significant around the new or expanded developed campsites (Wildwood, Green Canyon, several Salmon River road locations and the group camp at Old Salmon River campground), and at the three proposed barrier-free fishing sites. These effects could be partially mitigated by public education and more law enforcement, but this might be negated by a huge increase in recreation use. For this reason, the alternative is likely to meet only minimum protective standards for some riparian areas under existing management direction.

A more aggressive habitat restoration program on the mainstem and lower river tributaries could mitigate the loss of habitat capability. Rehabilitation efforts on both private and public lands would be much more extensive than in alternative A. Although the boundary would be the same for both alternatives on private land, alternative B calls for more coordination with private landowners in habitat protection and improvement. The restoration of side channels, channel meanders and flood channels on the mainstem and tributaries (as well as pool and alcove creation) would be implemented, although habitat improvement would primarily benefit the sport fishery.

Water quality standards would be developed and monitored under this alternative and, where not met, would be corrected if possible. Water quality would be expected to gradually improve over time, and this would benefit fish production. Minimum flow needs for fish and recreation would be determined and could be protected through acquisition of instream water rights.

Alternative C

This alternative would focus on the restoration and enhancement of native and wild-spawning salmonid populations. The number of hatchery-derived fish would rapidly decrease and wild fish production would be expected to rise over time.

Consumptive fishing opportunities would likely dramatically decrease on the Salmon River, as hatchery supplementation of anadromous and resident fish would be eliminated within the Salmon River mainstem, and consumptive fishing would be allowed only on marked hatchery stocks within the Sandy basin. This might lead to the loss of the popular summer steelhead fishery.

Non-consumptive fishing opportunities would be increased, especially for native anadromous stocks (such as winter steelhead and sea-run cutthroat) following population recovery; both have suffered from overharvest of both immature and adult forms, due to mixed stock fisheries of the more numerous hatchery and less numerous wild production. Native resident cutthroat trout would also likely increase, with implementation of catch-and-release regulations and targeted harvest of introduced species (rainbow and eastern brook trout).

Increased enforcement of fishing regulations would be provided for by cooperative programs to hire state police cadets. Data gathering on native species would also help provide for restoration of runs by allowing identification of key habitats and limiting factors. It is assumed that the total number of people fishing would likely decrease from existing levels with decreased opportunities for consumptive use.

This alternative is compatible with the Forest Service policies, the NWPPC Subbasin Plan and ODFW wild fish policy. It is also largely compatible with the Sandy River Subbasin Salmon and Steelhead Plan, although the plan currently recommends stocking of spring chinook and summer steelhead in the river; this provision would need to be resolved. It is possible to meet the escapement goals for all stocks discussed in the Sandy Subbasin Plan through implementation of this alternative, but there would likely be an initial decrease in the escapement/
production from the Salmon River following the cessation of stocking, especially for summer steelhead and spring chinook. If all measures in this alternative are implemented, especially the habitat protection/rehabilitation and protection of adequate spawning escapement of wild stocks (i.e., marking of all stocked fish and consumptive harvest limited to marked fish only in the Sandy system, along with protective regulations in the lower Columbia and ocean fisheries), the production goals could be realized relatively quickly.

Habitat protection would be emphasized in this alternative; new recreation developments that would impact streams would not be implemented. Many of the existing developed and undeveloped recreation sites would be modified to reduce use and/or impacts at the sites (sanitary facilities would be installed, stream-side campsites would be moved back from the bank, etc.) The three barrier-free fishing platforms would be constructed, but recreational use associated with the facilities and associated impacts to habitat would be lower than in alternative B. Total recreational use of the drainage would likely decrease slightly under this alternative, with a resulting decrease in habitat degradation.

Fishing along the Salmon River

In the upper basin, the East and West Forks would be included within the management area boundaries to improve protection of the streams and wetlands there. Grazing would be eliminated from the Salmon River Meadows area. In the lower basin, more of the wetlands and small, unnamed tributaries on private land would be included within the boundary and therefore given increased protection; most of the unnamed tributaries in Wildwood Recreation Area would be included, including virtually all habitat used by coho salmon. Relatively large areas on lower Boulder and Crystal Creeks would also be included and protected. As in alternative B, a county land management planning position would be cooperatively funded to assist with habitat and viewshed protection through land use planning processes.

Habitat restoration would occur in this alternative as in alternative B, but would emphasize habitat improvement for native species such as coho salmon, spring chinook, winter steelhead and cutthroat. A special effort would be made to restore lower basin, low-gradient meandering small streams and wetlands that provide prime habitat for coho salmon and sea-run cutthroat trout. Many of these areas are on private lands and would involve work with, and coordination of, private landowners. The Wildwood tributary and wetland could be used as an example of the desirable habitat protection and management.

Water quality and quantity for fish would be more aggressively protected and improved under this alternative. State and federal agencies would cooperate to reduce sediment input to the river, and to inform and facilitate private involvement in pollution abatement. Water and habitat quality would be expected to significantly benefit from measures implemented in this alternative.

Alternative D

Focus of fish management for this alternative would be to restore native and wild salmonid production, while attempting to provide near existing levels of consumptive fisheries opportunities. All of the stock management and fishing regulation measures are similar to Alternative C, except that catchable trout, spring chinook and summer steelhead smolts could continue to be stocked in the Salmon River. (These fish would be marked, and non-reproducing stocks would be substituted as soon as they were successfully developed and tested.) Continuing to stock non-native fish in the river may result in competition and genetic interaction with the native stocks, but further targeting the harvest of hatchery stocks should help to reverse current population trends, which currently show hatchery-derived stocks increasing and native stocks decreasing.

This alternative is compatible with FS and NWPPC policies, as well as the ODFW wild fish policy (assuming full implementation of all measures and near full harvest of stocked fish). It also best meets the existing direction of the Sandy Subbasin Salmon and Steelhead Plan, by protecting and improving wild production of anadromous salmonids, and continuing to provide for near existing levels of recreational and commercial fisheries. Where escapement goals are not now being met, escapement would be improved through habitat restoration, improved juvenile fish passage at Marmot Dam, and recommending further regulation of sport and commercial harvest in the lower Sandy, Columbia River and/or ocean if needed.

Habitat protection and rehabilitation measures are also similar to alternative C, but the area included within the management area boundary for major tributaries such as Boulder, Crystal, and East and West Forks is decreased. Grazing would continue to be allowed in Salmon River Meadows under the allotment plan, but would be intensively monitored and reduced if any impacts were detected. Although no new major developed recreation facilities would be constructed, total recreational use would be expected to remain stable or slightly increase, largely because of the improved fisheries and access (the three barrier-free fishing areas, for example). Under this alternative, increases in watershed protection measures, fisheries habitat rehabilitation measures, enforcement of land use controls, and enforcement of recreation and fisheries regulations should help mitigate the impacts of increased recreation use on private and public lands. Water quality would likely improve if all measures were implemented.

Cumulative Effects

The cumulative effects of each alternative on the Salmon River fishery generally can be summarized as increases and decreases in wild fish habitat capability and production levels in the Salmon River drainage (potentially available for non-consumptive fishing), and the gain or loss of consumptive fisheries opportunities in the drainage, downstream in the Sandy system, Columbia and ocean fisheries. These expected effects are displayed below.

Affected Resource	Effect			
	Alternative A	Alternative B	Alternative C	Alternative D
Stream Habitat Capability	--	-	+++	+++
Wild Fish Numbers	-	--	+++	+
Fish Harvest, Salmon River	-	+	---	--
Fish Harvest, Sandy River	-	+	--	-
Fish Harvest, Columbia/Ocean	-	0	-	0
+ ++ +++ = Low, moderate, and high positive effect - -- --- = Low, moderate, and high negative effect 0 = No effect				

As mentioned above, some of the native anadromous fish stocks are at critically low levels. This trend is not unique to the Sandy River system; similar stocks are rapidly declining in adjacent river systems as well. Management of the Salmon River fishery could worsen this trend, helping to push a native stock closer to extinction, or it could contribute to recovery of these stocks. Listed below are the stocks present or formerly present in the Salmon River that are considered as at risk of extinction by the American Fisheries Society.

Stock of Concern	Degree of Risk (H,M,L)	Effect			
		Alternative A	Alternative B	Alternative C	Alternative D
Spring Chinook	H	-	--	+++	+
Fall Chinook	H	0	0	+	+
Coho	H	--	-	+++	+
Sea-run Cutthroat	H	--	---	+++	+
+ ++ +++ = Low, moderate, and high positive effect - -- --- = Low, moderate, and high negative effect 0 = No effect					

As displayed above in the analysis of long-term or cumulative effects on various fisheries and native fish stocks, it appears that alternative C best protects native and wild fish stocks, alternative B best serves the consumptive fisheries interest, and alternative D provides for a high level of native/wild fish stock protection while minimizing effects on the consumptive fisheries.

Hydrology, Water Quality and Quantity

Population growth and increased recreational demand in the vicinity of Mt. Hood could have an impact on the water quality in the Salmon River. Since a majority of the Salmon River watershed consists of public lands, population growth within the watershed will be slight. However, recreation and consumptive demands for water within the watershed are expected to increase. Forestry practices, residential and commercial development, increasing demands for water withdrawal, and recreational development upstream from and on tributaries to the river could affect future water quality and quantity. Areas of concern include increased sediment, runoff, chemicals, pesticides, trash and bacteria from recreation use, road maintenance, and land practices. The large percentage of watershed contained in the Salmon-Huckleberry Wilderness will help regulate water quality, although higher demands for water may contribute to lower seasonal flows on the river.

Alternative A

Under this alternative, water quality would remain stable or decrease somewhat from current levels. Facilities and management presence would not be improved to handle the expected increase in recreation use. Higher levels of recreation use could result in damage to streambanks, riparian areas, and sideslopes with associated sediment, soil compaction, trash, and localized water pollution. Reconstructing trails and closing existing dispersed campsites where resource damage is occurring would alleviate some of the problems.

Some additional development of private lands on the lower sections of river is expected. Residential and commercial development could increase runoff, sediment, and chemical pollution, particularly with the potential lack of coordination between federal, county, and private interests. Water withdrawals from surface and groundwater sources in the watershed could decrease low flows in the river and potentially impact river values. The corridor boundary would protect adjacent riparian and wetlands within one-quarter mile of the river from degradation due to development.

Instream fisheries habitat improvements on the river and tributaries, including introduction of large logs, could cause short-term increases in bank erosion by deflecting flows into banks and reshaping stream beds, thus increasing sediment input. Long-term benefits could include increased stream channel stability and decreased sediment input and transport.

Timber harvest and roads in the watershed would continue to contribute sediment and runoff to the Salmon River. Assuming the level of harvest would remain about the same as current levels, no change in water quality would be expected. Grazing in Salmon River Meadows would continue, and would probably not cause increased water degradation unless livestock use also increases.

Alternative B

Overall, an improvement in water quality would be expected under this alternative. Recreation, trails, and access would be maximized, and campground, parking, and public access expanded to accommodate a greater number of visitors. This could have the potential to increase erosion and runoff from campgrounds, parking areas and trails, to increase streambank and riparian damage, to reduce bank stability, and to contribute to increased amounts of sediment, trash, and bacteria. More ranger patrols, enforcement of county regulations, monitoring of resource damage, reconstruction of existing trails where necessary, and closing pullouts where resource damage is occurring would help mitigate any resource problems. Pursuing cooperative river cleanup and public education programs would decrease any potential damage from recreation activities.

Restoring damaged riparian areas and promoting retention of large woody debris in the channel would improve water quality in the long-term, by improving stream stability and the ability of the channel to handle high flows. Watershed enhancement opportunities and funding would be sought, which would result in decreases in sediment and other non-point source pollutants.

Some additional development of private lands on the lower sections of river is expected. Residential and commercial development could increase runoff, sediment, and chemical inputs to the Salmon River. Coordination between federal, county, and private interests to enforce state and county regulations, and to produce a river landowner's handbook stressing conservation and enhancement could reduce impacts from adjacent private lands. Water withdrawals from surface and groundwater sources in the watershed could decrease low flows in the river and potentially impact river values. However, securing instream water rights would protect flows for river values. The corridor boundary would protect adjacent riparian and wetlands within one-quarter mile of the river from degradation due to development.

Timber harvest and roads in the watershed would continue to contribute sediment and runoff to the Salmon River. Assuming the level of harvest would remain about the same as current levels, no change in water quality would be expected. Grazing in Salmon River Meadows would continue, and would not cause increased water degradation unless livestock use also increases.

Alternative C

Water quality would improve under this alternative, with public access and recreation accommodated only where not in conflict with resource values. Reconstruction of trails where necessary, closing dispersed camping where riparian damage is occurring, discouraging camping within 100 feet of the stream, and closing and rehabilitating all small road pullouts would reduce sediment loading and trash. Bacteria, sediment, and trash entering the river would be reduced by providing facilities at pullouts, and installing signs to educate and encourage resource protection.

Restoring damaged riparian areas and promoting retention of large woody debris in the channel would improve water quality in the long-term by improving stream stability, and the ability of the channel to handle high flows. Watershed enhancement opportunities and funding would be sought, which could result in decreases in sediment and other non-point source pollutants.

Some additional development of private lands on the lower sections of river is expected. Residential and commercial development could increase runoff, sediment, and chemical inputs to the Salmon River. Coordination between federal, county, and private interests to enforce state and county regulations, and to produce a river landowner's handbook stressing conservation and enhancement could reduce impacts from adjacent private lands. Development proposals which have the potential to impact river values would be reviewed, with recommendations made for mitigation.

Easement acquisition could be expanded along corridor, which would enhance management and reduce development adjacent to the river. Water withdrawals from surface and groundwater sources in the watershed could decrease low flows in the river and potentially impact river values. However, securing instream water rights would protect flows for river values. The corridor boundary would protect adjacent riparian and wetlands within one-quarter mile of the river from degradation due to development.

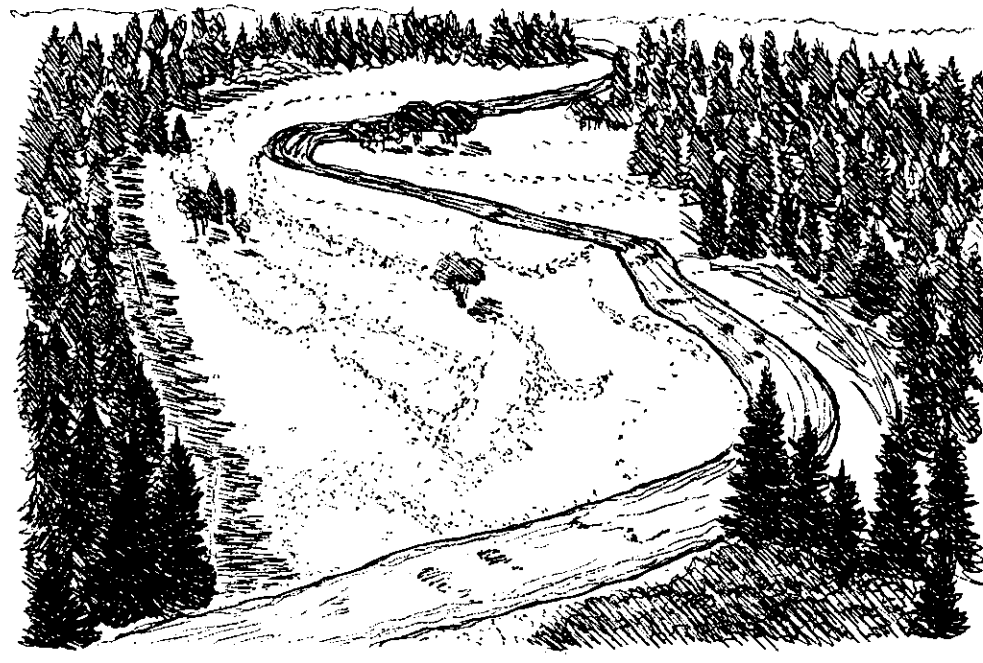
Timber harvest and roads in the watershed could continue to contribute sediment and runoff to the Salmon River. With harvest levels lower than alternatives A or B, an increase in water quality would be expected. Expanding the corridor boundaries up Crystal Creek and Boulder Creek would increase riparian protection and reduce additions of non-point source pollution from these tributaries. Eliminating grazing and closing roads on Salmon River Meadows would reduce sediment, fecal matter and bacteria, and wetland soil disturbance. Enhancing habitat and establishing beavers in Redtop and Salmon River Meadows would increase bank and stream stability and improve water and sediment storage by backing up water thereby decreasing flow velocities, and maintaining the wetland meadow environment. However, beavers carry the intestinal protozoan *Giardia* which is responsible for "beaver fever" in humans.

Alternative D

Water quality would improve under this alternative, but somewhat less than would be expected in alternative C. Recreation use would be somewhat higher, increasing erosion and runoff from campgrounds, parking areas and trails, increasing streambank and riparian damage, reducing bank stability, and resulting in increased inputs of sediment, trash, and bacteria. Agency presence and patrols would increase over present levels, but would be less than in alternative B. Reconstruction or realignment of existing trails where necessary, closing dispersed camping where riparian damage is occurring and vehicle pullouts where damage is excessive, and discouraging camping within 100 feet of the stream would mitigate increases in visitor numbers, and decrease sediment inputs. Pursuing cooperative river cleanup and public education programs would help decrease damage from recreational use.

Restoration of damaged riparian areas and promoting retention of large woody debris in the channel would improve water quality in the long term, by improving stream stability and the ability of the channel to handle high flows. Watershed enhancement opportunities and funding would be sought, which would result in decreases in sediment and other non-point source pollutants. Working with the Oregon Department of Transportation to install sediment traps for highway sediment and stabilizing road cut and fill would decrease sediment additions to the Salmon River.

1964 Flood, Salmon River



Some additional development of private lands on the lower sections of river is expected. Residential and commercial development could increase runoff, sediment, and chemical pollution in the Salmon River. Coordination between federal, county, and private interests to enforce state and county regulations, and to produce a river landowner's handbook stressing conservation and enhancement could reduce impacts from adjacent private lands. Development proposals which have the potential to impact river values would be reviewed and recommendations made for mitigation. Water withdrawals from surface and groundwater sources in the watershed could decrease low flows in the river and potentially impact river values. However, securing instream water rights could protect flows for outstanding values. The corridor boundary would protect adjacent riparian and wetlands within one-quarter mile of the river from degradation due to development.

Timber harvest and roads in the watershed would continue to contribute sediment and runoff to the Salmon River. With harvest levels less than in alternatives A and B, a small increase in water quality would be expected. Grazing in Salmon River Meadows would continue, and would not cause increased water degradation unless livestock use also increased. Expanding the corridor boundaries up Crystal and Boulder Creeks would increase riparian protection and reduce non-point source pollution from these tributaries. Enhancing habitat and establishing beavers in Redtop and Salmon River Meadows would increase bank and stream stability and improve water and sediment storage by backing up water thereby decreasing flow velocities, and maintaining the wetland meadow environment. However, beavers carry the intestinal protozoan *Giardia* which is responsible for "beaver fever" in humans.

Recreation

Recreation opportunities are made up of:

- The physical and biological environment (including the character of the landscape; level and type of development present; and fish, wildlife, and vegetation types)
- The social environment (the amount and type people who use the recreation setting, what activities they engage in, and what type of experiences they have)
- The managerial environment (the level, type, and location of public access, facilities, and improvements; interpretation and education efforts; and regulations)

Recreation experiences and opportunities may be affected by a number of factors, including logging, wildlife and fisheries management, amount of residential, commercial and facility development, level of recreation use (crowding), degree of regulations, and various types of or conflicting recreation activities occurring in the area.

Early in the planning process for the Salmon River, several issues were identified regarding recreation. These included:

- How increasing recreational use along the river would affect private property owners, fish and wildlife, wilderness, riparian vegetation, and the quality of the recreation experience;
- Where and what types of access would be provided to river users
- How to deal with litter, overfishing, and trespass problems
- What type of fishing experiences to provide anglers

This section describes how the four alternatives affect recreation and respond to these issues.

In all alternatives, it is recognized that fishing regulations and stock management are the responsibility of Oregon Department of Fish and Wildlife (ODFW). The Forest Service and the Bureau of Land Management can make recommendations to ODFW on regulations and stock management. Recreation effects are estimated assuming that recommendations made in the Fisheries section of Chapter 3 are carried out. Effects would be different if ODFW undertakes different fish management strategies than are proposed in this document.

Management Emphasis and Monitoring

Alternative A

There would be little change to current management emphasis along the river. There would be no coordinated effort made to establish carrying capacity or limits of acceptable use levels, or determine user preferences. This would result in a general lack of information for future planning efforts concerning river-related recreation use and users. Lower levels or occurrence of management presence in the field (patrols/monitoring) could result in impacts on river values and an increase in the number of illegal incidents such as poaching, trespass, and trash dumping.

Fishery stock management would emphasize maintaining the current mix of hatchery and wild stocks, resulting in little change in angler type and some increase in use levels. Limited ODFW management presence (current situation) and regulation enforcement could result in slight to moderate increases in illegal fishing or incidental take.

Limited agency presence and monitoring may also result in a slight to moderate degradation of recreational experiences due to lack of visitor contacts for information, safety and interpretive purposes.

Alternative B

Primary emphasis would be on enhancing both summer and winter recreational opportunities along the river. Actions such as site stabilization and improved signing should reduce many of the impacts at both developed and dispersed recreational sites along the river. Increased levels of patrols/monitoring would help identify and correct problems earlier than in alternative A. Patrols should also help increase compliance with regulations and reduce poaching and overfishing. The number of hatchery-release summer steelhead available for sport fishing would increase. This could result in slightly more crowded conditions and somewhat greater impacts to river values. The extended use season for Wildwood Recreation Site and Green Canyon Campgrounds would provide additional public camping opportunities not present in any of the other alternatives.

Alternative C

Management would emphasize protecting natural resource values along the river. Development of recreational opportunities would be subordinate to protection of river values, and many sites could be closed to reduce resource impacts. Additional dispersed winter facilities would not be provided. Additional monitoring above current levels would be undertaken to evaluate effects of recreation management activities on river values. Similar to alternative A, no additional patrols or enforcement would occur, probably resulting in slight increases in poaching, trash dumping, trespass, litter, and vandalism.

Protection and enhancement of native fish species would be emphasized over maximizing the sport fishery, which would reduce the amount of harvestable fish. This could result in a reduction in numbers of anglers, in crowding at certain locations, and in impacts to the riparian environment.

The managed use season for Wildwood and Green Canyon Campground would remain the same. Additional opportunities identified in alternative B would not be provided.

