United States
Department of
Agriculture

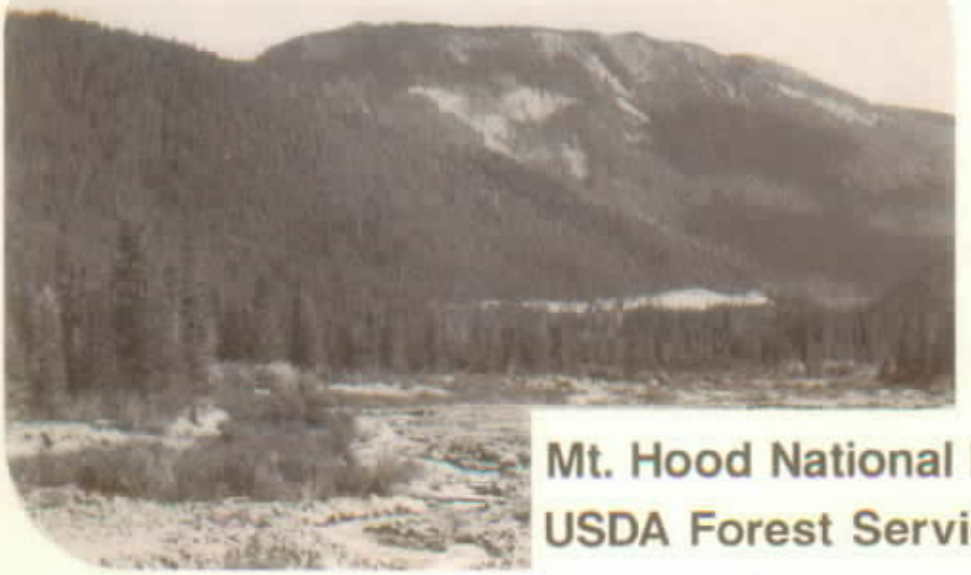
Forest Service

Pacific
Northwest
Region

WHITE RIVER

National Wild and Scenic River

Environmental Assessment



Mt. Hood National Forest
USDA Forest Service

Prineville District
Bureau of Land Management

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Environmental Assessment

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TABLE OF CONTENTS

Chapter 1: Need for the Proposal **1-1**
Introduction 1-1
Purpose and Need 1-1
The Decisions Needed 1-1
Background 1-1
Legislation 1-1
Planning Mandate 1-2
Summary of the Resource Assessment 1-6
Issues 1-8
Existing Plans, Policies, and Agreements 1-15
US Forest Service 1-15
Bureau of Land Management 1-15
US Fish and Wildlife Service 1-15
Conferated Tribes of the Warm Springs Reservation of Oregon . . 1-16
Land Conservation and Development and County Comprehensive Planning 1-17
Oregon Land Use Planning Act 1-17
Goal 5 1-17
Oregon Department of Transportation (ODOT) 1-18
Oregon Water Resources Department 1-18
Division of State Lands 1-18
Oregon Department of Fish and Wildlife (ODF&W) 1-19
Wasco County Comprehensive Planning 1-19
How this Document is Organized 1-21
Chapter 2: Alternatives **2-1**
Introduction 2-1
Process Used to Formulate the Alternatives 2-1
Analysis Process 2-1
Public Involvement 2-1
Boundary Process 2-2
Alternative Actions Eliminated from Further Study 2-2
Alternatives, Including the Proposed Action 2-3
Alternative A: No Action 2-3

Alternative B 2-3
Alternative C 2-3
Alternative D 2-4
Alternative E 2-4
Management Actions Common to All Action Alternatives 2-4
Alternatives 2-10
Plan Amendments Needed 2-43
Chapter 3: Affected Environment 3-1
Introduction 3-1
Existing Condition 3-1
Segments A and B 3-1
Segments C and D 3-8
Segments E and F 3-14
Desired Future Condition 3-16
All Segments 3-16
Segments A and B 3-17
Segments C and D 3-25
Segments E and F 3-27
Chapter 4: Environmental Consequences 4-1
Introduction 4-1
Management Alternative Effects 4-1
Effects on Issues 4-1
Issue 1: Commodity Production 4-1
Issue 2: Recreation and Scenic Quality 4-4
Issue 3: Water Quality and Quantity 4-16
Issue 4: Vegetation Management 4-21
Issue 5: Private/Public Lands Conflicts 4-27
Issue 6: Final Corridor and Designated Viewshed Boundaries 4-28
Social Effects 4-31
Economics 4-31
Civil Rights, Women, and Minorities 4-33
Cultural Resources 4-33
Land Ownership 4-36
Wetlands, Floodplains, Prime Farmland, and Rangelands . . . 4-36

Transportation and Access 4-36
Biological Effects 4-37
Threatened, Endangered, and Sensitive Species 4-37
Other Management Indicator Species 4-41
Fish and Fish Habitat 4-42
Old Growth 4-44
Biological Diversity 4-44
Ecosystem Health 4-47
Fuels and Wildfire Risk 4-47
Physical Effects 4-50
Air Quality 4-50
Geology 4-52
Required Disclosures 4-53
Chapter 5: Consultation with Others 5-1
Appendix A: White River Falls A-1
Appendix B: Integrated Landscape Analysis B-1
Appendix C: Scenic Resources Management C-1
Appendix D: Mt. Hood Meadows Expansion D-1
Appendix E: Glossary E-1
Appendix F: References F-1

List of Tables

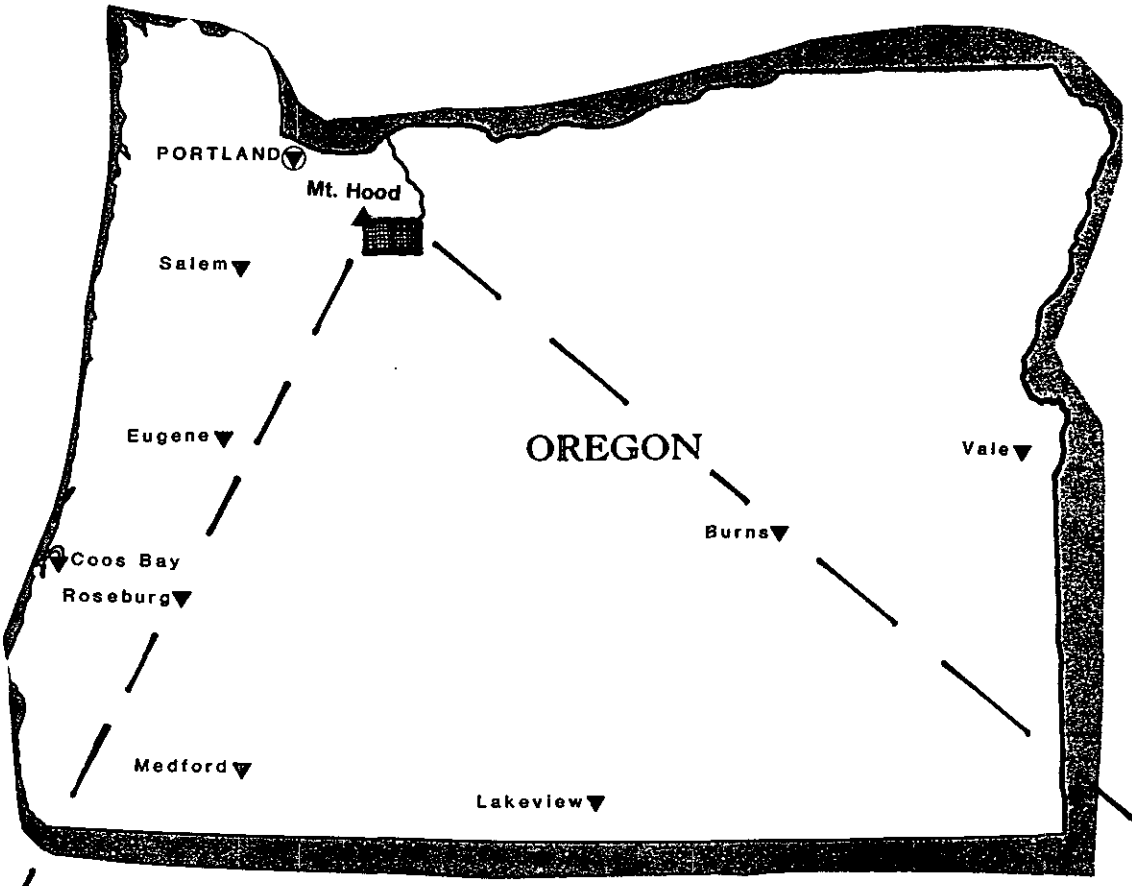
Table 1.1. Summary of White River values and issues. 1-3
Table 2.1. Effects of GIS mapping and river length reductions on allowable corridor acres. 2-2
Table 2.2. Alternatives. 2-10
Table 2.3. Corridor boundary alternatives. 2-34
Table 2.4. Designated Viewshed boundary alternatives. 2-39
Table 3.1. Outstandingly Remarkable Values for each segment pair of the White River. . . 3-2
Table 3.2. Existing stand structure for selected landscape units. 3-5
Table 3.3. Existing scenic condition and VQOs for selected viewpoints along White River. 3-9
Table 3.4. Trails within the White River analysis area. 3-10
Table 3.5. Campgrounds and camping areas within White River analysis area. 3-10
Table 3.6. Range of desired residue profiles by landscape unit and major plant association series on federal lands. 3-20

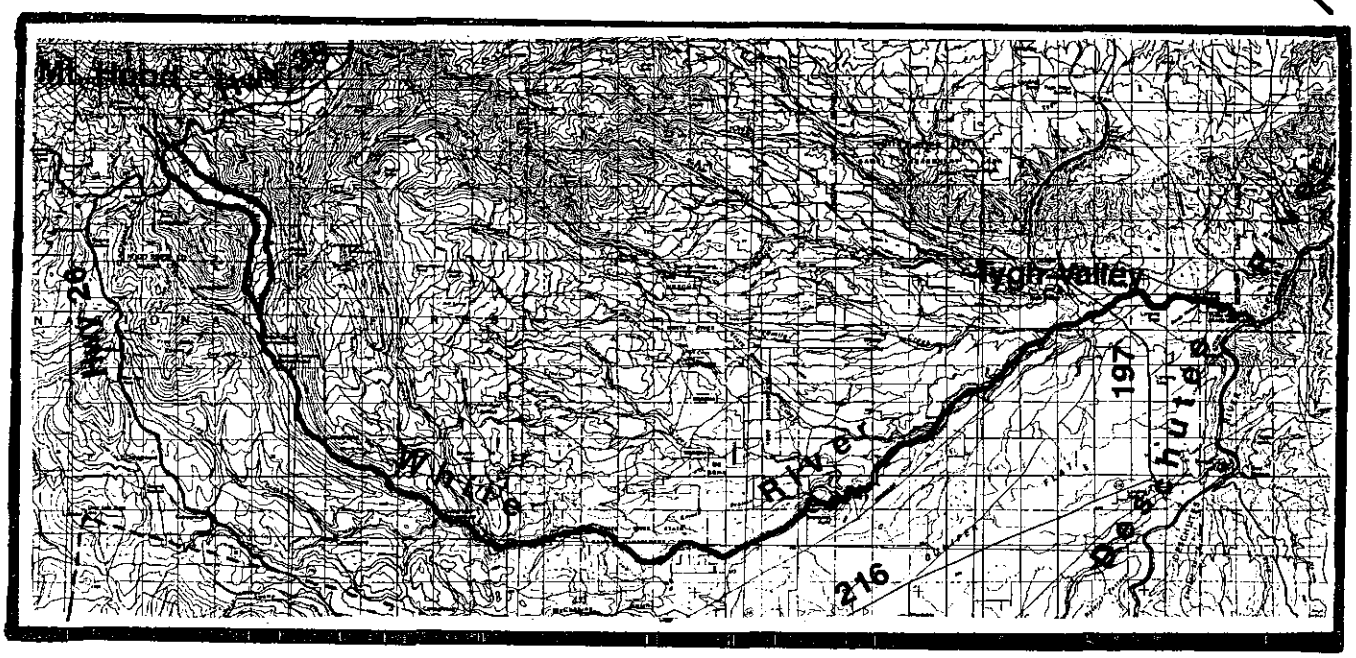
Table 3.7. Range of acceptable exposed mineral soil levels by landscape unit and plant association series on federal lands.. 3-20
Table 3.8. Range of desired percentages of each landscape unit in each stand structure category.. 3-21
Table 3.9. Target tree sizes for old growth stands by forest zone. 3-23
Table 3.10. Desired VQOs for the river corridor by management alternative, boundary alternative, and designated viewshed alternative. 3-24
Table 3.11. Desired Recreational Opportunity Spectrum class for each river segment by management alternative. 3-25
Table 4.1. Mix of recreation opportunities and alternative effects (Alternative A). 4-7
Table 4.2. Mix of recreation opportunities and alternative effects (Alternative B). 4-10
Table 4.3. Mix of recreation opportunities and alternative effects (Alternative C). 4-11
Table 4.4. Mix of recreation opportunities and alternative effects (Alternative D). 4-14
Table 4.5. Mix of recreation opportunities and alternative effects (Alternative E). 4-16
Table 4.6. Percent disturbance expected in critical river associated viewsheds--Alternative A and Viewshed Alternative I. 4-22
Table 4.7. Percent disturbance expected in critical river associated viewsheds--Alternative B. 4-24
Table 4.8. Percent disturbance expected in critical river associated viewsheds--Alternative C. 4-25
Table 4.9. Percent disturbance expected in critical river associated viewsheds--Alternatives D and E. 4-26
Table 4.10. Expected biomass consumption under two different burning conditions 4-51
Table 4.11. Representative fuel loadings for various fuelbeds representative of White River and expected fuel consumption under spring and summer conditions. 4-51
Comparison Table 1--Commodity production from federal lands. 4-54
Comparison Table 2--Recreation. 4-55
Comparison Table 2b--Scenic Quality. 4-58
Comparison Table 3--Water Quality and Quantity 4-60
Comparison Table 4--Vegetation Management. 4-61
Comparison Table 5--Private/Public Lands Conflicts 4-62
Comparison Table 6b--Final Corridor Boundary 4-63
Comparison Table 6b--Final Viewshed Boundary 4-63
Comparison Table 7. Estimated costs for each action alternative to implement projects not already mentioned in the Forest Plan or RMP 4-64
Table B-1. Interaction matrix. B-11
Table C-1. Forest Plan distance zones for viewpoints and trails from activity along roads, waterbodies, or use areas.. . . . . C-2

List of Figures

Figure 1.1. The river management planning process 1-2
Figure 1.2. White River segments and main roads. 1-4
Figure 1.3. White River and its main tributaries 1-5
Figure 2.1. White River corridor boundary--Alternative A (No Action). 2-35
Figure 2.2. Land ownership for Segments D, E, and F in White River corridor--Alternative A (No Action). 2-36
Figure 2.3. White River corridor--Alternatives 2 and 3 2-37
Figure 2.4. Land ownership for Segments D, E, and F in White River corridor--Alternatives 2 and 3 2-38
Figure 2.5. White River designated viewshed--Alternatives I (No Action) and II. 2-40
Figure 2.6. White River designated viewshed--Alternative III. 2-41
Figure 3.1. White River landscape units used in the ecosystem approach to alternative development. 3-18
Figure 3.2. Landscape units with listed range of desired percentages of each stand structure. 3-22
Figure 4.1. Comparison of acres available for each ROS class by management alternative and boundary alternative. 4-57
Figure D.1. Mt. Hood Meadows White River expansion in relation to White River corridor alternatives 2 and 3 . . . . . D-3

Vicinity Map





Chapter 1
Need for the Proposal

CHAPTER 1: NEED FOR THE PROPOSAL

INTRODUCTION

This chapter provides an overview of relevant river protection legislation, the purpose of this environmental assessment and management plan, and how the plan was developed. It also covers the specific legal and regulatory requirements that the planning process and this document must satisfy. Lastly, this chapter reviews the current plans, policies, and agreements affecting river resources and management.

PURPOSE AND NEED

Congress designated the White River as a wild and scenic river in 1988. The Wild and Scenic Rivers Act requires the Bureau of Land Management (BLM) and the Forest Service to develop a management plan for the river within three years of the designation date. The White 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 planning team. The environmental assessment also describes alternative methods for managing the river and documents the environmental effects of each alternative. The selected alternative provides the foundation for the management plan .

THE DECISIONS NEEDED

The Forest Supervisor of the Mt. Hood National Forest and the Area Manager of the Prineville District of the BLM have three decisions. First, they must decide which boundary alternative will best meet the intent of the river plan. Second, they must decide which viewpoints should be included within the designated viewshed. Third, they must decide which alternative will best protect and enhance the outstandingly remarkable values of the river and provide for public use and enjoyment of the river and its resources.

BACKGROUND

LEGISLATION

In 1968, Congress passed the National Wild and Scenic Rivers Act (P.L. 90-542), 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 1988 Act designated White River, from its headwaters on the southeast slope of Mt. Hood to its confluence with the Deschutes River just above Sherars Bridge, excluding 0.6 miles at White River Falls. The Mt. Hood National Forest will administer the upper half of the river and the Prineville District of the BLM the lower half.

Under the Wild and Scenic Rivers Act, designated rivers were classified as wild, scenic, or recreational, depending on the development level 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 largely undeveloped with few access points. Scenic rivers typically have more types of land uses and developments than wild rivers. Recreational rivers have still more development on the shore. Roads may parallel the river more closely and may dominate the landscape. The banks may have some development and existing impoundments or diversions may be present.

Due to the differing levels of existing developments, the Omnibus Oregon Wild and Scenic Rivers Act divided the White River into six segments:

Segment A. The 3.3 mile segment from the headwaters to the line between sections 9 and 16, township 3 south, range 9 east as a **recreational river**, to be administered by the USDA Forest Service

Segment B. The 16.73 mile segments from the line between sections 9 and 16, township 3 south, range 9 east to the confluence with Deep Creek as **recreational river**, to be administered by the USDA Forest Service.

Segment C. The 6.88 mile segment from the confluence with Deep Creek to the National Forest/BLM boundary as a **scenic river**, to be administered by the USDA Forest Service.

Segment D. The 18.03 mile segment from the National Forest/BLM boundary to the confluence with Threemile Creek as a **scenic river**, to be administered by the BLM.

Segment E. The 5.57 mile segment from the confluence with Threemile Creek to River Mile 2.46 at section 7, township 4 south, range 14 east as a **recreational river**, to be administered by the BLM.

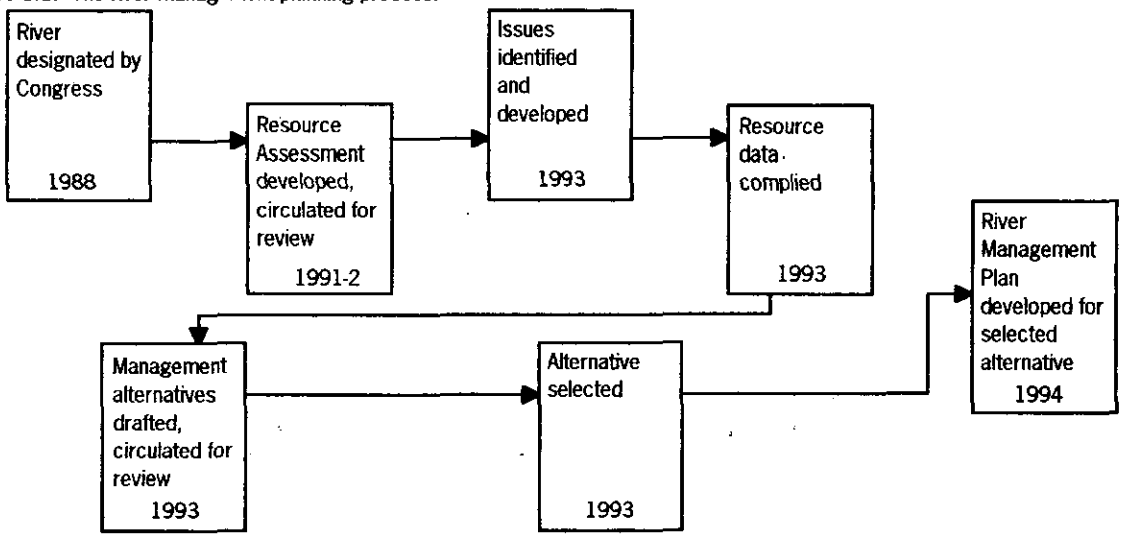
Segment F. The 1.85 mile segment from River Mile 1.85 at section 8, township 4 south, range 14 east to the confluence with the Deschutes River as a **recreational river**, to be administered by the BLM.

The miles above do not match with the miles in the enabling legislation. These mileages are from digitized data in GIS but do represent the descriptions and intent of the 1988 Omnibus Wild and Scenic Rivers Act.

PLANNING MANDATE

The Wild and Scenic Rivers Act requires that a comprehensive plan set the final boundaries and enhance the values for which the river was designated. The plan also provides goals, desired future condition, and standards and guidelines for the White River. It provides the necessary management direction for the river corridor and the adjacent areas that affect the corridor. Figure 1.1 illustrates the steps taken in developing the river management plan.

Figure 1.1. The river management planning process.



The river management plan should be compatible with local, including tribal, and statewide planning goals, and may be coordinated with planning for affected federal lands. This chapter discusses the jurisdiction of other agencies, such as the U.S. Fish and Wildlife Service and Oregon Department of Fish and Wildlife.

The resource values and issues drive plan development. The river management plan should protect and enhance river values and address issues related to river management. The Congressional Record named the following values as outstanding for White River:

- Geology,
- Fish habitat,
- Wildlife,
- Recreation,
- Scenic resources.

The Congressional Record mentions White River Falls in the features considered outstandingly remarkable. However, Senate Committee Report 100-570 excluded from designation a portion of the river to allow rehabilitation of the existing diversion and powerhouse. Congress intended to allow Northern Wasco County Public Utility District (PUD) to construct a hydroelectric generating facility using the existing diversion and water right. This excluded area includes White River Falls. However, in July 1993, the PUD voted not to construct the hydroelectric facility. The managing agencies would like to see this deleted area of the White River added into the Wild and Scenic River program. Appendix A details the history of this section and the proposal.

Early in the planning process, an interdisciplinary team evaluated the river resources and determined which were outstandingly remarkable values through development of a resource assessment. As a result, water quality and quantity were dropped from the list of values. The public and the planning team identified the outstandingly remarkable values and specific issues that the planning process needed to address (Table 1.1):

Table 1.1. Summary of White River values and issues.

Outstandingly Remarkable Values	Issues
Geology	Commodity Production
Hydrology	Recreation Management
Botany	Water Quality
Fish Habitat and Populations	Vegetation Management
Wildlife Habitat and Populations	Public/Private Lands Conflicts
Historic Resources	Final Corridor and Viewshed Boundaries
Recreation	
Scenic Resources	

Figure 1.2. White River segments and main roads.