Alternative D

Similar to alternative B but less emphasis on providing recreational opportunities along portions of the river of special natural value. This includes the Salmon River and Red Top Meadows area, upper portions of the East and West Forks of the Salmon, and the Cedar Ridge area on the lower portion of the river. Agency patrols and monitoring would be similar to alternative B, resulting in fewer incidents of trespass, litter, vandalism, and poaching. With the emphasis on enhancing native fish runs, the number of summer steelhead available for harvest would probably be similar to or slightly lower than existing levels, resulting in somewhat less crowding during high-use seasons.

The facilities and managed use season for Wildwood and Green Canyon would be expanded somewhat and would provide some additional recreation opportunities. However, public camping at Wildwood would not be pursued. Improved enforcement, signing and information would enhance the recreation experience and possibly reduce impacts to riparian areas, and to fish and wildlife.

Public Facilities, Access and Trails

Alternative A

Only minimal improvements would be made to existing facilities along the river. No other publicly owned camping or barrier-free fishing access facilities would be developed. The Forest Service would continue working on developing an adequate water supply for Green Canyon Campground that meets water quality standards. Because of the small size (15 sites) and its high popularity, the campground would probably continue to be filled at or above capacity three or four days per week during the summer camping season. The Bureau of Land Management would continue to operate Wildwood Recreation Site as it is currently but would keep the site open later in the season if funding allows.

No additional trails and no new access points to the river would be developed. Existing trails would be maintained and reconstructed if necessary. No new trailhead facilities would be developed. Some trails and dispersed campsites along the river where damage is occurring would be closed and rehabilitated in line with Forest Plan standards and guidelines. Overall, recreation opportunities within the river corridor would remain basically the same with some reduction in quality and a possible increase in recreation impacts.

With the projected increase in use, and with limited access (especially on the lower river), trespass on private land would continue to occur. Increased competition at public access points along the river is also expected to occur. Higher unregulated recreation use would increase the amount of littering and of damage to soil and vegetation along the river. Potential for human-caused fires would also increase. No new nordic facilities would be provided in the upper corridor, which could cause even greater crowding at existing ski areas.

Alternative B

This alternative would accommodate the greatest number of developed recreational opportunities along the river. A group campground would be developed in the upper river corridor near the junction of Highways 26 and 35. The expansion of Green Canyon Campground (seven or eight sites) and the development of camping sites at Wildwood Recreation Site would help meet increasing demand for camping facilities along the river. The construction of a walk-in campground (approximately 15 to 20 sites) down river from the Green Canyon Campground would provide additional camping opportunities of a more primitive type than exists now. Longer operating seasons for facilities would also be compatible under this alternative.

This alternative would provide the highest level of public access and trail development of all the alternatives. Greater public access to the river would tend to reduce incidents of trespass, improve opportunities for hiking, and improve recreational access/opportunities for the physically challenged. The construction of barrier-free fishing facilities along the Salmon River Road and Miller road quarry site, along with improvements including toilets and trash cans, would provide additional and higher quality day use facilities for all recreationists, including those with disabilities.

Development of nordic skiing and mountain bike trails, a sno-park, and a snow play area in the upper corridor adjacent to Highways 26 and 35 would meet increasing demand for these types of recreation. Extending the Salmon River Trail toward Timberline Lodge would provide additional opportunities for recreationists to hike along and view the upper river. Development of a formal side trail to an overlook of Final Falls would provide much safer access than currently exists and would reduce impacts to vegetation and soil. Barrier-free interpretive trails in Salmon River Meadows area, near Green Canyon Campground, and at Wildwood Recreation Site could be developed.

Improving trailheads and access points to the river and providing toilets, would reduce sanitation problems that currently exist. By developing additional access points all along the river, much of the existing and future public demand for additional access will be met. About the same number of sites with existing resource problems would be closed and rehabilitated as in alternative A. Many of the remaining dispersed sites could be identified for stabilization and/or closure.

Salmon River Trail

As in Alternative A, an increased demand for dispersed camping sites is expected. Greater levels of public education, patrols and law enforcement should minimize impacts as in alternative A. Some of the public education would focus on directing visitors to other, less used recreation sites.

Trespass problems on private lands should be reduced through increased public access along the river, improved signing and public education efforts.

Alternative C

As in alternative A, no additional facilities would be provided. Recreation opportunities would remain similar to the way they are now. However, some recreation opportunities could be limited if conflicts with river resources occur.

No new summer or winter use trails would be developed along the river. Toilet facilities would be developed and trailheads improved along the Salmon River Road to correct existing resource problems. New trail or access development as in alternative B would not be pursued.

Dispersed camping and access opportunities along the river would be reduced and all the small pullouts along the river would be closed. Of all the alternatives, this alternative would close the greatest number of dispersed sites along the river in order to protect river values. The few remaining acceptable sites would be identified and stabilized to reduce further resource impacts. The limited public education and interpretive signing done under this alternative would help reduce resource impacts.

Alternative D

In this alternative, Green Canyon Campground would be expanded as proposed in alternative B, but none of the other camping facilities proposed in that alternative would be constructed. Fewer camping sites would be available for public use than in alternative B but there would still be additional sites available beyond the current level. Barrier-free fishing access and associated improvements would be pursued and would have the same effects as in alternative B.

Interpretive trails in Salmon River Meadows and near Green Canyon Campground would not be developed, resulting in little or no recreation caused impacts in those areas. Heavily damaged dispersed sites would be closed and rehabilitated, although not as many sites as in alternative C. In the upper reaches of the East and West Forks of the Salmon, mountain bike trail development would be restricted during certain seasons to reduce conflicts with wildlife. Nordic ski trails could still be developed in these areas, possibly resulting in less crowding and conflicts at existing areas.

Interpretive Services, Signing and Public Information

Alternative A

No new interpretive materials and signing would be developed, which could result in continuing problems with littering, illegal fishing, erosion, damage to vegetation, and increased potential for wildfire.

Alternative B

This alternative provides that highest level of interpretive opportunities of all the alternatives, with the development of new interpretive trails, displays, and brochures. The development of a comprehensive interpretive/public information/education plan would help ensure that river-related interpretation would be coordinated and complementary. Interpretive/education efforts would inform the public about the river and its values, and of the need for protection.

This should result in enhancing recreation experiences and reducing some of the existing resource problems along the river.

Alternative C

Minimal interpretive/educational opportunities would be developed under this alternative. Any educational material developed would be to educate the public on how to protect river values and reduce conflicts with private landowners, provide basic information on recreational opportunities, and to channel some recreation use to other areas. Use along the river should be lower than in the other alternatives.

Alternative D

Similar to alternative B, but with fewer interpretive opportunities provided since two of the proposed interpretive trails would not be developed. Future recreation use levels along the river should also be less than alternative B, since a greater emphasis would be placed on encouraging the public to use other recreational areas. Similar to alternative B, the development of a comprehensive interpretive/public information/education plan would ensure that interpretive efforts along the river are coordinated and complementary, thus enhancing the recreational experience and reducing resource impacts.

Wilderness

For all alternatives, it is assumed that current and future wilderness management direction for the Salmon-Huckleberry Wilderness is at least as restrictive as, if not more than the wild classification under the Wild and Scenic Rivers Act and Guidelines in terms of protection and enhancement of river values. Because of this, effects incorporate and reflect both river-related and wilderness values.

The Forest Plan provides the management direction for the Salmon-Huckleberry Wilderness Area. An Integrated Resource Analysis and Implementation Schedule will be developed to determine the actions needed to carry out the management direction and protect river and wilderness resource values. Public involvement will be an important part of this planning process.

Alternative A

Increasing use of the Salmon River Trail could result in more soil erosion and compaction, sanitation problems, and damage to riparian vegetation. With a lower level of monitoring than in the other alternatives, it is likely that these impacts would be greater before corrective actions would be taken. Any permit system to limit use would be implemented under the direction of the Salmon-Huckleberry Wilderness management plan.

Alternative B

Since this alternative provides the greatest number of recreational opportunities along the river and would draw higher numbers of recreationists, it is anticipated that recreational use within the Wilderness would be highest in this alternative. This is especially true on the lower end of the Salmon River Trail #742 because of ease of access. Potential for impacts to wilderness values is greatest. The increased level of monitoring on the river could more quickly identify areas where corrective actions need to be taken to reduce resource damage. These actions could include closing campsites, encouraging the use of alternate areas, and instituting a permit system to restrict use along the trail. If necessary, a use limit permit would be implemented under the direction of the Salmon-Huckleberry Wilderness management plan.

Alternative C

This alternative would probably cause the least increase in use within the Wilderness of all the alternatives. Because of this, adverse impacts to wilderness values would be least in this alternative. As in alternative B, the higher level of monitoring on the river would more quickly identify areas of resource concerns within the Wilderness and corrective actions could be undertaken more quickly than in alternative A. If necessary, a use limit permit would be implemented under the direction of the Salmon-Huckleberry Wilderness management plan.

Alternative D

Same as alternative B, but use levels and associated impacts would be less than in B and greater than in alternative C. In addition, the interpretive emphasis along the river should emphasize protection of wilderness values better than in alternative B. If necessary, a use limit permit would be implemented under the direction of the Salmon-Huckleberry Wilderness plan.

Wildlife

Population trends for plants and animals are difficult to adequately assess without time and funding to study various aspects of ecosystems. Habitat within alternative boundaries, proposed projects of each alternative, and the protective measures of each alternative are important considerations in determining effects on population trends; these considerations often do not address biological processes on a community scale.

Wildlife interacts with a wide variety of other resources, particularly recreation. Undeveloped recreation usually does not have a major effect on wildlife resources except for temporary displacement of animals. (Where undeveloped use is high, wildlife harassment, use of coarse woody debris for campfires, and impacts from trash can occur.) However, developed recreation sites, trail construction, or dispersed activities such as off-highway vehicle (OHV) use or hunting can significantly affect localized wildlife communities.

Timber management activities can have significant impacts on wildlife by directly affecting the habitat of animals which frequent mature or old-growth forest, such as spotted owls, pileated woodpeckers, and pine martens. As stands with these characteristics are harvested and brought under intensive management, habitat for old-growth species diminishes in size and quality because of fragmentation.

Harvest activities can improve the quantity of forage for black-tail deer, Roosevelt elk, and game birds seasonally, while old-growth habitat provides year-round forage and protection for wildlife. The quality of hiding cover for wildlife is affected by the number of roads and the amount of road use. Roads that remain open provide more opportunities for humans and wildlife to interact, which may result in increased wildlife mortality. Wildlife habitat is affected by new road construction, often with a direct loss of habitat.

Land allocations and uses can dramatically affect wildlife populations. The intent of designated wildlife habitat and special wildlife areas is to maintain viable populations of species dependent on scarce or diminishing habitats, as more areas of the Forest are brought into managed timber rotation. Effects to most plants and animals of the Salmon River area are cumulative, originating both within and outside the designated river corridor. Effects of the alternatives as they relate to private and public lands are based on observed trends of private land and agency management.

Alternative A

This alternative focuses on continued implementation of the *1990 Mt. Hood National Forest Land and Resource Management Plan*. Trends in wildlife populations would be similar to those discussed in the Forest Plan, but cannot be applied specifically to the Salmon River Wild and Scenic corridor. The mix of land ownership and allocation within the planning area along the Salmon River is not typical of much other National Forest land (i.e., the relative amounts of private land, Wilderness, and non-timber emphasis areas), so the general assessments of habitat decrease and increase made in the Final Environmental Impact Statement for the Forest Plan cannot be applied.

In general, diversity of habitat throughout the drainage is high and encourages species diversity (number and species and total number of animals), with the highest level of species diversity occurring in the Salmon-Huckleberry Wilderness. Wilderness areas provide refuges for those species that require later seral stages, such as the spotted owl, pine marten, and pileated woodpecker. In the short-term (5 to 10 years), habitat diversity would remain the same within this area and local population levels would remain stable. There would be a long-term increase in diversity due to seral changes in areas formerly disturbed by wildfire, and by new disturbances such as wind storms, flooding, and wildfire.

In the lower expanses of the river, land management is oriented towards commercial and residential uses. Assuming development trends are the same along the privately owned reaches of the Salmon River as on other areas on Mt. Hood, habitat diversity is at risk and would most likely be reduced. Species that require more open, shrub/forb dominated areas would benefit the most, and populations of these species should increase. Species such as deer and elk use this type of habitat for forage, providing human disturbance is not too high and hiding cover is available.

In the upper drainage within the viewshed land allocation, most stands would be managed on a 100-year rotation except along stream courses. Conversion of mature/old-growth forest to early successional forest would eliminate spotted owl nesting habitat, goshawk nesting habitat, pileated woodpecker habitat, and pine marten habitat, but would improve forage for deer and elk. Site specific opportunities to create quality habitat for selected species would be limited to Red Top and Salmon River Meadows and the upper river corridor. These enhancement projects would target species such as sandhill cranes, deer, elk, and migratory birds. Any management activities in the upper river corridor area would have to meet scenic viewshed guidelines, with the possibility of less effective habitat for a variety of species including those mentioned above.

The meadows in this upper river corridor area are critical summer range and fawning, calving, and rearing grounds; the meadows of the East and West Forks are currently designated as scenic viewshed. Lack of protection in summer range and during fawning, calving, and rearing periods would make this habitat less effective for big game and possibly increase mortality, which over time would reduce population levels.

Land fragmentation would likely occur on private land, where natural forests and meadows are broken up into smaller parcels of land and/or converted into housing developments or high density recreational sites. This fragmentation interferes with migration and access to traditionally used areas. For example, development in the lower drainage (heavily used winter range) would not be controlled or coordinated to protect critical areas. This alternative would not encourage or facilitate coordination between the Forest Service/BLM and any of the private land owners or other agency land managers. As a result, mitigation for the impacts from habitat fragmentation on private lands would be much more difficult to implement. This could have significant impacts on species using the area, such as deer and elk.

Deer and elk have historically used the Salmon River drainage as a seasonal migration corridor, linking the high elevation summer ranges with the lower elevation winter ranges. This alternative does not address big game needs well. It protects and manages for some of their habitat needs, but does not provide full protection and management of key winter and spring reproductive habitats. It does manage for forage enhancement and a reduction in harassment in the upper drainage, but does not address wildlife harassment problems in the lower drainage. It also does not provide for coordination with private land owners and other agency ownerships to improve forage, reduce poaching, and prevent harassment, especially from dogs.

Collection of baseline information on plant and animal communities would be minimal on state and federal lands and would be less likely to occur on private land. Assessment of impacts of future activities on private land and associated impacts on rare plant and animal species would be difficult.

Human activity associated with recreational use along the river could be substantial, assuming recreation use levels continue to increase. In this alternative additional recreation projects and public access would not occur, but recreation use levels would be expected to increase. Therefore, harassment to wildlife would be expected to increase. Vehicle access in the headwater area would be limited seasonally to reduce harassment to wildlife. Opportunities to involve forest visitors in watchable wildlife projects and other interpretive programs would be few or none. Monitoring and management of recreation activity would be limited to the existing dispersed camping use along the Old Salmon River Trail with a goal of reducing impacts to wildlife and other river values.

Alternative B

Same as alternative A except habitat diversity throughout the drainage should be somewhat higher than under alternative A. The Forest Service and BLM would provide technical assistance/guidelines for private landowners intending to harvest timber on their property. In conjunction with this assistance, information could be provided to landowners on managing for wildlife and other resources. This strategy could help increase habitat diversity throughout the drainage. Wetland enhancement projects adjacent to the river could assist in maintaining or increasing wetlands wildlife species by setting back plant succession.

The amount of continuous forested habitat would increase somewhat from alternative A due to more coordination with private landowners. Increased forested habitat would make the drainage more effective as a travel corridor for migration of species such as big game, furbearing animals, and birds.

More baseline information would be collected on public land than in alternative A. Plant community data would be collected on federal lands, and plant communities would be monitored in recreation areas, the alpine/subalpine zone, and in the Salmon River meadows and adjacent meadows to analyze effects on wildlife habitats.

Recreational use along the river would increase from alternative A, with the development of new facilities and recreation opportunities. This would make the area less usable to resident populations of wildlife and could cause loss of species diversity. Some habitat for spotted owls and mature/old-growth dependent species would be removed or altered with negative effects to spotted owls and their habitats. Green Canyon expansion, development of a small walk-in campground, and improved larger parking areas along Salmon River Road proposed under this alternative would likely impact northern spotted owl habitat and any known pairs using the area. A site specific analysis would be done to assess the extent of the impact. The proposed projects are within a Habitat Conservation Area and Critical Habitat Units and would likely conflict with current direction regarding spotted owl management. Informal consultation with U.S. Fish and Wildlife Service would determine if these projects could actually be implemented. Wildlife viewing areas in Red Top and Salmon River Meadows would increase the likelihood of harassment to species using the area; some of the negative impacts of increased use could be mitigated through education and interpretation.

Closure and rehabilitation of trails and roads would improve habitat along the river for wildlife species. However, developing public access to areas within the wilderness would increase harassment in that area. The wilderness is now a refuge for many wildlife species. Any project designed to improve access would also increase recreation use and could result in negative impacts to wildlife.

Changing management in the Wildwood Recreation Site to accommodate visitors in late fall and early spring would increase deer and elk harassment. Deer and elk forage in the area and during hard winters, the Wildwood Recreation Site may be one of the few areas providing both forage and refuge from human harassment. With longer visitor use seasons, habitat capability would be reduced and local population levels could decrease. More public contact and enforcement through the use of wilderness rangers and State Police Cadets would help educate visitors and reduce wildlife harassment.

Alternative C

Habitat diversity throughout the drainage would be expected to increase somewhat from alternative B. Eliminating Salmon River Meadows from the grazing allotment would promote restoration of meadow habitat for rare species. With grazing comes the potential to degrade riparian habitat. Riparian habitat would be maintained and would provide for a diversity of species. A larger variety of habitat improvement/enhancement projects could occur under this alternative than in alternatives A and B, resulting in existing or higher numbers of beaver, cranes, deer, and elk.

Including portions of the East and West Forks of the Salmon River within the river corridor would guide development of all management activities in the entire upper river corridor, and would help balance recreation and wildlife management needs. The upper river corridor area provides summer range and fawning, calving, and rearing grounds. Disturbance during these critical periods could result in increased mortality which, over time, could reduce population levels. This alternative emphasizes a higher level of protection for the entire meadow ecosystem complex in the upper river corridor than does alternatives A and B.

The amount of forested habitat would be somewhat increased from alternatives A and B. Coordination with private land owners and agency land managers in the lower segments of the river would be at its highest under this alternative. The Salmon River drainage would be managed to minimize fragmentation and improve habitat for a diversity of species.

More baseline information would be collected on private and public land than in alternative B and alpine/subalpine and meadow areas would be monitored. A systematic botany survey for the entire river corridor could be undertaken, which could provide important information for wildlife habitat management. This alternative would have lower impacts to sensitive plant populations and communities than alternatives A or B.

Human activity associated with recreational use along the river would be substantial, yet somewhat reduced from alternative B. No new recreation facilities would be developed. Some campsites would be closed and rehabilitated. Resident populations of wildlife should remain the same or slightly increase.

The development of interpretive services and visitor information facilities would be slightly less than in alternative B but would still help prevent negative impacts from recreation use.

Some trails would be closed or rehabilitated to reduce environmental impacts. This will also improve the habitat along the river for wildlife species, and could potentially increase population levels of species using the area.

Alternative D

The effects on habitat diversity and amount of continuous forested habitat is the same as for alternative C. Generally, habitat diversity would be increased from levels in alternatives A and B, and amount of forested habitat would increase from levels in alternatives A and B.

The same level of baseline information would be collected under this alternative as in alternative C, but there would be more opportunities to monitor use of dispersed camping and mitigate impacts on wildlife. This alternative would have the same impacts to sensitive plant populations and plant communities as alternative C, relative to the amount of data gathered and subsequent mitigation activities. Increased monitoring and management of dispersed areas near the Salmon River Trail would help reduce negative impacts to wildlife.

Human activity associated with recreational use along the river would be less than in alternative B but greater than in alternative C. Development of visitor/recreation facilities would be the same as in alternative B except for the following:

- No wildlife viewing platform at Red Top or Salmon River Meadows would be constructed;
- No walk-in campsite one mile from Green Canyon Campground would be developed; and
- No drive-in public campground at Wildwood Recreation Site would be constructed.

By not increasing access to these areas, high-quality wildlife habitat would continue to be provided. Human harassment would be less and habitat capability would be higher than in alternative B. This would maintain or increase local population levels.

The effort to develop interpretive and visitor information services would be fairly high under this alternative, but less than in Alternative B.

Table 4.1 Impact of Alternatives on Wildlife

Topic	Alternatives			
	A	B	C	D
Habitat diversity	3	2	1	1
Fragmentation	3	2	1	1
Baseline information	4	3	2	1
High recreation use	1	3	1	2
Interpretation	4	2	3	1
Harassment	3	4	2	1
Totals	18	16	10	7

1 is high for protection and enhancement of wildlife, 4 is low.

Scenic Quality

Scenery is an "outstandingly remarkable" value in segments 1 and 2, and is a "substantial value" in segments 3, 4, and 5 of the Salmon River corridor. The scenic qualities of this river are one of the primary reasons for its classification as a Wild and Scenic River.

Except for natural catastrophes, human activities have the greatest potential for altering landscape character, and these activities are regulated in varying degree in the alternatives. Certain activities have potential negative effects on scenic quality, while others have potential positive effects. Those with potential negative effects include:

- Recreation site development (including sno-park sites)
- Fish and wildlife habitat improvements
- Road construction, timber harvest
- Mineral exploration and development
- Residential construction

Those with potential positive effects include:

- Increasing the width of the river corridor in certain areas
- Raising the visual quality standard to a higher level
- Rehabilitation of existing timber harvest units visible from the river
- Providing technical assistance to private landowners proposing timber harvest actions in the corridor
- Rehabilitation of road cuts and fills, revision of county zoning ordinances
- Purchase of scenic easements

- Reclamation of impacted riparian zones
- Closure of some dispersed campsites
- Possible designation of a Special Interest Area for alpine and subalpine areas
- Unless otherwise noted in the text, this section will describe the expected effects on the landscape character (positive and negative) of the Salmon River corridor, as proposed for each alternative.

Alternative A

Segment 1 - Recreational River

Under current Forest Plan standards, the interim boundary of one-quarter mile on each side of the stream would be adopted, and the Visual Quality Objectives (VQO) would remain as Partial Retention except for structural facilities, where Modification would apply.

No new recreational facilities would be constructed. It is doubtful that new roads would be built, but realignment or widening of Highway 26 could occur. On suitable land, timber harvest would be expected to occur on a regular, planned basis, using either uneven-age or even-age management systems. Mineral exploration and development would be permissible, but is not likely to occur. More residences are expected to be built near the river on private land in Section 6.

Under alternative A, the future visual condition of the upper portion of segment 1 (headwaters to Highway 26) would probably range from natural appearing to slightly altered, depending on the type and amount of timber harvest within the corridor. The lower portion of segment 1 (Highway 26 to Salmon River Meadows) would be expected to remain natural appearing.

Segment 2 - Wild River

Current Forest Plan standards specify a VQO of Preservation, except for structural facilities which would meet Retention.

Within the corridor, the only uses which might adversely affect the scenic quality are fish and wildlife habitat enhancement projects and livestock grazing. These activities normally have minimal effects on the landscape. In addition, the lower two-thirds of this segment is bounded on both sides by wilderness. Therefore, the expected future visual condition is expected to remain natural appearing.

Outside the corridor, the view to the south from Salmon River meadows, which includes several existing clear-cuts, is expected to gradually improve over the next 20 years, due to additional harvest done specifically to mitigate the negative visual impacts of the previous harvest.

Segment 3 - Recreational River

Current Forest Plan standards specify a VQO of Partial Retention, except for structural facilities, where Modification applies.

No new recreational facilities would be built. The segment is bounded on both sides by the Salmon-Huckleberry Wilderness. No new roads are anticipated. Timber harvest could occur, but would probably use uneven-age management. Mineral exploration and development is permissible, but is considered unlikely.

Under alternative A, it is expected that this segment would remain nearly natural in appearance, with minor alterations created mostly by recreational facilities.

Segment 4 - Recreational River

This segment is on private lands in the vicinity of the Mt. Hood Golf Course. At least one fairway is within the river corridor, as well as many private residences. Additional residences could be built (subject to Clackamas County regulations), but would not be expected to make significant changes in the character of the landscape, which is obviously developed, within a wooded setting.

Timber harvest could occur on private lands, subject to the State Forest Practices Act, which requires a 100-foot buffer along streams. Timber harvest has the potential to create significant changes in the existing landscape character. There could be additional roads built, either to access timber or to develop residential sites. County development standards restrict building heights to 35 feet or less, and require a 100-foot setback from mean low water line.

The view from the resort area to the river corridor is expected to remain similar to the present condition. But the view of private lands outside the corridor may change considerably if timber harvest is done using clearcutting methods.

Segment 5 - Scenic River

Within the interim boundaries, 640 of the total acres in this segment are in public ownership. 520 acres are managed by the Bureau of Land Management, and 120 acres are owned by Clackamas County. The remainder is in private ownership. Within section 5, Camp Arrah Wanna is located between Arrah Wanna Blvd. and the river. Assuming this youth camp retains ownership and operations, there would be no effects on scenic quality at that site. On the southwest side of the river, there are several residences, and there is the potential to build more to the north and into the northwest corner of Section 6. County standards require the structure to be set back at least 100 feet from mean low water line, and not to exceed 35 feet in height if visible from the river. A buffer strip of existing vegetation up to 150 feet deep is also required. The effects of residential development are expected to be less than what is now evident from existing residences because of the County regulations. The river shore would remain nearly natural in character, though slightly altered where structures are visible from the river shores.

Within the southwest 1/4 of the southwest 1/4 of Section 32, the northwest 1/4 of the southwest 1/4 of Section 31, and the west 1/2 of the northwest 1/4 of Section 31, there are 160 acres of private land on both sides of the river. Most of the land could be accessed by extending existing roads or building new ones. It is assumed that these tracts will be developed for residential use within the next 20 years. The effects are expected to change the existing natural landscape slightly.

Timber harvest could occur on these private lands, subject to the provisions of the State Forest Practices Act, which requires a 100-foot buffer along streams. If clearcutting were the harvest method, units would be visible through the buffer, and would cause a change from natural appearing to moderately altered.

Lands outside BLM jurisdiction are valuable for geothermal deposits. Drilling for geothermal heat creates moderate, but temporary and localized, visual impacts caused by clearing, machinery, and silt settling basins. The development of facilities for transmission of steam or for power generation would require a large land area, and would be expected to cause drastic changes in the landscape character.

The remainder of the corridor within Section 31 (280 acres) is administered by the Bureau of Land Management. The Wildwood Recreation Site occupies the north shore of the river.

No changes in landscape character are expected on these lands. The same effects would apply to the south half of Section 25 within the corridor, except that there are two mineral material (gravel) sites in Section 25. Excavation at these sites has made substantial alterations to the landscape character, and are visible from the river.

The northern end of the segment includes the community of Brightwood. These private tracts are nearly fully developed for residential use, so most of the effects are existing, and no significant effects are expected because of this action.

Alternative B

Segment 1 - Recreational River

Effects would be almost the same as alternative A except for the construction of the group campground, sno-park and associated trails, and the interpretive trail in the Salmon River Meadows area. These facilities should be able to meet the Modification VQO for the campground and partial retention for the remainder of the projects as viewed from the river and from roads and trails within the corridor. The future visual condition would not change significantly from what would occur under alternative A.

Segment 2 - Wild River

Same as alternative A.

Segment 3 - Recreational River

Same as alternative A. All proposed projects, including expansion of Green Canyon campground, construction of a new campground below Green Canyon, and of a barrier-free fishing pier, would be designed to meet the existing VQOs.

Segment 4 - Recreational River

Same as alternative A. Technical assistance by the Bureau of Land Management or Forest Service could reduce adverse effects of timber harvest and other development.

Segment 5 - Scenic River

Effects are essentially the same as in alternative A. There would be some increased potential to protect the existing scenic quality if areas sensitive for scenic quality could be purchased on a willing seller basis. In addition, rehabilitation of the Miller Road quarry site, if acquired, would improve the visual character of this site on the river.

Alternative C

Segment 1 - Recreational River

With the increased width of the corridor and change of the VQO to retention within the corridor as viewed from the river or State Highways 26 and 35, there would be less change in the future visual condition from what currently exists and in comparison to alternatives A and B. Any timber harvest activities done to meet protection or enhancement of river values would meet a partial retention VQO. Were the Forest Service and BLM to work more closely with Oregon Department of Transportation, visual impacts of both existing roadways and any planned expansion of Highway 26 and other roads in the corridor would be reduced.

Segment 2 - Wild River

Same as alternative A.

Segment 3 - Recreational River

Same as alternative A.

Segment 4 - Recreational River

Similar to alternative A, but there would be less potential to impact visual quality as viewed from the river because developments within the 100-year flood plain would be discouraged. Efforts would be made to have a 50-foot vegetative buffer requirement established by Clackamas County for principal river conservation areas.

Segment 5 - Scenic River

Same as alternative B.

Alternative D

Segment 1 - Recreational River

Same as alternative C but with some increased potential for long-term impacts to visual character if the proposed sno-park and associated trails are developed.

Segment 2 - Wild River

Same as alternative A.

Segment 3 - Recreational River

Similar to alternative B, but with less potential for visual impacts, since a walk-in campground approximately one mile below Green Canyon Campground would not be developed.

Segment 4 - Recreational River

Same as alternative A.

Segment 5 - Scenic River

Same as alternative B.

Cumulative Effects

Cumulative effects on landscape character are the aggregate changes to the existing landscape, both inside and outside the potential boundaries, which are likely to occur as a result of human activities or of acts of nature. In this case, the area under consideration is 33.5 miles long and about one-quarter mile wide, on the average. Over 75 percent of the land, both inside and outside the river corridor, is managed by the Forest Service. Nine miles of the river is within a designated wilderness. In the two lower segments outside the Mt. Hood National Forest (eight river miles), nearly 30 percent is in private ownership, as are nearly all lands outside the lower corridor. Resorts, residences, and timber management are the primary components in this section.

The lands inside the Mt. Hood National Forest, but outside of the river corridor will be managed to achieve the desired future conditions for the particular management areas, as designated in the Forest Plan. The adjacent lands are A2 Wilderness, A4 Barlow Road Special Interest Area, A5 Unroaded Recreation, A9 Key Site Riparian, All Winter Recreation, B2 Scenic Viewshed, B10 Deer and Elk Winter Range, and a small amount of C1 Timber Emphasis. The desired future conditions for these allocations are generally compatible with B1 Wild and Scenic River. Therefore, cumulative effects are expected to be minimal within the Forest.

The lands outside the corridor and outside the Forest will continue to exhibit changes in landscape character. Inside the river corridor, the effects of this proposal would be to reduce cumulative effects and to provide a more natural appearing landscape. This would be the strongest in alternative C, and weakest in alternative A, with alternatives B and D being moderate.

Grazing

Alternative A

Grazing would continue as directed in the Wapinitia Allotment Management Plan (AMP). There is the potential of some conflicts between cattle and big game (cow/calf-doe/fawn pairs), disturbance of sandhill cranes, and possible adverse effects to the sensitive plant, *Scheuchzeria palustris* var. *americana*, as well as other river values. Grazing would also have the potential to damage riparian vegetation if cattle are allowed to graze for extended periods along the banks of the river or small tributaries. Monitoring required by the Forest Plan should be able to identify many of the areas where these problems exist and changes would be made to grazing operations to mitigate impacts.

The quality of forage available for both cattle and big game species could be improved by allowing grazing to take place within the meadows. Cattle tend to graze older, less tender growth on the forage plants, stimulating growth of newer, more tender shoots on those plants. It is this newer, more tender growth that is preferred by big game species.

Alternative B

Same as alternative A.

Alternative C

Grazing within the Salmon River Meadows area would be eliminated through modifications in the AMP requiring that grazing take place elsewhere in the allotment. This would either increase grazing pressures elsewhere in the allotment or more likely, cause a reduction in the number of cattle allowed to graze within the allotment.

Elimination of grazing within the meadows area would ensure that there would be no conflicts between cattle and river/riparian values. The benefit of improved forage quality as a result of cattle grazing would not be realized in this alternative. Forage quality for big game species could be improved through other management activities such as flooding and controlled burning within the meadows.

Alternative D

Same as alternative A except there would be a higher level of monitoring for impacts on river and riparian values. This higher level of monitoring would allow for earlier identification of problems and of possible mitigation strategies. Because of this, river and riparian values would be better protected than in alternatives A and B.

Geology

No perceptible changes would occur to the surficial or bedrock geology along the Salmon River under any of the alternatives. Natural geologic processes would continue to operate. Minor landsliding and surface erosion along the river corridor would continue to introduce small amounts of sediment into the river.

Minor amounts of soil displacement and erosion would continue to occur from road surfaces, cut slopes, fill slopes, trails, and campgrounds. (See discussion under Effects on Water Quality.)

Palmer Snowfield, the West Fork of the Salmon River, and the upper Salmon River would continue to be considered zones of possible hazard that could be affected by pyroclastic flows, mudflows, and floods, should Mt. Hood erupt. The Salmon River valley from Red Top Meadows to the Sandy River would continue to be considered zones of possible hazard that could be affected by mudflows and floods, should Mt. Hood erupt.

There would be no change in environmental effects from mining activities under the 1872 Mining Law and the mineral leasing laws since restrictions governing those mineral activities would continue unchanged under all four alternatives. No mineral development under the 1872 Mining Law and the mineral leasing laws would be permitted within one-quarter mile of wild segment river banks (Segment 2). Locatable minerals would be recommended for withdrawal from development within the scenic and recreational river segments on National Forest or BLM lands. Mineral leasing permits would continue to be allowed on federally managed land along the river that is outside segment 2. There would continue to be a "No Surface Occupancy" stipulation for that portion of the permit potentially affecting river resource values. Common variety mineral development (e.g., sand and gravel) would not be permitted within any of the river segments on National Forest or BLM land.

Alternative A

Under this alternative there would be no geologic interpretive services or information developed for river users. There would be no new educational or interpretive facilities developed.

Recreational rock-hounding and gold panning would be allowed but not encouraged along the river in areas where this activity would not affect other resource values.

A small amount of mineral extraction would continue to occur from the nearly depleted Miller Road quarry site on the lower river. During the occasional operations at the quarry some noise and dust would be present within a short portion of river segment 5.

Alternative B

This alternative would provide the optimum opportunity to develop geologic interpretive services and information along roads, campgrounds, and trails. Geologic interpretive information would be developed as part of an interagency interpretation/public information program for the entire river.

The opportunities for recreational rock-hounding, including gold panning, would increase due to a higher level of information services and improved access. This would be limited to areas and to activity levels that would protect other river resource values. The potential for recreational gold panning is limited to segments 3, 4, and 5 due to the geology.

The Miller Road quarry site would be acquired and reclaimed, eliminating the opportunity for the removal of more mineral material from this site. There would be no noise or dust from quarry operations in segment 5.

Alternative C

The interagency interpretation/public information program that could be developed as part of this alternative would slightly increase the opportunities for geologic interpretive services and information compared to alternative A. Opportunities would be less than those provided under alternatives B and D, since the reduced access would limit interpretive services to fewer sites.

The opportunities for recreational rock-hounding and gold panning would be the least of any of the alternatives, due to reduced access and the increased emphasis on watershed enhancement.

A small amount of mineral extraction would continue to occur from the nearly depleted Miller Road quarry site on the lower river. During the occasional operations at the quarry some noise and dust would be present within a short portion of river segment 5.

Alternative D

The opportunities to develop geologic interpretive services would be limited by the reduced access when compared to alternative B. These opportunities would be much greater than those under alternatives A and C. An interagency interpretive program could still be developed for the entire river.

Opportunities for recreational rock-hounding and gold panning would be less than those provided by alternative B, but more than those provided by alternatives A and C.

The Miller Road quarry site would be acquired and reclaimed, eliminating the opportunity for the removal of more mineral material from this site. There would be no noise or dust from quarry operations in segment 5.

Socioeconomics

The major effects of the alternatives on the socioeconomic environment would be changes in economic opportunities associated with river-related resources and changes in the quality of resources such as scenery and recreation. Economic opportunities are examined by looking at the amount of money which would be paid from Forest receipts to Clackamas County and changes in employment and incomes resulting from Forest outputs, receipts and expenditures in the corridor under each alternative. Typically these changes reflect decreases or increases in the amount of timber harvest, and recreation use in the corridor. Non-commodity values such as scenery are also considered.

Five criteria were used to evaluate the socioeconomic effects of implementing each alternative:

- degree of impact on timber-related employment,
- degree of impact on tourism and service-sector employment,
- degree of impact on river-related recreation opportunities,
- degree of financial impact on counties (Forest Service timber and campground fee receipts), and
- degree of impact on non-commodity values (such as scenery, wildlife, clean air, the availability of wild places close to Portland, etc.) in the river corridor.

Alternative A

This alternative would cause no change in timber-related employment; service-related employment would stay the same or increase slightly as a result of low-level recreation development. Forest Service timber receipts to counties would stay the same as would campground payments. Non-commodity values would be protected at a slightly higher level, due to some control of resource damage in areas along the river but a decrease in scenic quality could occur, due to timber harvest, particularly on private lands in or outside of the corridor. Within the Forest, timber harvest would change some roaded natural areas to a more modified condition, which is less desirable for some of the recreation activities occurring now.

Alternative B

This alternative would cause a small change in timber-related employment; service-related employment could increase dramatically with the provision of more visitor services, bigger sport fishing programs, more winter recreation opportunities, and some new facilities. Funds to Clackamas County from Forest Service timber receipts would decrease by .05 percent and campground payments would increase slightly over time. Highest level of federal expenditures for public facilities and services would occur under this alternative. Non-commodity values would be protected at a slightly higher level by phasing out some dispersed areas, increasing public education and law enforcement, and encouraging concentrated use in developed recreation areas, although the sheer volume of visitors may offset gains.

Economic returns to corridor communities would be highest under this alternative, and could contribute to a greater level of community cohesion if businesses are not bought out by non-residents. In the upper river, some roaded natural areas would be altered over the next 10 years through timber harvest, at about the same level as alternative A.

Alternative C

This alternative would cause the greatest decrease in timber-related employment; service-related employment would stay the same or decrease slightly as a result of low-level recreation development that emphasizes protection of the environment (and may pre-empt some recreational activities). Opportunities for subsistence activities such as hunting, wood gathering and fishing would be moderate under the other alternatives but lower under this alternative, and could affect the livelihood of some people in nearby communities. Funds to Clackamas County from Forest Service timber receipts would decrease by .13 percent but campground payments would stay the same. Protection of non-commodity values would be the highest under this alternative.

With the phasing out of dispersed sites and the control of impacts from sport fisheries. Scenic values, cultural resources, old-growth forests, water quality and wildlife would be accommodated the most under this alternative. Some roaded natural areas in the upper corridor would be modified by timber harvest, but to a lesser extent than in the other alternatives.

Alternative D

This alternative would cause a small decrease in timber-related employment; service-related employment would increase somewhat with the provision of more visitor services and developed recreation opportunities. Funds to Clackamas County from Forest Service timber receipts to counties would decrease by .13 percent, and campground payments would stay about the same. A moderate level of federal expenditures for public facilities and road improvements would occur under this alternative. Protection of non-commodity values would be somewhat more than in alternatives A and B with the phasing out of some dispersed areas, increasing public education and law enforcement, and encouraging concentrated use in developed recreation areas.

Economic returns to corridor communities would be moderate under this alternative, because of the de-emphasis on sport fishing in the lower river. Some roaded natural areas would be altered over the next 10 years through timber harvest, but at a lower level than in alternatives A and B.

	Alternatives			
	A	B	C	D
Decline in ASQ in thousand board/feet	0	114	289	277
Dollar returns to Clackamas County (1991 figures)	6,467,580	6,459,315	6,446,627	6,447,497

-Based on the county receiving 47.2 percent of receipts (as in 1991) for 189 MMBF Forest-wide.

-Based on $290 per thousand board feet

-Reduced timber harvest will reduce the dollars distributed to local counties for schools and roads by $0.25 for each dollar of revenue not returned through timber sales.

Timber

The effects of timber harvest on other resources and specifically on wildlife, water quality, and visual quality have been identified as a public issue. For the purposes of analysis, it is assumed that:

- the demand for high visual quality will remain;
- that the demand for recreational facilities and activities will continue to increase;
- that all timber management, and specifically timber harvest, activities will meet or exceed state water quality standards; and
- that the development and retention of quality wildlife habitat will be a primary issue determining the scope, timing and intensity of timber management activities.

It is also assumed that:

- timber supply will continue to decline, and
- that pressure will increase to ensure that at least a portion of the timber supply will be obtained from Category B lands as outlined in the Mt. Hood Forest Plan.

Finally, it is also assumed that:

- maintaining forest health will be a primary issue in determining resource management activities regardless of location and land allocation.

The following were used as measures for evaluation:

- Forested areas impacted by insects/disease/acres actually treatable under alternative, excluding wilderness and habitat conservation areas.
- Acres of forest stands suitable for timber management and harvest/acres actually available under the alternative, excluding wilderness and habitat conservation areas.
- Estimated volume reduction per decade by alternative.

Each alternative section is divided into two segments: a discussion related to effects on National Forest lands and a discussion of effects on other federal, state, county, and private lands.

Alternative A

National Forest Lands

No change is projected in allowable sale quantity (ASQ) from current Forest Plan levels. Some increase could be expected should the current restriction on timber harvest be lifted on lands within Class I HCAs.

Regeneration silvicultural systems would be restricted to shelterwood or clearcuts with significant green tree retention. There would be an estimated 10-25 percent reduction in harvest volume depending on the specific prescription and whether the overstory were left or retained into the next and future rotations.

Natural regeneration would be used more often to either improve stocking or as the primary regeneration technique. With overstory retention, species composition in the developing stands would tend to favor more shade tolerant species to the detriment of seral stage species.

There would be an increased risk for future insect attacks, especially in the upper half of the drainage, due to continuing natural changes in forest stand conditions and compositions. Such attacks would increase in duration, intensity, and area and would increase the potential of secondary infestations that would further increase losses. Such attacks would be expected to reduce the ability of the affected areas to protect water quality, maintain quality wildlife habitat, and retain scenic quality.

There would an increased risk of catastrophic fire due to increased tree mortality from insect attacks.

Opportunities for special forest products (firewood, for example, and landscaping materials) could decrease due to limited access and changes in forest management. Other opportunities or products could become available as stand conditions change, but would not be expected to meet current levels.

Other Lands

No change is projected in timber harvest volumes unless visual quality standards are imposed by the state of Oregon. Such objectives could reduce harvest volumes by 10 to 25 percent depending on the objectives and requirements implemented.

Projected timber supply shortages could be expected to cause landowners who manage timber to manage it more intensively. It would also increase the pressure on other small forest landowners to cut their timber prematurely or inappropriately. Such actions could increase the potential for adverse impacts on water and scenic quality.

Increasing demand for recreation, including recreational properties, could result in the net loss of timber-producing lands, as such lands would be converted to other uses. Such a change in land use could further constrain existing timber supplies, drive up stumpage prices, and result in additional timberland conversions. This could place additional harvesting pressure on the remaining timberland base, both federal and other.

Alternative B

On National Forest lands, it is estimated the ASQ will be reduced by approximately 114 MBF/year in order to protect visual quality, water quality, and other resource values. On other lands, it would be the same as alternative A except there would be some reduction in timber harvest volumes with reductions of up to 100 percent where scenic easements are required. There could be a greater reduction in forest health in the upper portions of the drainage. Future insect attacks could be larger in area, greater in intensity and longer in duration. The potential for catastrophic fire would be higher than in alternative A.

Alternatives C and D

Similar to alternative B, except ASQ would be reduced by 289 MBF/year in alternative C and 277 MBF/year in alternative D, because of the elimination of regulated timber harvest in segment 1 of the river corridor. Harvest activities would still take place along the river in order to protect and/or enhance river values.

Greater losses due to insect attack and the highest risk for catastrophic fire as a result of those losses would be expected under these alternatives.

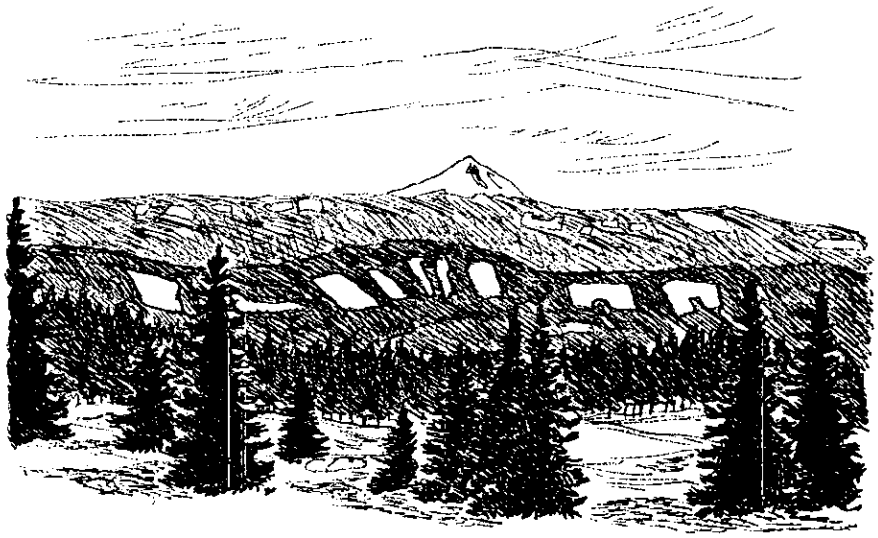
Cumulative Effects

The majority of the cumulative effects of any of the alternatives are likely to occur on lands outside of the National Forest boundary. Declining timber supplies, higher timber prices, and increasing demand for recreational housing and commercial development are expected to cause impacts to the river corridor and adjacent lands. Removal of land from the timber base could increase the potential for the loss of critical wildlife habitat. Water quality problems associated with development, such as increased sedimentation, increased stream temperatures, and loss of shade would reduce the river's capability to maintain existing fish stocks.