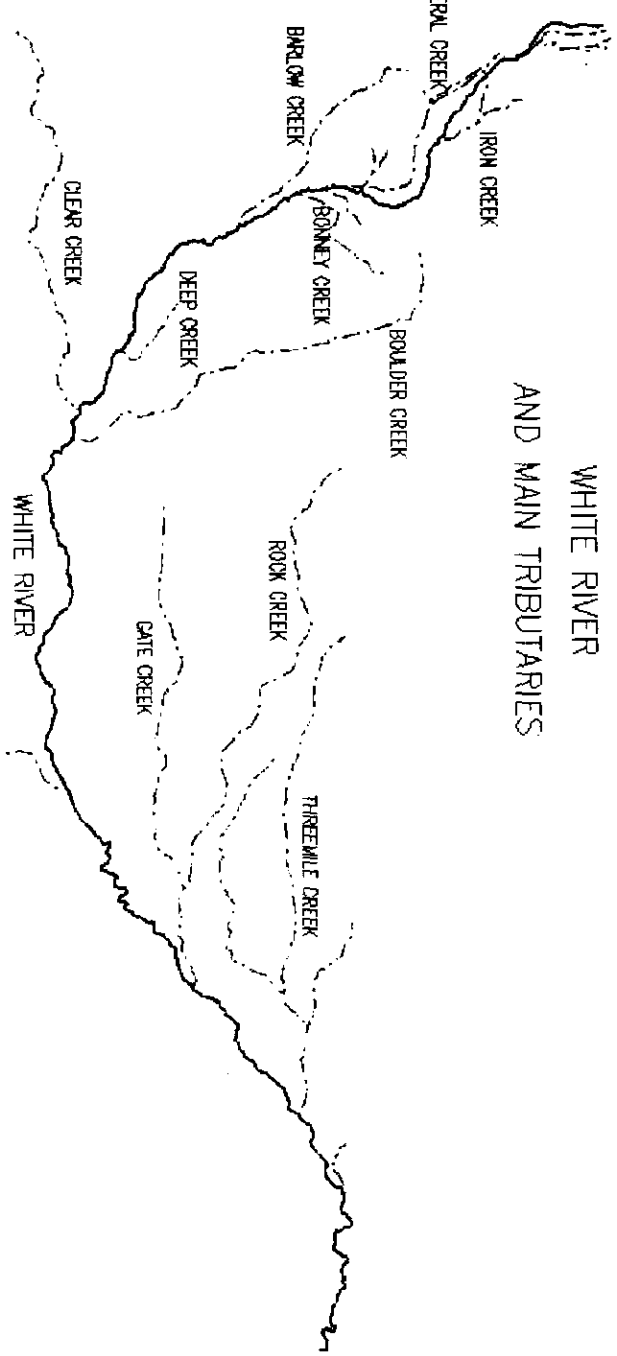


Figure 1.3. White River and its main tributaries.

SUMMARY OF THE RESOURCE ASSESSMENT

The resource assessment represents the initial phase of management plan development for White River and serves as the plan foundation. The resource assessment documents those river-related values or features that are outstandingly remarkable and those that are significant and contribute to the river setting or to the function of the river ecosystem.

To qualify as outstandingly remarkable, the river-related value must be a rare, unique, 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. White River lies within SCORP Region 10, which contains the lightly populated area of the state just east of the Cascades; Bend, Redmond, and The Dalles are the largest cities. Region 10 includes all of Hood River, Wasco, Sherman, Gilliam, Jefferson, Wheeler, Deschutes, and Crook counties and the Warm Springs Reservation. This region also includes the Deschutes, Metolius, Lower Crooked, and John Day Wild and Scenic Rivers. The Columbia River forms the northern boundary.

The first part in developing a river management plan is to (1) assess the resources and values associated with the river and river corridor and (2) to decide the significance of these values. Existing scientific data and informed professional judgment form the basis of the findings in the assessment. The assessment methodology uses specific guidelines that provide an objective determination of river value importance, as well as a degree of standardization and consistency in the analysis process.

Geology

The geology of White River is an outstandingly remarkable value for Segments A-D. Specific features include evidence of recent volcanic activity, ghost forests, active fumarole field, active mountain glacial activity in the upper reaches, and the Graveyard Butte area. The river corridor contains a variety of landforms, starting with the glacially carved valley on Mt. Hood's flank, extending into a broad, glacial valley floodplain, then descending into steep canyon lands with impressive water falls.

Hydrology

White River's hydrology meets the criteria for an outstandingly remarkable value for all river segments. The glacially formed environment, the river's white color in late summer and fall, and the river's aspect and gradient make White River unique in the region. White River Falls isolates the watershed aquatically, providing an environment in which indigenous aquatic species, such as the White River race of redband rainbow trout, have evolved.

Botany

Many regionally important sensitive and unique plants and plant communities are present along the river including: bog communities with stiff club moss (*Lycopodium annotinum*) in the upper drainage; dark-soiled bogs with "genus communities" of grape ferns (*Botrychium* spp.) in the Iron Creek-Buck Creek areas; the notable plant communities of the south-facing, rocky openings along the river near the National Forest boundary, including unusual extensions of species beyond normal range; and an endemic plant with a very small range, Tygh Valley milkvetch (*Astragalus tyghensis*). The river corridor's broad diversity of plant species and communities, ranging from subalpine to desert steppe, and the potential research natural area values also provide a unique combination and relationship among the communities listed above.

Fish Habitat and Populations

The White River race of redband rainbow trout is genetically distinct from other redband rainbow trout. Segments A-E, above White River Falls, provide existing or potential habitat for White River redband rainbow trout. The possible introduction of chinook into Segments A-E represents a potential outstandingly remarkable value with regional significance. Analysis of anadromous fish introduction is

beyond the scope of this document since the area of potential impact is much larger than the wild and scenic river corridor. Possible interactions between introduced anadromous fish and the native fish are not known, but also beyond the scope of this document to analyze.

Wildlife Habitat and Populations

Wildlife populations and their habitat are outstandingly remarkable values in Segments B-D. These segments support a diversity of endangered, threatened, and sensitive species associated with the river corridor. Segment B provides important northern spotted owl and harlequin duck habitat. Segments C and D contain important peregrine falcon habitat. High quality habitat conditions for elk and various raptors are significant values, but are not nationally or regionally significant, nor are they unique to Central Oregon.

Cultural Resources

Prehistoric Period--The prehistoric sites known to exist within the corridor are considered significant but not outstandingly remarkable. These sites have the potential to increase knowledge of the river's and the region's prehistory.

Historical Period--Historical cultural resources are outstandingly remarkable values in Segments B and C. Two important historic sites, Barlow Road and Keeps Mill, lie along the river corridor in these segments. The Barlow Road in Segment B, an important alternate route along the Oregon Trail, parallels the river for approximately four miles until it crosses at White River Station. This piece of the Oregon Trail is of national significance. Keeps Mill in Segment C is a significant regional site. Both the Barlow Road and Keeps Mill have high interpretative value as well as historic value.

Segment A contains Timberline Trail which, while regionally important, does not meet the criteria for an outstandingly remarkable value. Other historic resources are known to exist within White River canyon in Segments D-F; however, these sites have not been formally recorded and evaluated.

Traditional Use, Cultural--Based on the archaeological and ethnohistorical evidence, all river segments are considered significant. The corridor lies within ceded lands of the Confederated Tribes of Warm Springs Reservation. Special treaty rights exist concerning use of the land for traditional practices or activities.

Recreation

Segments A-D offer outstanding opportunities for sightseeing, photography, nordic skiing, and kayaking. Rugged hiking and backpacking, and nature and wildlife observation are additional outstanding recreational opportunities within Segment D. The river canyon's outstanding solitude and hiking opportunities attract visitors within and outside the region.

Scenic Resources

White River has outstandingly remarkable scenic values in Segments A-D. The river's scenery is regionally important and widely appreciated in all seasons. The following outstanding viewsheds support this finding: views within the corridor from White River, the campgrounds and dispersed sites, and from the Barlow Road; views of the river corridor from Timberline Lodge, its lower parking area, and Timberline Trail; views of Mt. Hood and White River valley from White River East Sno-park; the view into the canyon from above Keeps Mill; views from Bonney Butte; and views into the rugged canyon from several points between the National Forest boundary and Tygh Valley.

ISSUES

The National Environmental Policy Act defines issues as ". . . unresolved conflicts regarding alternative uses of available resources." Both the public and the agencies involved can identify issues. Consultation with the public and other agencies as well as internal discussions between members of the planning team identified six major issues. These issues reflect federal environmental laws and mandates and land management goals defined in the Mt. Hood National Forest Land and Resource Management Plan (Forest Plan) and the Two Rivers Resource Management Plan (RMP).

The first four issues are interrelated with overlap in the specific concerns and measures. In theory, the IDT could have either further split the issues into their separate conflicts or combined everything into one "super issue." The Team felt that further splitting would create an unwieldy number of issues and that further combining would create an unwieldy issue. In all cases, the conflicts discussed either cannot be mitigated or cannot be fully mitigated.

The issue discussion format consists of the main issue question, a list of specific conflicts, a narrative describing the issue in more detail, and set of measurement criteria. The measures are designed to answer the issue question and will be used in Chapter 4 to compare how the different alternatives affect the issue.

Issue 1--Commodity Production: **What commercial products, on both public and private lands, can the river corridor produce and at what levels?**

Specific conflicts include:

1. Regulated vs unregulated harvest
2. Harvest vs water quality, fish habitat, late successional wildlife habitat (old growth), sensitive plants, cultural resources, Barlow Road management, scenic quality, and recreation experience
3. Mining vs water quality, fish habitat, scenic quality, and recreation experience
4. Grazing vs water quality, fish habitat, sensitive plants, and recreation experience

Under a regulated harvest regime the area should produce a set level of wood products on a regular basis. In order to provide this volume, money is allocated for planning, including environmental analysis, and implementation. The river corridor would be included in the land base used to calculate the Forest's Allowable Sale Quantity (ASQ). Under an unregulated harvest regime the area is not expected to produce any wood products, although harvest may occur to meet other objectives. Funds are not appropriated on a regular basis for planning and implementation even though timber harvest may be a very viable method of managing for desired conditions and some Outstandingly Remarkable Values. The river corridor would not be included in the land base to calculate the Forest's ASQ.

Timber harvest provides many goods and some services. It provides wood fiber for the various markets, in turn providing employment both during harvest and reforestation. It generates revenue for all levels of government and for private landowners. The roads associated with most harvest operations provide access into the area, particularly for people with limited mobility. Treatment prescriptions can enhance habitat for species associated with opening and less dense stands, such as deer and elk. Thinnings may promote more rapid development of an old growth stand structure, easing management for species dependent on such structure. Silvicultural prescriptions may serve to rehabilitate older harvest units that do not meet Visual Quality Objectives (VQOs). Treatments may promote certain desirable plants and fungi, such as huckleberries, beargrass, and morel mushrooms.

Timber harvest also results in undesirable effects. It fragments a particular stand condition if it covers a wide area. Tree removal reduces the area covered by a given stand stage, usually older stands due to the volume available. Treatments remove habitat for species associated with old stand and dense

stands, such as northern spotted owls and goshawks. Unit shape and placement may degrade scenic quality. Roads produce sediment which can reduce water and fish habitat quality. The roads and the increased access usually leads to more encounters between visitors, changing the recreation experience from a more primitive setting to a less primitive setting. Treatment prescriptions may not meet the original intent or fail to provide the desired landscape or results. Treatments may promote undesirable plants and fungi, such as thistles, knapweed, and root diseases. Harvest activities or treatments may unintentionally damage or destroy sensitive plant populations and cultural resource sites.

Most of the mining within the potential boundary produces common variety minerals, mostly sand and gravel. White River corridor has low to very low potential for any other type of mineral. The sand and gravel mining provides material for construction, road maintenance, and traction material for winter driving. White River sand from Tygh Valley is especially desired as a building construction material throughout central Oregon. Mining provides employment and generates revenue for all levels of government and private landowners. Quarries provide opportunities for certain recreational activities, such as snow play and target shooting. However, the access roads and the quarries also provide sediment that can degrade water and fish habitat quality. Quarries are not part of the characteristic landscape along most of the river. Mining operations usually generate noise, dust, smells, and sights that result in a less primitive recreational setting.

Public land grazing provides meat for local use and for market. Grazing can provide some vegetation management for forbs and shrubs. However, the typical vegetation on much of the public land in the corridor and the lack of water cause cattle to concentrate in areas that provide both. Overgrazing and trampling in riparian areas can reduce or virtually eliminate streamside vegetation and break down streambanks. Both effects increases sediment in the streams or river and can raise water temperature, degrading water and fish habitat quality. High grazing pressure and areas of concentrated use in uplands tends to reduce or eliminate native plants, including some sensitive species, and increase non-native plants usually classified as noxious weeds. Fences create a less primitive recreational setting. Fences in poor repair may pose a public safety hazard and may allow cattle to enter areas in which they should not be, at least at that time.

Measures:

1. Proposed regulated or unregulated harvest (Conflict 1)
2. Commercial products available in each segment (Conflicts 1, 2, and 3)
3. Relative change in commercial product output levels compared to No Action (Conflicts 1, 2, and 3)

Issue 2--Recreation and Scenic Resources: **How should we manage recreation use and maintain scenic quality?**

Specific conflicts include:

1. Types of recreation use (horseback riders vs mountain bikers vs hikers, motorized vs nonmotorized)
2. Levels of recreation use vs fish and wildlife habitat quality and scenic quality
3. Demand for recreation areas vs supply of more primitive recreational experiences
4. Scenic quality vs recreation use levels and developments and commodity production

Certain types of recreation uses tend to conflict with one another. Horse users, hikers, and mountain bikers do not require trail standards that differ significantly. However, these three user groups frequently conflict. Horses leave deep tracks in wet trails and can create deeply churned mudholes in seasonally

wet pockets. They leave manure on the trails and usually push hikers and mountain bikers off the trail temporarily. Mountain bikers leave deep ruts when trails are wet and in high use areas that can make travel difficult for hikers and horseback riders. The silent and rapid approach of mountain bikes can startle both horses and hikers and leave clouds of dust that linger in high use trails. Backpacks, due to shape or color, can scare horses. Many hikers do not know what to do when they encounter horses.

Motorized recreational equipment, such as snowmobiles and off road vehicles, provides opportunities for people with limited mobility and allows travel over a much greater distance in a given period of time. Motorized recreation requires a higher level of development to support the use, such as more roads, parking areas, and signs. Motorized equipment creates sounds that carry long distances, especially in winter. Poorly tuned equipment and two-cycle equipment tends to leave plumes of smoke.

Nonmotorized recreational activities generally require some degree of self-sufficiency and require a lower level of development to support. Sounds created by nonmotorized recreation usually carry only a short distance. Nonmotorized recreation provides fewer opportunities for people with limited mobility. It may cause degradation to water quality from animal wastes or human wastes in areas that lack sanitation facilities. It restricts travel to a shorter distance within a given period of time.

Recreational use and demands are increasing at a rapid rate throughout Oregon and along portions of the White River. Segments A and B receive use year-round. Segments C and D receive use during the snow free period, such as floating during high flows in the spring, hunting, and occasional fishing. As recreation use increases, it places increasing pressure on fish and wildlife habitat. Fishing pressure can reduce the numbers of fish surviving to reproductive age. Areas of concentrated use can lead to denuded banks, increased erosion and sediment, and decreased spawning habitat. Certain wildlife species, such as harlequin duck and wolverine, are very sensitive to human presence and disturbance. As use increases, these species may leave an area where otherwise suitable habitat exists. Steep topography, the lack of trails, and mixed ownerships in Segments C, D, and F limits most public use to Keeps Mill, Graveyard Butte, White River Falls, and the mouth at the Deschutes River. Private land ownership limits use in Segments E.

As recreation use levels increase White River's topography will tend to concentrate ever more use into a limited area. As use increases, several problems begin to develop or accelerate. Wildlife species sensitive to disturbance; such as wolverine, harlequin duck, nesting peregrine falcons, and deer and elk during fawning and calving; may decline in population or disappear. Trampling and parking in inappropriate locations leads to more erosion and sediment, degrading water and fish habitat quality. Fishing pressure increases, distorting the age structure of fish populations. Popular areas and trails without sanitation facilities can lead to water quality degradation from "toilet paper fields." Managing visitor use to reduce impacts on the Outstandingly Remarkable Values will require additional signs, facilities, and other development. Increased use usually means increased problems with littering and vandalism.

Population is expected to increase dramatically in the Portland metropolitan area. The Mt. Hood National Forest is a major recreation destination for the residents of the metropolitan area, including the eastside. Opportunities for Primitive and Semi-Primitive Nonmotorized recreation are limited in the Cascades. As demand for recreation sites increases, the type of recreation experience will change from a more primitive, less developed Recreational Opportunity Spectrum (ROS) Class to a less primitive, more developed ROS Class.

Scenic quality is an important part of the recreation experience and setting. As use levels increase, the associated impacts from trampling, littering, vandalism, facility construction, crowding, and site rehabilitation efforts increase the risk of degrading scenic quality. As harvest levels increase the risk that treatment prescriptions, unit shape and location, and operations will not meet VQOs increases.

Measures:

1. Recreational opportunities in each segment (Conflict 1)
2. Risk to threatened, endangered, and sensitive wildlife species from levels of recreation use (Conflict 2)
3. Open road density (Conflicts 2 and 3)
4. Relative use levels (Conflicts 2 and 3)
5. Acres available for each ROS class (Conflict 3)
6. Number of campgrounds and day use areas and capacities of both (Conflict 3)
7. Expected visual quality levels and percent visually disturbed (Conflict 4)
8. Risk to meeting VQOs (Conflicts 2 and 4)

Issue 3--Water Quality and Quantity: **How do we maintain water quality and assure sufficient flows to protect or enhance the Outstandingly Remarkable Values dependent on water?**

Specific conflicts include:

1. Increased use and demand for recreation and commodity production vs maintaining water quality
2. Providing adequate flows to protect or enhance Outstandingly Remarkable Values associated with fish and fish habitat, boating, and scenic quality vs increasing demands for water for domestic, irrigation, and commercial uses

White River naturally carries a high sediment load, particularly in summer and late fall when the glacial milk begins flowing. The aquatic organisms in the river have adapted to this annual surge of sediment. All major commodity production activities (harvest, mining, farming, and grazing) result in some level of erosion. As commodity production levels increase or when commodity production is concentrated near streams, the risk increases that additional sediment will reach the river. As recreation use levels increase, the risk also increases that use itself or developments designed to manage the use will increase sediment in the river. Sediment generated from these activities are not the same type of material as the glacial milk.

Increased sediment would possibly alter the river's color, fill the few pools that exist in the river, may cause the river to change course more frequently in Segment B, and may increase flooding problems and river shifting in Segment E. Fish and aquatic habitat quality would decline. Habitat surveys have rated the fish habitat in White River as poor to fair due to the sediment load, lack of cover, and lack of pools. These conditions are, for the most part, the result of natural processes rather than management actions. Much of the river has experienced little development or manipulation due to its inaccessibility.

The water temperature in White River is suitable for cold water fish species. Increased recreation use, concentrated cattle use in riparian areas and wetlands, and harvest units with inadequate buffers may remove enough vegetation to raise water temperatures for part of the river. Water temperatures may increase enough to reduce habitat quality for cold water fish and other aquatic species adapted to cold water conditions.

Consumptive demands for water in the White River basin include irrigation, domestic use, industrial use, and hydroelectric generation. Nonconsumptive demands for water include fish habitat, wildlife habitat, boating, and scenic quality. Significant water removals already occur on White River's tributaries. Many

of these withdrawal rights predate the Forest Reserves. Since most of the water withdrawals occur outside the wild and scenic river boundary and the current water rights are senior to any for which the managing agencies may file, a large part of this issue is outside the scope of this document. However, within the mandates for wild and scenic river management, the managing agencies can purchase, receive donations, or otherwise acquire current water rights. Increased removals may reduce the potential to adequately provide for nonconsumptive uses. Decreasing removals thorough the purchase or acquisition of water rights reduces the potential for consumptive uses.

When agencies recommend an in-stream flow, it is usually a minimum in-stream flow needed to maintain a particular feature or value. The danger lies in further analysis, research, or discoveries that reveal the minimum in-stream flows provided using old information do not actually provide adequate flow to maintain the feature or value for which it was intended. Optimum flows provide a buffer against this potential problem. However, optimum flows may remove water for other uses, such as irrigation, that are not necessary to remove. Obtaining optimum flows is more expensive and time consuming to support than obtaining minimum flows.

The state of Oregon has determined minimum in-stream flow needs for all the state's river, but only for fish habitat. That in-stream flow may not provide sufficient flow for other Outstandingly Remarkable Values. Recreational boating may require a higher flow than providing fish habitat. White River does provide a low number of boating opportunities during high water periods and years. Research may show that the river is theoretically capable of providing a longer boating season if less water was diverted. People expect a river to appear river-like, in terms of water volume. This flow may also require more water than just providing for fish habitat.

Measures:

1. Open road density (Conflict 1)
2. Relative use levels (Conflict 1)
3. Sediment production potential (Conflict 1)
4. In-stream flow recommendation (Conflict 2)

Issue 4--Vegetation Management: **How should we manage the vegetative complex to maintain and enhance the Outstandingly Remarkable Values?**

Specific conflicts include:

1. Some management tools (harvest, fire, grazing, chemical controls, biological controls, mechanical methods, and manual methods) may not be compatible with some Outstandingly Remarkable Values (water quality, wildlife habitat, fish habitat, sensitive plants, scenic quality, and recreation experience) or with adjacent owner objectives
2. Intensive management vs conservative management
3. Natural patterns vs vegetation management

Vegetation management depends on the use of one of five basic tools--prescribed burning, biological methods, chemical methods, mechanical methods, and manual methods. Grazing and timber harvest are two examples of widespread biological and mechanical methods, respectively. Appropriate use of these tools can enhance wildlife and fish habitat, certain sensitive plants, scenic quality, and the recreational experience. Inappropriate use can damage or degrade these values as well as water quality and fish habitat. Since vegetation management usually involves vegetation removal over the short-term this activity will reduce the acres of land covered by closed canopy, late successional plant communities,

thus reducing habitat for wildlife dependent on those communities. Vegetation management or the particular tool used may enhance one Outstandingly Remarkable Value at the expense of another. Further, use of one particular tool or mix of tools or the refusal to use one or more tools can affect how well an adjacent landowner can manage their ground to produce the goods and services they desire.

Intensive vegetation management is intended to provide a desired level of goods and services at a set interval while minimizing the risk of unexpected disturbances. Entries are regular and relatively frequent and usually associated with regulated harvest. Treatments tend to occur over a large area; a wide variety of treatment methods may be used over time and within a given entry. It tends to replace natural disturbance factors with active management. Intensive management is usually driven by goals related more to cost efficient production.

Conservative vegetation management is intended to allow natural processes provide the goods and services at a level and interval little influenced by technology. Entries tend to be more irregular and relatively infrequent and usually associated with unregulated harvest. Treatments tend to occur over a smaller area; a wide variety of treatments may be used over time, but not within a given entry. It allows at least some natural disturbance factors to operate. Conservative management is usually driven by goals related more to very specific resource concerns.

Natural forces typically produce a much different landscape than past vegetation management practices. Natural forces operate on a wide variety of scales and frequencies whereas vegetation management tends to operate on a limited scale and with a set interval. Natural forces tend to exhibit high variation in the disturbance intensity, creating a mosaic of undisturbed, and lightly, moderately, and severely disturbed areas. Vegetation management tends to exhibit low variation in the disturbance intensity. Vegetation management provides more regular and predictable output levels of goods and services than natural forces. Natural forces tend to create a more diverse landscape. Vegetation management activities are more likely not to meet Visual Quality Objectives (VQOs) since those objectives are based on the degree of difference from natural landscapes.