Increased development and loss of non-National Forest timberlands will increase pressure on National Forest lands to produce more timber from a reduced land base. Conversely, demands for increased recreational opportunities and scenic values will limit options and opportunities to harvest timber. Such limited options and opportunities will reduce the potential to maintain Forest health.

Reduction in timber harvest will reduce the potential to prevent catastrophic resource losses resulting from insects, disease, fire or other agents.

Salmon Clearcuts from Timberline Lodge



Required Disclosures

The interdisciplinary team determined that the four alternatives met all applicable national laws and executive orders with specific direction regarding wild and scenic rivers, and National Forest and BLM land management. These items included cultural resources, water quality, forest regeneration, scenic quality, air quality, soil productivity and threatened, endangered and sensitive plant and animal species. It was determined that none of these alternatives would have significant adverse effects on the above.

For all alternatives, irreversible and irretrievable commitments of resources would not exceed those discussed in the Final Environmental Impact Statement for the Mt. Hood National Forest Land and Resource Management Plan.

There are floodplains and wetlands within the planning area. Any effects on these are evaluated in this chapter under appropriate sections. There are no prime farmlands or rangeland within the planning area.

Until research findings can resolve some major scientific uncertainties, evaluation of climate changes effects in a document such as this would be speculative.

Native American rights, including those covered by the American Indian Religious Freedom Act, would not be affected, Socioeconomic effects are discussed in the socioeconomic section. Effects on Native Americans, other minorities, and women would be similar to socioeconomic effects on the general population.

Alternative A, the no-action alternative, is in compliance with the Forest Plan and the BLM Resource Management Plan. The other alternatives would require an amendment to the Forest Plan before they could be implemented.

Chapter 5

Consultation With Others

List of Preparers

Interdisciplinary Team

Paul Norman, recreation specialist and co-leader for the team, has a B.S. in Outdoor Recreation from Colorado State University. He has 13 years planning experience on the Mt. Hood and Sierra National Forests. Prior to 1978, Paul was in private forestry consulting.

Bob Ratcliffe, BLM recreation planner and co-leader of the team, has a B.A. in Outdoor Recreation and a M.S. in Natural Resource Planning. An avid whitewater boater, he has 10 years experience in river and recreation planning and management.

John Barber, BLM hydrologist for the team, has both a B.S. and M.S. in hydrology. He has five years experience in hydrology, watershed planning, water quality, and aquatic systems.

Val Chambers is the public affairs specialist for the team and is Wild and Scenic Rivers coordinator for the Forest. Since 1975, she has worked for a variety of agencies in natural resource management and planning, and in public affairs. Val has a B.S. in forest management from the University of Washington and a M.S. in public relations/environmental studies from the University of Oregon.

Dick Shaffer, the retired Forest landscape architect for the Mt. Hood National Forest, has a B.S. in landscape architecture from Oregon State University and a M.S. in Urban Planning from Portland State University.

Jeff Jaqua, the cultural resources specialist for the team. He has a B.A. in anthropology from the University of Montana, a B.S. in zoology from Montana State University, and has pursued graduate studies in archaeology at Portland State University and University of Idaho. He has worked for the Mt. Hood National Forest since 1978.

Larry Scofield, the BLM botanist for the team, has a B.A. and M.S. in biology and has 18 years experience with the BLM in botany, ecology, and wildlife.

Jeff Uebel has a B.S. in fisheries science and a B.S. in wildlife science from OSU. He has worked for the Mt. Hood National Forest since 1987. From 1988-1990, he worked in Ecuador in fisheries production and management as a Peace Corps volunteer.

The following people provided valuable technical assistance:

Dan Fissell, Grazing
Barb Kott, Wildlife
Carol Hughes, Wildlife
Jennifer McDonald, Socioeconomics
Rich Wands, Fire Management
Glen Sachet, Recreation, Forest Planning
Shelly Young, Timber
Jamie Bradbury, GIS/Mapping
Rowan Bibb, Cultural Resources
Beth Walton, Cultural Resources
Tom DeRoo, Geology
John Haglund, Forest Ecology
Larry Bryant, Hydrology
Dean Apostol, Landscape Architecture

Desktop publishing by Shelly York, line drawings by Richard Zita, editing and proof-reading by Elizabeth Hollomon.

List of Agencies, Organizations and Individuals Consulted

David Bayles, Oregon Rivers Council

Tom Cassidy, American Rivers

Bob Freimark, Michelle Wilson, The Wilderness Society

Doug Cramer, Portland General Electric Company

Scott Stuemke, Confederated Tribes of Warm Springs

Culture and Heritage Committee, Confederated Tribes of Warm Springs

Jay Massey, Oregon Department of Fish and Wildlife

John Garren, National Organization for River Sports

Jeff Kaiser, Oregon Dept. of Transportation

***John Borge,** Clackamas Co. Dept. Transportation and Development

Bill Fujii, Oregon State Water Resources Board

Jackie Diedrich, U.S. Forest Service

Jim Hulbert, U.S. Forest Service

***Keppie Keplinger,** Mt. Hood Corridor CPO

Gary Hackett, Portland General Electric Company

Clay Morehead, Tamara DeRidder, City of Sandy

***Larry Callister,** Oregon Trout

Thomas Pierson, Cascade Volcano Observatory

***Jon Tullis,** Timberline Lodge

***Charles McGinnis,** Wapinitia Homeowners Association

***Tom Kloster,** City of Gresham

***Troy Moore,** Clackamas County

***Mark Bachmann,** The Fly Fishing Shop

***Dennis Tylka**

* designates a public working group member

The following individuals provided additional verbal and written input and/or attended public meetings.

John McClay
Janeen Boldt
Mike Filbin
Gerald Ashland
Diane Bennett
Bill Davidson
Mike Walker
R. H. Schrader
J. C. Duff
T. Harrison
Dick Harrison
Donovan Aldinger
Mike Annes
Alan Rusconi
Robert Mathers
Steve Taylor
William White
Cathy Townsend
Kitty Filbin
Steve Kruse
Don and Christy Mench
Herb Forbes
D. Steigler
Ralph Parker
Kathy Amundsen
Tom Raybus
Tim Cowles
Gary Kish
Ken Bunker
Bob Roth
Ron Grossmann
Bill Vogle
Ron Fransen
Dave Mihelic
Patty Barnes
John Crabbe
John Bonebrake
Mark Stensland
Claude Gudge
Jeff Bohren
Julian Crow
Dave Butt
Claude Blessing
Bill Keil
Milt Fox II
Bill Davidson
Dwight Englert
B.W. Edwards
Wes and June Steinbrook
Keith Petrie
Chris and Tom Thompson
Gerald Ashland
Milt Hegstrom
Hugh Marquis
Lyla Foggia
Kelly Neal
Gail Achterman
Robert Clytel
Jody Sterne
Greg Hessler
Brian Silvey
Syd Kruse
Florence Kniles
Philo Gregg
Merlin and Donna Kliewer
D. Schuyler
John Powell
Ben and Lupe Rushford
Loretta Beard
J. Highland
Michael P. Jones
Dennis Deck
Ed Hall
Mitch Williams
Ralph Saperstein

The entire mailing list for the Salmon River is included in the Appendix.

Summary of Public Involvement

Resource Assessment

Consultation with specialists
Newsletter
Public meeting 11/90
Written comments

Issues

Newsletter
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Appendix A

Final Resource Assessment

Executive Summary

The mainstem of the Salmon River from its headwaters to its confluence with the Sandy River was designated by Congress as a wild and scenic river in 1988. The Mt. Hood National Forest is responsible for the administration of the upper 25.5 miles of the river with the Salem District of the Bureau of Land Management (BLM) responsible for administration of the remaining 8.0 miles of the river.

The Wild and Scenic Rivers Act of 1968 (P.L. 90-542) requires that the agencies responsible for management of designated rivers develop a management plan to provide protection of the river's free-flowing condition and its "outstandingly remarkable" values "for the benefit and enjoyment of present and future generations." As a part of that joint planning effort, this resource assessment has been prepared by the Forest Service and BLM to determine the significance of river-related values on the Salmon River and whether some of those values are truly outstandingly remarkable. The findings of this assessment are that scenic, recreation, fisheries, wildlife, hydrologic, and ecological/botanical values are all outstandingly remarkable on this river. River-related cultural resource values, while not meeting the criteria for outstandingly remarkable, were found to be very important and will be addressed in the river management plan.

Introduction

The Omnibus Oregon Wild and Scenic Rivers Act of 1988 (P.L. 100-557) added segments of 40 Oregon rivers to the National Wild and Scenic Rivers System. One of those rivers was the Salmon River. All 33.5 miles of the river from its headwaters on the upper slopes of Mt. Hood to its confluence with the Sandy River were designated as a Wild and Scenic River.

This resource assessment represents the initial phase of the development of the management plan for the Salmon River. It will serve as the foundation for the management plan which will be developed within the next two years. The purpose of this assessment is to document and substantiate which of the river-related values or features can be considered "outstandingly remarkable" and which values contribute substantially to the river setting or to the function of the river ecosystem.

River Description

The Salmon River flows from the southern flanks of Mt. Hood nearly 34 miles to its confluence with the Sandy River. It moves through a wide variety of settings ranging from alpine glaciers, to alpine meadows, to forested canyons where it flows over a series of waterfalls, to rural residential areas and the communities of Welches and Brightwood. Due to the different levels of existing development, the river as described in the Omnibus Bill was divided into five segments:

Segment 1. The 7-mile segment from its headwaters to the south boundary line at section 6, township 4 south, range 9 east as a **recreational river**; to be administered by the U.S. Forest Service.

Segment 2. The 15-mile segment from the south boundary line at section 6, township 4 south, range 9 east to the junction with the South Fork of the Salmon River as a **wild river**; to be administered by the U.S. Forest Service.

Segment 3. The 3.5-mile segment from the junction with the South Fork of the Salmon River to the Mt. Hood National Forest boundary as a **recreational river**, to be administered by the U.S. Forest Service.

Segment 4. The 3.2-mile segment from the Mt. Hood National Forest boundary to Lymp Creek as a **recreational river**; to be administered by the Bureau of Land Management.

Segment 5. The 4.8-mile segment from Lymp Creek to its confluence with the Sandy River as a **scenic river**; to be administered by the Bureau of Land Management.

Segments 1 through 3 are all within the Mt. Hood National Forest boundary and are almost exclusively National Forest land. There is a parcel of private land within segment 1 of approximately 90 acres in size that contains private homes and a service station. The only other parcel of private land is at the lower end of segment 3, consisting of approximately 60 acres with a few private homes along the river.

Approximately 60 percent of the 1,595 acres of land within the preliminary boundaries of the lower river (segments 4 and 5) is in private ownership. The remaining 40 percent is in public ownership under BLM or Clackamas County administration. There are numerous homes, a rock quarry, as well as two resorts and a BLM-administered recreation site within these segments.

There are currently no valid permit applications for hydroelectric projects on the Salmon River. There are 47 water rights, concentrated along the lower river, which permit the diversion of 33.35 cfs of water. Of that, 25 cfs may be diverted by the City of Sandy for municipal uses. Most of the remainder is for domestic purposes. One acre-foot of water may be stored under two rights for livestock and fish purposes. These water rights specify the legal maximum limits on water use within the corridor and cannot necessarily be interpreted to reflect actual water use (*The Wild and Scenic Salmon River: A Water Resources Summary*, Oregon Water Resources Department, November 1989).

Resource Assessment Process

For additional discussion of the resource assessment process, see Appendix A.

The first step in developing a river management plan is to evaluate the resources and values associated with the river and river corridor, and to determine the level of significance of these **river-related values**. This process is called the resource assessment. The findings in this process are based on existing scientific data and informed professional judgment. The resource assessment methodology uses specific guidelines that provide an objective determination of the importance of river values, as well as a degree of standardization and consistency between different rivers and river segments.

The purpose of this resource assessment is to document those river-related values or features that are truly "outstandingly remarkable" values and those that, while not outstandingly remarkable, are significant and contribute substantially to the river setting or to the function of the river ecosystem. To qualify as an outstandingly remarkable value, the river-related value must be a unique, rare, or exemplary feature that is significant at a regional or national level. Specific criteria for individual values are described in the opening paragraph of the discussion section for each of the values.

As a basis for regional comparison, geographic regions defined in the State of Oregon Comprehensive Outdoor Recreation Plan (SCORP) are used. The Salmon River is within SCORP Region 7. (See Appendix A-2 for a SCORP Regional Map.) SCORP Region 7 contains the most heavily populated area of the state and incorporates Columbia, Clackamas, Multnomah, and Washington counties. It is located in the northern Willamette Valley and is bordered on the east by the Cascade Range. This region also contains the Clackamas, Roaring, and Sandy Wild and Scenic Rivers. The Columbia River forms its northern boundary.

Discussion of Values

A narrative description for each resource value considered is provided in the assessment. The narrative begins with a definition of the criteria for outstandingly remarkable for each resource. The criteria are followed by the preliminary findings and a rationale for the determination of significance. In the case where a determination could not be made because of insufficient information, an explanation is given including requirements necessary to complete the determination. The description includes information on the existing condition of the resource values, the potential of the resource values, any possible threats to the resource values, and information needed to complete resource management direction. The resource assessment also identifies the specific location of resource values if it does not occur throughout the reach.

Scenic

Outstandingly Remarkable Criteria

The landscape elements of landform, vegetation, water, color and related factors result in notable or exemplary visual features and/or attractions. When analyzing scenic values, additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions (such as power lines) are viewed may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

Preliminary Finding

For the purposes of scenic analysis, the Salmon River was evaluated by segment. Visual quality was evaluated using Forest Service and Bureau of Land Management Visual Resource Management Standards. Using these standards, segments 1 and 2 were found to meet the scenic criteria for outstandingly remarkable and segments 3, 4, and 5 were found to have substantial scenic resource values. The outstandingly remarkable values include the very impressive close-up views of Mt. Hood from the upper river area near Timberline Lodge and the views of Mt. Hood and surrounding area as well as the scenic diversity in the Red Top Meadows and Salmon River Meadows areas. In the lower part of segment 2, they also include the narrow river canyon containing basalt cliffs and a series of waterfalls. The presence of timber harvest units that can be seen from the upper river area near Timberline Lodge and Salmon River Meadows is not considered significant enough to reduce the finding of outstandingly remarkable for the upper two segments.

In the lower three segments, scenic values are not considered to be as diverse and remarkable as the upper portion of the river, yet they still provide important opportunities for viewing of the river and isolated areas of old-growth trees in a typical west-side Cascade forest type. Roads, homes, other structures, and restricted or confined views of surrounding landscapes along the river in these lower segments tend to detract from the scenic quality of the river for many viewers.

Discussion of Existing Situation

Several striking scenic features are found along the Salmon River. Visitors to Timberline Lodge are treated to spectacular views of the stark, rugged beauty of Mt. Hood. Based on figures from the Oregon Department of Tourism, the lodge itself is the second most visited attraction in the state of Oregon. Views to the south from Timberline include forested landscapes, Mt. Jefferson, and the Three Sisters. There are some timber harvest units visible from the lodge which somewhat detract from the naturalness of the views from this area. Plans are being made to reduce the visual impact of these units in the future.

In Red Top Meadows and Salmon River Meadows, outstanding views of Mt. Hood and the surrounding area are complemented by the open meadows and varied vegetation. The variety of landforms and vegetation contribute to the area's scenic diversity. The timber harvest units visible from Salmon River Meadow somewhat detract from the naturalness of the views from the meadows.

There are spectacular views looking up the Salmon River corridor to Mt. Hood from the Pacific Crest National Scenic Trail where it runs to the south of Salmon River Meadows. The open meadow areas along the river, surrounded by heavily forested areas with Mt. Hood in the background, are considered to be very scenic.

In the lower two-thirds of segment 2, the river flows into a narrow river canyon containing impressive basalt cliffs and a series of waterfalls ranging in height from approximately 15 to 75 feet. Hikers along the Salmon River Trail #742 often make their way to the cliffs to view the waterfalls which are not visible from the main trail. This portion of the river segment is within the Salmon-Huckleberry Wilderness and retains a primitive untouched character for the visitor.

In segments 3, 4, and 5, vegetation along the river is relatively typical of that found in a west-side Cascade forest type, though its scenic qualities are enhanced by the presence of old-growth Douglas fir in various locations along the river. The river in these segments provides enjoyable close-in views for hikers, campers, anglers, residents and others using the river. The Salmon River Trail parallels the river in segment 3, providing access to the public for enjoying the scenic qualities of the river. Similar trails are found along the river within the Wildwood Recreation Site in segment 5. Future plans call for the development of a nature trail in this area.

The lower river tends to flatten out in gradient, and meanders somewhat in segment 4. In the lower segments, roads, homes, resorts, and other facilities detract somewhat from the scenic qualities of the river at several locations. Overall, however, the views from the river of the natural-appearing shoreline and foreground are enjoyed by those using and living along the river.

Recreation

Outstandingly Remarkable Criteria

Recreational opportunities are, or have the potential to be, unique enough to attract visitors from outside of the geographic region. Visitors would be willing to travel long distances to recreate on the Salmon River. River recreation includes such activities as sightseeing, wildlife observation, photography, hiking, fishing, hunting and boating.

Interpretive opportunities may be exceptional and may attract, or have the potential to attract, visitors from outside the geographic region.

The river may provide or have the potential to provide settings for national or regional recreation events.

Preliminary Finding

The wide variety of recreational activities that take place on the Salmon River; the river's importance as an important anadromous sport fishery; the pristine nature of the corridor in segment 2; the variety of recreational facilities—such as Timberline Lodge, recreation resorts, Wildwood Recreation Site, Green Canyon Campground, and a number of planned and existing trails—all contribute to a finding of outstandingly remarkable for the recreational values along the river. Visitors to the river and river area come from throughout the Pacific Northwest to enjoy its natural beauty and resources. The river's proximity to a major urban center provides an important component to the region's recreation opportunities. The river and river corridor provide a full spectrum of recreational opportunities, from designated wilderness to fully developed recreation resorts, a relatively rare attribute for a single river within the region.

Discussion of Existing Situation

A wide variety of recreational activities take place within the river corridor. The river is very well known by anglers as a prime anadromous fishery in the lower portion of the river. Fishing use is high on this portion of the river. In order to improve the quality of the fishing experience, as well as add diversity to fishing in the area, fishing is restricted to fly fishing only above the bridge on the Salmon River Road #2618 to Final Falls. This restriction also improves survival of juvenile anadromous fish and resident trout that are caught and released and adds protection to adult spring chinook that spawn in that area since few adult chinook are caught with fly fishing gear. The upper portion of the river above the series of waterfalls also receives moderate to low fishing use for resident species.

Recreation facilities found along the river are highly varied. Timberline Lodge and Rippling River Resort are two major resorts in the river corridor. Both resorts draw recreationists from around the Pacific Northwest and throughout North America. Timberline Lodge annually attracts over 1,000,000 non-skiing visitors in addition to an estimated 200,000 alpine and nordic skiers (based on Forest Service use estimates). This site is the second most visited recreation site in the state of Oregon according to the Oregon Department of Tourism. There is also a recently developed recreational vehicle resort on the river in segment 5. The BLM manages the Wildwood Recreation Site with trails and group and individual picnic sites adjacent to the river in that segment. Green Canyon campground is the only publicly owned developed campground located on the river. There are other potential campground sites along the river if the need for such facilities is identified.

Salmon River trail #742 parallels the river for most of segment 2 and all of segment 3. Much of the 17.5 miles of this trail is in the river corridor. This trail receives moderate to heavy use, especially on its lower end. There are a number of other trails that enter the corridor and tie into the Salmon River trail. In addition, Boulder Ridge Trail #783, Bonanza Trail #786, and Salmon Butte Trail # 791 all provide linkages between Salmon River and the Roaring River drainage, Roaring River being another designated Wild and Scenic River on the Forest. Opportunities exist for re-opening abandoned trails or developing additional new trails along the south and east sides of the river in segments 2 and 3 which can provide many new recreational opportunities, including new loop opportunities.

The Pacific Crest National Scenic Trail crosses the river near its headwaters and receives very heavy use. Jackpot Meadows Trail #492, which is part of the historic Skyline Trail, crosses the corridor in segment 2.

The river flows through the Salmon-Huckleberry Wilderness providing hikers and campers with the opportunity for a primitive recreation experience. The pristine character of this section of river provides a contrast to higher development levels above and below the wild segment of the river.

The variety of scenery along the river provides many different photo opportunities including open vistas with spectacular views of Mt. Hood, old-growth trees along the river, and impressive basalt cliffs and waterfalls.

There is some alpine skiing from Timberline Lodge Ski area that takes place in the river corridor as well as the potential to expand ski runs in the future to provide new advanced skiing opportunities. There is also a limited amount of nordic skiing taking place in the lower end of segment 1 and the upper end of segment 2. There is a high potential for new nordic ski trails and sno-parks to be developed in this portion of the corridor in the future depending on demand and direction for the river developed in the river management plan.

Hunting is also another activity that takes place along the river, primarily in the upper one-third of the river. Hunting use is estimated to be light.

The river receives light use by kayakers and drift boaters. There is some drift boat use by anglers on the lower reaches of the river. From Green Canyon Campground to the mouth, there is also light use of the river by kayakers, estimated to be approximately 50 person/days per year. This use is primarily by expert kayakers during high water flows when the river offers a challenging experience (personal communication with Alder Creek Kayak Supply).

There are many private homes along the lower two segments of the river. About one-third of these are owned by year-round residents but the majority are second homes used for recreational purposes by residents from Portland and other areas who enjoy the special attributes of the Salmon River.

The lower three segments of the river as well as a portion of the upper segment are within a one- to two-hour drive of the Portland metropolitan area, the most heavily populated portion of Oregon. State Highway 26, part of the Mt. Hood Loop, and a major route between the Portland area and eastern Oregon, crosses the river in segments 1 and 5 and provides easy access to the river. Because of this easy access and the fact that the river provides such a wide spectrum of recreational opportunities, ranging from primitive experiences to highly developed recreational facilities, the river provides an important component to the region's recreational opportunities.

Because of easy access to the river, especially in the lower three segments, demand is high for public access. In segments 4 and 5, there is much private land along the river and conflicts currently exist in terms of trespass on these private lands by recreationists wanting access to the river for fishing and other recreational pursuits. Along with trespass problems, litter is common at many public access points, especially where facilities for litter control do not exist.

Geologic

Outstandingly Remarkable Criteria

The river or the area within the river corridor contains an example(s) of a geologic feature, process, or phenomenon that is rare, unusual, one-of-a-kind or unique to the geographic region. The feature(s) may be in an unusually active stage of development, represent a textbook example, and/or represent a unique or rare combination of geologic features (erosional, volcanic, glacial and other geologic structures).

Preliminary Finding

Geologic values in a three mile portion of segment 2 were found to be outstandingly remarkable. This finding is due to the presence of six waterfalls ranging in height from 15 to 75 feet in a three-mile stretch. While the waterfalls themselves are hydrologic features, it is because of the geology of the area that the waterfalls exist. The high number of waterfalls in this relatively short distance is considered unique for similar rivers in the region. Geologic features throughout the remainder of the river were not considered to be rare, unique, or exemplary and were therefore not found outstandingly remarkable.

Discussion of Existing Situation

The headwaters of the Salmon River are located high on the south slopes of Mt. Hood below Palmer Snowfield. The dominant feature in the upper reaches is the volcano, formed Mt. Hood. In this area, the river flows through a series of unconsolidated pyroclastic deposits that were formed during the three most recent eruptive periods of Mt. Hood. Because of the relatively steep channel gradients, the river channel is very narrow and deeply incised into the mountain side.

Below the upper reaches is the Red Top Meadows/Salmon River Meadows area which is a broad meadow area of low stream gradient. These broad, glacially-formed basins have been filled with volcanic, alluvial, and outwash material from farther upstream. The relatively flat meadow complexes have been maintained because resistant andesite bedrock at the southwestern edge of Salmon River Meadow resists erosion. The river in this area tends to be slow flowing and meandering in character.

Farther downstream there is a series of six waterfalls ranging in height from 15 to 75 feet within a three-mile stretch of river segment 2. These falls developed on hard, erosionally resistant basalt lava flows of the Columbia River Basalt Group after the river eroded through the overlying volcanic units. There are other streams throughout the region with waterfalls similar in character to those found on the Salmon River (and whose waterfalls may be more spectacular for height of waterfall, etc.), but it is regionally unique to find such a high number of waterfalls in such a short distance on a river of this size and volume.

In segments 4 and 5, the river flows into a broader valley with lower stream gradients. The area around the river is primarily made up of alluvial and debris flow deposits from Mt. Hood, although the hill around which the river flows before joining the Sandy River has been mapped as a glacial moraine. Due to low stream gradients and relatively unconsolidated bed and bank material, the river has a meandering nature in this reach, and even contains oxbows.

Fish

Fish values may be judged on the relative merits of either fish populations or habitat, Native American cultural use, or a combination of these river-related conditions. Consideration is given for potential as well as existing values.

Outstandingly Remarkable Criteria

Populations

The river is internationally, nationally or regionally an important producer of resident and/or anadromous fish species. Of particular significance is the presence of wild stocks and/or federal or state listed threatened, endangered, and sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

Habitat

The river provides or has the potential to provide exceptionally high-quality habitat for fish species indigenous to the region. Of particular significance is habitat for wild stocks and/or for federal or state listed or candidate threatened, endangered, and sensitive species. Diversity of habitats is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

Preliminary Finding

The fishery resource in the Salmon River from its mouth to river mile 14 (RM 14) at Final Falls qualifies as an outstandingly remarkable value because it provides extremely important and productive anadromous fish spawning and rearing habitat. Several state of Oregon listed anadromous and resident fish species are either present or have been reported in the Salmon River. The river is also a nationally renowned summer steelhead fishery and draws anglers from outside the state of Oregon.

Above RM 14, the river, while not containing outstandingly remarkable values, is significant because it provides important habitat for resident trout. It also supports the downstream fishery by providing high-quality water, nutrients for fish, and large woody debris important for meeting habitat needs.

Discussion of Existing Situation

The Salmon River from its mouth to RM 14 is very important for its anadromous fishery values. The river is nationally renowned for its summer steelhead fishery and anglers come from outside Oregon to fish the river. In addition to summer steelhead, this section of the river also contains winter steelhead, coho salmon, spring chinook salmon, native cutthroat trout, and native and hatchery rainbow trout. Above RM 14, the river contains brook trout and native cutthroat trout.

There are historic reports of bull trout in the drainage but their presence has not been confirmed. Bull trout is a state of Oregon listed sensitive species and a candidate for federal threatened or endangered species status. Suitable habitat and isolation exists to support this species in Salmon River tributaries such as Mack Hall Creek, South Fork Salmon River, and Cheeney, Copper, and Wolf Creeks.

Three other state of Oregon listed sensitive species are, or were, present in the Salmon River. Columbia River coho salmon (late-run) are likely still present in the Salmon River drainage in very low numbers. Historically, lower Columbia fall chinook salmon and coastal cutthroat trout (Columbia River sea-run) were present, although both are now found only in downstream areas, below Marmot Dam on the Sandy River. Excellent habitat conditions are present for all three species in the lower reaches of the drainage.

Based on visual observation, water quality in the Salmon River is excellent throughout most of the year. The river, in contrast to some of the other major tributaries in the Sandy River system (of which the Salmon is one) tends to run clear, even during the summer months when other tributaries contain glacial flour resulting from glacial melt on Mt. Hood. Red Top Meadows and Salmon River Meadows filter out some of the glacial flour and keep water quality high.

Habitat surveys for the river corridor are currently being conducted within the National Forest boundary. There is a diversity of aquatic habitats represented within the drainage ranging from low gradient anadromous spawning and rearing areas to small, high gradient, alpine glacier-fed creeks. Generally, the habitat quality is thought to be high from the Salmon River Meadows area to the Green Canyon Campground area. Below the confluence of the river

with the South Fork Salmon there is a lack of large woody debris (LWD) important for habitat needs in the river.

There are large areas of old growth and associated instream LWD in many of the tributaries. These areas are important sources of LWD for the entire system.

Fish habitat improvement projects. including placement of large rocks and logs to develop additional spawning areas and provide hiding cover, have been implemented in the South Fork of the Salmon to improve the quality of the spawning and rearing habitat in the rivers. The river and its tributaries below Final Falls at river mile 14 provide very important spawning and rearing habitat for coho, spring chinook, winter steelhead and resident trout. Because of the importance of this habitat, angling for salmon and steelhead is prohibited between January 1 and the fourth Saturday in May to maximize escapement and allow increased opportunities for spawning and rearing.

Only one impoundment, at Marmot Dam, is located between the Salmon River and the Pacific Ocean. This dam is equipped with a fish ladder for returning adults and with screens to aid the downstream migration of smolts.

Estimates of annual adult fish returns into the Upper Sandy/Salmon system are: 9,600 winter steelhead, between 5,000 and 6,000 summer steelhead, 1,700 spring chinook, approximately 2,900 fall chinook (1987 estimate), and 12,840 early- and late-run coho, with almost all of these being the early-run coho.

The Oregon Department of Fish and Wildlife released a draft *Sandy River Subbasin Salmon and Steelhead Production Plan* in January, 1990. This document provides substantial additional information about the salmon and steelhead resource in the Sandy system and identifies objectives and recommended strategies for future enhancement of the resource. The excellent habitat provided by the Salmon River and its tributaries will be instrumental in the future maintenance or improvement of anadromous fish runs in the Sandy River system. The future objectives for total returning adult fish for this river system are summarized below:

Coho	3,800 fish	This number applies to both early- and late-run coho. This figure is only for escapement and hatchery return needed for production in the Sandy Subbasin and does not include additional hatchery adults needed for full production (i.e., eggs needed for transfer to other hatcheries). Increasing production of the late-run coho, which is a rare stock of coho, is a major goal of this subbasin plan.
Winter Steelhead	11,500 fish	
Summer Steelhead		The objective for summer steelhead is to maximize sport harvest and minimize spawning escapement. Summer steelhead is an introduced run and natural reproduction is undesirable in the management plan. Angling for salmon and steelhead is prohibited between January 1 and the fourth Saturday in May to increase escapement and spawning success.
Fall Chinook	1,800 fish	The draft plan lists 4,500 fall chinook as the objective for total returning adult fish. Personal communication with Jay Massey, Fisheries Biologist for ODFW, corrects this number to 1,800 fall chinook.
Spring Chinook	4,500 fish	

Wildlife values are judged on the relative merits of either wildlife populations or habitat, Native American cultural use, or a combination of these conditions.

Outstandingly Remarkable Criteria

Populations

The river or area within the river corridor contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique or populations of federal or state listed or candidate threatened, endangered, and sensitive species. Diversity of species is an important consideration and could in itself lead to a determination of outstandingly remarkable.

Habitat

The river or area within the river corridor provides exceptionally high-quality habitat for wildlife of national or regional significance, or may provide unique habitat or a critical link in habitat conditions for federal or state listed or candidate threatened, endangered and sensitive species. Contiguous habitat conditions are such that the biological needs of the species are met. Diversity of habitats is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

Preliminary Finding

In the Salmon River/Red Top Meadows area, wildlife values were found to be outstandingly remarkable. The meadow complexes provide relatively unique, optimal quality habitat for elk and other big game species as well as many other vertebrate and invertebrate species. The mosaic of vegetative types meets the needs of many types of wildlife. The combination of different vegetative types and the number and larger size of the meadows in this meadow complex is unique in comparison to other meadow areas throughout the region.

Other locations along the river corridor also provide important wildlife habitat. While important, this habitat is not of a quality to be considered outstandingly remarkable.

Discussion of Existing Situation

The Salmon River Meadows/Red Top Meadows area provides very important high-quality wildlife habitat along the river. The meadows themselves are a mosaic of vegetative types including open meadows, mixed hardwoods such as alder and willow, and islands of coniferous trees that provide optimal summer range for big game species because of the excellent forage and hiding cover. The meadow complexes are large in comparison to other meadows in the region, and at their elevation, are considered quite unique.

The meadows are also thought to function, at least to some degree, as a waterflow "sink." They store water during wetter times of the year, later releasing it, providing a more even-flow regimen that better meets the needs of the many wildlife species present. Specific wildlife values in these meadow complexes include:

- Two key species found within the area include Roosevelt Elk and Sandhill Cranes. The Sandhill Crane is on the R-6 sensitive species list. This small population of cranes is the northernmost population and represents somewhat of an anomaly for the species, being separated from other crane populations.

- The Roosevelt Elk are an important big game species in the area. They are known to migrate from both the east and west side of the Cascades to the meadows. Because of

this, the area may also be important for providing a larger gene pool for the species. The Forest has been working cooperatively with the Rocky Mountain Elk Foundation to improve the quality and amount of forage in the Salmon River Meadows area.

The river provides potential high-quality habitat for sensitive aquatic species such as the Cascade frog, Olympic salamander, and tailed frog. No surveys have been done at this time and their presence is not verified. Additional survey work needs to be done in the area to confirm or deny the presence of these species. The red-legged frog is listed as a sensitive species with the state of Oregon and has been found in wetlands in the Wildwood recreation site.

Many wildlife species, including large carnivores such as black bear, cougar, and bobcat can be found along the river corridor. Black-tailed deer and possibly Roosevelt elk use the lower portions of the river for traditional winter range. This area may be very important in severe winters. Ruffed grouse, bandtail pigeon, and kingfisher are all common bird species present. Golden eagles, bald eagles, and osprey have been observed in casual sightings along the river but no nest sites have been found at this time. Pileated woodpeckers have also been spotted in Wildwood Recreation Site in segment 5.

Along the river in segments 2 and 3, there are remnant old-growth stands that provide important habitat to species such as the northern spotted owl and pine marten that require the habitat conditions found in these forest types. The lower half of segment 2 and all of segment 3 are also contained in a category 1 Habitat Conservation Area as proposed by the Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl.

The steep cliffs and rocky faces along the middle and lower portions of the river offer the potential for future habitat for the peregrine falcon, although no current use is known.

In segments 4 and 5 (BLM-administered portion), there are several small wetlands along the river. There is even one small oxbow that provides important habitat for species such as wood ducks, mergansers, and herons. Because of the high level of development in these two segments in the past, the habitat has been disturbed, reducing its value for many wildlife species throughout the two segments. However, this area still is important to the overall health of the river's ecosystem and water quality, and protection of the existing values will need to be considered in the river management plan.

Cultural Resources

Prehistoric:

Outstandingly Remarkable Criteria

The river or area within the river corridor contains a site(s) where there is evidence of occupation or use by native peoples. Sites must have unusual characteristics or exceptional human interest value(s). Sites may have national or regional importance for interpreting prehistory; may be rare and represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; or may have been used by cultural groups for rare or sacred purposes. Of particular significance are sites or features listed in, or eligible for inclusion in, the National Register of Historic Places.

Historic:

Outstandingly Remarkable Criteria

The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare, unusual or one-of-a-kind in the region. A historic site(s) and/or feature(s) in most cases is 50 years old or older. Of particular significance are sites or features listed in, or eligible for inclusion in, the National Register of Historic Places.

Traditional:

Outstandingly Remarkable Criteria

The river or area within the river corridor contains regionally unique location(s) of importance to Indian tribes (religious activities, fishing, hunting, and gathering). Locations may have unusual characteristics or exceptional cultural value being integral to continued pursuit of such activities. Locations may have been associated with treaty rights on ceded lands or activities unprotected by treaty on ceded lands or in traditional territories outside ceded lands.

Preliminary Finding

The preliminary finding is that the prehistoric, historic, and traditional cultural resources of the Salmon River do not meet the criteria for outstandingly remarkable when compared with other areas within the region. There are, however, several important sites and values within the corridor that will be protected, and where the potential exists, interpreted in the future. Some of these are already on the National Register of Historic Places. Management of these areas will be addressed in the river management plan.

The high-quality segment and secondary segments of the Barlow Road and the section of the Skyline Trail do not follow the river itself but just cross over the river. Because of this, it is considered that they do not owe their location to the presence of the river itself and are therefore not river-related. Timberline Lodge's location is also not considered to be river-related, even though it is within the river corridor. The lodge's location is more closely tied to being on Mt. Hood than being adjacent to the river itself. Since Wild and Scenic river values must be river related, the presence of the above in the river corridor were not used in determining the level of significance of cultural values for this assessment. These sites will however, continue to receive the protection worthy of their important cultural significance and protection and enhancement of their values will be addressed in the river management plan.

Discussion of Existing Situation

There are currently no known prehistoric sites within the river corridor. This may be due to the lack of archaeological surveys in the area rather than an actual absence of sites. Forest site files have identified known vision quest sites which were used by local tribes in the Linney Butte area just south of the river corridor. It is likely that there was a semi-permanent camp along the river occupied by Native Americans using these vision quest sites, but such a camp has not been identified at this time.

The Salmon River Meadows area is known to have been used regularly for camping by local bands of Native Americans heading to Mt. Hood for berries and other high elevation subsistence and trade activities. Limited survey work has occurred in the area at this time and prehistoric cultural sites have not been identified in the Meadows. Dense vegetation reduces site visibility and may be a contributing factor to having not located sites in the Meadows as well.

The Barlow Road, a portion of the Oregon Trail, crosses the river near the junction of U.S. Highways 26 and 35. Some segments of the Road in this area are in excellent condition and are easily interpretable. There are also two places where secondary routes of the Barlow Road are within one-quarter mile of the river in segment 5 near the river's mouth. While U.S. Highway 26 overlays these segments in this lower section, people can still "travel" the Barlow Road and have the Oregon Trail Experience. In those locations where the Barlow Road is actually within the Wild and Scenic river corridor, the Road is really crossing through the river corridor. In these locations, it is not paralleling the river or river canyon and therefore its location is not considered to be river related. The Barlow Road is on the National Register of Historic Places.

The Oak Grove Wagon Road, which joins the Barlow Road at Summit Meadows just south of Government Camp, crosses the river near Salmon River Meadows. This road was blazed for the early settlers of the Juniper Flat-Wapinitia area as an alternate route to the Barlow Road east of Summit Meadows.

Jackpot Meadows Trail #492 passes through the river corridor in the upper one-third of segment 2. This is a section of the historic Skyline Trail.

Salmon River Trail #742 parallels the river. It was first built in 1908 from the Forest boundary to Kinzel Mine which is north of the river corridor. This trail has not been evaluated but may be eligible for the National Register of Historic Places.

There is evidence of historic use of cedar tree bark for basket weaving in the Salmon River Meadows area. No prehistoric camps were found in the area and core samples from the trees indicate that the trees were cut and the bark peeled about 1913.

The Timberline Trail which traverses around Mt. Hood was built in the 1930's and crosses the river corridor just above Timberline Lodge. It is also the Pacific Crest National Scenic Trail in this location.

The Salmon River Meadows Guard Station was located in the river corridor and was constructed for use by Forest Service crews. The exact date of construction is not known. Most guard stations on the Forest were built in the 1930's but there is evidence of a 1916 trail leading to the site of the station so it is possible that a formal structure was constructed there as early as 1920.

Timberline Lodge is located on the edge of the river corridor. It was constructed in the 1930's as a Works Progress Administration project to help those unemployed as a result of the Depression. The lodge itself was dedicated by President Franklin D. Roosevelt in September of 1937 and is on the National Register of Historic Places. The Lodge is very well known throughout the Northwest and is the second most visited public attraction in the state of Oregon.

The East Leg of Timberline Road is located within the river corridor. This road, coupled with the West Leg Road and a tie road between the two, provided access to Timberline Lodge. The road started at the current site of Snowbunny Lodge. Traffic flow on the East Leg Road was basically up to the Lodge with traffic from the Lodge traveling down the West Leg Road. Following World War II until completion of the current two-way road in 1950, the East Leg road was used for winter access to Timberline since it was difficult to plow around the sharp switchbacks and other tight turns on the West Leg road. The upper section of the current highway to Timberline Lodge follows the location of East Leg. Portions of the lower sections of East Leg road are still used for timber harvest and recreational access as well as a nordic ski trail during the winter.

There are also a number of areas within the river corridor that are important for current tribal use such as gathering of huckleberries.

Outstandingly Remarkable Criteria

The river or area within the river corridor provides prime quality habitat for federally listed and candidate threatened and endangered species, with species present in that habitat. The area may also include nationally or regionally unique combinations of plant communities or a rare or displaced plant community, as in a bog, swamp or meadow. The presence of a nationally or regionally unique natural or undisturbed riparian community may also merit an outstandingly remarkable determination. The importance of these plant communities to existing or past cultures, including Native American cultures, is also an important criterion.

Preliminary Finding

The ecological/botanical resource on Salmon River qualifies as an outstandingly remarkable value because of the diversity of vegetation and presence of the unique and rare plant communities. Salmon River Meadows/Red Top Meadows complex is an area of special consideration, because of the diversity of habitat and plant and animal species.

Discussion of Existing Situation

The Salmon River flows through a wide variety of life zones from its headwaters to its mouth, ranging from high alpine life zones at its headwaters to lower elevation westside Douglas-fir forest types at its mouth. Along the way, the river flows through a variety of life zones and plant communities, including a large subalpine meadow complex, important riparian areas, areas along the river containing cliffs and their unique ecological communities, and old-growth Douglas-fir communities. The wide variety of communities that are known to be within the relatively short length of the river is unique in comparison with several other rivers in the four county region.

Very little survey work has been done along the river corridor to determine all of the plant and animal communities present. There is a need to do additional survey work to determine exactly what unique plant and animal communities are present along the river.

Salmon River Meadows/Red Top Meadows area is unique ecologically. There are few, if any, other meadow complexes of the size and diversity of plant communities found in that elevation zone throughout the central Cascades. This area is very important in meeting the habitat needs of a wide variety of fish and wildlife. (See Fish and Wildlife sections.)

A population of *Scheuchzeria palustris* var. *americana*, common name scheuchzeria, is found in Salmon River Meadows. This population consists of thousands of plants and is the largest known population in the state of Oregon. This plant is on the R-6 Regional Forester's list of sensitive plants and is also listed as threatened by the Oregon Natural Heritage Data Base. While the plant does have a wide range from Alaska to California, across North America, and in the eastern hemisphere, it is very rare in Oregon.

Another sensitive species, *Corydalis aquae-gelidae* (coldwater corydalis), occurs along and adjacent to portions of the Salmon River, primarily near the confluence of Linney Creek and Salmon River. This plant is on the Regional Forester's list of sensitive plants, is a federal candidate category 2 species, and is listed as threatened by the Oregon Natural Heritage Data Base. The plant may be at other locations along the river but extensive surveys have not been done to confirm its presence.

The lower portions of the river provide excellent opportunities to easily observe old-growth Douglas-fir communities that are along the river, especially in segment 3 along the Old Salmon River Trail #742.

The area along the river in the lower one-half of segment 2 and adjacent to segment 3 provides important habitat to meet the needs of the Northern Spotted Owl, a federally listed threatened species, as well as other old-growth dependent wildlife species. This area of the river is also contained in a category 1 Habitat Conservation Area proposed by the Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl.

There are important small wetland areas along the river in segments 4 and 5, as well as one oxbow that provides important habitat for wildlife species. One of the wetlands is in the Wildwood Recreation Site administered by the BLM (segment 5). The BLM is in the process of developing an interpretive trail near this wetland area to better educate the public on the importance of the ecological values of wetlands.

In the lower two segments, plant communities and riparian areas have been heavily impacted by the high level of development of residences and resorts along the river, reducing the value of the riparian area to wildlife and fish species.

Due to limited survey work on the river, especially on the lower two segments, a conclusive determination of ecological values cannot be made in these segments. Further information will be collected as part of the planning process.

Hydrological

Outstandingly Remarkable Criteria

The waterway offers nationally or regionally unique examples of free flowing nature. Examples include flooding, bank or bed erosion, natural flow regimens, island building, downcutting, and other stream flow characteristics, etc., or water-created features such as falls, sinks, caverns, springs, etc.

The river water itself is one of the best examples of clarity, purity, glacial "milk", etc., or the combination of water chemistry and temperature supports life forms nationally or regionally unique.

Preliminary Finding

The presence of six waterfalls in a short three-mile stretch in segment 2 of the river is unique enough regionally that hydrologic values would qualify as outstandingly remarkable.