Measures:

1. Management tools proposed in each segment (Conflict 1)
2. Risk to providing adequate habitat to wildlife species dependent on late-successional plant communities (Conflict 1)
3. Risk to water quality and fish habitat (Conflict 1)
4. Risk to sensitive plants (Conflict 1)
5. Risk to meeting scenic quality Visual Quality Objectives (VQOs) (Conflict 1)
6. Visual quality levels (Conflict 1)
7. Percent visually disturbed (Conflict 1)
8. Risk to maintaining ROS Class (Conflict 1)
9. Regulated or unregulated harvest (Conflict 2)
10. Natural forces (fire, flood, wind, insects, and disease) allowed to operate (Conflict 3)
11. Management action's ability to emulate natural patterns (Conflict 3)
12. Scale, frequency, and intent of management activities (Conflict 3)

Issue 5--Private/Public Lands Conflicts: **How can we manage visitor use and natural resource management on public lands to minimize conflicts with private lands?**

Specific conflicts include:

1. Trespass vs use of the wild and scenic river corridor
2. Risk to private lands from public land management activities or restrictions

Visitors cannot reach several parcels of BLM public land without crossing private ownerships. Private landowners may suffer property loss or damage due to vandalism, gates left open, and wildfires from careless visitors. Promoting recreation use on federal lands may unintentionally promote trespass on private lands. We need to manage visitor use and access cooperatively with private landowners.

Federal land management can increase the risk of damage or degradation to private land values. The greatest risks include escaped fires from prescribed burning activities, insect outbreaks from constraints on pest management and from overstocked forest stands, and noxious weed invasions or increases from pest management constraints.

Measures:

1. Public access methods provided in Segments D-F (Conflict 1)
2. Number and location of public access points in Segments D-F (Conflict 1)
3. Degree of risk to private lands from proposed public land management (Conflict 2)

Issue 6--Final Boundary: **Where should we locate the final Wild and Scenic River boundaries and the viewshed boundary?**

Specific conflicts include:

1. Adequate protection and inclusion of the Outstandingly Remarkable Values vs strict adherence to the acreage limitations
2. Federal restrictions on land use vs private property rights
3. Scenic quality vs land management activities outside the river corridor and within the designated viewshed

The Omnibus Oregon Wild and Scenic Rivers Act of 1988 (PL 100-557) designated the White River and the 1968 Wild and Scenic Rivers Act provided guidelines for the size of the river corridor. The river corridor should include all the Outstandingly Remarkable Values identified in the resource assessment. Because the river meanders and shifts channel in Segment B, providing a large enough corridor to both protect the Outstandingly Remarkable Values and that remains within the acreage limits will be difficult.

In Segments A-C all the lands are publicly owned. Much of Segments D-F are privately owned. These landowners prefer to manage their lands with little or no influence from the federal land management agencies. Private landowners perceive that the final Wild and Scenic river boundary could have significant impacts on how they use their property and the value of that property.

The viewshed boundary may be much larger than the river corridor boundary, particularly in Segments A and B. Because the viewshed boundary is tied to one of the Outstandingly Remarkable Values (scenic quality) a viewshed boundary that exceeds the river boundary could place additional constraints on federal land management activities in other federal land allocations.

Measures:

1. Encompasses ORVs (Conflict 1)
2. ORVs protected by other agency or National direction (Conflict 1)
3. Acres included in the river corridor boundary (Conflict 1)
4. Acres per river mile (Conflict 1)
5. Private land acres included in the river corridor boundary (Conflict 2)
6. Number of important viewpoints located within the viewshed boundary (Conflict 3)
7. Additional acres included in the viewshed boundary over the river corridor boundary (Conflict 3)

EXISTING PLANS, POLICIES, AND AGREEMENTS

US FOREST SERVICE

The White River management plan signifies an amendment to the 1990 Mt. Hood National Forest Land and Resource Management Plan (Forest Plan). The Forest Plan provides direction for management programs, practices, uses, and protection measures on the Mt. Hood National Forest. The White River environmental assessment tiers 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: B1 Designated Wild and Scenic Rivers. The standards and guidelines for B1 management areas, as well as the White River resource assessment, have guided the interim management of White River, pending completion of this plan. The Forest Plan will be amended to incorporate this river management plan and any changes to its standards and guidelines for B1 lands.

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

BUREAU OF LAND MANAGEMENT

White River Management Plan tiers to the Two Rivers RMP. The RMP provides direction for all resource management programs, practices, uses, and protection measures on the northern portion of the Prineville District. The Two Rivers RMP does not conflict with actions proposed under any alternatives discussed in Chapter 2. The river plan will guide any actions the BLM would undertake in managing lands under its jurisdiction in the river corridor.

US FISH AND WILDLIFE SERVICE

The US Fish and Wildlife Service has the primary responsibility for administering the 1973 Endangered Species Act. At least three federally listed species may be found in the White River corridor during all or part of the year--peregrine falcon, bald eagle, and northern spotted owl. The US Fish and Wildlife Service prepares recovery plans for federally listed species which all federal agencies are obligated to follow. All federal projects which may affect the viability of any federally listed threatened or endangered species must go through formal consultation with the US Fish and Wildlife Service before the project can proceed.

THE CONFEDERATED TRIBES OF THE WARM SPRINGS RESERVATION OF OREGON

The Plateau culture extended from the Cascade mountains to the Rockies and from Canada to California, taking in many American Indian peoples. Ethnographic accounts indicate that native peoples belonging to as many as nine cultural-linguistic groups may have exploited the area of the Plateau within and near the White River corridor during the prehistoric period. These groups include several subtribes of the Tenino, Tygh, Wasco, and Molalla people. All of these cultural groups belong to the Penutiam macro-phylum of languages which dominated the western and northern portions of Oregon.

People culturally affiliated with the Plateau, including the Conferated Tribes of the Warm Springs Reservation of Oregon, were hunters and gatherers as well as fishermen who practiced a semi-nomadic lifeway in their quest for food and other essential resources. Although the tribes established summer and winter villages, seasonal travel to favored locations for fishing, hunting, and gathering plants was a necessary part of life. The White River corridor would have provided many of the resources that the native inhabitants sought.

Prehistoric use and remains are evident within the White River canyon, indicating that native people visited the river and used its varying resources. The river corridor contains riparian plants and land and aquatic animals which enthohistorical evidence shows the Plateau people traditionally used, at least through the time of initial contact with European explorers and settlers and prior to establishment of the Warm Springs Reservation.

Although the managing agencies do not know of any specific locations, it is likely that these traditional activities have continued to some degree into the present era. Further ethnographic research may find that specific locations in the river canyon were and are the focus of traditional cultural activities. Members of the Confederated Tribes of Warm Springs continue at least some traditional activities in the vicinity of White River such as hunting, fishing, and collecting native plants and other materials for subsistence, medicinal, ceremonial, and religious purposes.

The Confederated Tribes of the Warm Springs Reservation of Oregon is the modern day political successor to the seven bands of Wasco- and Sahaptin-speaking Indians of the mid-Columbia area. Representatives of these seven bands were signatories to the Treaty with the Tribes of Middle Oregon of June 25, 1855, 12 Stats. 63. Article I of the treaty describes the 10 million acre area of eastern Oregon ceded by the tribes to the United States, which includes the White River wild and scenic river corridor, and sets out the boundaries of the Warm Springs Reservation.

Article I also contains the express reservation by the tribes to the "exclusive right of taking fish in streams running through and bordering said reservation . . . and at all other usual and accustomed stations, in common with citizens of the United States." These rights were reserved by, not granted to, the treaty tribes. In essence, "the right of taking fish at all usual and accustomed places" guarantees that members of the treaty tribes shall have the right of access to and fishing from all salmon- and steelhead-bearing locations on the Columbia River.

Other rights reserved in the Treaty of 1855 include the right of erecting temporary buildings for curing fish, along with the privilege of hunting, gathering roots and berries, and pasturing horses and cattle on open and unclaimed land. This document reserves rights to the signers to perform traditional subsistence and sacred activities within the ceded lands.

Lastly, the tribes hold various parcels of trust land off-reservation, including an 888 acre parcel on both sides of the Deschutes River at Sherars Falls. A portion of this parcel lies within the White River wild and scenic corridor. The tribes, with assistance from the Bureau of Indian Affairs, manages tribal trust lands on and off the reservation as well as tribal natural resources.

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. 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.

OREGON LAND USE PLANNING ACT

The statutory basis for Oregon's state-wide land use planning program primarily derives 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 and Conservation 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)

The DLCD, the administrative arm of LCDC, carries out the state planning act through review of over 275 city and county comprehensive plans and land use regulations. This department reviews the plans for consistency and compliance with the mandatory statewide planning requirements, or goals. These statewide planning goals, and the process for developing, approving, and 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 direct 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 goals are equally important. The goals provide both prescription 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 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.

Goal 5 encompasses a broad scope of natural resources 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:

1. Inventory the resource.
2. Identify conflicting uses that potentially impact designated river values.
3. Develop and implement land use regulations to resolve the identified conflicting uses.

Compliance would include a program to coordinate changes in land use along rivers with applicable state and federal agencies (state parks, BLM, and Forest Service). Mandatory plan policies and zoning requirements must protect the resource values identified in the inventory.

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)

Oregon Department of Transportation is responsible for planning, designing, constructing, and maintaining state highways for the safety and benefit of the public. The agency requires authorization to use National Forest and BLM 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 new and reconstruction activities. It also includes responsibilities for maintenance, signs, access, and landscape management.

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

Besides construction and reconstruction, ODOT maintains (in coordination with the Federal Highway Administration) Highways 35, 197, and 216 within the existing road prisms to preserve and perpetuate the highways. It has the authority and responsibility to install and maintain all signs within each highway's right-of-way and to determine access points to the highways.

OREGON WATER RESOURCES DEPARTMENT

Oregon Water Resources Department manages and allocates the state's water resources. The Water Resources Commission typically develops policy through the preparation of basin plans for each of Oregon's 18 river basins.

The Water Resources Department 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. The Water Resources Commission establishes minimum perennial streamflows through administrative designations.

DIVISION OF STATE LANDS

Under state law, the Division of State Lands (DSL) manages the beds and banks of navigable waterbodies (ORS 274.005-274.590). The DSL is the administrative arm of the State Land Board, composed of the Governor, Secretary of State, and State Treasurer. Under constitutional and statutory guidelines the State Land Board manages the assets of the Common School Fund. These assets include the beds and banks of Oregon's navigable waterways. The Division of State Lands manages the beds and banks of these waterways to provide the greatest benefit for Oregon's citizens, consistent with the conservation of this resource under sound land management techniques. This responsibility also includes protection of public trust values for navigation, fisheries, and public recreation.

Oregon received ownership of the beds of navigable waterbodies in 1859 as an incidence of statehood. The U.S. Constitution protects this inherent attribute of state sovereignty. The United States or its grantees retain ownership of the beds of non-navigable waterbodies. The navigability of White River has not been established. Currently, the federal government, the Confederated Tribes of Warm Springs, and other private citizens claim ownership of the river's bed and banks. This management plan does not propose to address the issue of navigability. Rather, this plan intends to provide a management philosophy for the river.

The Daniel Bell case over 100 years ago established the original federal test for deciding navigability. The U.S. Supreme Court ruled that rivers "are navigable in fact when they are used, or susceptible of being used, in their ordinary condition, as highways of commerce . . . ." Subsequent court decisions adopted this test for title purposes and 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.

The DSL has determined there may be sufficient evidence to support a claim of navigability and state ownership of White River's beds and banks at least from Barlow Crossing to Tygh Valley. The position of the Forest Service and BLM is that the navigability of the river has not been established.

For purposes of managing this river, 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 when they undergo major structural alteration, replacement, or relocation. In addition, sand and gravel removal requires a royalty lease. Any nonfederal use that occupies any area of submerged or submersible land requires a waterway lease.

Further, the DSL 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 from 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 Waterway, special authorization is needed from the Board and DSL for "any alteration of the beds and banks of the Deschutes River within the White River Plan area" (ORS 390.835).

Nothing set forth in this plan shall limit the ability of the Forest Service and BLM to administer White River. As with any jointly managed resource, jurisdiction is not as important as care of 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.

OREGON DEPARTMENT OF FISH AND WILDLIFE (ODF&W)

Oregon Department of Fish and Wildlife (ODF&W) manages the fish and wildlife populations for the citizens of Oregon. Based on recommendations of the agency's biologists the Oregon State Game Commission sets hunting and fishing seasons and bag and catch limits throughout the state. In addition, ODF&W owns and manages the White River State Game Management Area for big game animals, such as deer and elk. Part of the White River State Game Management Area lies within the designated wild and scenic river corridor in Segment D. Oregon Department of Fish and Wildlife reviews all federal projects that may have an affect on wildlife populations, especially huntable and catchable species, and recommends changes to the projects to protect or benefit those species.

WASCO COUNTY COMPREHENSIVE PLANNING

The Omnibus Oregon Wild and Scenic Rivers Act of 1988, the Federal Land Policy and Management Act of 1976, and the National Environmental Policy Act of 1969 (as amended) all encourage or mandate intergovernmental coordination, consultation, and, where possible, plan consistency. Since the Wild and Scenic Rivers Act envisioned high reliance on local comprehensive plans to achieve the Act's objectives, a review of the existing plans for Wasco County was critical.

The Oregon LCDC acknowledges Wasco County's comprehensive plan; the plan conforms to statewide planning goals and objectives. Under Section 202 of the Federal Land Policy and Management Act all BLM and Forest Service plans must be consistent, as much as possible, with officially approved or adopted State and local agencies' resource related plans, policies, and programs. Similarly, state-managed land must conform to statewide planning goals and objectives and support local comprehensive plans.

Wasco County and The Nature Conservancy designated White River Canyon as a "Natural Area" and placed the area in the Environmental Protection District zone. The area designated follows the interim river corridor boundary and ends at the bluffs above Tygh Valley. These lands are zoned for Agriculture (A-1, 80), exclusive farm use with a minimum parcel size of 80 acres. Smaller sized parcels already present when the plan was approved are accepted.

Due to the Environmental Protection District Zone, topography, and nature of the canyon, the county considers the threat of conflicting uses in the Natural Area negligible and the resource adequately protected. The county uses special review criteria, listed in Chapter 5 Conditional Use Review, in making decisions to approve or deny development within the Natural Area overlay.

Several land use zones exist in Tygh Valley along the river. The former mill site in the town of Tygh Valley is zoned M-2 Medium Industrial. A commercial district (C-2) also exists in the town. Other zones present west of Highway 197 include Residential and Mobile Home (RMH-2) along the north side of the river and Agriculture with a 20 acre minimum parcel size (A-1, 20). Most lands east of Highway 197 are zoned A-1, 80 with one 40 acre parcel of Light Industrial (M-1).

Wasco County has begun update its Comprehensive Plan and Comprehensive Plan Maps through the required periodic review and amendment process. If the White River Management Plan is completed before the county's planning process ends, the managing agencies recommend that Wasco County incorporate the river plan's recommendations as appropriate.

HOW THIS DOCUMENT IS ORGANIZED

Chapter 2 Alternatives contains descriptions of actions that could take place in the corridor assuming the current management described in Chapter 3 continued over the next ten years (Alternative A--No Action). 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 appear as action alternatives with continuation of current management as described in Alternative A--No Action. This chapter describes the process used to formulate the alternatives, displays alternatives eliminated from detailed study, and compares the alternatives to each other.

Chapter 3 Affected Environment more completely describes the resource values and uses in the designated corridor, also known as existing condition, and describes the desired future condition for the corridor.

Chapter 4 Environmental Consequences displays the irreversible and irretrievable effects, if any, as well as the social, biological, physical, and cumulative effects of each alternative described in Chapter 2. These effects apply to the values and conditions discussed in Chapter 3.

Chapter 5 Consultation with Others includes a list of the persons and agencies consulted during the planning process.

The appendices provide support information to the main document and include the landscape analysis process and results, the resource assessment, public mailing list, glossary, costs associated with each alternative, monitoring plan, implementation plan, and so forth.

Chapter 2

Alternatives

CHAPTER 2: ALTERNATIVES

INTRODUCTION

This chapter presents and compares the alternatives developed during the planning process. The first section explains the process used to create these alternatives. The next section briefly discusses alternatives considered, but eliminated from further study. The third section lists each management alternative for the river as well as management actions common to all alternatives. The chapter concludes with a comparison of each alternative using the measures listed in the Issues section of Chapter 1.

PROCESS USED TO FORMULATE THE ALTERNATIVES

ANALYSIS PROCESS

In developing a management plan for the White River the Forest Service and the BLM followed National Environmental Policy Act (NEPA) requirements, including establishing an interdisciplinary team and involving the public. Members of the interdisciplinary team (IDT) included resource specialists for each of the Outstandingly Remarkable Values. Several other resource specialists served as consultants to the team. Outside experts from universities, other agencies, and the public assisted in preparation of the resource assessment and the environmental assessment. Chapter 5 lists the interdisciplinary team members and consultants, along with their qualifications.

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 the environmental impacts to the public. The Act requires interdisciplinary, issue-driven analysis that identifies the direct, indirect, and cumulative effects of each alternative. In addition, the White River IDT elected to use landscape analysis to help identify land capability to provide a variety of resources and identify the interconnections between the various resources, the river corridor, and human desires and needs. Appendix B describes the landscape analysis process the IDT used. Figure 1.1 depicts the steps used in developing the river management plan.

PUBLIC INVOLVEMENT

Public involvement has played and continues to play a critical role in the river management planning process. Private citizens, interest groups, state and local governments, other agencies, and the Confederated Tribes of Warm Springs offered valuable advice throughout development of the resource assessment and management plan. The planning effort involved mass mailings, 5 public meetings, and a public working group established at the time the IDT developed issues and draft alternatives.

In June 1991, the Mt. Hood National Forest and the Prineville BLM held a public meeting at Tygh Valley to introduce the planning process and solicit public comment. All landowners within the quarter-mile interim corridor and other interested citizens and groups received invitations. About 50 people attended the first meeting.

The draft resource assessment, released in 1991, identified outstanding values for the river. The Forest Service and the BLM did not change any of the findings as a result of public comment, but added information to the resource assessment.

In December 1992, a citizen work group was set up to discuss issues and propose alternatives with the river planning team. Members represented a variety of interests and viewpoints and met 7 times between December 1992 and July 1993. The IDT incorporated the work group input into the desired future condition, issues, and alternatives.

The draft alternatives were presented at a four public meetings in September 1993 at Gresham, Warm Springs, Maupin, and The Dalles.

BOUNDARY PROCESS

The boundaries for White River posed several challenges. First, there are two boundaries: the river corridor boundary and the viewshed boundary. This management plan and environmental assessment proposes management direction within the corridor boundary and within the viewshed boundary for scenic quality. The viewshed boundary, which may or may not correspond to the corridor boundary, can affect management actions on federal lands outside the corridor.

Second, the river moves across a broad floodplain in Segment B. The potential span of movement is large enough that the mapped boundary does not include the actual river for approximately four miles. The intent of the Wild and Scenic Rivers Act is to include the main thread of the river. Therefore the interim boundary would move as the river moves. The river will continue to shift course irregularly throughout this floodplain.

Third, the Wild and Scenic Rivers Act limits the corridor to an average of 320 acres per designated river mile. White River corridor can encompass a maximum of 16,662 acres. The corridor boundary should protect the features and values identified as outstandingly remarkable. White River's geography complicates the task of protecting the outstandingly remarkable values while limiting the corridor size to 16,662 acres.

The IDT evaluated several alternative corridor boundaries for White River. More accurate mapping found a river length of 53.30 miles, instead of the 46.5 miles listed in the 1988 Act. The Lower Deschutes River Plan already established management direction that overlaps the last 0.62 miles in Segment F. Standards and guidelines in that management plan will apply to that portion of White River.

Due to differences between the GIS mapping process and the river miles discussed in the enabling legislation, the team decided to use the mapped boundaries on the USGS quad (White River) as the breaks around the power generating facility. This change makes Segment F a total of 1.85 miles, leaving 1.23 miles of Segment F in the analysis area. Segment E ends at river mile 2.46, instead of river mile 2.2. Table 2.1 summarizes the effects of these river mile changes on the allowable acres within the corridor.

Table 2.1. Effects of GIS mapping and river length reductions on allowable corridor acres.

	River Miles	Allowable Acres
1988 Omnibus Wild and Scenic Rivers Act	46.5	14,880
GIS mapping--total river length	53.3	17,056
Segment F--intersection with Lower Deschutes	-0.62	-198.4
Exclude hydropower diversion	-0.61	-195.2
Total length of designated river	52.07	16,662.4

ALTERNATIVE ACTIONS ELIMINATED FROM FURTHER STUDY

In the course of developing alternative management actions, the IDT did not place any constraints on the creative process. After generating a list of possible actions in each segment, the IDT then examined each alternative action to decide if any fell outside the scope of the plan, were infeasible, failed to protect one or more outstandingly remarkable values, did not meet the minimum standards and guidelines in either the Forest Plan or the Two Rivers RMP, or did not meet other federal or state laws and

regulations. As a result of this process, no alternatives were developed that were later eliminated from further study.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

The following describes a selection of management options for the river corridor. Alternative A represents continuation of current management. Alternatives B-E offer packages of proposed refinements or changes to current management. Each is tied to the Desired Future Condition described in Chapter 3 but moves toward that condition along slightly different paths and at different rates. Alternative B envisions a corridor with little obvious management outside of the agriculture and private land mineral development. Alternative E envisions a corridor with obvious signs of management throughout. Alternatives C and D are mid-range proposals that incrementally increase the signs of management. The alternative finally selected, which occurs on publication of a Decision Notice, would be the 10-year management program applied to the river corridor.

The following text summarizes each alternative management strategy. Table 2.2 lists the proposed management strategy for each alternative. In addition, Table 2.3 lists the proposed river corridor boundaries and Table 2.4 lists the proposed viewshed boundaries. Any of the five management strategy alternatives could be applied in any of the three boundary alternatives, with only minor changes where particular items fall within one corridor and not another. The section following the viewshed boundary alternatives lists the Forest Plan and RMP amendments needed to implement the desired future condition, management alternatives B-E, the management actions common to all action alternatives, boundary alternatives 2 and 3, and designated viewshed alternatives II and III.

Any project will require additional analysis to assess probable environmental effects. Depending on the analysis results, the project may proceed as stated, be modified to mitigate for any unacceptable results that may arise, or be dropped. Project implementation depends on available funding. The alternatives merely state the actions which are allowed. For some projects, the alternative includes constraints that may affect project feasibility once detailed analysis begins.

ALTERNATIVE A: NO ACTION

This alternative implements existing direction in the Forest Plan and Two Rivers RMP.

ALTERNATIVE B

This alternative emphasizes naturalness over management. Resource management should not be readily apparent to most observers. Management would occur only as needed to protect river related resources and to aid species recovery. Vegetation manipulation should only occur as needed to repair any damage caused by recreational use or natural events, such as fire or blowdown. Minimal prescribed burning for ecosystem management would occur and only on federal lands. Recreational uses should cause little disturbance of the other river related values and should not create large areas of bare ground, cause excessive erosion, or disturb sensitive areas and plant and animal species. Facility redesign would limit recreation use to a level lower than current levels by restricting parking areas and campground capacity. This alternative provides for a wide variety of recreational activities with preference for nonmotorized pursuits, such as nordic skiing and hiking and a low level of recreation use. Recreation capacity would not be allowed to increase on federal lands.

ALTERNATIVE C

This alternative emphasizes naturalness over management, but allows for slightly more active management than Alternative B. Resource management should not be readily apparent to most observers. Management would occur only as needed to protect river related resources and to aid species recovery. Vegetation manipulation should occur as needed to repair any damage caused by recreational use or natural events, such as fire or blowdown, or to prevent the imminent loss of habitat

from catastrophic levels of insects and disease. Limited vegetation management is allowed to improve scenic quality and to provide additional vistas in the upper segments of the river. Recreational uses should cause little disturbance of the other river related values and should not create large areas of bare ground, cause excessive erosion, or disturb sensitive areas and plant and animal species. Facility redesign would limit recreation use to the same as present but afford better protection to the Outstandingly Remarkable Values. This alternative provides for a wide variety of recreational activities with preference for nonmotorized pursuits, such as nordic skiing and hiking. Recreational use levels would be allowed a slight increase over present levels.

ALTERNATIVE D

This alternative allows for relatively active management in order to prevent foreseeable problems and to move the corridor towards the desired condition at a slightly faster rate than possible in Alternatives B and C. Resource management may be apparent to most observers. Vegetation management should occur to prevent catastrophic events, such as large wildfires and epidemic outbreaks of insects and disease. Vegetation management is allowed to improve scenic quality and to provide vistas, primarily in the upper river. An active program of prescribed burning for ecosystem management objectives should occur throughout the corridor. Recreational uses may cause some minor disturbance of other river related values but should not create large areas of bare ground, cause excessive erosion, or disturb sensitive areas and plant and animal species. Facility design and redesign would allow an increase in recreation use but at a level lower than the theoretical maximum, or optimum. This alternative provides for a wide variety of recreational uses, including a mix of motorized and nonmotorized activities. Recreational use levels would be allowed to increase over present levels.

ALTERNATIVE E

This alternative allows for active management in order to enhance Outstandingly Remarkable Value features and to move towards the desired condition at a rapid rate. Resource management will likely be apparent to most observers. Vegetation management should enhance habitat conditions and scenic quality, provide vistas, and reduce the risks of catastrophic events, such as insect and disease outbreaks and large wildfires. An active program of prescribed burning for ecosystem management objectives should occur throughout the corridor. Recreational uses may cause some minor disturbance of other river related values but should not create large areas of bare ground, cause excessive erosion, or disturb sensitive areas and plant and animal species. This alternative provides for a wide variety of recreational uses, including a mix of motorized and nonmotorized activities. Facility design and redesign would allow recreational use levels to increase to the level of maximum, or optimum, carrying capacity. Carrying capacity would incorporate the ROS class, physical capability, and ecological capability of each segment.

MANAGEMENT ACTIONS COMMON TO ALL ACTION ALTERNATIVES

The Forest Service and BLM have already taken some management actions, or are in the process of implementing some actions, based on the Forest Plan and the Two Rivers RMP. Other actions are minimums or actions required by current environmental laws and regulations and by species recovery plans. Standards and guidelines already present in the Forest Plan and Two Rivers RMP and important to the goals and intent of White River management include the standard and guideline citation. In many cases, the intent of the two plans do not differ; however, no specific standard or guideline related to the direction was listed in one of the plans. White River had not been designated as a federal wild and scenic river before release of the Two Rivers RMP and Record of Decision.

General

1. Conduct an eligibility and suitability study to include White River Falls into the White River Wild and Scenic River designation (see Apprndix A).

2. In cooperation with local law enforcement authorities, ensure that dumping of household, industrial, or hazardous waste does not occur anywhere in the corridor.
3. In cooperation with other landowners and local authorities, establish procedures and policies to promote clean-up of existing dumps and any new dumps.
4. Use the Limits of Acceptable Change process to establish standards and guidelines for all outstandingly remarkable values.
5. Coordinate management activities within White River corridor with adjacent or adjoining wild and scenic river plans (Salmon River and Lower Deschutes River).

Mining and Energy Development

1. Amend the special use permit for the pit above Highway 35 to add requirements for site rehabilitation consistent with the Desired Future Condition in this plan, VQOs, and protection of the Outstandingly Remarkable Values.
2. Recommend denial for license applications from the Federal Energy Regulatory Commission to construct any impoundment, water conduit, reservoir, powerhouse, transmission line, or other associated hydroelectric facility in any river segment (B1-069). Initiate a withdrawal review of the existing power site withdrawals along White River.

Hydrology

1. Collect baseline data on water quantity and quality for White River (RMP pg. 30).
2. Leave all downed logs across White River and its tributary streams unless the material poses a severe threat to public safety (FW-092). Consult with an agency hydrologist or fisheries biologist before removing any logs.
3. Establish water quality monitoring stations at several points along White River. The state Department of Environmental Quality (DEQ) would monitor water quality and enforce the non-degradation policy. Federal agencies would assist in water quality monitoring and coordinate with DEQ to share data and monitoring techniques and to upgrade water quality in order to meet or exceed state standards.
4. Establish gauging stations at points of diversion for irrigation systems within the White River basin and monitor use.
5. Actively manage the river corridor to maintain nonimpairment of water quality (FW-055). The managing agencies would assist Oregon Department of Environmental Quality (DEQ) in monitoring water quality and would coordinate with DEQ to share data and monitoring techniques and to upgrade water quality.
6. Conduct an in-stream flow study to biologically determine appropriate flows that would restore and/or protect outstandingly remarkable values within the river segments.
7. Monitor and participate in issues which have the potential to impact optimum flows associated with the outstandingly remarkable values by playing an advocacy role and, if necessary, actively seek opportunities to accept transfer, receive donations, or purchase water rights (FW-074).
8. Cooperate and coordinate with the State's water resource analysis to determine available water quantities and future needs for domestic, agricultural, and commercial water users.

Vegetation Management

1. Retain large, undisturbed blocks of old growth In Segments B-C that connect with old growth in adjacent basins or subbasins.
2. Monitor riparian areas on federal lands using riparian inventory and photo trend, water quality inventory, biotic condition index, fish census, and remote sensing (RMP pg. 11).
3. Manage riparian vegetation to provide cover for neotropical migratory birds and other animals dependent upon the riparian area. Riparian projects would be analyzed on a project by project basis to rehabilitate severe riverbank erosion.
4. Adopt the 1993 R6 Interim Old Growth definitions.

Threatened, Endangered, and Sensitive Species

1. Survey for threatened, endangered, and sensitive species on federal lands.
2. Research or provide research opportunities to better understand the biological and habitat needs of threatened, endangered, and sensitive species.

Wildlife

1. Manage streams in Segment B to provide high quality amphibian and aquatic insect habitat.
2. Discourage human travel into sensitive plant and animal habitat through vegetation management and trail placement and barriers.
3. Protect and manage areas important to species to reach the desired future condition and to minimize disturbance due to human presence.

Fish

1. Survey and analyze fish habitat conditions throughout the corridor every five years using an interagency survey method.
2. Recommend that ODF&W make fish screening of irrigation diversions in the White River basin a high priority. Screens should meet ODF&W specifications to reduce or prevent losses of native fish into pumps and through stranding in irrigation ditches. Recommend that ODF&W seek enforcement of state law ORS 509.615, if needed, through the state Water Resources Commission if compliance does not occur within agreed to timelines or ODF&W specifications.
3. Analyze the genetic traits and life history requirements of native sculpin, longnose dace, and whitefish to determine eligibility for designation as an Outstandingly Remarkable Value.
4. With ODF&W and the Confederated Tribes of Warm Springs, determine the habitat use of spring and fall chinook, steelhead, and Pacific lamprey in Segment F.
5. Provide technical assistance to interested landowners and identify cost-effective and feasible methods to enhance riparian habitat and promote streambank stability.
6. Cooperate with ODF&W, the Confederated Tribes of Warm Springs, and other interested groups to develop a consistent and well coordinated inventory, management plan implementation, funding, and monitoring program for in-stream and riparian resources along the river.
7. Prohibit the use of chemicals in riparian areas on Forest Service lands to control noxious weeds (Forest Service 1988).

8. Determine the structure, size, composition, distribution, abundance, and hydrologic function of naturally occurring numbers of downed logs in the river.
9. Recommend that ODF&W adopt fishing regulations that specify of promote catch and release fishing with barbless hooks on White River.

Grazing

1. Monitor grazing effects on outstandingly remarkable value features on federal lands and adjust Animal Unit Months (AUMs), periods of utilization, or allotment boundaries as appropriate through the allotment management plan or allotment evaluation (B1-033 through B1-036, RMP pg. 14-16).
2. Exclude cattle grazing from campgrounds and day use areas in Segment B.
3. With willing landowners, identify alternative grazing practices to avoid the need to construct or reconstruct fences across the White River.

Fire Protection

1. Recommend that property owners in the corridor without formal wildfire protection form or join rural fire protection districts and make mutual aid agreements with the Oregon Department of Forestry (ODF). The managing agencies would expand existing mutual aid agreements with ODF to provide backup and wildfire suppression assistance for the newly protected areas.
2. Formalize the existing agreement for fire protection on Tribally owned lands in Segment F.
3. Develop a fire management plan for federal lands within the corridor. Consider the use of all types of prescribed fires to meet river management objectives. Incorporate adjacent land allocations or plans into the area covered. Coordinate plan development with adjacent owners and state and local fire protection organizations.
4. Retain a sufficient number of logs to meet the 1993 R6 Interim Old Growth definitions. Wherever possible, leave entire trees instead of pieces of trees.

Cultural Resources Management

1. Manage archaeological, historical, and traditional values resources within the White River corridor through a coordinated plan of goals and objectives common to the Forest Service, BLM, and Oregon State Parks and Recreation Department and with the participation of and coordination with the CTWS and private landowners. Specific management goals would focus on the protection and enhancement of cultural resource sites and features and traditional values.
2. Maintain a cultural resources database atlas for federal lands. The managing agencies would encourage the CTWS to contribute information on significant traditional values and materials.
3. Conduct an appropriate level of inventory on federal lands to identify prehistoric and historic sites and features in areas proposed for surface disturbing activities. Sites discovered should be evaluated for significance following National Register of Historic Places criteria, in consultation with the State Historic Preservation Office (SHPO) (FW-598 through FW-626, RMP pg. 30).
4. Protect traditional values on federal lands from timber harvest, recreational developments, and road and trail construction (FW-615 through FW-624, RMP pg 30). These sites will have no interpretive signing. Interpretive materials will not reveal the locations of these sites.
5. Revise the interpretive sign at Klinger's Camp, originally constructed by the Civilian Conservation Corps, to correct errors in the text.

Scenic Resources and Recreation

1. Conduct a study of recreational use on federal lands to determine current use levels, types of use, impacts on other Outstandingly Remarkable Values, and carrying capacity. Carrying capacity will incorporate ROS class, physical capability, and ecological capability for each segment.
2. Develop a comprehensive trail plan that minimizes conflicts between main user groups, protects Outstandingly Remarkable Value features and processes, and is consistent wit the ROS class of each segment. The plan should evaluate different use levels and the carrying capacity on each user network and the trail system as a whole.
3. Allow mountain bikes and pack and riding stock on trails designated for those uses.
4. Develop a comprehensive interpretive plan for the entire corridor. The plan should cover which Outstandingly Remarkable features and processes should have interpretive materials, the most appropriate medium and method for a given Outstandingly Remarkable Value and river segment, and the location of interpretive materials. Evaluate different levels of interpretation, such as self-guided trails, signs, brochures, and so forth.
5. Prohibit additional commercial ski area expansion into the corridor beyond that allowed in the Mt. Hood Meadows Ski Area Management Plan currently under review.
6. Limit nordic skiing opportunities in Segment A to ungroomed, undeveloped trails.
7. Rehabilitate openings, roads, parking areas, and other facilities on federal lands to meet the established scenic quality objectives for that site or area (FW-558).
8. Require that all facilities are designed to meet the ROS setting as seen from within that site.
9. Properly locate all recreations facilities, such as trails, trailheads, parking, and so forth, in relation to the outstandingly remarkable values for the river and in relation to threatened, endangered, and sensitive plant and animal species populations and habitat, and in relation to cultural resource sites.
10. Require that all recreational activities be compatible with the ROS class for each river segment and with management of the outstandingly remarkable values (FW-464, B1-007, B1-008).
11. Acquire scenic easements, as needed and available from willing sellers, to protect scenic resources and meet scenic quality objectives within the designated viewshed.
12. Place toilets at White River East Sno-park.
13. Use trail markings consistent with the ROS class of each segment (FW-464, B1-007, B1-008).
14. Prohibit motorized recreational vehicle use north of Highway 35 and its parking areas.

Transportation Systems/Facilities; Travel and Access Management

1. Decommission roads in Segments A-C not needed for log haul, administrative use, or recreation access to eliminate sediment sources to the river. Close the road entrance(s) and follow one of the following options: a) allow the roadbed to naturally revegetate, b) rip the road surface and allow it to naturally revegetate or seed it, or c) "deconstruct" the road by pulling up the sidecast, recontouring the slope, and seeding the former road. Road decommissioning may allow continued use of the roadbed as a trail.
2. Recommend reconstruction of the Highway 35 bridge across White River to eliminate river channelization should a debris torrent or other natural event destroy or severely damage the bridge. The reconstructed bridge should allow the relatively unimpeded flow of debris torrents

and glacial outwash floods that normally influence the river channel and the river's hydrologic regime.

3. Permit no additional road construction Segment A.

Table 2.2. Alternatives.

Resource Area	Alternative A	Alternative B
Alternative Goal and Intent	**Goal:** No Action. Follow the existing management plans as written and any other applicable laws, agreements, and species recovery plans. **Intent:** Carry out the Mt. Hood Forest Plan and the Two Rivers Management Plan as written. Nonfederal landowners comply with applicable state and local laws.	**Goal:** Minimize manipulation of the existing environment except as needed to protect resources and aid in species recovery. Provide for levels of recreational use that promote enjoyment of the river-related values while minimizing impacts on those values. **Intent:** Modify the Mt. Hood Forest Plan and the Two Rivers Management Plan to increase protection of river-related values and apply ecosystem management principles using very inactive land management. Retain recreational use at a low level to provide a very high quality of experience with an emphasis on dispersed recreation activities. Encourage nonfederal landowners to apply similar management on their lands.
Mining	**Locatable:** On Forest Service lands, withdraw locatable minerals. Make provisions for valid existing mining rights (B1-053, B1-054). All BLM land within the corridor remains open for mineral entry and managed under the 43 CFR 3809 regulations. Operating plans are required for exploration and development on federal within the wild and scenic corridor (RMP pg. 22).	**Locatable:** Same as Alternative A on Forest Service lands. Pursue a mineral withdrawal for locatable minerals for all BLM lands within the corridor. Work with other agencies and private landowners to encourage them to lessen the impacts to scenic values from any mining operations they establish within the viewshed. Request that private mining operators identify other economical mining locations outside of the river flood channel in Segment E.

Alternative C	Alternative D	Alternative E
Goal: Manipulate the environment to a low degree to move slowly towards the desired condition. Provide for levels of recreational use that promote enjoyment of the river-related values while minimizing impacts on those values. **Intent:** Modify the Mt. Hood Forest Plan and the Two Rivers Management Plan to protect and enhance river-related values and apply ecosystem management principles using a low level of land management. Manage recreational use at a low-moderate level to provide a high quality of experience with more emphasis on dispersed recreation activities. Encourage nonfederal landowners to apply similar management on their lands.	**Goal:** Manipulate the environment to a moderate degree to move rapidly toward the desired condition. Provide for levels of recreational use that promote enjoyment of the river-related values while reducing the impacts on those values. **Intent:** Modify the Mt. Hood Forest Plan and the Two River Management Plan to protect and enhance river-related values and apply ecosystem management principles using a moderate level of land management. Manage recreational use levels at a moderate level to provide a high quality of experience with more emphasis on developed recreation activities. Encourage nonfederal landowners to apply similar management on their lands.	**Goal:** Manipulate the environment to a high degree to attain the desired condition in the shortest period of time. Provide for the highest level of recreational use that still protects the river-related values. **Intent:** Modify the Mt. Hood Forest Plan and the Two River Management Plan to protect and enhance river-related values and apply ecosystem management principles using very active land management. Manage recreational use levels at a moderate level to provide a high quality of experience with an emphasis on developed recreation activities. Encourage nonfederal landowners to apply similar management on their lands.
Locatable: Same as Alternative A.	**Locatable:** Same as Alternative A plus the managing agencies would work with other agencies and private landowners to encourage them to lessen the impacts to scenic values from any mining operations they establish within the viewshed. Request that private mining operators identify other economical mining locations outside of the river flood channel in Segment E.	**Locatable:** Same as Alternative D.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Mining (cont.)	**Leasable:** All federal land would be open to mineral leasing with a no surface occupancy stipulation for that portion of the permit potentially affecting river resource values (B1-056, RMP pg. 20).	**Leasable:** The Forest Service and BLM would pursue a mineral withdrawal for leasable minerals on all federal lands within the corridor. The managing agencies would work with other agencies and private landowners to encourage them to lessen the impacts to scenic values from any mining operations they establish within the viewshed. Request that private mining operators identify other economical mining locations outside of the river flood channel in Segment E.
	Salable: No common variety mineral development shall occur within any river segments on Forest Service land. An existing permit upstream from Highway 35 shall be an exception (B1-057, B1-058). The BLM would consider applications from local governments for salable minerals, such as sand and gravel, on BLM lands within the corridor where consistent with protection of resource values (RMP pg 22).	**Salable:** No permits for salable minerals would be issued within the corridor. Request that private mining operators identify other economical mining locations outside of the river flood channel in Segment E.
	Highway 35 Permit: Sand and gravel operations end after removing an additional 600,000 cubic yards of material (Stage IV). Site restored to stabilize surface (B1-059, B1-061 through B1-063).	**Highway 35 Permit:** Sand and gravel operations would end before additional removal of material and the site restored to provide area for safe snow play and to stabilize surface. New rehab./restoration plan developed consistent with DFC. ODOT locates alternative source(s) with FS assistance

Alternative C	Alternative D	Alternative E
Leasable: Same as Alternative A.	**Leasable:** Same as Alternative A plus the managing agencies would work with other agencies and private landowners to encourage them to lessen the impacts to scenic values from any mining operations they establish within the viewshed.	**Leasable:** Same as Alternative D.
Salable: Same as Alternative A.	**Salable:** Same as Alternative A plus the managing agencies would work with other agencies and private landowners to encourage them to lessen the impacts to scenic values from any mining operations they establish within the viewshed.	**Salable:** Same as Alternative D.
Highway 35 Permit: Same as Alternative B except sand and gravel operations end after removing an additional 200,000 cubic yards of material (Stage II).	**Highway 35 Permit:** Same as Alternative C except sand and gravel operations end after removing an additional 400,000 cubic yards of material (Stage III).	**Highway 35 Permit:** Same as Alternative A.

Table 2.2. Alternmatives (cont.)

Resource Area	Alternative A	Alternative B
Hydrology	Manage all Forest Service river segments in a free-flowing and unpolluted state (B1-050). Protect instream flows on federal lands (FW-074, RMP pg. 30).	Determine **optimal** in-stream flow needs to protect Outstandingly Remarkable Values. Obtain water rights for the optimal flow needed to enhance Outstandingly Remarkable Values with emphasis on native fish species and the minimum flow needed for channel maintenance as rights become available.
Vegetation Management	All methods are available as vegetation management tools. Regulated timber harvest should occur and salvage shall occur on Forest Service lands (B1-040 through B1-047). Manage riparian areas on BLM lands within the corridor to reach proper functioning condition by 1997, to achieve good to excellent aquatic habitat condition, emphasizing wetland habitats supporting unique plant species or communities. Manage upland vegetation to provide maximum wildlife habitat diversity (ecological condition of high mid seral to low late seral stage) with particular attention to forage and habitat needs for big game in Segment D (White River Game Management Area) (RMP pg. 11).	No chemical or biological methods would be used as vegetation management tools. Unregulated timber harvest may occur. Initiate vegetation manipulation when damage or degradation to one or more Outstandingly Remarkable Value is observed. On BLM lands, focus vegetation management on those areas in early to mid-seral stages. Coordinate efforts with adjacent landowners.
	Within recreational segments . . . silvicultural prescriptions should protect or enhance river values (B1-042, B1-043).	In Segment B, prohibit tree removal to open views of Mt. Hood and White River .
	Implement Barlow Road IRA vegetation management recommendations.	Vegetation management activities should emphasize river related resource values over Barlow Road related resource values.

Alternative C	Alternative D	Alternative E
Same as Alternative B.	Same a Alternative B except deal only with **minimal** instream flow needs.	Same as Alternative D.
Same as Alternative B except biological methods would be allowed. Initiate vegetation manipulation when damage or degradation to one or more Outstandingly Remarkable Value is strongly suspected to occur within the next 5 years.	Same as Alternative A except initiate vegetation manipulation when damage or degradation to one or more Outstandingly Remarkable Value is suspected to occur within the next 10 years. On BLM, State, and private lands emphasize wetland or riparian dependent species. Use cooperative efforts with willing landowners to affect the vegetative mosaic, habitat conditions, and scenic quality. Provide technical assistance to interested landowners in Segment E to create wetlands in carefully selected locations.	Same as Alternative D except initiate vegetation manipulation in order to enhance one or more Outstandingly Remarkable Value.
In Segment B, remove trees to open views to Mt. Hood and White River at selected points along the Barlow Road.	Same as Alternative C plus include other appropriate viewpoints.	Same as Alternative D.
Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Vegetation Management (cont.)	**Noxious Weeds:** Use integrated pest management strategies to manage pests and nonnative invader species within the constraints of laws and regulations. IPM strategies shall be consistent with the Vegetation Management FEIS, ROD, and Mediated Agreement on Forest Service lands (FW-384) and with the Northwest Area Noxious Weed Control Program Final Environmental Impact Statement 1985 and Supplement 1987 and Records of Decision on BLM lands (RMP pg. 31). Coordinate control activities with adjacent State and private landowners	**Noxious Weeds:** Control noxious weeds on federal lands using nonchemical and nonbiological methods. Coordinate control activities with adjacent State and private landowners.
Threatened, Endangered, and Sensitive Species	Identify and manage threatened, endangered, and sensitive species in accordance with the Endangered Species Act, Oregon Endangered Species Act, and agency policies and guidelines (FW-170 through FW-186, RMP pg. 30). Monitor bald eagles annually (RMP pg. 11).	Same as Alternative A plus, in cooperation with private landowners and other entities, conduct comprehensive inventories and develop a coordinated strategy for protecting these species. Identify suitable sites and reintroduce peregrine falcon into Segment D or other segments with landowner cooperation.