Discussion of Existing Situation

The Salmon River evolves from a high gradient, high energy stream at its headwaters, to a low gradient meandering river in its lower reaches. The varying geology and topography of the Salmon River drainage system have produced hydraulic features such as waterfalls, wetland meadows, and oxbow river channels in places along the stream course. The overall average stream gradient for the Salmon's 35-mile length is 3 percent or 154 feet per river mile. The Salmon River has no water impoundments and is considered free-flowing throughout its length.

There is a series of six waterfalls ranging in height from 15 to 75 feet within a 3-mile stretch of segment 2 of the river. (See Geology section for more information on these waterfalls.) The high number of waterfalls in a relatively short distance is considered unique for similar rivers in the region.

Average daily discharges as measured near Government Camp in segment 1 for the years 1910 to 1987 range from a low of 24 cfs in September to a high of 75 cfs in May. Average daily discharges as measured at a station in segment 4 above Boulder Creek near Brightwood, for the period of 1936 to 1952, range from a low of 103 cfs in September to a high of 738 cfs in April. The data illustrate that average discharges are influenced substantially by

rates of snow accumulation and snowmelt within the watershed. In the upper watershed, as measured near Government Camp, average discharges are seen to gradually increase during the months of October through December. Average daily discharges level out or decrease slightly during the colder months of January and February, reflecting periods of snow accumulation. Average discharges increase to maximum levels from March through June, peaking towards the end of May or beginning of June, as a result of spring snowmelt.

A similar pattern of stream discharge is observed in the data measured at Brightwood. However, there is much more variability in the flows, reflecting the dominance of rainfall rather than snowfall in much of the lower elevation portions of the watershed. The peak spring runoff also occurs about one month earlier, due to earlier snowmelt in the lower elevations.

Average or mean discharge figures, by themselves, may be misleading. Major peak discharges associated with rain on snow events are dramatically illustrated in the streamflow records for both the Government Camp and Brightwood stations. Peak flows of 728 cfs and 8,680 cfs have been recorded during the month of December at the Government Camp and Brightwood stations, respectively. Similar peaks have occurred with regularity over the periods of record, primarily during the months of November through February. It is these peak flows which have the potential to dramatically affect stream channel characteristics, aquatic habitat, and riparian features. Overall, the Salmon River appears to have coped well with these peak flows. Channel stability characteristics, aquatic habitat, and riparian conditions are judged to be among the best on the Forest based on observation by Forest hydrologists.

The Salmon River/Red Top Meadows area appears to contribute substantially to the generally high water quality observed in the Salmon River. The stream and several tributaries meander slowly through these meadows, allowing sediments to settle out of the water, improving downstream water quality. The meadows may also act as a "sink" where water is detained and slowly released to the stream as base flow. The overall contribution to the drainage as a whole is not known and is believed to be relatively small. However, on-site, the meadows are valuable in maintaining favorable conditions of flow.

It is thought that the tributaries to the river within the Salmon-Huckleberry wilderness also help in regulating water quality since most originate in and flow through undisturbed areas. Water quality in these tributaries appears to be very good based on the limited information available.

There is a lack of water quality information about the Salmon River at this time, and work needs to be done to develop baseline data for the river segments. Some potential hydrologic problems that have been observed on the river include high turbidities during parts of the year and some sedimentation and erosion, especially in the more developed areas along the lower third of the river.

Appendix A-1

Resource Assessment Process

Purpose and Need

The importance of a thorough resource assessment cannot be overstated. The resource assessment serves as the foundation of the river management planning process. It determines which river-related features are truly outstandingly remarkable or contribute substantially to the river setting and the functioning of its ecosystem. It is not intended to serve as an eligibility evaluation.

Usually the initial step in the river management planning process, the resource assessment must take into consideration all features which are directly river-related. This early identification and evaluation will help ensure that significant features are not overlooked and that a holistic approach to investigating the inter-relationship among various features is achieved.

The identification and documentation of outstandingly remarkable and other significant values is a first step in developing management prescriptions that protect and enhance river values. A thorough resource assessment provides the basis upon which management decisions affecting resources within the planning area can be made during the interim period pending plan completion and approval. Additionally, the findings and conclusions reached at the end of the assessment effort will be used in management plan scoping, including specific issue identification and establishment of final administrative boundaries.

The process is done using an interdisciplinary team knowledgeable of the Wild and Scenic Rivers program and of the values being considered. Information from other experts is obtained through consultation and/or direct involvement as needed.

It is important to remember that the term "outstandingly remarkable" as used in the Wild and Scenic Rivers Act has never been precisely defined. Consequently, any determination of outstandingly remarkable values is a matter of informed professional judgment and interpretation. The only firm expectation is that the basis for the judgment be adequately documented in the resource assessment.

Value Assessment

All values assessed should be directly river-related, or owe their location or existence to the river ecosystem. The rationale for a direct river relationship is that the program involves the Wild and Scenic Rivers System rather than a generalized land and resource conservation program. It is therefore appropriate to focus attention on the river and resources directly related to it.

The resources to be assessed are specifically identified in the Wild and Scenic Rivers Act (P.L. 90-542) and include scenic, recreation, geologic, fish and wildlife, historic, cultural, and other similar values. Other similar values include, but are not limited to, hydrologic, botanic and ecological resources.

Significance Thresholds

In order to be assessed as "outstandingly remarkable," a river-related value must be a unique, rare, or exemplary feature that is significant at a regional or national level. Those river related values that are not assessed as outstandingly remarkable but contribute substantially to the functioning of the river system and river setting should be described and their level of significance indicated.

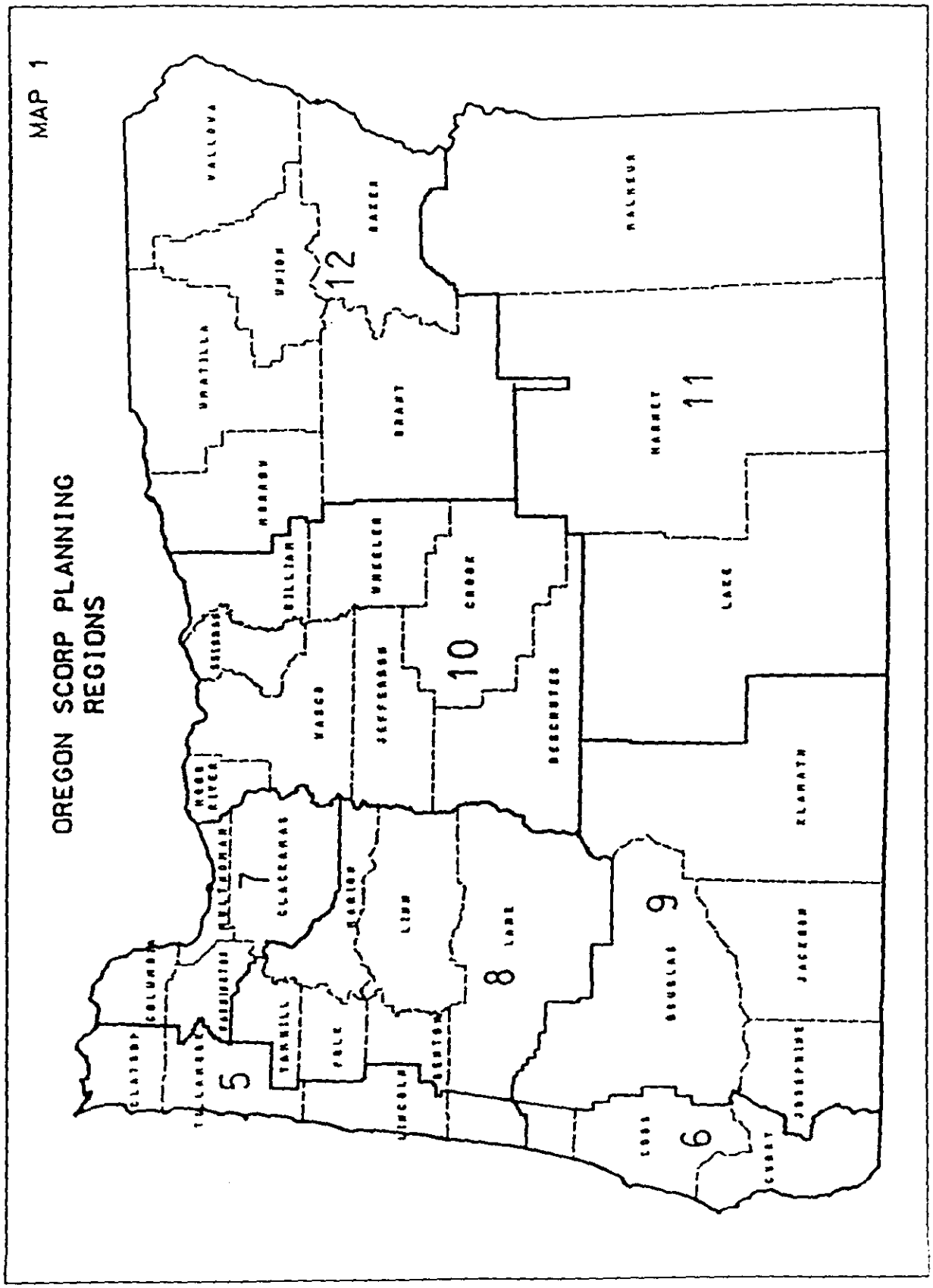
The geographic regions (8) described in the *1989 Statewide Comprehensive Outdoor Recreation Plan* (SCORP) for Oregon are used for comparing certain river-related values among the rivers in a "region."

The guidelines for assessing values are set forth under the discussion of each of the values in the main part of the assessment.

Appendix A-2

Oregon SCORP Regions

Map A-2.1 Oregon
SCORP Regions



Appendix A-3

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Appendix B

Salmon River Mailing List

Salmon River Mailing List

David Roth
John Lilly
Ray Miller
Mike Filbin
John Allen
Leonard Palmer
David French
Gary Miniszewski
David Bayles
Rob Galasso
Tom Cassidy
Oregon Natural Resources Council
Scott Stuemke
Peter Paquet
Mark Mercier
Bill Bakke
Greg Burtchard
Charles Ciecko
Northwest Steelheaders
Roy Bowden
Richard Hanes
Rick Stoots
Jay Massey
Doug Schulz
Herb Forbes
Thomas C. Pierson
Jim Heffernan
Jerry Gray
Mark Bachmann
Oregon Department of Geology and Mineral Industries
The Flyfishing Shop
Mike Gray
U.S. Geological Survey
Marcia Hale
Doug Cramer
Doug Hodson
Rocky Mountain Elk Foundation
NW Steelheaders/Sandy River Chapter
Mark Stearn
Dick Bauman
Steve Scherrer
Marc Liverman
Thom Powell
Dan Carlson
Gene Silosky
John H. Garren
Thomas M. Chereck
Mazamas
Jean Siddall
Jeff Kaiser
Isaak Walton League
Winston Kurth
Bill Fujii
Bob Powne
Dick Vander Schaaf
Tom Kloster
Cathy MacDonald
John Borge
Tim Cowles
Gary Kish
Ken Bunker
Bob Roth
Donald McLeod
Ralph Parker
Elizabeth Handler
Ron Grossmann
John Rowell
Steve Taylor
Mt. Hood Area Chamber of Commerce
George Ostertag
Bill Vogle
Ron Fransen
Dave Mihelic
Janet Tobkin
Gary Hackett
Richard Zettervall
Patty Barnes
John Crabbe
John Bonebrake
Karl Bialkowsky
Ron Baird
Dan Green

Tamara DeRidder
Mark Stensland
Liz Frenkel
Claude Gudge
Jeff Bohren
Julian Crow
Dave Butt
Claude Blessing
Bill Keil
Milt Fox II
Philo Gregg
Bill Davidson
Dwight Englert
B.W. Edwards
John O'Neill
Wes and June Steinbrook
Keith Petrie
Chris and Tom Thompson
Milt Hegstrom
Hugh Marquis
Greg Powell
Bob Dorman
Mike Walker
Dick Springer
Linda Wagner
Lyla Foggia
Kelly Neal
Gail Achterman
John Well
Barbara White
William Yager
Robert Clytel
Mary Warner
Florence Kniles
Karl Anuta
Merlin and Donna Kliewer
D. Schuyler
John Powell
Ben and Lupe Rushford
Loretta Beard
Dennis Tylka
J. Highland
Steve Taylor
Diane Bennett
Cascade Geographic Society
Bonnie Levet
John McClay
Jon Tullis
Chuck McGinnis
Troy Moore
Clay Moorehead
Larry Callister
Robert Child
Keppie Keplinger
Michelle Wilson
Dennis Deck
Terry Kimpel
Craig Markham
Bob Freimark
John Sherman
Michael P. Jones
Char Corkran
National Wildlife Federation
PCT Conference
David Ellis
John Woodard
Steven Dow Beckham
Ralph Saperstein
Kathy Amundsen
Eric Goranson
Harry Abernethy
Lee Asch
Jonathan Ater
Ethel Balcom
Phyllis Bennett
Jeff and Becky Blanche
Philip Bogue
Martin Akin
Raymond Ashbrook
Camille Bain
Craig Baxley
Eugene Bentley
Marjorie Boate
Robin Bolton
Richard Brenneke
Sharon Bridge
Robert Brown
M.J. Schuberg
Alice Burns
B.H. Christiansen
George Bolton
Molly Bowman
Margaret Brice
Gretchen Brooks

Tim Brown
Andrew Canale
Connell Corporation
Barbara Cooper
Jim Crawford
Jeanette Daletas
Barbara Davis
Harold Clarke
Sara Corrigan
Dorothy Courtain
Wendy Dahlberg
William Davidson
Jeff Day
Jody Ann Dayley
Susan Duling
Steve Durham
Michael Eilers
Malvin Everist
Vahan Dinihanian
Clifford Fortune
Jack Dunn
Harold Ruby
Richard Evans
Scott Everist
Far West Federal Bank, Welches
Letha Flynn
Dorothy Fouch
Allan Franzke
Christine Gann
Richard Goshorn
Julia Glover
Donald Grufke
Wayne Hamreus
Shirley Hanson
Tom Hartman
Eline Haskell
Theodore Hergert
Francis Hilton
Ed Hopper
Frank Hannigan
Dale Harlan
Jack Hasbrook
Marcia Heilig
Robert Hood
Robert Hopwood
David Homer
Jim Hurst

William Jantz
Roger Kidder
Dan Krohn
Darin Laughery
Sandra Sofich
Mary Hughes
Ray Ivarson
Michael Kadderly
Florence Krebs
Loyal Lang
Larry Ledwith
John Lindgren
Ed Lindquist
Gerda Lymp
David Maas
Robert Mathers
Donald Mayne
Walter McKinney
M.M. Meadows
Oliver Lund
David Lythgoe
Mark Maupin
Linford McKeown
Mary McLain
Linda Miller
Judith Mondun
Thomas Nash
W.E. O'Dao
Oregon Baptist State Convention
Garry Padrta
Jacquie Yates
Larry Murphy
Paul Niedermeyer
James O'Dea
J.D. Palmer
Don Peters
A. Platt
Steve Post
Warren Ranta
Hugh Richardson
Hortensia Rockney
Donald Peters
Marvin Porter
Bertha Pugh
Paul Rice
Jerry Calavan
W.R. Rogers

Hope Ronning
Bob Schumacher
Arthur Shields
James Sonderen
Joe Stein
James Russell
Salmon River Park Water Improvement District
Betty Schmidt
Raymond Seibert
Wesley Stainbrook
Laurie Strong
Ben Tannier
Marlene Tennyson
Jean Thomas
Robert Tindle
Grace Tower
Steve Volpin
Lindsay Wagner
Mary Kean Taylor
Richard Sagor
Leonard Thompson
Robert Tinker
Willard Turner
Ken Vartanian
Paula Walker
Hal Hines
Rod Wichman
Roger Zener
Jim Lauer
Rhododendron Neighborhood Group

Appendix C

Glossary

Glossary

A

Acre-foot (af)

A water measurement term equal to the amount of water that would cover an area of one acre to a depth of one foot (43,560 cubic feet).

Activity

Actions, measures, or treatments that are undertaken that directly or indirectly produce, enhance, or maintain forest outputs and rangeland outputs, or achieve administrative and environmental quality objectives. Forest Service activity definitions, codes, and units of measure are contained in the Management Information Handbook (FSM 1309.11).

Airshed

A geographical area that, because of topography, meteorology, and climate, shares the same air.

Allowable Sale Quantity

Or ASQ. The quantity of timber that may be sold from the area of land covered by the Forest plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the average annual allowable sale quantity. (The allowable sale quantity applies only to the lands determined to be suitable for timber production, and to utilization standards specified in the land and resource management plan.)

Alternative

One of several policies, plans, or projects proposed for decision making.

Amenity

An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity value is typically used in land use planning to describe those resource properties for which market values cannot be established.

Anadromous Fish

Those species of fish that mature in the ocean and migrate into streams to spawn. Salmon, steelhead, and shad are examples.

Animal Unit Month (AUM)

The quantity of forage required by one mature cow (1,000 pounds), or the equivalent for one month, based upon average daily forage consumption of 26 pounds of dry matter per day (800 pounds/month).

Aquatic Ecosystems

Stream channels, lakes, marshes or ponds, etc., and the plant and animal communities they support.

Aquatic Habitat

Habitat directly related to water.

Aquifer

A geologic formation or structure that contains and transmits water in sufficient quantity to supply the needs for water development. Aquifers are usually saturated sands, gravel, or fractured rock.

B

Background

The visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the forest stand (see Foreground and Middleground).

Benefit

The results of a proposed activity, program or project expressed in monetary or nonmonetary terms.

Best Management Practices (BMP)

A practice or combination of practices that are the most effective and practical (including technological, economic and institutional considerations) means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

Big Game

Those species of large mammals normally managed for sport hunting.

Biological Control

Biological control is the use of parasites, predators, or disease pathogens (bacteria, fungi, viruses, and others) to suppress pest populations.

Biomass

The total quantity (at a given time) of living organisms of one or more species per unit of space (species biomass), or the total quantity of all the species in a biotic community (community biomass).

Broadcast Burn

Allowing a prescribed fire to burn over a designated area within well-defined boundaries for a reduction of fuel hazard or as a silvicultural treatment, or both.

C

Capability

The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease. (36 CFR 219.3)

Class I Wilderness

Those wilderness over 5,000 acres which were in existence as of August 7, 1977. All other National Forest System lands are Class II, including new wildernesses and expansions to Class I wildernesses which occurred after August 7, 1977.

Clearcutting

The harvesting in one cut of all trees in an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, stand, or strip large enough to be mapped or recorded as a separate age class in planning for sustained yield.

Climax Species

Those species that dominate the forest stand in either numbers per unit area or biomass at climax.

Code of Federal Regulations (CFR)

The listing of various regulations pertaining to management and administration of the National Forest.

Commercial Forest Land (cfl)

Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn from timber management by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils, productivity, or watershed conditions; and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking of young trees can be attained within five years after final harvest.

Commercial Thinning

Cutting by means of sales of products (poles, posts, pulpwood, etc.) in immature forest stands to improve the quality and growth of the remaining stand.

Community Stability

A community's capacity to handle change without major hardships or disruptions to component groups or institutions.

Commodity

A transportable resource product with commercial value, all resource products which are articles of commerce.

Common Varieties

Nonmineralized sand, gravel, stone, etc.

Congressionally Classified and Designated Areas

Areas that require Congressional enactment for their establishment, such as National Wilderness Areas, National Wild and Scenic Rivers, and National Recreation Areas.

Conifer

A group of cone-bearing trees, mostly evergreen, such as pine, spruce, and fir.

Consumptive Use

Those uses of a resource that reduce its supply.

Core Area

(As related to spotted owl.) An area encompassing at least 300 contiguous acres of old-growth forest suitable for nesting and reproduction. The area consists of a portion of the territory required by a pair of owls, the nest site, and principal roost areas.

Created Opening

Created openings are openings in the Forest created by the silvicultural practices of shelterwood regeneration cutting at the final harvest, clearcutting, seed tree cutting, or group selection cutting.

Critical Habitat

For threatened or endangered species, the specific areas within the geographical area occupied by the species (at the time it is listed, in accordance with provisions of Section 4 of the Endangered Species Act) on which are found those physical or biological features essential to the conservation of the species. This habitat may require special management considerations or protection. Protection may also be required for additional habitat areas outside the geographical area based on a determination of the Secretary of the Interior that such areas are essential for the conservation of the species.

Cubic Foot

A unit of measure with the dimensions of one foot by one foot byone foot.

Culmination of Mean Annual Increment (CMAI)

The point where the mean annual growth of a timber stand ceases to increase prior to decline. This is calculated by determining the cubic foot per acre volume of a stand of trees divided by the age of the stand.

Cultural Resources

Includes the remains or records of districts, sites, areas, structures, buildings, networks, neighborhoods, memorials, objects and events from the past which have scientific, historic or cultural value. They may be historic, prehistoric, archaeological, or architectural in nature. Cultural resources are an irreplaceable and nonrenewable aspect of our national heritage.

Cumulative Effects

The combined effects of two or more management activities. The effects may be related to the number of individual activities, or to the number of repeated activities on the same piece of ground. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

D

Data Recovery

The systematic removal of the scientific, prehistoric, historic, and/or archaeological data that provides a cultural resource property with its research or information value.

Debris Slide

A shallow landslide of soil, rock, and organic material that occurs on steep slopes.

Debris Torrent

A large debris slide that is changed with water and confined to a steep stream channel. Debris torrents may travel several thousand feet.

Decision Criteria

Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decisionmaker in identifying a preferred choice from an array of possible alternatives.

Demand

The amount of output that users are willing to take at specific price, time period, and conditions of sale.

Designated Wild and Scenic River

A river which is part of the National Wild and Scenic River system.

Destination Locations

Those areas people commonly seek for camping or day use.

Destination Resort

A recreation resort designed for multi-day use in contrast to single day use.

Developed Recreation Site

Distinctly defined or designated area where facilities are provided for concentrated public use; e.g., campgrounds, picnic areas, boating sites, and ski areas.

Developed Recreation Site Maintenance Levels

Level I - Minimum Level. Operation and Maintenance of developed recreation sites at a level that only meets minimum requirements for public health and safety and does not maintain facilities over time. At this level no funding is provided for upgrading of facilities or completion of any portion of the backlog rehabilitation needs associated with developed sites.

Level II - Low Standard. Operation and Maintenance of developed recreation sites at the level necessary to maintain facilities over time and protect investments in facilities and to complete approximately 50 percent of the backlog rehabilitation needs associated with developed sites.

Level III - Standard Service Level. Operation and Maintenance of developed recreation sites at a level that will ensure normal life expectancy of facilities and at a level that meets Forest Service full service standards of maintenance, service, compliance and ensures the experience level for which the site is designed and meets other aspects of administration as outlined in Forest Service manuals and regulations. At this level one hundred percent of any backlog rehabilitation needs associated with developed sites will be completed.

Dispersed Recreation

Outdoor recreation that takes place outside developed recreation sites or the Wilderness.

Diversity

The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. (36 CFR 219.3)

Domestic Water Source

A watershed which provides water for human consumption that does not meet the criteria for a municipal watershed.

E

Earthflow

Rotational failure which occurs on gentle to moderate slopes.

High Risk - High potential for mass movement. Damage to facilities, loss of life or detrimental effects on fisheries or municipal water sources.

Moderate Risk - Moderate potential for movement. Less a risk of loss of life, damage to facilities or fisheries and municipal water sources encompass many acres.

Low Risk - Small in size. Little risk of loss of life, damage to facilities or fisheries and municipal water sources.

Ecosystem

An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems.

Edge

The boundary between two or more elements of the environment; e.g., field and woodland.

Eligible Wild And Scenic River

Candidate river that is free-flowing and contains at least one outstandingly remarkable value.

Effects

Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include population growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or health related, whether direct, indirect, or cumulative. Effects resulting from actions may have both beneficial and detrimental aspects, even if on balance the agency believes that the overall effects will be beneficial (40 CFR 1508.8).

Endangered Species

Any species of animal or plant which is in danger of extinction throughout all or a significant portion of its range. Not included are members of the class Insecta which have been determined by the Secretary to constitute a pest whose protection under the provisions of this Act (Endangered Species Act of 1973) would present an overwhelming and overriding risk to humans. An endangered species must be designated in the Federal Register by the appropriate Federal Agency Secretary.

Endemic Plant

A plant confined to a certain country or region and with a comparatively restricted geographic distribution.

Energy Minerals

Minerals which produce energy, e.g., oil, gas, geothermal, coal.

Enhancement

A short- or long-term management practice which is done with the express purpose of increasing positive aspects of a resource.

Environmental Analysis

An investigation and analysis of alternative actions and their predictable short- and -long-term environmental effects, incorporating the physical, biological, economic, social, and cumulative effects. This process provides the information needed for identifying actions that may be categorically excluded or for preparing environmental documents as required.

Environmental Assessment

A concise public document required by the regulations implementing the National Environmental Policy Act.

Environmental Impact Statement (EIS) and Decision Documents

Refers to a NEPA environmental assessment, environmental impact statement finding of no significant impact, decision notice, notice of intent or record of decision.

Erodible

Susceptible to erosion.

Erosion

The wearing away or detachment of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitation creep.

Erosion (accelerated)

Erosion much more rapid than normal, primarily as a result of the influence or the activities of man.

Escape Cover

Usually vegetation dense enough to hide an animal, used by animals to escape from potential enemies.

Essential Habitat

Areas designated by the Regional Forester of the Forest Service that possess the same characteristics of critical habitat as those designated by the Secretary of the Interior or Commerce.

Evapotranspiration

Loss of water from a land area through transpiration of plants and from the soil.

Even-aged Management

The application of a combination of actions that results in the creation of forest stands composed of trees of essentially the same age. Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes throughout the forest area). The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained in a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands. (36 CFR 219.3)

F

Fee Campground

A fee campground must have as a minimum all of the following: tent or trailer spaces, drinking water, access road, refuse containers, toilet facilities, camp fee collection, reasonable visitor protection, and simple devices for containing a campfire where permitted.

Fish Passage

Passage of fish up or downstream especially over stream obstructions.

Floodplain

The lowland and relatively flat areas adjoining inland and coastal water including, at a minimum, that area subject to one percent or greater chance of flooding in any given year.

Forage

All browse and non-woody plants available to livestock or wildlife for grazing or harvestable for feed.

Forbs

Non-woody plants, other than grasses. Term refers to feed used by both wildlife and domesticated animals.

Foreground

A term used in visual (scenery) management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway (see "Background", "Middleground").

Forest Land

Land at least 10 percent occupied by forest trees of any size or formerly having had such cover and not currently developed for non-forest use. Lands developed for non-forest use include areas devoted to crops, improved pasture, residential or administrative areas, improved roads of any width and adjoining road clearing and powerline clearing of any width (36 CFR 219.3).

Forest Plan Amendment

Formal alteration of the Forest Plan by modification, deletion or addition based upon nonsignificant or significant changes. Non-significant changes are minor modifications of management direction. Significant changes are major alterations of specific management prescription direction or land use designations. Unlike a complete Plan revision, an amendment addresses only the issues that trigger a need for a change. Amendments must satisfy both NFMA and NEPA procedural requirements, including appropriate public notification.

Forest-wide Standard

A principle requiring a specific level of attainment: a rule to measure against. The Forest-wide Standards apply to all areas of the Forest regardless of the other prescriptions applied.

Fuels

Combustible wildland vegetative materials. While usually applied to the above ground living and dead surface vegetation, this definition also includes roots and organic soils such as peat.

Fuel Treatment

The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

Game

Wildlife that are hunted for sport and regulated by State Game regulations.

General Distribution

The geographic area presently occupied, often on a seasonal basis, by a species within the planning area. Distribution is not to be confused with present occupancy of specific habitat(s). Resource management activities will create changes in habitat which will force local shifts in occupancy.

Geothermal

Of or pertaining to the inherent heat of the earth. Geothermal steam is a leasable mineral.

Goal

A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principle basis from which objectives are developed. (36 CFR 219.3)

Goods and Services

The various outputs, including on-site uses, produced from forest and rangeland resources. (36 CFR 219.3)

Gradient

Change of elevation, velocity, pressure or other characteristics per unit length.

Group Selection Cutting

Removal of tree groups ranging in size from a fraction of an acre up to about 2 acres in area that is smaller than the minimum feasible for even-aged management of a single stand.

Guideline

An indication or outline of policy or conduct that is not a mandatory requirement (as opposed to a standard, which is mandatory.

H

Habitat

The place where a plant or animal naturally or normally lives and grows.

Habitat Component

A simple part, or a relatively complex entity, regarded as a part of an area or environment in which an organism or biological population normally lives.

Habitat Capability

The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish or plant population. It is measured in terms of potential population numbers.

Hardwood

A broad-leafed flowering tree.

Harvest Cutting Method

A combination of interrelated actions whereby forests are tended, harvested, and replaced. The combination of management practices used to manipulate the vegetation in forests. Harvest cutting methods are classified as even-aged and uneven-aged.

Hiding Cover

Vegetation capable of hiding 90 percent of a standing deer or elk from the view of a human at a distance of 200 feet.

High Quality Habitat

Habitat which completely satisfies a species' existence requirements.

History

People, places, things and events which have occurred or pertain to the time of written record. For the Pacific Northwest, the history of written documentation is approximately 1600 AD.

Hundred-year Flood

Severe flood which, statistically, has a chance of occurring once in a hundred years, or has a 1 percent chance of occurring each year.

Hydrology

The scientific study of the properties, distribution, and effects of water in the atmosphere, on the earth's surface, and in soil and rocks.

Hyphoriac Zone

The subterranean areas below and adjacent to stream channels, which contain a complex community of small animals (i.e., insects and crustaceans) living in the gravels.

I

Impact, Economic

The change, positive or negative, in economic conditions, including distribution and stability of employment and income in affected local, regional, and national economies, which directly or indirectly results from an activity, project, or program.

Indian Tribe

The governing body of any Indian tribe, band, nation, or other group which is recognized as an Indian tribe by the Secretary of the Interior for which the United States holds land in trust or restricted status for the entity of its members. Such term also includes any Native village corporation, regional corporation, and Native group established pursuant to the Alaska Native Claims Settlement Act (36 CFR 800.2(g)).

Indicator Species

A wildlife management scheme in which the welfare of a selected species is presumed to indicate the welfare of other species.

Individual (single) Tree Selection

See Uneven-aged Silvicultural Systems.

Instream Flows

A prescribed level (or levels) of stream flow, usually expressed as a stipulation in a permit authorizing a dam or water diversion, for the purpose of meeting National Forest System management objectives.

Integrated Pest Management

A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resources values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable. (36 CFR 219.3)

Intensive Forest Management

A high investment level of timber management that envisions initial harvest, regeneration with genetically improved seedling stock, control of competing vegetation, fill-in planting, precommercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest.

Interdisciplinary Team

A team of people that collectively represent several disciplines and whose duty it is to coordinate and integrate planning activities.

Intermittent Stream

A stream that flows above ground at intervals or only flows periodically during the year. Intermittent streams generally have well-defined channels.

Inventory

Strategies designed to collect existing information and locate cultural resources in a specific area, such as through field survey, records search, oral interviews, and archival study.

Irretrievable

Applies to losses of production, harvest, or use of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible

Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long time periods. Irreversible also includes loss of future options.

Issue

A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

K

Key Interest Areas

Any interesting feature or condition in an area that attracts people. For example, a waterfall along a trail or road, a scenic overlook or a wildlife viewing area.

Key Site Riparian Areas

Large riparian areas exhibiting high habitat diversity and outstanding capabilities for producing high quality water; excellent fish spawning and rearing habitat; high quality waterfowl breeding, nesting and resting habitat; wildlife cover; and diverse plant communities.

Knutson-Vandenberg Act

Or K-V. Legislation authorizing the collection of money from timber sale receipts for reforestation, stand improvements, and other resource improvement or mitigation projects on timber sale areas.

L

Land Allocation

The assignment of a management emphasis to particular land areas with the purpose of achieving the goals and objectives of that alternative.

Landings

Those designated areas within a timber sale where logs are temporarily stored before transport to a mill.

Landslide

The group of slope movements wherein shear failure occurs along a specific surface or combination of surfaces.

Large Woody Debris

Logs, tree boles, and root wads greater than 4 inches in diameter.

Leasable Minerals

All minerals except salable minerals on acquired lands. All minerals on Outer Continental shelf. Coal; phosphate; oil; gas; chlorides, sulphates, carbonates, borates, silicates or nitrates of potassium and sodium; native asphalt, solid and semi-solid bitumen and bitumenous rock including oil-impregnated rock or sands from which oil is recoverable only by special treatment after the deposit is mined.

Legal Trout

A trout six inches or longer is legal by registration in the State of Oregon.

Life Form

How a species makes its living, also called a niche.

Limiting Habitat

Habitat which completely satisfies existence requirements.

Limits of Acceptable Change (LAC)

Maximum limit of human-caused change allowed in wilderness. Each WRS Class has a set of limits which presupposes that certain areas of wilderness (trails) will be allowed to receive higher levels of use than other areas (trail-less), and thus will receive more change or resource impact. LAC's are not a management objective, but a maximum limit.

Litter

The uppermost layer of organic debris on the ground under a vegetation cover. Essentially the freshly fallen or only slightly decomposed vegetable material, mainly from foliage but also bark fragments, twigs, flowers, fruits, etc.

Local Roads

Connect terminal facilities such as log landings and recreation sites, with forest collector roads, forest arterial roads, or public highways. Location and standards are determined by the specific resource needs that the roads serve.

Locatable Minerals

Those hardrock minerals which can be obtained by filing a claim on Public Domain or National Forest System lands reserved from the Public Domain. In general, the locatable minerals are those hardrock minerals which are mined and processed for the recovery of metals, but may also include certain nonmetallic minerals and uncommon varieties of mineral materials.

M

M

Thousand

Maintenance Levels 1-5

Level 1 - This level is assigned to intermittent service roads during the time management direction requires that the road be closed to motorized traffic.

Level 2 - This level is assigned where management direction requires that the road be open for limited passage of traffic. Roads in this maintenance level are intended for use by high clearance vehicles and not maintained passenger car traffic.

Level 3 - This level is assigned where management direction requires that the road be open and maintained for safe travel by a driver in a standard four-wheel passenger car.

Level 4 - This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds. Traffic volumes are normally sufficient to require a double land aggregate surfaced road. Paved surfaces are often used.

Level 5 - This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities.

Management Area

An area with similar management objectives and a common management prescription. In Region 6, a management area is the contiguous area assigned to a specific management strategy (the management strategy then becomes the management prescription).

Management Direction

A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them. (36 CFR 219.3)

Management Practice

A specific activity, measure, course of action, or treatment. (36 CFR 219.3)

Management Prescription

Management practices and intensity of management selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives. (36 CFR 219.3)

Mass Movement

Downslope, unit movement of a portion of the land's surface; i.e., a single landslide or the gradual simultaneous, downhill movement of the whole mass of loose earth material on a slope face.

Mature Timber

Trees that have attained full development, particularly in height, and are in full seed production.

Maximum Modification

A visual quality objective meaning man's activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

MBF

Thousand board feet. A measure of wood volume.

Middleground

The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the stand.

Mineral Potential

A rating system for mineral resources based on the degree to which certain criteria indicates favorable potential for development of mineral resources.

Mining Claims

That portion of the public estate held by law for mining purposes in which the right of exclusive possession of locatable mineral deposits is vested to the locator of a deposit.

Mitigation

Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice.

MM

Million.

MMBF

Million board feet.

Monitoring

A process to collect significant data from defined sources to identify departures or deviations from expected plan outputs.

Modification

A visual quality objective meaning human activity may dominate the characteristic landscape but must, at the same time, utilize natural established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

Multilayered Canopy

A stand of trees with two or more distinct tree layers in the canopy.

Multiple Use

The management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people. The concept also includes making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in the use to conform to changing needs and conditions. Some lands will be used for less than all of the resources. There will be harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land. Consideration will be given to the relative values of the various resources, and management will not necessarily favor the combination of uses that will give the greatest dollar return or the greatest unit output.

N

National Environmental Policy Act (NEPA) (1969)

An Act, to declare a National policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the nation; and to establish a Council on Environmental Quality.

National Forest Management Act (NFMA)

An Act passed in 1976 amending the Forest and Rangeland Renewable Resources Planning Act. NFMA requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development.

National Forest Systems

All National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 USC 1010-1012), and other lands, waters or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system. (16 U.S.C. 1608)

National Register - Eligible Property

A property that has been determined eligible for National Register listing by the Secretary of the Interior, or one that has not yet gone through the formal eligibility-determination process but meets the National Register criteria. For management purposes, an "eligible" property is treated as if it were already listed.

National Registry of Natural Landmarks

National inventory and listing of all or part of recreation areas classified under 36 CFR294.1 and research natural areas classified under 36 CFR 251.23 which have values illustrating the ecological or geological character of the nation.

Natural Forest

The condition of a forest environment at any point in time including its associated plant and animal communities, which has been reached essentially through the process of natural succession. This process would include the effects of natural catastrophic occurrences.

NEPA

An abbreviation of National Environmental Policy Act.

NFMA

An abbreviation of the National Forest Management Act of 1976.

Non-game

Any species of wildlife or fish which is not managed or otherwise controlled by hunting, fishing, or trapping regulations.

Non-point

Refers to area sources of water pollution such as a watershed in contrast to a point source such as an outlet from a factory.

Noxious Weeds

A plant considered to be extremely destructive or harmful to agriculture and designated by law. An undesirable species that conflicts with, restricts, or otherwise causes problems with the management objectives.

O

Objective

A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals. (36 CFR 219.3)

Off-road Vehicle (ORV)

Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice, or other natural terrain. Non-motorized Mountain Bicycle use is also considered an Off-Road Vehicle.

Old-growth Stand

An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: 1) stands contain mature and overmature trees in the overstory and are well into the mature growth stage; 2) stands will usually contain a multilayered canopy and trees of several age classes; 3) standing dead trees and down material are present; and 4) evidence of human activity may be present but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

For additional information on how old growth was defined on the Mt. Hood National Forest, see FEIS-Chapter 3.

Output

A good, service, or on-site use that is produced from forest and rangeland resources. See FSH 1309.11 for forest and rangeland outputs, codes and units of measure. Examples: X06 - Softwood Sawtimber production - MCF; X80 - Increased Water Yield - Acre feet; W01 - Primitive Recreation Use - RVD's.

Outstandingly Remarkable Values

River-related resource values that are rare, unique or exemplary, and are significant at a Regional or National level.

Overstory

That portion of the trees in a forest of more than one story, forming the upper canopy layer.

P

PAOT

Persons-At-One-Time - Public recreational measurement term. The number of people in an area or using a facility at one time.

Partial Retention

A visual quality objective where man's activities may be evident but subordinate to the characteristic landscape.

Particulates

A component of polluted air consisting of any liquid or solid particles suspended or falling through the atmosphere.

Patented Mining Claims

A patent is a document which conveys a title. Public law provides that when patented, a mining claim becomes private property and is land over which the United States has no property rights, except as may be reserved in the patent. After a mining claim is patented, the owner does not have to comply with requirements of the General Federal Mining law, but is required to meet State regulations.

Payment in Lieu of Taxes

Payments to local or State governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing. Specifically, they include payments made under the Payments in Lieu of Taxes Act of 1976, P.L. 94-565 Stat. 2662; 31 USC 1601-1607 (Note these payments are in addition to payments made from gross receipts from forest products made under the Twenty-Five Percent Fund Act of May 1908).

Peak Discharge, Peak Flow

The maximum volume of flow attained at a given point in a stream during a runoff event.

Perennial Stream

A stream that flows throughout the year.

Permanent Road Closure

Roads closed with the intent to never use them again, action taken to make them impassable and remove them from the transportation system.

Personal Use Firewood

Firewood gathered for use by the woodcutter. Resale of personal use firewood is not allowed.

Physically Challenged Individuals

Persons with physical conditions who require specialized access or equipment for certain activities.

Planning Area

The area of the National Forest System covered by a regional guide or Forest Plan. (36 CFR 219.3)

Plant Communities

A vegetation complex unique in its combination of plants which occur in particular locations under particular influences. A plant community is a reflection of integrated environmental influences on the site, which includes soils, temperature, elevation, solar radiation, slope, aspect, and rainfall.

Pool Habitat

That portion of the stream with reduced current velocity, often with water deeper than the surrounding areas, and which is frequently usable by fish for resting and cover.

Practices

Those management activities that are proposed or expected to occur.

Precommercial Thinning

The selective felling or removal of trees in a young stand, primarily to accelerate diameter increment on the remaining stems, maintain a specific stocking or stand density range, and improve the vigor and quality of the trees that remain.

Prehistory

People, places, things and events which have occurred or pertain to the time before written record.

Prescribed Fire

A wildland fire burning under preplanned specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions. Proposals for use of unplanned ignitions for this purpose must be approved by the Regional Forester.

Prescribed Natural Fire

The use of unplanned natural ignitions to meet management prescriptions.

Preservation

A visual quality objective that allows only ecological changes to take place.

Presuppression

Activities required in advance of fire occurrence to ensure an effective suppression action. It includes (1) recruiting and training fire forces, (2) planning and organizing attack methods, (3) procuring and maintaining fire equipment, and (4) maintaining structural improvements necessary for the fire program.

Primitive Recreation

Those recreation activities which occur in areas characterized by an essentially unmodified natural environment of fairly large size (2,500 acres or greater).

Production Potential

The capability of the land or water to produce a given resource.

Programmed Harvest

The part of the potential timber yield that is scheduled for harvesting. Includes salvage and cull timber volumes. It is based on current demand, funding, and multiple use considerations.

Public Access

Usually refers to a road or trail route over which a public agency claims a right-of-way for public use.

R

Radio Telemetry

A radio signal that is used to measure the position and/or movement of a wild animal. The radio transmitter is attached to the animal, and a receiver is used by a researcher to locate the animal in its natural habitat.

Range Allotment

A designated area containing land suitable and available for livestock grazing use upon which a specified number and kind of livestock are grazed under an approved allotment management plan. It is the basic management unit of the range resource on National Forest System lands administered by the Forest Service.

Range Allotment Plan

A long-term operating plan for a growing allotment designed to reach a given set of objectives and meet forest plan standards and guidelines. It is prepared with input from the permittee.

Ranger District

An administrative subdivision of the Forest, supervised by a District Ranger who reports to the Forest Supervisor.

Raptors

Any predatory bird such as a falcon, hawk, eagle or owl that has feet with sharp talons or claws adapted for seizing prey and a hooked beak for tearing flesh.

Recreation Opportunity

An opportunity for a user to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired.

Recreation Opportunity Spectrum (ROS)

Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs. This is measured based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The seven classes are:

Primitive - Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low, and evidence of other users is minimal. The area is managed to be essentially free from evidence of management restrictions and controls. Motorized use within the area is not permitted.

Semiprimitive Nonmotorized - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.

Semiprimitive Motorized - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.

Roaded Modified - A subclass of the Roaded Natural ROS class. Involves areas that are characterized by predominantly natural-appearing environments with high evidence of the sights and sounds of humans. Such evidence may not harmonize with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident and may not harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

Roaded Natural - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, and evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

Rural - Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

Urban - Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

Recreational Mining

A leisure-time activity involving the search for and collection of mineral specimens using nonsurface disturbing methods.

Reforestation

The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial restocking.

Regeneration

The actual seedlings and saplings existing in a stand; or the act of establishing young trees naturally or artificially.

Regeneration Cut

Any removal of trees to make regeneration possible.

Regional Forester

The official responsible for administering a single Forest Service region.

Regulated Harvest

Harvest that contributes chargeable timber volume to the Allowable Sale Quantity.

Rehabilitation

A short-term management alternative used to return existing visual impacts in the natural landscape to a desired visual quality.

Resident Trout

A trout which spends its entire life in fresh water.

Residual Stand

The trees remaining standing after some form of selection cutting is performed on a stand.

Residue

Material which includes both desired and unwanted vegetative residues which result from an activity or natural event.

Responsible Official

For land management planning purposes, the Forest Service employee who has been delegated the authority to carry out a specific planning action. (36 CFR 219.3)

Retention

A visual quality objective where human activities are not evident to the casual forest visitor.

Riffle

A feature of a stream having swift-flowing, turbulent water; can be either deep or shallow; features are generally cobble- or boulder-dominated.

Riparian

Pertaining to areas of land directly influenced by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence. Streamsides, lake borders, or marshes and wetlands are typical riparian areas.

Riparian Areas

Geographically delineated areas, with distinctive resource values and characteristics, that are composed of aquatic and riparian ecosystems. On the Mt. Hood National Forest riparian areas typically include areas adjacent to all streams, lakes, ponds and areas comprising seeps, springs, and wetlands.

Riparian Ecosystems

A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. Identified by soil characteristics and distinctive vegetation communities that require free or unbound water.

Riparian Vegetation

Vegetation growing on or near the banks of a stream or body of water on soils that exhibit some wetness characteristics during some portion of the growing season.

Risk

The degree and probability of loss based on chance.

Runoff

The flow or discharge of water from an area, including both surface and subsurface flow.

Road

A general term denoting a way for purposes of travel by vehicles greater than 40 inches in width.

Forest Arterial Road. Provides services to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It is usually developed and operated for long-term land and resource management purposes and constant service (FSM 7710.51).