Alternmative C	Alternative D	Alternative E
Noxious Weeds: Same as Alternative B except biological methods would be allowed.	**Noxious Weeds:** Same as Alternative A.	**Noxious Weeds:** Same as Alternative A.
Same as Alternative B.	Same as Alternative B except emphasize habitat enhancement for threatened, endangered, and sensitive species over just habitat protection and maintenance.	Same as Alternative D.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Wildlife	Limit habitat improvement practices to those necessary to protect, conserve, rehabilitate, or enhance river area resources (B1-029); structures should mimic noncatastrophic events and shall not create hazardous conditions or interfere with recreational use of the river (B1-031). Continue cooperatively managing the White River Game Management Area in Segment D with ODF&W to meet established objectives (RMP pg. 11).	Same as Alternative A except emphasize habitat management for native species only. Emphasize species diversity and nongame species on federal lands.
	No specific wildlife surveys or special management actions are planned on federal lands, except for B5 management plans.	Conduct baseline wildlife surveys for raptors on federal lands and heron rookeries, reptiles, waterfowl, and passerine birds on BLM lands.
Fish	Limit habitat improvement practices to those necessary to protect, conserve, rehabilitate, or enhance river area resources (B1-029); structures should mimic noncatastrophic events and shall not create hazardous conditions or interfere with recreational use of the river. (B1-031)	Same as Alternative A except emphasize habitat management for native species only. Identify spawning sites of native fish, determine their distribution, and evaluate how they function in a river with naturally high sediment loads.

Alternative C	Alternative D	Alternative E
Same as Alternative A except emphasize habitat management for native species while providing habitat for desirable non-native species, such as wild turkey, chukar, and Hungarian partridge.	Same as Alternative A. Emphasize habitat management for native and desirable non-native species.	Same as Alternative A. Emphasize habitat management for native and desirable non-native species with an emphasis on big game in Segments D-F.
Same as Alternative B plus survey for neotropical migratory birds on national forest lands.	Same as Alternative B except emphasize only raptors and heron rookeries on BLM lands.	Same as Alternative B except conduct baseline wildlife surveys only for big game habitat quality on BLM lands.
Same as Alternative B.	Same as Alternative B except drop project on spawning sites of native fish.	Same as Alternative C plus determine if spawning habitat enhancement is feasible.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Grazing	Continue livestock grazing on federal lands in accordance with provisions developed through existing evaluations and permits, and provided river banks and riparian areas are either protected from adverse impacts or the adverse impacts mitigated through management. Range improvements may occur to protect or enhance river related values. Monitor grazing effects on Outstandingly Remarkable Value features and adjust Animal Unit Months, periods of utilization, or allotment boundaries, as appropriate, through the allotment management plan (B1-033 through B1-037, RMP pg. 14).	Same as Alternative A in Segments A and B. Recommend modifying the White River and Grasshopper Allotment Management Plans to exclude grazing where little or no grazing occurs presently. Exclude cattle grazing on BLM land below the rims of the canyon. Grazing above the rims would continue as in Alternative A. Construct approximately 5 miles of gap fencing (1.5 miles in Segment D, 1.0 miles in Segment E, and 2.5 miles in Segment F) along the rim. Upland water sources may be developed to provide alternative watering locations.
Fire Protection	**Retardant:** Direct fire retardant "drops" to minimize entry of chemicals into water courses. Colored chemical suppressants and other water additives allowed (B1-089, RMP pg. 31). **Fuels Management:** Prescribed burning may occur to protect river related values (B1-090, RMP pg. 31).	**Retardant:** No chemical suppressants or other water additives would be allowed within the corridor for fire suppression **Fuels Management:** Develop an ecosystem-based prescribed burning program for federal lands within the corridor.

Alternative C	Alternative D	Alternative E
Same as Alternative B.	Same as Alternative A except limit livestock grazing on BLM land below the rims to periods between Nov. 1 and May 1. For this action to occur on Segments E and F, seek private landowner cooperation to implement a seasonal grazing system. Gap fencing may be necessary. Grazing on the uplands would continue as in Alternative A. Upland water sources may be developed as in Alternative B.	Same as Alternative D except no livestock grazing would occur on BLM land within the corridor. Construct approximately 26 miles of fence (20 miles in Segment D, 3 miles each in Segments E and F) to separate BLM land from private land.
Retardant: Same as Alternative A. Use uncolored or fugitive chemical suppressants and other water additives.	**Retardant:** Same as Alternative C.	**Retardant:** Same as Alternative A.
Fuels Management: Same as Alternative B.	**Fuels Management:** Same as Alternative B plus include private, state, and tribal lands in the corridor within the prescribed burning program if landowner is willing.	**Fuels Management:** Same as Alternative D.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Fire Protection (cont.)	**Campfire Restrictions:** Allow campfires and the collection of firewood for campfire purposes with standard restrictions. Private landowners and the state would regulate campfires and firewood collection on their lands.	**Campfire Restrictions:** Same as Alternative A. The managing agencies would encourage use of fire pans in Segments D-F.
Cultural Resources	**Inventory:** Following Section 106 of the National Historic Preservation Act, cultural resource inventories shall be conducted, on a project specific level, for all activities which might affect resources eligible for the National Register of Historic Places (FW-598, RMP pg. 30). **Protection:** No specific incentive programs or cooperative agreements are in place with other agencies or private landowners within the corridor.	**Inventory:** Conduct reconnaissance/sample level surveys (Class II) on federal lands within the corridor for cultural resources. Evaluate those sites identified for National Register significance. **Protection:** Use incentive programs to protect cultural resources on non-Federal lands.

Alternative C	Alternative D	Alternative E
Campfire Restrictions: Same as Alternative B.	**Campfire Restrictions:** Implement a fire closure between June 1 and October 15 in Segment C below Keep's Mill and on all BLM lands. Campfires and charcoal would be allowed only at Graveyard Butte camping area. During the open campfire season, the managing agencies would encourage use of fire pans and allow firewood collection on BLM lands. Recommend to other fire protection agencies and districts and private landowners that they adopt similar restrictions on lands within the corridor under their protection.	**Campfire Restrictions:** Same as Alternative D except firewood collection at Graveyard Butte would be prohibited.
Inventory: Same as Alternative B.	**Inventory:** Comprehensively survey (Class III) federal lands within the corridor for cultural resources. Evaluate those sites identified for National Register significance.	**Inventory:** Same as Alternative D.
Protection: Same as Alternative B.	**Protection:** Develop cooperative agreements to manage significant cultural resources on non-Federal lands within the corridor.	**Protection:** Acquire non-Federal lands from willing sellers that contain significant cultural resources or acquire significant artifact assemblages within the corridor for curation and interpretation.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Scenic Resources and Recreation	**Viewpoints:** The managing agencies may develop scenic waysides (B1-019). Site development would be on a case-by-case basis and not necessarily coordinated between districts or agencies.	**Viewpoints:** In Segment B, convert the road to Bonney Butte overlook to a trail and provide limited parking near Road 4891; no new turnouts or scenic waysides would be constructed. All overlooks in Segments C-F would remain undeveloped.
	Recreation Use: Manage recreation use levels to maintain the prescribed ROS class (B1-010). Use levels are not regulated or monitored on BLM lands.	**Recreation Use:** Reduce use capacity through facility redesign.
	Commercial Use: Authorize commercial recreation use under a Special Use Permit. No restrictions exist regarding commercial use levels or the number of commercial recreation permittees.	**Commercial Use:** Exclude commercial recreation use.
	Off Road Vehicles: On Forest Service lands permit motorized vehicles only on open roads (B1-078). Limit off road vehicles to designated trails (B1-079). All BLM lands within the corridor are open to off road vehicle use (RMP pg. 24).	**Off Road Vehicles:** Allow no off road vehicle use on federal lands except as permitted for snowmobiles.

Alternative C	Alternative D	Alternative E
Viewpoints: In Segment B, reconstruct the road to Bonney Butte overlook and provide limited parking near the viewpoint. Construct scenic waysides that provide views to Mt. Hood and White River. In Segment C, all overlooks would remain undeveloped but provide adequate parking. No developed viewpoints would be located on BLM lands.	**Viewpoints:** In Segment B, reconstruct road to Bonney Butte overlook and provide limited parking near the viewpoint. Construct scenic waysides that provide views to Mt. Hood and White River. In Segment C, provide adequate parking with barrier-free trails to overlooks along the rim. Develop a small scenic wayside with limited parking overlooking the White River canyon on the southern rim at Graveyard Butte. Place an interpretive sign to explain river values and visitor use of this area.	**Viewpoints:** Same as Alternative D.
Recreation Use: Maintain current use capacity while redesigning facilities.	**Recreation Use:** Increase use capacity to a level below optimum through facility design and redesign. Provide technical assistance to interested landowners to identify potential recreation opportunities on private land while still protecting the river's Outstandingly Remarkable Values and ROS class in Segment D.	**Recreation Use:** Same as Alternative D except increase use capacity to the optimal level through facility design and redesign.
Commercial Use: Same as Alternative A plus decide how much of the allowable use should be allocated to outfitters and guides.	**Commercial Use:** Same as Alternative C.	**Commercial Use:** Same as Alternative C.
Off Road Vehicles: Same as Alternative B.	**Off Road Vehicles:** Limit off road vehicles to designated routes on federal lands.	**Off Road Vehicles:** Same as Alternative D.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Scenic Resources and Recreation (cont.)	**Winter Sports:** Provide a broad spectrum of year-round dispersed recreation opportunities, experiences, and settings where they do not conflict with Management Area management direction; manage for winter sports opportunities within snow zones (FW-453).	**Winter Sports:** Provide nordic skiing opportunities north of Road 43 and prohibit all motorized vehicle use on Road 48 north of Road 43 between Nov. 15-April 1. Emphasize nonmotorized winter sports with no further expansion of snowmobile routes. No increased use by alpine skiers would be allowed. Develop White River pit as a snow play area.

Alternative C	Alternative D	Alternative E
Winter Sports: Prohibit wheeled ATVs and street-legal vehicles on Road 48 north of Road 43 between Nov 15-April 1. Eliminate a 3.3 mile snowmobile route from the junction of roads 48 and 4890 to the junction of roads 4890 and 4891. Formally designate Road 48 between Road 43 and White River East Sno-park as a snowmobile route. No further expansion of snowmobile routes would be allowed. Develop White River as a snow play area with well defined snow play runs after mining operations end. No increased use by alpine skiers would be allowed.	**Winter Sports:** Same as Alternative C plus construct warming huts for snowmobile users and nordic skiers. Add additional toilets to White River West Sno-park. Minimize use increases by alpine skiers.	**Winter Sports:** Same as Alternative D except have a concessionaire operate the snow play area at White River pit. The concessionaire would be responsible for the site design and facility construction and maintenance.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Scenic Resources and Recreation (cont.)	**Recreational Development:** Developed recreation improvements shall provide for comfort and convenience of users in Recreational river segments and a minimum of convenience in Scenic river segments. New developed sites may occur (B1-016, B1-018 through B1-020). Incorporate the needs of physically challenged individuals in the design of facilities consistent, with the Architectural Barriers Act and the Uniform Federal Accessibility Standards (FW-663).	**Recreational Development:** Provide barrier-free units at one or more developed day use areas and campgrounds. Redesign campgrounds to provide better resource protection. Provide minimal facilities for pack and riding stock at one campground in Segment B. Develop at least one small group campsite at a single campground in Segment B. Redesign Keeps Mill to better protect resource values at current capacity. No watercraft facilities would be provided. Allow day use at Graveyard Butte. No development would occur unless necessary to protect resource values. Protection measures could include barrier post placement or a barrier-free toilet if sanitation conditions warrant. Prohibit construction of new campgrounds on federal lands.

Alternative C	Alternative D	Alternative E
Recreational Development: Same as Alternative B plus provide barrier-free units at 1/2 of all developed day use areas and campgrounds in Segment B. White River Station and Barlow Creek will provide limited facilities for pack and riding stock. Develop at least one small group campsite at all campgrounds in Segment B. Limited overnight use may occur at Graveyard Butte.	**Recreational Development:** Same as Alternative B except provide barrier-free units at **all** developed day use areas and campgrounds in Segment B. Develop at least one small group campsite and facilities for pack and riding stock at **all** campgrounds in Segment B. Redesign Keeps Mill to increase capacity. Monitor kayak use and parking at Keeps Mill and develop a staging area in the CG and parking on the rim as needed to mitigate resource damage. Provide adequate and appropriate watercraft launch facilities where needed in Segment B, at Graveyard Butte, and in Tygh Valley if land or an easement can be obtained from willing landowners. Develop a small primitive campground on public lands at Graveyard Butte. Include a parking area with barrier posts to control vehicle use and a barrier-free toilet. Recommend interested landowners evaluate the feasibility of providing recreational developments, such as campgrounds, in the Tygh Valley area.	**Recreational Development:** Same as Alternative D plus develop a group campground in Segment B. Provide adequate and appropriate watercraft lauch/takeout areas where needed in Segment B, at Keeps Mill CG and Graveyard Butte, and in Tygh Valley if land or an easement can be obtained from willing landowners. Develop a small to moderate sized campground with designated sites on public lands at Graveyard Butte. Fees may be charged once the facility is fully developed.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Transportation and Access Management	**Trails:** Trails shall provide for the comfort and convenience of users in Recreational river segments and for a minimum of convenience in Scenic river segments on Forest Service lands (B1-009).	**Trails:** In Segment A, prohibit new trail construction. Continue to provide access on existing trails; improvements and reconstruction allowed. In Segment B, design and maintain trails at a primitive standard designed for resource protection. Provide no constructed river and stream crossings, although fords constructed of non-cemented materials would be allowed across White River. No barrier-free trails would be provided. In Segment C, no additional trial construction would be allowed. No developed trails or trailhead facilities would be constructed on BLM lands. Existing wildlife or user developed trails would remain. If resource degradation occurs from increased visitor use, rehabilitation would occur. No developed trails or trailhead facilities would occur on any acquired lands or easements. Rehabilitate these acquired lands as necessary.

Alternative C	Alternative D	Alternative E
Trails: Same as Alternative B plus allow limited new trail construction to provide viewing and interpretive opportunities in Segment A, with emphasis on minimizing disturbance to wildlife and habitat. In Segment B, design and maintain trails at a variety of standards to present varying levels of challenge and still protect other resources. Provide accessible trail(s) that challenge physically disabled users. In Segment C, design and construct a trail from White River Crossing to Keeps Mill.	**Trails:** Same as Alternative C plus all trails would have constructed river and stream crossings. Bridges are allowed when constructed of native materials and rustic in appearance. Provide barrier-free interpretive trails. If land or easements are acquired from willing landowners upriver from Graveyard Butte, survey a trail for feasibility. If feasible, design and construct a hiking trail from White River Crossing to Graveyard Butte. Due to the nature of the terrain, this would not be a barrier-free trail between Keeps Mill and Graveyard Butte. Recommend that private landowners evaluate the feasibility of providing hiking, biking, or horseback opportunities along their lands in Segments E and F.	**Trails:** Same as Alternative D plus design and maintain all trails in Segment B at a high standard and provide resource protection. Design and construct a trail network that provides a continuous trail from Hwy 35 to Graveyard Butte. The BLM would acquire public easements to cover trail use opportunities along the river.

Table 2.2. Alternatives (cont.)

Resource Area	Alternative A	Alternative B
Transportation and Access Management (cont.)	**Roads:** New roads may be constructed (B1-073 through B1-075).	**Roads:** In Segments A and B, turn some roads into trails and obliterate others in conflict with Outstandingly Remarkable Values. Open road density within the White River corridor on Forest Service lands should be 1.5 miles/sq. mile or less year-round. The road to Keeps Mill would handle only high clearance vehicles. No new road construction would be allowed on BLM lands below the rim.
	Public Access: As opportunities arise and where public access is desired in Segments D and E, acquire the minimum access needed to achieve management objectives, preferably through negotiated purchase of an easement or exchange (RMP pg. 24).	**Public Access:** Pursue easements or acquisitions from willing landowners, emphasizing legal, primitive access to public lands upriver from old 197 and downriver from Tygh Valley State Park.
	Trespass: Boundaries are not posted in Segments D-F.	**Trespass:** Provide signs along roads or use trails on BLM lands around Graveyard Butte informing visitors of limited public access and the need to respect private property.

Alternative C	Alternative D	Alternative E
Roads: Same as Alternative B.	**Roads:** Same as Alternative B except open road density within the White River corridor on Forest Service lands should be 2.5 miles/sq. mile or less year-round.	**Roads:** In Segment A, turn all roads into trails. In Segment B turn some roads into trails and close all others in conflict with Outstandingly Remarkable Values. Open road density within the White River corridor on Forest Service lands should be 2.5 miles/sq. mile or less year-round. Design the road to Keeps Mill to handle most passenger cars but provide for resource protection and not visitor comfort. No new road construction would be allowed on BLM lands below the rim.
Public Access: Same as Alternative B.	**Public Access:** Same as Alternative B plus pursue legal watercraft takeouts along Segment E.	**Public Access:** Same as Alternative D except public easements would also be pursued along all of Segments E and F. Pursue land acquisition from willing sellers in Segment D to consolidate public lands within the canyon.
Trespass: Same as Alternative B.	**Trespass:** Same as Alternative B except place additional signs along the developed trails and major public access points concerning respect for private property rights. Mark boundaries as needed to reduce the risk of trespass.	**Trespass:** Same as Alternative D.

Table 2.3 River corridor boundary alternatives.

	ALTERNATIVE 1 **Goal:** No Action. Boundary is the same as the interim boundary except in Segment B.	ALTERNATIVE 2 **Goal:** Maximize protection of river-related values. This alternative will require Congressional action.	ALTERNATIVE 3 **Goal:** Maximize protection of river-related resources within acreage limitation
SEGMENT A	Boundary runs 1/4 mile along each side of the river; interim boundary moves as river changes course	Boundary includes the headwaters of Iron Creek and White River and follows Clackamas County line	Boundary includes headwaters of the South Fork of Iron Creek and White River and follows the Clackamas County line
SEGMENT B	Boundary runs 1/4 mile along each side of the river	Boundary includes lands between Barlow Ridge, Frog Lake Butte, and Bonney Butte	Boundary includes lands between Road 48 and foreground area as seen from the river channel
SEGMENT C	Boundary runs 1/4 mile along each side of the river	Boundary runs from canyon rim-to-rim	Same as Alternative 2
SEGMENT D	Boundary includes all BLM lands and nonfederal lands approximately 1/4 mile from the river. Boundary follows straight lines rather than river course.	Boundary runs from canyon rim-to-rim	Same as Alternative 2
SEGMENT E	Boundary includes all BLM land, to top of current banks near the town of Tygh Valley to Hwy 197. West of Hwy 197, boundary includes lands approximately 1/4 from river. Boundary consists of straight lines rather than following river course.	Boundary includes all existing riparian vegetation near the river, generally following evidence of old river channels as seen in aerial photos	Same as Alternative 2
SEGMENT F	Boundary includes various quarter-quarter sections which lie within 1/4-1/2 mile of the river.	Boundary runs from canyon rim-to-rim	Same as Alternative 2
ACRES	13,697	27,160	16,188
ACRES/MILE	263	521.6	310.9

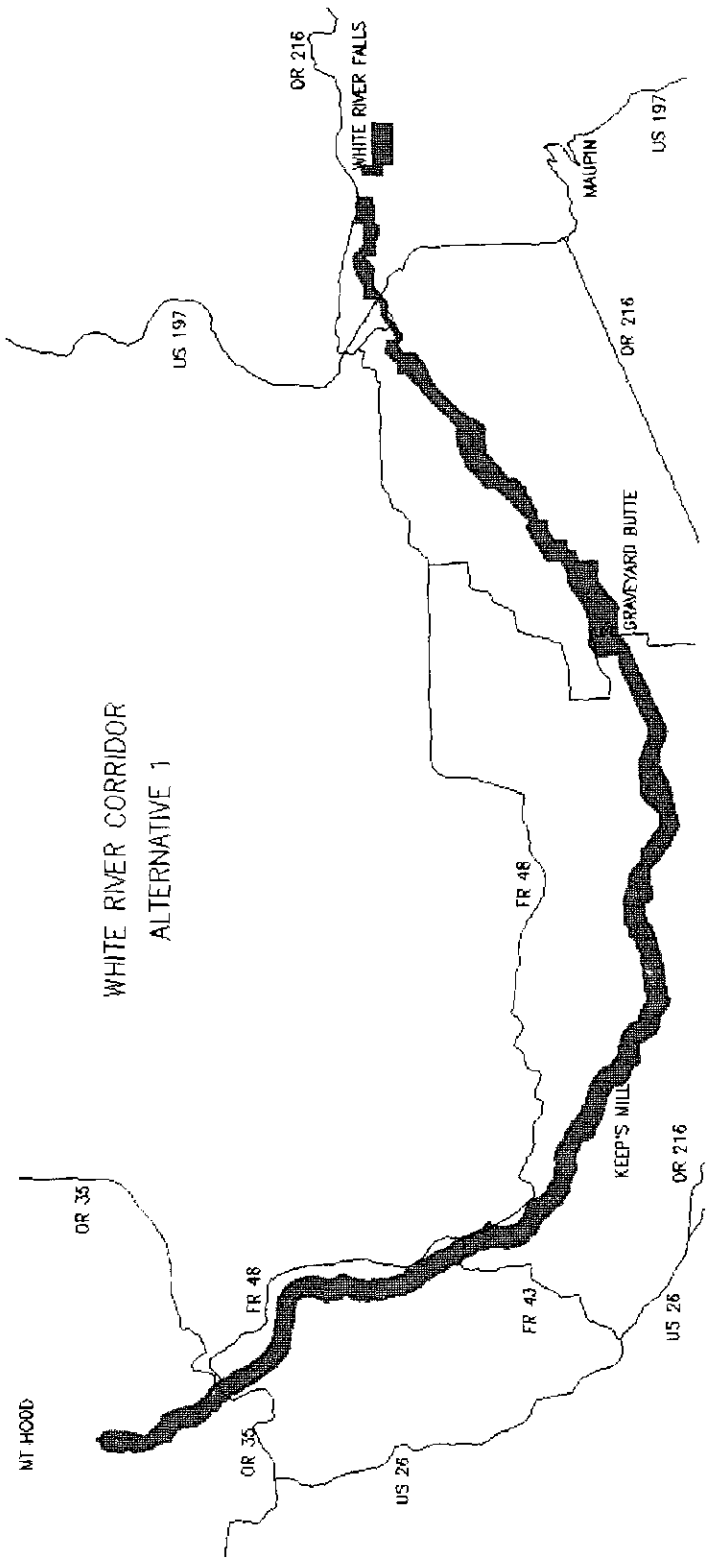


Figure 2.1. White River corridor boundary--Alternative 1 (No Action).

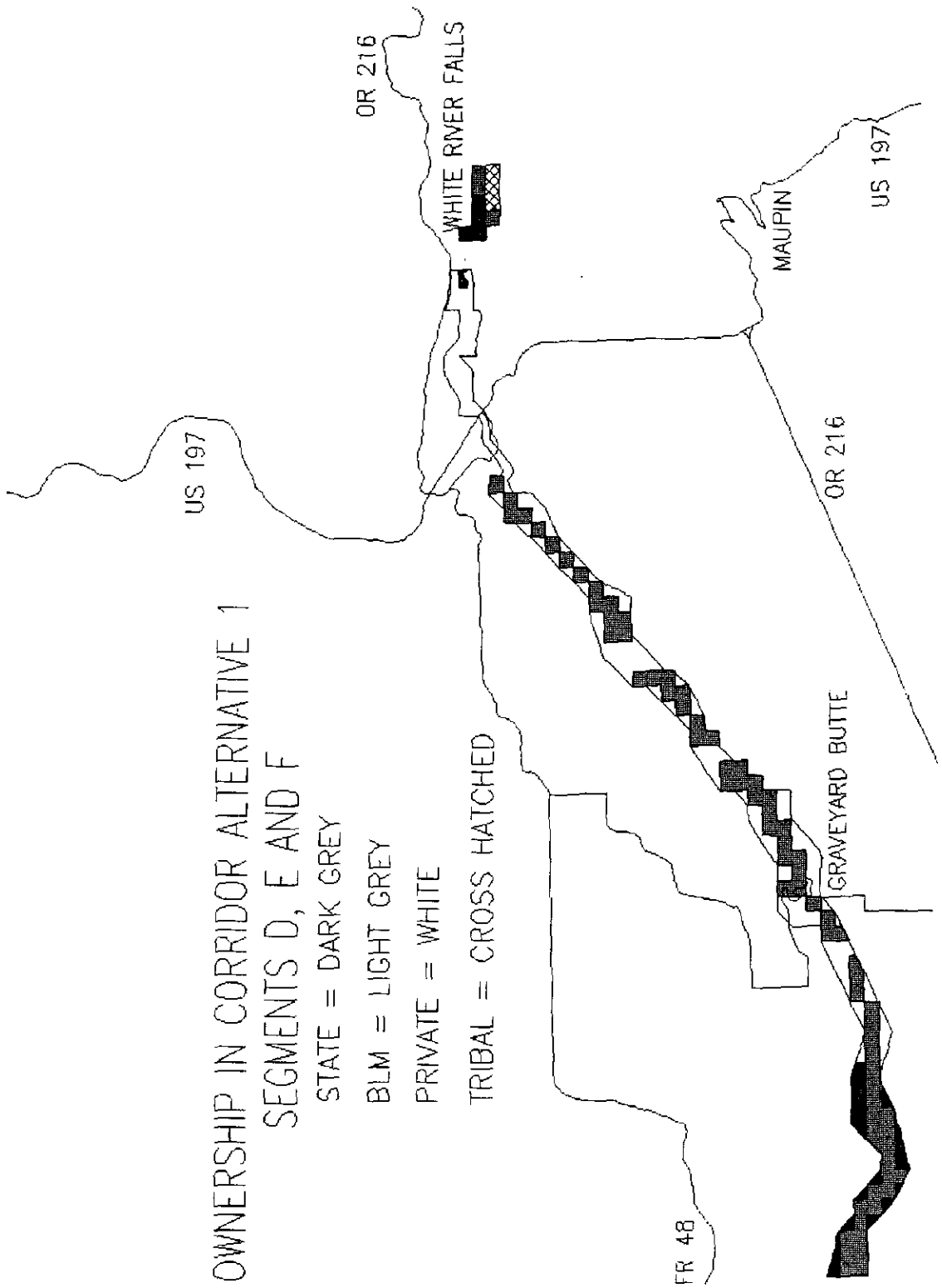


Figure 2.2. Land ownership for Segments D, E, and F in White River corridor--Alternative 1 (No Action).

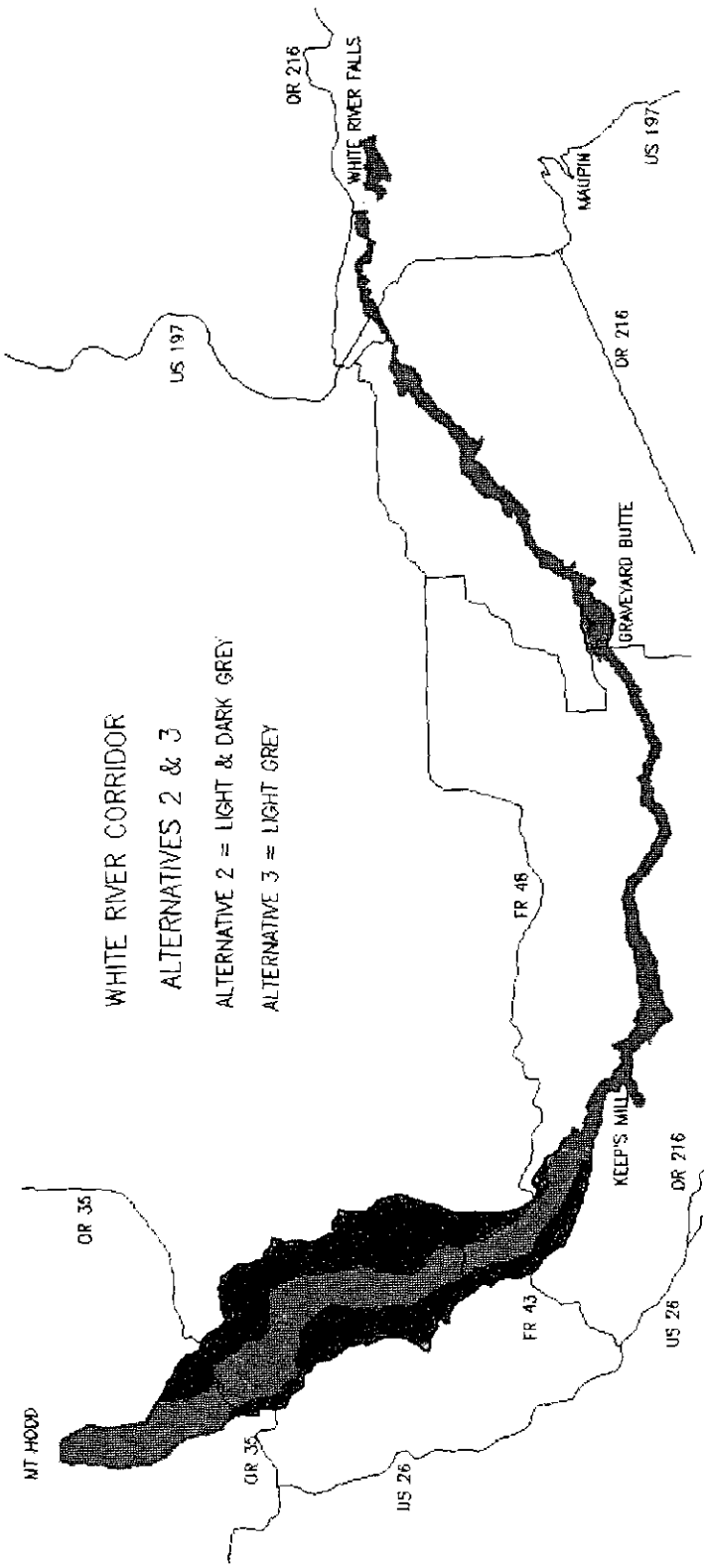


Figure 2.3. White River *corridor* boundary--Alternatives 2 and 3.

Figure 2.4. Land ownership for Segments D, E, and F in White River corridor--Alternatives 2 and 3.

Table 2.4. Designated Viewshed boundary alternatives.

	ALTERNATIVE I **Goal:** No action. Adopt the interim viewshed boundary.	ALTERNATIVE II **Goal:** Include additional protection on private lands through purchase of scenic easements from willing sellers. Officially designate a viewshed in Segments D-F.	ALTERNATIVE III **Goal:** Include additional protection on private lands through purchase of scenic easements from willing sellers. Officially designate a viewshed in Segments D-F. Include seen area from major viewpoints on Forest Service lands in Segments B and C and BLM land in Segment D.
SEGMENT A	Viewshed includes the Foreground, Middleground, and Background from viewpoints on White River	Same as Alternative 1	Same as Alternative 1.
SEGMENT B	Viewshed includes the Foreground, Middleground, and Background from viewpoints on White River	Same as Alternative 1.	Viewshed adds seen area from Barlow Butte, Bonney Butte, Road 48, and Timberline Lodge and parking lot.
SEGMENT C	Viewshed includes the Foreground, Middleground, and Background from viewpoints on White River	Same as Alternative 1.	Viewshed includes seen area from Keeps Mill Overlook.
SEGMENT D	No viewshed formally designated.	Viewshed includes the Foreground, Middleground, and Background from viewpoints on White River.	Viewshed includes seen area from Graveyard Butte.
SEGMENT E	No viewshed formally designated.	Viewshed includes the Foreground, Middleground, and Background from viewpoints on White River	Same as Alternative 2.
SEGMENT F	No viewshed formally designated.	Viewshed includes the Foreground, Middleground, and Background from viewpoints on White River	Same as Alternative 2.

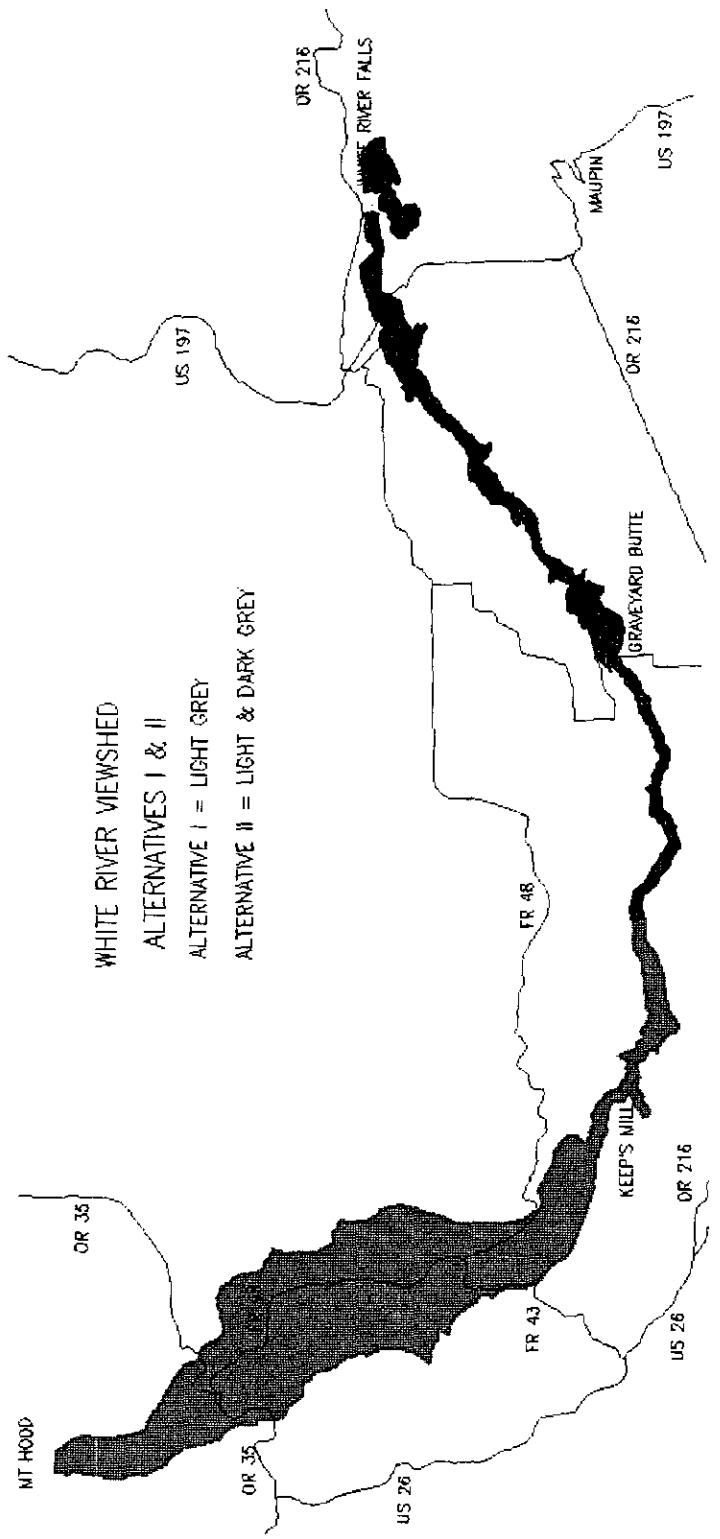


Figure 2.5. White River designated viewshed--Alternatives I (No Action) and II.

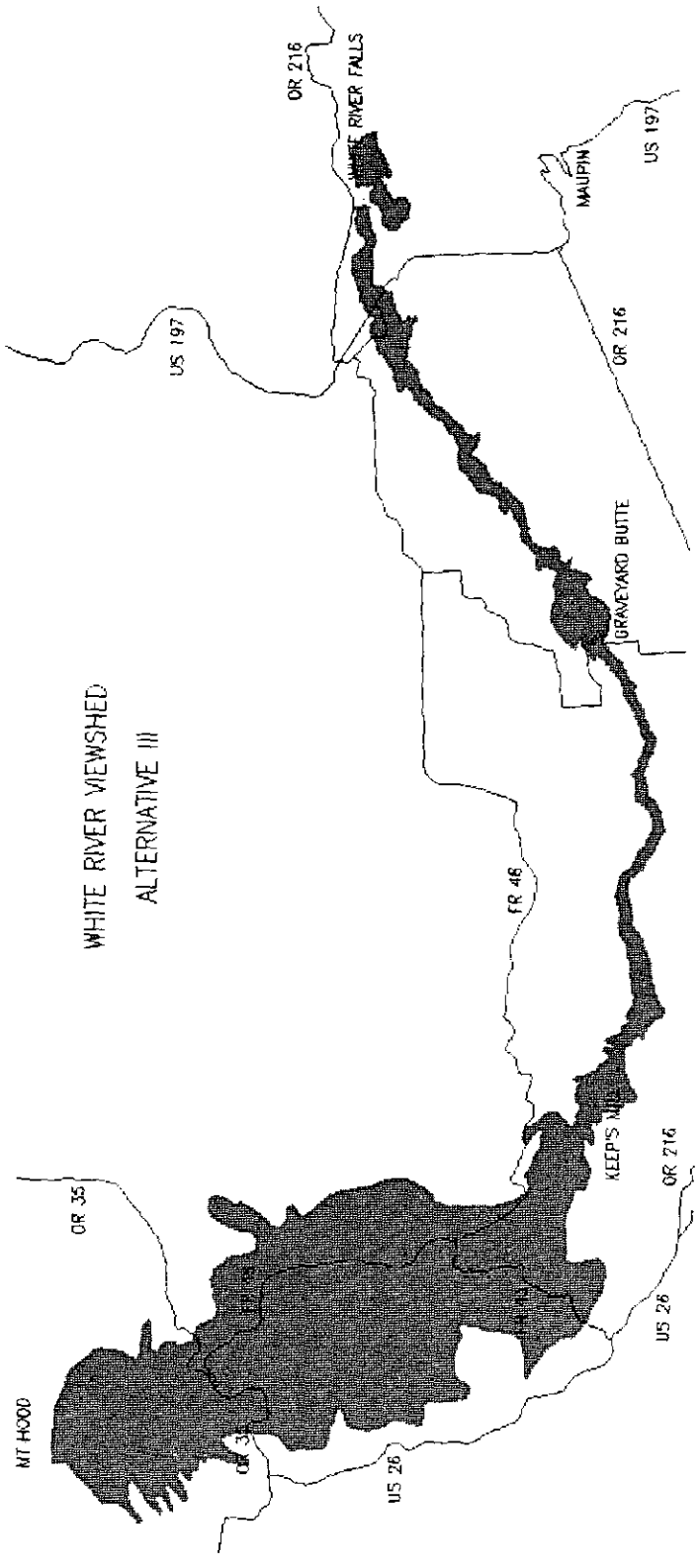


Figure 2.6. White River designated viewshed--Alternative III.

PLAN AMENDMENTS NEEDED

DESIRED FUTURE CONDITION

Forest Plan:

Proposed Desired Future Condition: Adopt the target tree sized by species and plant association listed in Table 3.9 (Chapter 3--Desired Future Condition). These target tree sizes would apply to old growth stands and to all distance zones and Visual Quality Objectives.

Current Direction Future Condition: Target tree sizes listed on page Four-7 and Four-8 (Scenic Quality) list target tree sizes by vegetation type and for Foreground Retention and Foreground Partial Retention. These target tree sizes apply to mature trees as defined in the Forest Plan.

RMP: No amendments needed.

WILD AND SCENIC RIVER BOUNDARY

Forest Plan:

Current Boundary: defined as the Interim boundary in the Forest Plan and map for Alternative Q.

Proposed Boundary: Both Alternatives 2 and 3 would change the entire Interim boundary to a new boundary.

RMP: No amendment needed since the river was not designated when the RMP was approved.

DESIGNATED VIEWSHED

Forest Plan:

Current Boundary: defined as the Interim Designated Viewshed in the Forest Plan and mapped on the Designated Viewsheds (Supplement to Alternative Q).

Proposed Boundary: Alternative III would change the Interim Viewshed to a new Designated Viewshed. Alternative II has the same boundary as the Interim Designated Viewshed.

Proposed Visual Quality Objectives:

VIEWSHED ALTERNATIVE II[1]								
		Retention			Partial Retention			
Management Alt.	River Segment	Fg[2]	Mg	Bg	Fg	Mg	Bg	Modification
B	All	X	X	X				Views from Bonney and Barlow Buttes, Mg and Bg from Road 48
C	A and B	X				X	X	
	C	X	X	X				
Dand E	All				X	X	X	
VIEWSHED ALTERNATIVE III								
		Retention			Partial Retention			
Management Alt.	River Segment	Fg	Mg	Bg	Fg	Mg	Bg	Modification
B	All	X	X	X				None
C	A and B	X				X	X	
	C	X	X	X				
D and E	All				X	X	X	
[1] Corridor alternatives 2 and 3								
[2] Distance zones: Fg = Foreground, Mg = Middleground, Bg = Background								

Current Visual Quality Objectives:

VIEWSHED ALTERNATIVE I (INTERIM)[1]							
	Retention			Partial Retention			
River Segment	Fg	Mg	Bg	Fg	Mg	Bg	Modification
A/B				X	X	X	Views from Bonney and Barlow Buttes, Mg and Bg from Road 48
C	X				X	X	
[1] Management Alternative A only and Corridor Alternative 1 only							

RMP: No amendment needed since the river was not designated when the RMP was approved.

MT. HOOD NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN	
Alternative B	
Proposed Standard and Guideline or Direction	Existing Standard and Guideline or Direction (Reference)
Change land allocation from B1 to A1.	Forest Plan land allocation
Withdraw from entry leasable minerals within the corridor.	B1-056
Issue no permits for salable minerals within the corridor.	B1-058
Prohibit the use of chemical and biological methods for vegetation management and noxious weed control.	FW-378
Emphasize habitat management for native wildlife and fish species only.	Forest Management Goal 11
No chemical suppressants or other water additives allowed for fire suppression.	B1-089
Construction of new campgrounds prohibited	B1-019
Change ROS class in Segment B to Semi-primitive Motorized	B1-008
All motorized vehicle use prohibited on Road 48 north of Road 43 between November 15 - April 1.	FW-411
Motorized recreational vehicles prohibited north of Highway 35	FW-409, B1-078, B1-079
Only over-snow vehicle trails allowed within the corridor.	FW-410, B1-079
No permits issued for commercial recreation uses.	B1-065, B1-067
Road construction in Segment A, outside the Mt. Hood Meadows expansion are, prohibited.	B1-075
Open road density shall not exceed 1.5 miles per square mile.	FW-209
Alternative C	
Change land allocation from B1 to A1.	Forest Plan land allocation
Prohibit the use of chemical methods for vegetation management and noxious weed control.	FW-378
Emphasize habitat management for native fish species only.	Forest Management Goal 11
Use of uncolored or fugitive chemical suppressants or other water additives allowed. Use of red retardant prohibited.	Addition to B1-089
Construction of new campgrounds prohibited	B1-019
Change ROS class in Segment B to Semi-primitive Motorized	B1-008
Wheeled ATV and street-legal vehicle use prohibited on Road 48 north of Road 43 between November 15 - April 1.	FW-411
Motorized recreational vehicles prohibited north of Highway 35	FW-409, B1-078, B1-079
Only over-snow vehicle trails allowed within the corridor.	FW-410, B1-079
Road construction in Segment A, outside the Mt. Hood Meadows expansion are, prohibited.	B1-075
Open road density shall not exceed 1.5 miles per square mile.	FW-209

Alternative D	
Emphasize habitat management for native fish species only.	Forest Management Goal 11
Use of uncolored or fugitive chemical suppressants or other water additives allowed. Use of red retardant prohibited.	Addition to B1-089
Change ROS class into Keeps Mill to Roaded Natural	B1-007
Wheeled ATV and street-legal vehicle use prohibited on Road 48 north of Road 43 between November 15 - April 1.	FW-411
Motorized recreational vehicles prohibited north of Highway 35	FW-409, B1-078, B1-079
Road construction in Segment A, outside the Mt. Hood Meadows expansion are, prohibited.	B1-075
Alternative E	
Emphasize habitat management for native fish species only.	Forest Management Goal 11
Change ROS class into Keeps Mill to Roaded Natural	B1-007
Wheeled ATV and street-legal vehicle use prohibited on Road 48 north of Road 43 between November 15 - April 1.	FW-411
Motorized recreational vehicles prohibited north of Highway 35	FW-409, B1-078, B1-079
Road construction in Segment A, outside the Mt. Hood Meadows expansion are, prohibited.	B1-075

TWO RIVERS RESOURCE MANAGEMENT PLAN	
Alternative B	
Proposed Management Direction	Existing Management Direction (Reference)
Livestock grazing below the rims prohibited.	RMP pg. 14--Livestock Grazing
Off road vehicle use prohibited	RMP pg. 24--Off Road Vehicles
Alternative C	
Livestock grazing below the rims prohibited.	RMP pg. 14--Livestock Grazing
Off road vehicle use prohibited	RMP pg. 24--Off Road Vehicles
Alternative D	
Limit livestock grazing below the rims to periods between November 1 - May 1.	RMP pg. 14--Livestock Grazing
Off road vehicles limited to designated routes	RMP pg. 24--Off Road Vehicles
Alternative E	
Prohibit livestock grazing on all BLM lands within the corridor	RMP pg. 14--Livestock Grazing
Off road vehicles limited to designated routes	RMP pg. 24--Off Road Vehicles

Chapter 3
Affected Environment

CHAPTER 3: AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the character and resources of White River for one-quarter mile on each side of the river and the adjacent lands. These descriptions represent the baseline information against which we evaluate the alternatives. The first section describes the current conditions for each segment pair to acquaint readers with the river corridor. The second section describes the desired future condition for each segment pair to acquaint readers with the background behind the alternatives. The alternatives describe different methods and rates to move from the current, or existing, condition towards the desired future condition.

White River lies east of the Cascade Range and south of the Columbia River Gorge. Originating on Mt. Hood, the river flows for approximately 53 miles to its confluence with the Deschutes River just above Sherar's Bridge. All but 0.6 miles of the river at White River Falls is designated as a federal Wild and Scenic River. The USDA Forest Service manages Segments A, B, and C. Segment D consists of a mix of BLM, state, and private lands. Virtually all of Segment E is privately owned, flowing through Tygh Valley. Segment F is a mix of BLM, state, private, and Tribally owned lands. The Prineville District of the BLM manages Segments D, E, and F.