Forest Collector Road. Serves smaller land areas than a Forest arterial road and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multi-resource service needs as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility (FSM 7710.51).

Forest Local Road. Connects terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard are usually controlled by specific resource activity requirements rather than travel efficiency needs (FSM 7710.51).

Roadless Area

See Inventoried Roadless Area.

ROS

An abbreviation of Recreation Opportunity Spectrum.

Rotation Age

The age of a stand when harvested.

S

Salmonid Smolt

Juvenile fish of the salmon/trout family going through biochemical changes during its migration to the ocean.

Sanitation Cutting (Salvage)

The removal of dead, damaged or susceptible trees primarily to prevent the spread of insect pests or diseases and promote forest hygiene.

Scoping Process

Determining the extent of analysis necessary for an informed decision of a proposed action. The process includes: (1) reviewing present Management direction as it relates to the analysis; (2) contacting those publics interested or affected by the proposed action to get their opinions and surface the issues; 3) determining local management concerns. This process continues throughout analysis until a decision is made.

Second Growth

Forest growth that has come up naturally after some drastic interference with the previous forest growth (e.g., cutting, serious fire, or insect attack).

Sediment

Solid material, both mineral and organic, that is in suspension, and is being transported from its site of origin by air, water, gravity, or ice, or has come to rest on the earth's surface either above or below sea level.

Selection Cut

Selection cutting is the periodic removal of mature trees individually or in small groups from an uneven-aged forest. By this method, both regeneration cutting and tending of immature stand components are accomplished at each entry.

Semi-primitive Motorized ROS Class

See Recreation Opportunity Spectrum.

Semi-primitive Non-motorized ROS Class

See Recreation Opportunity Spectrum.

Sensitive Species

Those species of plants or animals that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists.

Seral

A biotic community which is a developmental, transitory stage in an ecological succession.

Sheet Erosion

The removal of a fairly uniform layer of soil from the land surface by runoff water.

Shelterwood Cutting

Any regeneration cutting in a more or less mature stand designed to establish a new stand under the protection (overhead or side) of the old stand. Usually the shelterwood involves two separate harvest operations. The first harvest (seed cut) is designed to create space and seed production to establish new trees. The second harvest (removal cut) is designed to remove the remainder of the old stand before it begins to compete with the new stand for light and nutrients. This is usually within 10 years.

SHPO

"State Historic Preservation Officer" means the official appointed or designated pursuant to Section 101(b)(1) of the National Historic Preservation Act to administer the State historic preservation program or a representative designated to act for the SHPO. Among other duties, the State Historic Preservation Officer advises and assists Federal agencies and State and local governments and cooperates with these agencies and others to ensure that historic properties are considered at all levels of planning and development.

Silvicultural System

A management process whereby forests are tended, harvested, and replaced resulting in a forest of distinctive form. Systems are classified according to the logging method that removes the mature crop and provides for regeneration and according to the type of forest thereby produced. (36 CFR 219.3)

Silviculture

The art and science of growing and tending forest vegetation for specific management goals.

Site Productivity

Production capability of specific areas of land to produce defined outputs such as AUMs, cubic feet/acre/year, etc.

Snag

A standing dead tree.

Smolt

A young salmon during its migration downstream to the sea after hatching.

Socioeconomic

Pertaining to, or signifying the combination or interaction of, social and economic factors.

Soil Productivity

The capacity of a soil to produce a specified crop such as fiber or forage under defined levels of management. Productivity is generally dependent on available soil moisture and nutrients, and length of growing season.

Special Emphasis Watersheds

This designation is applied to selected watersheds where special management emphasizes unusually high combinations of riparian resource values and high sensitivity due to generally demanding site conditions and where the goal is to maintain or improve habitat conditions for the sustained, long-term production of fisheries and high quality water.

Stand

Timber possessing uniformity as regards to type, age class, risk class, vigor, size class, and stocking class.

Standard

A principle requiring a specific level of attainment, a rule to measure against.

Stream Buffer

See Streamside Management Unit.

Stream Channel Morphology

The structure or form of a stream channel, as influenced by processes of erosion and deposition of channel materials (gravel, cobbles, sand, soil, etc.).

Stream Class

Classification of streams based on the present and foreseeable uses made of the water, and the potential effects of on-site changes on downstream uses. Four classes are defined:

Class I - Perennial or intermittent streams that provide a source of water for domestic use; are used by large numbers of fish for spawning, rearing or mitigation; and/or are major tributaries to other Class I streams.

Class II - Perennial or intermittent streams that are used by moderate though significant numbers of fish for spawning, rearing or migration; and/or may be tributaries to Class I streams or other Class II streams.

Class III - All other perennial streams not meeting higher class criteria.

Class IV - All other intermittent streams not meeting higher class criteria.

Stream Discharge

The volume of water flowing past a point per unit time, commonly expressed as cubic feet per second, million gallons per day, gallons per minute or cubic meters per second.

Stream Scour Or Channel Scour

Erosion of the channel bottom and/or banks caused by high flows or water, loss of channel stability, or debris torrents.

Stream Structure

The arrangement of logs, boulders, and meanders which modify the flow of water, thereby causing the formation of pools and gravel bars in streams. Generally, there is a direct relationship between complexity of structure and fish habitat. Complex structure is also an indication of watershed stability.

Streamflow

The flow of water, generally with its suspended sediment load, down a well-defined watercourse.

Streamside Management Unit (SMU)

An area of varying width adjacent to a stream where practices that might affect water quality, fish, and other aquatic resources are modified to meet water quality goals, for each class of stream. The width of this area will vary with the management goals for each class of stream, the characteristics of the stream and surrounding terrain, and the type and extent of the planned activity.

Successional Stage

A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax. For example, coniferous forests in the Blue Mountains progress through six recognized stages: grass-forb, shrub-seedling, pole-sapling, young, mature, and old growth.

Suppression

The action of extinguishing or confining a fire.

Surface Resources

Renewable resources located on the earth's surface in contrast to ground water and mineral resources located below the earth's surface.

Surface Runoff

Water that flows over the ground surface and into streams and rivers.

T

Targets

Output accomplishments assigned to the Forest by the Forest Service Regional Forester. A statement used to express planned results to be achieved within a stated period of time.

Temporary Roads

Localized roads of limited duration, typically available for generic forest activities during the life of the project for which the road was constructed.

Terrestrial Habitat

Land area; wildlife species that dwell primarily on land, not aquatic, arboreal or aerial.

Thermal Cover

Cover used by animals to lessen the effects of weather; for elk, a stand of coniferous trees 12 meters (40 feet) or more tall with an average crown closure of 70 percent or more; for deer, cover may include saplings, shrubs, or trees at least 1.5 meters (5 feet tall) with 75 percent crown closure.

Threatened Species

Any species of animal or plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of Interior as a threatened species.

Tiering

The coverage of general matters in broader environmental impact statements with subsequent, narrower statements or environmental analyses incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. Tiering is appropriate when the sequence of statements or analyses is:

(1) from a program, plan, or policy environmental impact statement to a program, plan, or policy statement or analysis of lesser scope to a site-specific statement or analysis.

(2) from an environmental impact statement on a specific action at an early stage to a supplement or a subsequent statement or analysis at a later stage. Tiering is such cases is appropriate when it helps the lead agency to focus on the issues which are already ripe for decision and exclude from consideration issues already decided or not yet ripe.

Tolerant Species

Plants that grow well in shade.

Turbidity

The degree of opaqueness, or cloudiness, produced in water by suspended particulate matter, either organic or inorganic. Measured by light filtration or transmission and expressed in Jackson Turbidity Units (JTU).

U

Understory

Vegetation growing under a higher canopy.

Uneven-aged Management

The application of a combination of actions needed to simultaneously maintain continuous high forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. This management must provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection. (36 CFR 219.3)

Uniform Flow

A state of steady water flow where the mean velocity and cross sectional area are equal at all sections.

Unroaded Acres

Those areas of undeveloped Federal land within which there are no improved roads maintained for travel by means of vehicles intended for highway use.

Unregulated Timber Management

Timber cut from those lands that are not organized to provide sustained yields of timber.

Utility and Transportation Corridors

A strip of land designated for the transportation of energy, commodities, and communications by railroad, state highway, electrical power transmission (69 KV and above), oil and gas and coal slurry pipelines 10 inches in diameter and larger, and tele-communication cable and electronic sites for interstate use. Transportation of minor amounts of power for short distances- such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line- are not to be treated within the Forest Plan effort.

V

Viewshed

The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

Primary Viewshed - The landscape seen from a designated travel route, or designated use area, which has high volume of use, long duration of use, or is a major access to the Forest.

Secondary Viewshed - The landscape seen from a designated travel route, or designated use area, with low use volume, short use duration, or is a minor access route to the Forest.

Visitor Information Service (VIS)

Activities which interpret for visitors, in layperson's language, Forest management, protection, utilization, and research. It also includes interpretation of local botany, geology, ecology, zoology, history, and archaeology.

Visual Condition

The visual appearance of a landscape described in terms of the degree of alteration of the natural appearing landscape. These terms are normally used as a summary rating for a large land area, such as a viewshed corridor. Descriptive degrees of alteration are:

Natural Appearing - Area appears untouched by humans; changes are not visually evident. Generally similar to the Retention VQO.

Slightly Altered - Changes may be noticed by the average visitor but do not attract attention. Natural appearance dominates minor disturbances. Generally similar to the Partial Retention VQO.

Moderately Altered - Changes are easily noticed by the average visitor and may attract attention. Disturbances are apparent. Generally similar to the modification VQO.

Heavily Altered - Changes are strong and obvious to the average visitor. Changes dominate the landscape but may resemble natural patterns when viewed from a distance of 3 to 5 miles. Disturbances are major. Generally similar to the maximum modification VQO.

Visual Quality Objectives (VQO)

Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape.

Preservation (P) - Ecological changes only.

Retention (R) - Management activities should not be evident to the casual Forest visitor.

Partial Retention (PR) - Management activities remain visually subordinate to the characteristic landscape.

Modification (M) - Management activities may dominate the characteristic landscape but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

Maximum Modification (MM) - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Enhancement - A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists.

Visual Resource (Scenery)

The composite of basic terrain, geologic features, water features, vegetative patterns, and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors. Visual resource categories include Retention (R), Partial Retention (PR), and Modification (M).

W

Water Quality

The biological, physical, and chemical properties of water that make it suitable for given specified uses. Definition of water quality for forest areas is difficult because of the wide range of downstream uses.

Water Yield

The measured output of the Forest's streams.

Watershed

The line separating head-streams which flow to different river systems; it may be sharply defined (crest of a ridge), or indeterminate (in a low undulating area).

Wetlands

Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (Executive Order 11990). Under normal circumstances the area does or would support a prevalence of vegetative or aquatic life.

Wild and Scenic Rivers

Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

Wild River Areas - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic River Areas - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Recreational River Areas - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Wilderness

Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and unconfined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

Wilderness Resource Spectrum (WRS)

Standard and guidelines for managing Wilderness within the nondegradation policy have been developed under the Wilderness Resource Spectrum (WRS) concept. In the Pacific Northwest Region, the WRS classification system has been adopted to establish a variety of settings to meet Wilderness management and should not be confused with the Recreation Opportunity Spectrum; classification system. WRS classifications are determined by measured criteria which describe the social, biological, and physical characteristics of the area. Three primary zones are:

Primitive Trail-less - This zone offers the maximum possible solitary Wilderness experience. To qualify for this designation, the zone must be large enough to allow at least two days of cross-country travel without crossing a constructed trail. No more than one encountered with another user may be expected. The Forest does not contain this class of Wilderness zone.

Primitive Trailed - This zone offers the most solitary experience to be found on the Forest. The only facilities permitted are those needed to protect the environment. In practice, this means the presence of trails and a limited number of signs only. A user may expect to encounter no more than six other parties per day during 80 percent of the use season.

Semi-Primitive Trailed - This zone offers somewhat less solitary Wilderness experience than the Primitive Trailed. Activities to control degradation of the ecological and social values of the Wilderness are evident. Limited development, including toilets, are permitted. The number of encounters with other users is not expected to exceed 12 parties per day during 80 percent of the season.

Transition - In this zone encounters with other users in some areas exceed those specified for the Semi-Primitive Trailed zone making it desirable to identify areas where the heaviest use of the Wilderness takes place. Higher intensities of management activity in a Transition Zone are evident. More signs are in the zone, and trails may be constructed to higher standards. Encounters with other users is expected to be 18 or less per day during 80 percent of the season.

Wildfire

Any wildland fire not designated and managed as a prescribed fire within an approved prescription.

Winter Range

The area available to and used by big game through the winter season.

Withdrawal

An order removing specific land areas from availability for certain uses.

Appendix D

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Note: Some are fully cited in the text of the document.

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Appendix E

Recreation Opportunity Spectrum and Wilderness Resource Spectrum

Recreation Opportunity Spectrum

The Forest Service, Bureau of Land Management, and other agencies use the Recreation Opportunity Spectrum (ROS) framework to characterize outdoor recreation settings (places where people go for recreation) based on such characteristics as access, remoteness, naturalness, likelihood of encounters with other visitors, level and type of facilities and management regulations, visitor impacts, and visitor management. The ROS contains a range of opportunity classes: primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, roaded modified, rural, and urban. These classes are part of spectrum of recreational opportunities ranging from very primitive conditions where the level of solitude and potential for risk taking and level of self reliance is high at one end of the spectrum, to a high level of development where the opportunities for socializing, security and comfort are at the other end of the spectrum. Following are descriptions of the classes.

Primitive

Primitive opportunities occur in an unmodified natural environment and the opportunity for solitude is high. Self reliance is required by users. Very few on-site controls are used. Only facilities for user safety are provided and these are limited in number and very rustic in appearance. All activities are non-motorized and use levels are relatively low. This class is not found within the Salmon River corridor.

Semi-Primitive Nonmotorized

Some opportunities for isolation from the sights and sounds of people in a predominately unmodified natural environment of moderate size. Concentration of users is low but there is often evidence of of use. Spacing of groups may be formalized to disperse use and limit contact. Area management occasionally uses onsite controls (such as signs or self-registration boxes) but this is subtle and limited. Facilities are provided for the safety of users only. Activities are non-motorized and similar to what would be present under the primitive category, but use levels may be higher.

Semi-Primitive Motorized

Opportunities and characteristics of this classification are very similar to semi-primitive nonmotorized (SPNM) except that off-highway vehicles are permitted. Disturbance of the environment is more evident than in the SPNM class. This class is not found within the Salmon River corridor.

Roaded Natural

Opportunities for solitude are more limited with social encounters being moderate to high contact on roads and in developed sites, and moderate to low on trails. Concentration of users is generally low to moderate with facilities sometimes provided for group activities. Rustic facilities may be provided for user convenience, as well as for safety and resource protection. Knowledge and practice of outdoor skills may be important.

Roaded Modified

In these roaded environments, vegetation has been substantially modified. Opportunities for solitude is moderate. Developed campgrounds and other facilities are not usually available. Within roaded modified areas, roads, timber sale landings, logging slash, and debris may be very evident, but these experiences are usually accompanied by feelings of independence and freedom. This class is not found within the Salmon River corridor.

Rural

Sights and sounds of people are readily evident and concentration of users is often moderate to high. Onsite controls and direct management techniques predominate and resource modification and utilization practices are obvious. Access and facilities are designed for high levels of use and are developed for the convenience of users. Facilities for motorized use are available. A wide variety of activities are available, including spectator sports, outdoor concerts, recreational vehicle camps and some modern resorts.

Urban

Chance for social encounters is usually high and generally very important to the visitor. Onsite controls are very evident and sophisticated. Access and facilities are designed for user comfort and convenience and high levels of use. While a natural appearing backdrop may be present, the environment is urbanized, including paved streets and possibly stoplights. Highly developed resorts and shopping complexes can be found in this class.

Wilderness Resource Spectrum

For areas actually within designated wilderness areas, the Forest Service in the Pacific Northwest has established the Wilderness Resource Spectrum (WRS) classifications. These classifications have been adopted to establish a variety of settings to meet wilderness management objectives. The WRS classification system applies specifically to wilderness and should not be confused with the Recreation Opportunity Spectrum classification system described above. WRS classifications are determined by measurable criteria which describe the social, biological, and physical characteristics of the area. There are three primary zones, Primitive Trailless or Pristine, Primitive Trailed or Primitive, and Semi-Primitive Trailed or Semi-Primitive. In addition, on the Mt. Hood National Forest, a Transition Zone has been established. Descriptions of these classifications is below:

Primitive Trailless or Pristine

Within this classification or wilderness zone, the area is characterized by an extensive unmodified natural environment. Natural processes and conditions have not and will not be measurably affected by the actions of users. The area is managed to be as free as possible from the influence of human activities. People are only brief visitors. Essentially no facilities are required to protect the Wilderness resource. Terrain and vegetation allow extensive and challenging cross-country travel.

This zone provides the most outstanding opportunity for isolation and solitude, free from evidence of past human activities and with very infrequent encounters with other users. The user has outstanding opportunities to travel cross-country utilizing a maximum degree of primitive skills, often in an environment that offers a high degree of challenge and risk.

On the Mt. Hood National Forest, this zone must be large enough to allow two days cross-country travel without crossing a constructed trail. The Forest and Salmon River corridor does not contain any of this class of wilderness zone.

Primitive Trailed or Primitive

This classification or wilderness zone is characterized by essentially unmodified natural environment. Concentration of users is low and evidence of human use is minimal.

The area is managed to be essentially free from evidence of human-induced restrictions and controls. Only essential facilities for resource protection and safety are used and are constructed of native or natural appearing materials. No facilities for comfort or convenience of the user are provided. Visitors are encouraged to disperse to desirable existing sites to minimize contacts with other groups.

Within this zone, there is a high opportunity for exploring and experiencing considerable isolation, solitude, and self-reliance through application of primitive recreation skills in an environment that offers a high degree of challenge and risk.

While this wilderness zone can be found on the Forest, none is found within the Salmon River corridor.

Semi-Primitive Trailed or Semi-Primitive

Within this classification or wilderness zone, the area is characterized by predominately unmodified natural environment of moderate size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present but are subtle. Facilities are only provided for the protection of Wilderness resource values rather than visitor comfort or convenience. Materials should be natural or natural appearing.

Within the zone, there are moderate opportunities for exploring and experiencing isolation (from the sights and sounds of people); independence; closeness to nature; tranquility and self-reliance through the application of no trace and primitive skills in a natural environment that offers a moderate to high degree of challenge and risk.

Transition

In addition to the above zones, the Mt. Hood National Forest has established a transition zone. Within this zone, conditions may be similar to the Semi-Primitive trailed yet the number of social encounters are higher and may exceed current standards. The area is managed to a higher intensity and there may be additional on-site controls and restrictions than in the above zones. Long term management objectives are to have these zones meet the standards for the at least the semi-primitive trailed zone.

Appendix F

Summary of Estimated Costs Associated With Each Alternative

SUMMARY OF ESTIMATED COSTS ASSOCIATED WITH EACH ALTERNATIVE[1]

SALMON RIVER	RECREATION RESOURCES			RESOURCE PROTECTION		OTHER INITIAL ADMINISTRATIVE COSTS	TOTAL ONE-TIME COST	ANNUAL MANAGEMENT COST	COSTS TO Clackamas County
	Acquisition and Easements[2]	Facilities, Trails, Signing and Information and Education	Monitoring, Enforcement and Staffing	Acquisition, Easements and Incentive Programs[3]	Studies, Inventories, Monitoring, Restoration and Staffing	Cooperative Federal and County Programs[4]			Clackamas County contribution to matching funds[5]
ALTERNATIVE A[6]	$ 0	$ 1,000	$ 12,000	$ 0	Water quality $ 8,500 Fisheries $ 45,000 Botany/wildlife $ 14,000 Cultural $ 3,500 Visual $ 3,000	$ 0	$ 0	$ 87,000	$ 0
ALTERNATIVE B	$ 160,000	$ 1,050,000*[7]	$ 135,000*	$ 140,000	Water quality $ 8,500 Fisheries $ 83,000 Botany/wildlife $ 19,000 Cultural $ 3,500 Visual $ 11,000	$ 40,000*	Acquisition $ 300,000 Facilities, studies and restoration $ 1,060,000	$ 290,000	$ 25,000

[1] All costs estimated assume only those costs to the federal government and do not estimate possible shared costs to other government agencies. An asterisk (*) denotes federal contribution to shared costs with other federal, state and county agencies. Costs associated with Alternative A are difficult to estimate because they are part of existing budgets and not dedicated solely to the Salmon River corridor. No federal acquisition programs exist currently.

[2] Primarily for recreation easements and acquisition from willing sellers. Funding pursued through Land/Water Conservation Fund and other federal/private sources.

[3] Primarily for conservation and scenic easements and acquisition from willing sellers of high priority habitat or viewshed areas. Funding pursued through Land/Water Conservation Fund, fish/wildlife habitat mitigation funds and other federal/private sources.

[4] Includes costs of matching funds dedicated for county river planner/liaison position, zoning reviews, Wildwood to Miller Quarry river trail feasibility study, GIS mapping, and landowner conservation incentive program and stewardship handbook. These costs would be funded for three years.

[5] Estimates include matching contributions toward cost share for landowner conservation incentive program, Oregon State Patrol cadets and county river planner/liaison position.

[6] Includes annual costs for USFS. Does not include current BLM costs for river planning or Wildwood Recreation Site.

[7] Cost estimates do not include estimates for recreation developments that are not directly related to river management but were identified as compatible potential recreation projects within the corridor such as the USFS snow-park/trails and group campground near the upper river, and the possible campground and fisheries environmental education center at Wildwood. Such recreation developments would not be funded out of Wild and Scenic River management monies.

SALMON RIVER	RECREATION RESOURCES			RESOURCE PROTECTION		OTHER INITIAL ADMINISTRATIVE COSTS	TOTAL ONE-TIME COST	ANNUAL MANAGEMENT COST	COSTS TO Clackamas County
ALTERNATIVE C	$ 120,000	$ 22,500	$ 5,000	$ 1,055,000	Water quality $ 12,000 Fisheries $ 145,000 Botany/wildlife $ 31,000 Cultural $ 3,500 Visual $ 6,000	$ 50,000*	Acquisition $ 1,175,000 Facilities, studies and restoration $ 77,000	$ 196,000	$ 35,000
ALTERNATIVE D	$ 160,000	$ 923,000*	$ 75,000	$ 985,000	Water quality $ 12,000 Fisheries $ 130,000 Botany/wildlife $ 62,000[a] Cultural $ 3,500 Visual $ 11,000	$ 45,000*	Acquisition $ 1,145,000 Facilities, studies and restoration $ 1,060,000	$ 256,000	$ 25,000

[a]Includes fencing costs for Salmon River meadows enclosures.

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