The chapter first describes the existing condition of all resources for each pair of segments (A and B, C and D, E and F) with a general format of the physical setting, biological setting, and social setting. Next, the chapter describes desired future condition for all segments and then each segment pair, following the same general format as the existing condition. Table 3.1 lists the outstandingly remarkable values for each segment pair. Note that an individual outstandingly remarkable value may appear in one or both segments of each pair. Readers should review the Resource Assessment and specialists' reports for a more complete discussion of the river values for each segment.

EXISTING CONDITION

Segments A and B

The 1988 Omnibus Oregon Wild and Scenic Rivers Act (1988 Rivers Act) designated Segments A and B (13.6 miles) Recreation River. Segment A includes the river from White River Glacier to the section line between section 9 and 16, township 3 south range 9 east. Segment B includes the river from the section line above to the confluence with Deep Creek.

Segment A begins with an active fumarole field, known as "Devil's Kitchen," and White River glacier. Immediately below the glacier lies a mixture of andesite, dacite flows with pyroclastic debris, and glacial moraines. Next come the youngest series of pyroclastic and mudflow deposits, known as the Old Maid flows. These flows occurred about 260 years ago and buried a forest on the slopes of Mt. Hood (Crandell 1980). Recent downcutting by White River and its tributaries has exposed portions of this "Ghost Forest" (Cameron and Pringle 1991) along with several of the Old Maid flows in a sequence of terraces along the valley edge upriver from the Highway 35 crossing.

Table 3.1. Outstandingly Remarkable Values for each segment pair of the White River.

SEGMENT PAIR	RESOURCE AREA	OUTSTANDINGLY REMARKABLE VALUES
A and B	Geology	Old Maid age pyroclastic flows and mudflow deposits Ghost forests Fumarole field Active glacier Glacially carved valley Glacial valley floodplain
	Hydrology	River color Aspect and gradient
	Botany	Bog communities and stiff club moss Dark soiled bogs and 'genus communities' of grape ferns Plant community diversity
	Fish Habitat and Populations	Genetically isolated redband rainbow trout
	Wildlife Habitat and Populations	Diversity of threatened, endangered, and sensitive species Northern spotted owl habitat Harlequin duck habitat
	Cultural Resources	Barlow Road
	Recreation	Sightseeing, photography, nordic skiing, kayaking opportunities
	Scenic Resources	Views from Timberline Lodge and lower parking area, Highway 35, Timberline Trail, White River East sno-park, top of Bonney Butte, views to Mt. Hood from the river
C and D	Geology	Old Maid age pyroclastic flows and mudflow deposits Graveyard Butte
	Hydrology	River color Aspect and gradient
	Botany	Unusual extensions of species beyond normal range Tygh Valley milkvetch Plant community diversity
	Fish Habitat and Populations	Genetically isolated redband rainbow trout
	Wildlife Habitat and Populations	Diversity of threatened, endangered, and sensitive species Peregrine falcon habitat
	Cultural Resources	Keeps Mill
	Recreation	Sightseeing, photography, kayaking, rugged hiking and backpacking, nature and wildlife observation, solitude opportunities
	Scenic Resources	Keeps Mill Overlook Graveyard Butte
E and F	Hydrology	River color Aspect and gradient
	Botany	Tygh Valley milkvetch Plant community diversity Potential Research Natural Area
	Fish Habitat and Populations	Genetically isolated redband rainbow trout

The Forest Service and Oregon Department of Transportation (ODOT) use a sand pit in Segment B that removes the Old Maid deposits. Zigzag Ranger District prepared and signed an Environmental Assessment in June, 1988, covering pit development with ODOT as the primary user. A rehabilitation plan to cover earlier excavations was developed in 1991 and partially implemented in 1992. The 1988 EA calls for pit development in four stages; Stage I has been completed. The state removes a 4-5 year supply in one entry and stockpiles the material at various locations. They use this material to sand Highways 35 and 26 and other roads under state maintenance responsibility within the forest boundary. They do not recover this material from the roadway for reuse since it breaks down into particles too small to provide effective traction. Both the state and the Forest Service dump waste material, such as rock from slides, in the pit and this material is used to implement the rehabilitation plan. Both the EA and rehabilitation plan were prepared before Forest Service Engineering and ODOT knew the mined deposits were considered an outstandingly remarkable feature.

Neither segment contains any known locatable or leasable mineral claims. Historical journals mention an iron mine near Barlow Creek and White River, but this site has not been found. The river has a very low potential for locatable minerals. Geothermal exploration has occurred on the south slopes of Mt. Hood with test wells in the vicinity of White River near Highway 35, Mt. Hood Meadows, and Timberline Lodge. No claims have been filed as a result of this exploration. Both segments have a low potential for viable geothermal operations with present technology. The river has very low potential for oil and gas.

Below the Old Maid deposits lies a broad outwash plain strewn with boulders. White River shifts channel across this plain, tending to flow either towards Mineral Creek or towards Iron Creek. At present, the river flows into Iron Creek. Current topographic maps depict White River flowing into Mineral Creek. Because of this mistake, the river lies outside the interim boundary for approximately four miles.

Most of Segment B consists of a U-shaped valley, containing remnant glacial moraines, glacial erratics, a kettled lake, and another Ghost Forest. Immediately adjacent to the river is a series of sandflats, some of which contain a pebble armor surface. The armored sandflats are particularly fragile and susceptible to disturbance from wheeled vehicles. At the very bottom of Segment B, the river enters a narrow V-shaped valley.

Soils in much of these two segments consist of fresh sands and gravel, rock, and glacial deposits. Wetlands appear throughout the segments, but are especially prominent and large in Segment B. Soil textures typically run to cobbly loams, gravelly loams, stoney loams, and sandy loams. The adjacent uplands contain a mix of sandy loams and silt loams with some loamy fine sands. When left undisturbed, most soils range from very stable to moderately stable. Even when disturbed, the surface soil erosion hazard is generally low, except in the fresh sands and gravels. The saturated wetlands and poorly drained bottoms produce much runoff. Soils in Segment A mostly contribute to peak flows, unable to store much water. Soils in Segment B contribute to both peak flows and base flows.

According to the Soil Resource Inventory (Howes 1978) most soils in both segments are unsuited or poorly suited for campgrounds and picnic areas. Soils rated for recreational development tend to suffer soil and site damage from normal levels of use. Many of the glacial deposit soils are moderately suited and well suited for trails.

The river begins at White River Glacier. As the leading edge of the glacier melts in late summer, it releases large amounts of silt and sand which settle out and cover much of the channel bottom. This sand and silt give the river a milky appearance, and provide the source for its name. The main tributaries in these two segments include Mineral, Barlow, Alpine, Green Lake, Iron, Red, and Bonney creeks. Two well known springs, Faith and Charity, also appear within these segments.

Along its upper four miles, the river drops 830 feet per mile, producing a relatively high gradient. Some tributaries, most notably Mineral and Red creeks, contain an alga that gives the streams a red color. The glacial outburst floods cause the river to changes course and create a large, sandy floodplain. The sandy soils also allow the river to meander and actively cut into the present banks during spring runoff.

Average annual precipitation on Mt. Hood exceeds 130 inches at the glacier and rapidly drops off to about 50 inches at the confluence with Deep Creek (Topik et al. 1988). Most precipitation falls as snow, peaking in winter. The segments experience warm, dry summers and cold, moist winters.

These segments contain the highest biological diversity and complexity of the corridor. Rocks 'N' Ice, the highest landscape unit, contains little vegetation. The Subalpine landscape unit falls within the mountain hemlock and Pacific silver fir zones. Beargrass and huckleberries dominate the understory. Sandy, cold soils in the floodplain give rise to the open lodgepole pine stands in the Lodgepole Flats landscape unit. Few other species grow with the lodgepole pine, but prairie lupine (*Lupinus lepidus* var. *lobbii*) and pussypaws (*Spraguea umbellata*) are common. Undisturbed open, sandy areas support patches of the moss *Rhacomitrium canascens* var. *ericoides*.

In contrast, the poorly drained portions of the floodplain provide suitable conditions for bogs and their associated species in the Wetlands landscape unit. The Wetlands landscape unit contains several rare species such as stiff club-moss (*Lycopodium annotinum*), fir club-moss (*L. selago*), mountain grape-fern (*Botrychium montanum*), and gray grape-fern (*B. minganense*). The overstory reflects that of the adjacent, drier uplands.

Although not mapped in the associated management guide (Halverson et al. 1986), a significant portion of Segment B contains western hemlock plant associations, described as the Cool, Wet Mixed Conifer landscape unit. Both the overstory and understory reflect the species diversity and biological complexity of this zone.

At the lower end of Segment B, the grand fir zone replaces western hemlock zone in the Mesic Mixed Conifer landscape unit. The overstory remains quite diverse, supporting grand fir, Douglas-fir, ponderosa pine, western larch, and western white pine. Western redcedar and Engelmann spruce become restricted to bottomlands and wet areas very close to the river. The understory contains species associated with warm and relatively moist conditions, such as trillium, sidebells pyrola, twinflower, and Oregon anemone. The Open Riparian landscape unit contains many hardwood species such as cottonwoods, willows, and alders. Since the river changes course rather frequently, the riparian plant community is relatively young.

Much of Segment B has the feel of old growth forest. Late successional species dominate both the overstory and understory (Table 3.2). Both segments support several species of insects and diseases in the conifers. Most species are at endemic levels and do not significantly affect forest health and scenic quality. Western spruce budworm (*Choristoneura occidentalis*) is an exception, especially in the Cool, Wet Mixed Conifer and Mesic Mixed Conifer landscape units. Noticeable defoliation was mapped in 1991 and 1992. Another species of possible concern is Douglas-fir bark beetle (*Dendroctonus pseudotsugae*). Stress, brought on by prolonged drought and overcrowded growing conditions, leaves Douglas-fir susceptible to successful attack. Various butterfly and moth larvae feed on the leaves of the hardwoods within these segments. Hardwoods tolerate periodic defoliation and this feeding does not appear to cause any major damage to the cottonwoods, willows, or alders.

Moisture conditions during summer are suitable to sustain white pine blister rust (*Cronartium ribicola*) which can infect and kill western white pine and whitebark pine. These segments contain several important decay fungi that affect timber values and campground safety. Most common are the stem decays Indian paint fungus (*Echinodontium tinctorium*) and pouch fungus (*Cryptoporus volvatus*) and laminated root rot (*Phellinus weirii*). Several species also contain dwarf mistletoe.

Table 3.2. Existing stand structure for selected landscape units.

Stand Structure	Description	Landscape Units		
		Cool, Wet Mixed Conifer	Mesic Mixed Conifer	Dry Mixed Conifer
Stem Initiation	New openings, seedlings, and saplings	5%	2%	<1%
Stem Exclusion[1]	Closed canopy with natural thinning	50%	68%	27%
Stand Reinitiation	Gaps appearing in canopy and new conifer regeneration starting	1%	4%	70%
Old Growth	See R6 definitions	44%	26%	3%

[1] Includes both single story (poles) and two-story (mature) stands

The forest health of Segments A and B is fair. Late successional species dominate both understory and overstory in many uncut stands. Late successional species, such as grand fir and western hemlock, are more susceptible to insect and disease attack and more likely to support epidemic levels of insect populations. The recent spruce budworm outbreak and potential Douglas-fir bark beetle outbreak reflect declines in forest health and successional change. Many stands simply contain more trees than soil nutrient and moisture availability can readily support. The recent prolonged drought has worsened the situation.

The vegetation within Segment B supports a variety of wildlife species. Species associated with old growth stand structures and closed canopy stands, such as the northern spotted owl, are abundant in the area. Nine spotted owl activity centers occur in or adjacent to Segment B in the Cool, Wet Mixed Conifer and Mesic Mixed Conifer landscape units. Both a Designated Conservation Area (DCA) and a Habitat Conservation Area (HCA) lie on each side of the river at Segment B. The Open Riparian landscape unit does not provide spotted owl nesting, foraging, or distribution habitat.

In each quarter township at least 50% of the landscape capable of producing such conditions, the trees within the stand must average at least 11 inches diameter at breast height (DBH) and the stand have 40% canopy closure (11-40 Rule). In the quarter township encompassing Segment A, 85% of the landscape capable of producing spotted owl habitat meets or exceeds this requirement. In the quarter townships encompassing Segment B to within two miles of Deep Creek, 55-59% of the landscape provides 11-40 habitat. Only 43% of the landscape meets the 11-40 Rule in the quarter township encompassing the last two miles of Segment B.

For peregrine falcons, Segment A contains potentially suitable nesting cliffs adjacent to the north side of the river. However, the riparian zone does not appear to support enough vegetation to provide an adequate prey base for the bird. This segment probably does not support nesting falcons. Any birds seen are probably dispersing subadults or displaced adults looking for suitable habitat, or just an occasional "fly by" of birds moving through the area. Segment B does not appear to have suitable nesting cliffs close enough to the river to serve as good peregrine habitat. As with Segment A, any sightings are probably incidental.

Both segments contain the turbulent, gravelly streams considered suitable harlequin duck habitat. Only Segment B provides sufficient cover for nesting. A survey conducted in 1993 located one female harlequin duck with six young and two additional lone females within Segment B. Cope's giant salamanders have been found in several tributaries of White River, the southern and eastern range of the species. The Oregon Natural Heritage Database files contain records of Cascades apatanian caddisfly in the North Fork of Iron Creek and one-spot rhyacophilan caddisfly in the headwaters of Barlow Creek. Both streams are tributaries of White River and both sightings date from the mid-1960s.

Either black rosy finches or gray-crowned rosy finches may inhabit parts of the Rocks 'N' Ice and Subapline landscape units. Additional surveys are needed to determine which species occurs in Segment A. Adult red-legged frogs occur in at least one tributary to Mineral Creek. Potentially suitable habitat exists within a number of small tributaries and potholes for this species.

Wolverine tracks have been found in the upper portions of White River as recently as 1991. From approximately two miles upstream of Highway 35 to about two miles downstream of White River Station Campground the adjacent forest provides suitable, undisturbed habitat for wolverines for most of the year. One management area each for pileated woodpeckers and pine martens lie in the lower portions of Segment B. Both segments serve as summer forage for deer and elk and provide calving and fawning sites.

Segments A and B support very few fish or small fish, although a USFS 1983 habitat survey noted juvenile trout within three miles of White River Glacier. An ODF&W electrofishing survey in 1983 and 1984 found redband rainbow trout the most abundant species. This same survey noted brook trout, a fish not native to this area, in Barlow Creek (a tributary of White River) and abundant sculpin throughout both segments. Currens (1990) found populations of the White River race of redband rainbow trout at two sites in Barlow Creek.

The river actively works across the valley bottom in both segments, producing generally poor fish habitat. The USFS 1983 habitat inventory rated rearing habitat as poor, with a fair rating from river mile 40.4 to 43.1. Spawning habitat rates as poor throughout both segments. Segment A lacks spawning gravels and large woody debris. The channel in Segment A is a broad, sparsely vegetated floodplain, typical of glacial moraine systems. Segment B contains low quality and quantity spawning gravels. Most gravel areas suitable for spawning are less than one yard square and lie above the mean high water line. Cover varies greatly since stream turbulence and turbidity are considered fish cover. When the glacial milk begins flowing, fish cover reaches as high as 40%. Glacial milk provides the dominant cover in Segments A and B.

Segment A has no glide areas and only seven pools for a pool:riffle:glide ratio of 0.05:9.2:0.0. The river averages ten feet wide with a sandy bottom. Some gravel is present, but not suitable for spawning beds. Segment B contains approximately 53 pools and some glides for a pool:riffle:glide ratio of 0.7:8.2:0.5. River width ranges from 8.8 feet to 25.7 feet with a sandy bottom over most of the length. One portion of the river has a cobble bottom. The rockier areas of the riverbed are more than 35% embedded in sand.

Both Iron Creek and Mineral Creek, tributaries to White River in Segment B, rate as fair to good fish habitat with portions of Iron Creek rating excellent. Both creeks contain fair to good rearing habitat but poor spawning habitat and both contain low numbers of redband rainbow trout. Currently, White River has captured the lower 2.7 miles of Iron Creek.

No range allotment occurs in Segment A. White River Allotment lies in Segment B below Highway 35. Within the river corridor, cattle find suitable forage only in recent clearcuts. Cattle do wander down to White River itself for water, but rarely cross it. The permittee does not force his cattle across the river since little forage grows on the slopes of Bonney Butte. Range improvements within the corridor consist of cattleguards.

Most of Segment A lies above timberline, so fuel loadings are not a consideration. Fuel loadings in Segment B are generally light to moderate, although heavy patches do appear. Fine fuels decay quickly so most of the fuel exists either as logs or live plants. Most of the logs present in uncut stands are rotten. Conifer reproduction and shrubs provide routes for fire to reach the overstory crowns (ladder fuels). Canopy closure in most of the area delays fuel drying; wildfires will not spread readily until very late in the summer or fall, if at all. Prolonged drought and epidemic insect and disease attack increase both fuel loading and the rate of fuel drying. The predominate tree species cannot tolerate even low intensity fire. Many understory forbs and herbs cannot tolerate fires which burn most or all the duff.

Prior to white settlement, wildfires typically replaced the existing stands with little underburning. Most ecologically significant fires burned both the tree crowns and much of the duff. According to available records, lightning started 58% of fires since 1916. Multiple starts from a single storm are rare. Most fires, 81%, burned less than 1/4 acre. Much of Segment B burned around the turn of the century in a series of large fires. Since 1918, fires have averaged only 2 acres in size. Fire exclusion has had little effect in Segments A and B. Under current conditions the resources listed in the 1992 Mt. Hood Appropriate Suppression Response guide should be able to catch most surface fires starting within Segment B. Most landscape units would not benefit from reintroducing fire into the ecosystem. An exception may be stands on the south aspects of Bonney Butte where ponderosa pine or a mix of ponderosa pine and Douglas-fir used to dominate.

Timber supplied from these two segments helps support the local communities, primarily in the Estacada area. A percentage of the timber sale receipts go to Hood River, Wasco, and Clackamas counties for payments in lieu of taxes. White River Allotment covers all of Segment B, although the lack of forage prevents heavy use. All campgrounds within the segments are free use, generating no income to either the federal government or, indirectly, Hood River, Wasco, or Clackamas counties. Sno-park users must buy a use sticker to park at either sno-park within the segments along Highway 35. These fees help pay for plowing the parking areas.

Both segments contain several cultural resource sites. The Timberline Trail crosses the corridor in Segment A. Barlow Road runs next to the White River in Segment B and contains many sites associated with the initial settlement of Oregon. Two sites are documented where Native Americans peeled the bark from western redcedars. The Confederated Tribes of Warm Springs still collect various plants for traditional uses throughout the corridor.

Visitors to the corridor in segments A and B encounter many different views (Table 3.1). Timberline Lodge, Mt. Hood Meadows, the sno-parks on Highway 35, and the top of Bonney Butte offer outstanding views of the river corridor and Mt. Hood. Most sensitivity level I and II views meet VQOs except in the middleground (Table 3.3). Most sensitivity level III viewpoints do not meet VQOs. In all cases, the harvest units south of the river violate Forest Plan scenic quality standards.

The portions of the Cool, Wet Mixed Conifer landscape unit on Frog Lakes Butte and Bonney Butte and the portion of Lodgepole Flats and Open Riparian landscape units just southeast of Highway 35 are the most visually sensitive. The state pit in Segment B does not meet the VQO for the area nor do the two sno-parks. Generally, the campgrounds in Segment B lack screening vegetation and uncontrolled traffic circulation has created many bare areas.

The Resource Assessment classified sightseeing, photography, nordic skiing, and limited kayaking as outstandingly remarkable recreation values. Three sno-parks exist within or immediately next to the river corridor and offer cross-country skiing, tubing, snowmobiling, snow shoeing, and general snow play (Table 3.2). Only White River West offers toilets. Several cross-country ski trails lie in Segment B in the Lodgepole Flats landscape unit and along the edge of the Cool, Wet Mixed Conifer landscape unit. Snowmobile routes run along forest roads 48 and 43. Occasionally wheeled vehicles attempt to drive Road 48 in early and late winter, creating unsafe conditions for snowmobilers and skiers.

The Mt. Hood Loop, Highway 35 within the river corridor, accommodates over one million visitors annually. Many visitors photograph the dramatic view of Mt. Hood from the sno-parks. Timberline Trail crosses Segment A and the Pacific Crest National Scenic Trail parallels the corridor. Other hiking trails within these two segments include Barlow Ridge, Catalpa Lake, Bonney Meadows, Rimrock, and White River (Table 3.4).

The Barlow Road runs through some of Segment B. Both four-wheel drive and two-wheel drive vehicles use portions of it, although only street legal vehicles are allowed. Off Highway vehicles illegally use portions of the Lodgepole Flats landscape unit around Road 43; cross country travel by recreational vehicles is not allowed in this area. Three heavily used campgrounds lie along the river and along the Barlow Road in Segment B (Table 3.5). Visitors seeking more isolation tend to use dispersed sites, of

which six known sites exist. White River Station campground was originally a pioneer camp site along the Barlow Road.

Segments C and D

The 1988 Rivers Act designated Segments C and D as Scenic River. Segment C runs from the confluence with Deep Creek to the Forest Service/BLM boundary. Segment D runs from the Forest Service/BLM boundary to the confluence with Threemile Creek.

In both segments, the river flows through a steep V-shaped canyon. The canyon walls, a series of steps formed by benches and rock walls, consist of alternating layers of fluvial sediments, ash flows, and lava flows. The flows in Segment C occurred about 250,000 to 4 million years ago while those in Segment D occurred 5 to 7.5 million years ago. Smock Prairie and Juniper Flats are the surface of the flows in Segment D. The flows in Segment C are part of those that formed the crest of the Cascades Range and were glaciated. Graveyard Butte is a cinder cone cleaved by a fault. This fault allowed White River to cut through the cone, creating the unique feature seen today. The north wall just downstream of Graveyard Butte exposes six basalt plugs.

Neither segment contains any known locatable or leasable mineral claims. The potential for these resources is considered very low. An inactive gravel pit operated by Wasco County lies just north of the river at Graveyard Butte.

Soils in Segment C reflect glacial origin while those in D reflect a volcanic origin. Other than the talus slopes, the soils in Segment C have finer textures than further upstream, consisting more of silt loams. Soils in Segment D have a mix of textures, reflecting a covering of ash and loess over basalt and andesite. Erosion hazard and runoff potential in both segments depends on slope more than any other soil characteristic. These soils contribute to both peak flows and base flows, although water storage capability is relatively low. Below the canyon rim, the soils are unsuited or poorly suited for recreational developments and trails, again due to slope steepness. In Segment D, a characteristic feature of the area appears in the form of raised mounds of deeper soil surrounded by shallow soil with much surface rock. Locally, this feature is descriptively known as biscuit scabland. Farmers plow many of the "biscuits" and raise commercial agricultural crops.

Perennial tributaries to White River consist of Deep, Boulder, and Clear creeks in Segment C and Rock and Threemile creeks in Segment D. Both segments have ephemeral streams and springs flowing into the river. Even though the segments have few perennial tributaries, these tributaries drain a very large area. Numerous diversions for irrigation occur on all these perennial tributaries as well as on McCubbins Gulch, and on several of the subtributaries. McCubbins Gulch is actually an ephemeral streambed that local irrigators have used as a ditch since the early 1900s. When not needed for irrigation, water in Clear Creek Ditch is diverted back into White River, creating a waterfall at its confluence. Although required by Oregon law (ORS 509.615), none of the diversions are screened to keep fish out.

The climate in these two segments continues to become drier between Deep Creek and Threemile Creek. Precipitation amounts average approximately 50 inches per year at Deep Creek, 30 inches at the Forest Service and BLM boundary, and 15 inches at Tygh Valley. Summer temperatures are quite high, frequently exceeding 100° in August and September. Low relative humidities occur at the same time with values less than 15% common. Marine influence from the Columbia River helps to moderate both summer and winter temperatures.

Table 3.3. Existing scenic condition and VQOs for selected viewpoints along White River.

Segments	Viewpoint	Sensitivity Level	Existing Scenic Condition	VQO
A and B	Timberline Lodge, Lower Parking Lot, Trail	I	R/Mg, PR/Bg[1]	PR/Mg, Bg
	Mt. Hood Meadows	I	R/Mg, PR/Bg	PR/Mg, Bg
	Highway 35/White River Sno-parks	I	R/Fg, Mg, Bg	R/Fg, Mg; PR/Bg
	Barlow Crossing CG	I	PR/Fg	R/Fg PR/Mg Bg
	White River Station CG	I	M/Fg, M-UM/Mg, Bg	PR/ Fg, Mg, Bg
	Barlow Creek CG	I	PR/Fg; M/Mg, Bg	PR/Fg Mg, Bg
	Trails 221, 222, 244, 471, 014, and 013	I	No recon.	R/Fg; M/Mg, Bg
	Trail 538	I	R/Fg;R-PR/Mg (one UM cut)	R/Fg; M/Mg, Bg
	Pacific Crest Trail	I	R/Fg	R/Fg; M/Mg, Bg
	Road 48	II	R-PR/Fg, M-UM/Mg, Bg (Buck #9 UM/Fg)	PR/Fg; M/Mg, Bg
	Barlow Ridge Trail (north 1/2), Clear Creek Trail	II	R/Fg; UM/Mg; PR/Bg	PR/Fg Near; M/Fg Far, Mg, Bg
	Top of Bonney Butte	III	UM/Mg, Bg	M/Fg, Mg, Bg
	Top of Frog Lake Butte	III	UM/Mg, Bg	M/Fg, Mg, Bg
	Top of Rimrock Trail	III	UM to top from west slope	M/Fg, Mg, Bg
	Clear Lake Lookout	III	UM/Bg	M/Fg, Mg, Bg
	Barlow Ridge Trail (south 1/2)	III	No recon.	M/Fg, Mg, Bg
	Road 4890	III	M-UM/Mg, Bg	M/Fg, Mg, Bg
C and D	Keeps Mill CG	I	PR/Fg; R/Mg; PR/Bg	R/Fg; PR/Mg, Bg
	Keeps Mill Overlook	III	PR/Fg; R/Mg, Bg	M/Fg, Mg, Bg
	Miscellaneous overlooks off 2110-270 and 4885	III	PR/Fg, Bg; R/Mg	M/Fg, Mg, Bg
	White River from Forest Boundary to Graveyard Butte	N/A	R/Fg, Mg, Bg	PR/Fg, Mg, Bg
	Graveyard Butte bridge	N/A	UM	PR/Fg, Mg, Bg
	White River from 1/2 mile below Graveyard Butte to Threemile Creek	N/A	R/Fg, Mg, Bg	PR/Fg, Mg, Bg
Segments E and F	White River in Tygh Valley, old US 197, US 197, Highway 216	N/A	PR/Fg, Mg, Bg	PR/Fg, Mg, Bg
	White River below White River Falls	N/A	R/Fg, Mg, Bg	R/Fg, Mg, Bg

[1] R=Retention, PR=Partial Retention, M=Modification, UM=Unacceptable Modification. Fg=Foreground, Mg=Middleground, Bg=Background.

Table 3.4. Trails within the White River analysis area.

TRAIL NAME	SEGMENT	USE LEVEL	NUMBER	PRIMARY USE	OTHER USE	MILES[1]	COMMENTS
Timberline	A	Moderate	600	Hike	—	2	Historically Significant
Pacific Crest	A	Moderate	2,000	Hike	Ski	4	Nationally Significant
Yellow Jacket	A	Moderate	674	Ski	—	2.5	Demanding backcountry trail
Boy Scout Ridge	A	Light	674A	Ski	—		Ties in with Pacific Crest and Yellow Jacket trails
Mineral Jane	B	Light	48 and 4800230	Ski	—	3	Needs signs
Road 48	B	?	48	Ski	Snowmobile, ATVs, 4WDs	10	Paved road, use conflict
Road 3560	B	Moderate	3560 and spur roads	Ski	—	3.5	
Barlow Ridge	B	Light	670	Hike	—	3	Steep, difficult portions, needs rehab.
Catalpa Lake	B	Light	535	Hike	—	0.75	Pristine lake
Bonney Meadows	B	Light	471	Hike, Horse	—	5.2	Crosses White River
Rimrock	B	Light	487	Hike, Horse	—	1.5	Fragmented trail
White River	B	Light	538	Hike, Ski	—	5	Reconst. 1993-4
Clear Creek	C	Light	490A	Hike, Horse	—	1	Rugged by Keeps Mill

[1] Estimated miles within the analysis area

Table 3.5. Campgrounds and camping areas within White River Analysis area.

NAME	SEGMENT	ACCESS	SEASON	USE LEVEL	FACILITIES	ACTIVITIES	COMMENTS
Barlow Creek	B	Road 3530	May-Oct.	Heavy	5 sites, 1 toilet, no water	Camp, fish, tube, hike, hunt, ride horse, swim	On Barlow Road
Barlow Crossing	B	Road 3530	May-Oct.	Heavy	5 sites, 1 toilet, no water	Camp, fish, tube, hike, hunt, ride horse	On Barlow Road
White River Station	B	Road 3530	May-Oct.	Heavy	6 sites, 1 toilet, no water	Camp, fish, tube, hike, hunt, ride horse, swim	Semi-primitive camping; on Barlow Road
6 dispersed sites	B	Road 3530	May-Oct.	Light-Mod.	None	Camp, fish, tube, hike, hunt, ride horse, swim	On Barlow Road
Keeps Mill	C	Road 2120	May-Oct.	Moderate	5 sites, 1 toilet, no water	Camp, fish, tube, hike, hunt, ride horse, swim	Kayak put-in, historic site, not accessible to trailers

Table 3.2 lists the existing stand structure of the Cool, Wet Mixed Conifer, Mesic Mixed Conifer, and Dry Mixed Conifer landscape units. Western hemlock stands appear at the west end of Segment C but only south of the river (Cool, Wet Mixed Conifer). The grand fir zone quickly replaces the western hemlock zone in the Mesic Mixed Conifer and Dry Mixed Conifer landscape units. Ponderosa pine and Oregon white oak become the dominant tree species within two miles downstream of Deep Creek on the north side of the river. Shortly after crossing into Segment D, forest occurs only within the canyon and the

Pine-Oak landscape unit appears. The Oak-Juniper landscape unit is mapped east of Graveyard Butte, although Oregon white oak dominates these woodlands. Juniper woodland appears intermixed with farm and range lands south of the river on the plateau. North of the river, farm and range lands dominate (Ag Lands and Range landscape units) with scattered clumps of oaks, cottonwoods, and willows near ponds and wet areas. Clumps of aspen grow around some talus patches within the canyon in Segment C and the west end of Segment D, all on the south side of the river.

The understory plants indicate the dry climate within Segment C and the west end of Segment D. Typical species include elk sedge, oceanspray, snowberry, chinkapin, hazel, fescue, pinegrass, yarrow, arrowleaf balsamroot, and antelope bitterbrush. Segment C contains at least three sensitive plant species: Bolander's grass (*Scribneria bolanderi*), mountain lady's slipper (*Cypripedium montanum*) and a variety of Douglas onion (*Allium douglasii* var. *nevii*). In the Range landscape unit, grasses and shrubs such as antelope bitterbrush, rabbitbrush, and sagebrush dominate. Tygh Valley milkvetch (*Astragalus tyghensis*) grows in scattered locations within this landscape unit.

Several forest insect and disease problems have appeared in recent years within Segment C and portions of Segment D. Most notable are spruce budworm, fir engraver beetle, and western pine beetle. The first two insects feed primarily on grand fir, but also attack Douglas-fir, and are a problem mostly in Segment C. Western pine beetle attacks older ponderosa pine and is a problem in Segment D. Laminated root rot is a growing problem in grand fir on the Barlow Ranger District. Insect and disease problems at epidemic levels in these two segments indicate a high degree of stress brought on by prolonged drought and overstocking. These pests, as well as several other species, normally occur at endemic levels and do not cause economic harm. Agricultural crops are prone to several insects and diseases. Rusts are the most common diseases of grass and grain crops such as wheat and alfalfa hay.

The diversity of plant communities in Segments C and D still support many different wildlife species; however the species present and the dominance of various species changes. Segment C provides some spotted owl habitat, though generally of a lower quality in the eastern portion of the segment. The upper five miles of Segment C lies within quarter townships containing 36% to 43% 11-40 habitat. The 1.5 miles immediately above the National Forest boundary lie within an abbreviated quarter township that is 56% 11-40 habitat. Much of the habitat adjacent to Segment C is highly fragmented and below the 50% level of distribution habitat. Only one spotted owl activity center lies within one mile of Segment C and occurs in the abbreviated quarter township with the highest density of nesting and distribution habitat. Segment D has no habitat suitable for northern spotted owls.

Segments C and D contain cliff areas potentially suitable for peregrine falcon nesting. The cliffs examined in Segment C to date offer little protection from predators and very small ledges. Suitable cliffs for nesting have been documented in Segment D with an aerie recorded in the National Heritage Data Base. Both segments contain good to excellent riparian habitat for a peregrine falcon prey base due to stand conditions, limited public access, and concurrent low level of disturbance. Lack of access limits the amount of human use, and subsequent disturbance, in most of the canyon. However, this portion of the river corridor lies within a military flight corridor. Navy jets operating out of Whidby Island Naval Air Station practice low level flights within this corridor. The jet noise is not frequent enough to acclimate any peregrine falcons to this disturbance. Due to base closures, consolidation of military aircraft at fewer facilities, and the need to practice, military overflights may increase as much as 150% over 1992 levels.

A small number of bald eagles winter in the area, the number found depending on the severity of the winter. The corridor does not contain sufficient quantities of large animal carcasses, fish carcasses, high wintering waterfowl populations or some combination of these factors to attract large numbers of bald eagles. Segment C contains a limited amount of habitat potentially suitable for harlequin duck nesting and rearing. No ducks have been documented to date in the National Heritage Data Base. Pacific giant salamander may live in association with the springs in both segments, although no documented sightings have occurred. The canyon vegetation conditions and low level of human disturbance provide suitable travel corridors for wolverines through both segments.

The Forest Plan designates the areas extending north and south of the canyon rim in Segment C as deer/elk winter range emphasis areas. The north side of the canyon provides an important travel and migration corridor between summer range in Segment B and the White River State Game Management Area in Segment D. The upper 3.5 miles of Segment D runs through the Game Management Area, which the state manages for high quality wintering habitat for deer and elk. A drift fence across the river at the lower boundary of the Game Management Area keeps most of the deer and elk away from agricultural lands. The state sometimes feeds the herd during severe winters.

Segment C contains two areas designated as pine marten management areas (MRs) and one area designated as a pileated woodpecker MR. The pine marten MRs contain at least 320 acres of suitable habitat and the woodpecker MR at least 600 acres of suitable habitat.

Both segments contain redband rainbow trout and sculpin. Brook trout reside in the upper watersheds of Boulder, Frog, and Clear creeks, which flow into Segment C. A small population of longnose dace occur in one tributary of Threemile Creek and appear to be the only longnose dace in the White River basin (ODF&W 1985). The 1983-84 ODF&W survey also found a small population of largemouth bass at one site in a section of Rock Creek. Historically, ODF&W stocked hatchery rainbow trout into White River at Graveyard Butte between April and July.

Both Segment C and D occur in a deep canyon with steep sides and low flood plain development. Fish habitat in Segment C rates as fair with low numbers of trout observed in off-channel pools. Rearing habitat consists of moderately sized pools and rated fair in a 1983 habitat survey. This survey ranked the spawning habitat in Segment C as poor due to the poor location and embeddedness of the gravels. In Segment D, the river averages 1.9 feet deep and pools average 3.9 feet. On average, one tree at least two feet in diameter stands adjacent the river every 35 feet. As these trees naturally fall into the river, they provide fish habitat.

Segment C contains 62 pools and a pool:riffle:glide ratio of 0.9:8.4:0.7. The river averages 31.7 feet wide with a cobble and small boulder bottom. Segment D has a pool:riffle:glide ratio of 1.7:7.5:1.0. Slightly less than half the river provided suitable cover for six inch fish with deep pools and glacial milk providing most of the cover.

Two range allotments occur adjacent to the river in Segment C. White River allotment lies south of the river and Grasshopper allotment north. Cattle rarely travel to the river in either allotment due to the steep topography, numerous rock outcrops, and talus slopes. Range improvements in Segment C consist of several cattleguards, two developed springs as water sources, fencing around Keeps Mill Seed Orchard, and corrals and fencing at Camas Prairie, all part of the White River allotment.

Six range allotments occur on BLM lands in Segment D. The largest, White River allotment, lies adjacent to the National Forest boundary and White River State Game Management Area. This allotment contains four populations of Tygh Valley milkvetch and scattered populations of Howell's milkvetch (*Astragalus howellii*). Of the two species, Tygh Valley milkvetch appears to be sensitive to grazing. Above the canyon rim, medusahead and cheatgrass dominate; perennial bunchgrasses dominate below the rim. Livestock use appears to be light even on seasonal riparian areas created by irrigation runoff and virtually no grazing occurs below the canyon rim.

Five other allotments occur in BLM lands in Segment D, all smaller than the White River allotment. The BLM has not conducted any range condition surveys in recent years for these allotments. Of these five, the Rocky Ridge allotment contains populations of Tygh Valley milkvetch. Livestock may be able to reach the river in three of these five allotments, but topography limits the access. River access for one allotments is unknown and nonexistent on the other. Annual grasses dominate the range above the canyon rim on most allotments.

Before white settlement, the fire frequency increased from west to east, ranging from 200 years between fires in the Cool, Wet Mixed Conifer landscape unit to as little as five years between fires in the Range landscape unit. Native Americans burned much of the land on a regular basis to promote desirable plant

and animal species. Fire type also changes from west to east with stand replacing crown fire dominating the west edge and underburning most of the remaining forested areas.

Fire exclusion in Segment C has increased fuel loadings above 'natural' levels and altered stand composition towards more fire sensitive tree species. Prior to white settlement, much of Segment C burned on a relatively short frequency, averaging 10-50 years between fires. In the Dry Mixed Conifer landscape unit a typical fire would underburn the area, favoring ponderosa pine and Oregon white oak in the eastern end of the unit and ponderosa pine and Douglas-fir in the western end. In the Mesic Mixed Conifer landscape unit, a typical fire would consist of a mix of underburning and stand replacing fire. The Talus landscape unit rarely burned. The Canyon Riparian landscape unit burned at more irregular intervals and the typical fire depended more on drought conditions.

Currently, fuel loadings in much of Segment C consist of a mix of downed logs and branches on the ground, and extensive ladder fuels in the form of grand fir regeneration. Barlow Ranger District recently completed a fuels analysis of the Hazel planning area north of the river and Bear Springs analyzed fuels in the Wildhorse planning area south of the river. Both found a high risk of crown fire through much of the area. Prior to 1900, typical fuels would have consisted more of ponderosa pine needles, oak leaves, and grasses. Ladder fuels would have been scattered and smaller in size, consisting of patches of ponderosa pine or mixed ponderosa pine and Douglas-fir regeneration.

In Segment D, fire exclusion has had a greater impact in the canyon south of the river. Conditions there resemble those discussed in Segment C for Dry Mixed Conifer. North of the river and on both sides below Graveyard Butte, the impact of fire exclusion is much more subtle and difficult to discern. Grasses and forbs dominate the fuelbed both currently and prior to white settlement. Above Graveyard Butte fire exclusion has favored greater numbers of trees than before white settlement and may have encouraged more conifers than typical. Below Graveyard Butte, fire exclusion has permitted western juniper to expand across the landscape and may allow greater numbers of trees. Throughout Segment D fire exclusion has helped increase shrub cover.

Available records indicate that lightning started 30% of the fires in these two segments and humans 70%. The two segments together average one fire start a year and 19 acres per fire.

The Forest Service manages Segment C. Formerly, timber supplied from this segment helped support the economies of Tygh Valley and Maupin. Since both sawmills closed in this area the timber goes elsewhere in Oregon and Washington. A percentage of the timber sale receipts goes to Wasco County for payments in lieu of taxes. Keeps Mill Campground is free use, generating no income to either the federal government or, indirectly, Wasco County. The area occasionally produces personal use firewood in designated collection areas. Although Segment D is a mix of public and private land, almost all income generated in the segment comes from private farming and ranching. Typical products include wheat, hay, irrigated pasture, and beef.

Humans have occupied and traveled through both segments for thousands of years. The Confederated Tribes of Warm Springs use several areas on public lands for gathering berries, medicinal plants, roots, and acorns. Local groups used to burn the area to promote desired plants and habitat for primary game species. Segment C contains Keeps Mill and Flume, an early development for water and timber. Segment D contains an historic waterwheel at river mile 21.25 or 21.5 and a rock structure with a groundstone within the canyon, and a historic log structure above the rim. The sites in Segment D have not been formally recorded.

The scenic quality of Segment C is generally high (Table 3.3). Keeps Mill Campground exceeds VQOs for the middleground and meets VQOs for the background. Keeps Mill Overlook meets VQOs for that site and is an outstandingly remarkable value for the view. Two other viewpoints on the south rim exceed VQOs for all distances. Access into the canyon along the river provides small scale, intimate views of rocks, water, and streamside vegetation. Keeps Mill offers history and beauty along with camping opportunities, but the campground contains large areas of bare ground, detracting from the view.

Segment D also provides high scenic quality (Table 3.3), offering similar types of views from the river as Segment C. Graveyard Butte is an exception due to the county pit and the lack of designed recreation facilities, such as parking areas and toilets. The pit and road cut do not meet the Visual Resource Management (VRM) guidelines for the site. These features dominate the scene and do not blend with the landscape character.

The lack of access limits recreational opportunities but serves to provide a high quality experience. The Resource Assessment classified the sightseeing, photography, and kayaking opportunities as values in Segment C. Outstandingly remarkable values for recreation in Segment D include off-trail hiking, backpacking, sightseeing, photography, kayaking, and wildlife and nature observation. Rugged terrain, dense vegetation, and very limited access create outstanding opportunities for solitude, attracting visitors from within and outside the region.

Kayaking occurs during high water between Barlow Crossing, Keeps Mill, Graveyard Butte, and Tygh Valley. Kayakers must portage numerous log jams to run Class 3+ to Class 4 water between Barlow Crossing and Graveyard Butte and Class 2+ to Class 3 water between Graveyard Butte and Tygh Valley. The river contains few pools for resting. Private lands in Segment D limit resting areas also, since users must have permission from the landowners to land.

Recreationists also enjoy big game hunting, fishing, mushroom collection, and camping in Segment C, and hunting and fishing in Segment D. Clear Creek Trail, used by hikers and horseback riders, connects Keeps Mill to Clear Creek Campground (Tables 3.4 and 3.5). Visitors cannot access most of Segment C in winter. Visitors in Segment D occasionally trespass on private lands, particularly boaters and anglers in spring and hunters in fall.

Segments E and F

The 1988 Rivers Act designated Segments E and F as Recreation River. Segment E runs from the confluence with Threemile Creek to River Mile 2.46 just above White River Falls. Segment F runs from below White River Falls to the confluence with the Deschutes River. The 0.6 mile segment that includes White River Falls was not included in the Wild and Scenic River designation.

The oldest rocks in the White River area lie in these two segments. The 14.5 million year old French Springs Member of the Wanapum Basalt lie over the 15 million year old Grande Ronde Basalts. Collectively, these deposits form part of the Columbia River Basalt Group. White River Falls cuts into both these formations.

Neither segment contains any known locatable or leasable mineral claims. The potential for these resources is very low. A private sand and gravel operation lies just south of the river.

Soil types in Segments E and F consist of loess, volcanic ash, colluvium, alluvium, and residuum. Textures range from very stoney loams to silt loams to clay loams. The soils generally absorb water at moderate rates and contribute to base flows. Erosion becomes a problem only on steep slopes near Segment E and in Segment F. Private landowners farm much of the old floodplain in Segment E, producing wheat, hay, and irrigated pasture. Most soils are only moderate suitable for campgrounds and picnic areas, but some are well suited for trail development.

Only one perennial stream, Tygh Creek, feeds the river in Segment E. Although required by Oregon law (ORS 509.615), none of the diversions in the Tygh Creek watershed are screened to keep fish out. No perennial water flows into Segment F except in association with springs on the canyon wall. The river in Segment E meanders across the valley, creating side channels and oxbow ponds. Human activities have denuded and compacted riverbanks in several areas, most notably at the old Tygh Valley Mill site. One landowner with water rights to the main stem uses an bulldozer in the river channel to create the diversion each year.

The climate is hot and dry, with as little as 10 inches annual precipitation at the river mouth. Although weather influence from the Columbia River moderates temperatures, summer temperatures often exceed 100° in August and September. Most precipitation falls in winter, peaking in January and February.

Vegetation within both segments consists mostly of shrubs, forbs, and grasses. Trees appear only immediately adjacent to the river in Segment F and most of Segment E. Trees also grow on the steep canyon walls on the west edge of Segment E. Trees found elsewhere in the area depend on natural springs or some form of irrigation for water. The cottonwood stands in the Tygh Valley Riparian landscape unit qualify for Research Natural Area (RNA) status and may provide habitat for nesting bald eagles in the future. The Ag Lands, Range, and Shrublands landscape units form the uplands. These units contain several populations of Tygh Valley milkvetch. Problem plants include annual grasses, such as medusahead and cheatgrass, and invasive shrubs, such as rabbitbrush. These species dominate where human disturbance, including grazing, is most significant.

Several species of insects and diseases may be present within these segments; only those which attack commercial crops appear to be economically important. Ponderosa pine on the west edge of Segment E faces increasing attack from mountain pine beetle. Various butterfly and moth larvae defoliate or partially defoliate the hardwoods but do not appear to affect tree health.

Wildlife species present in Segments E and F are typical of those associated with open areas and that can tolerate the presence of much human activity. The riparian area of Segment E could support an adequate prey base for peregrine falcon. The lack of forest favors prairie falcon if suitable nesting cliffs exist. Segment F contains suitable nesting cliffs but cannot support an adequate prey base for peregrine falcons, leaving the area more conducive for prairie falcon. Wintering bald eagles occasionally appear, the number varying with winter severity. Although roosting habitat exists, the area lacks a suitable food source to support many birds. Pacific giant salamanders may occur in the springs. This species has been sighted at Oak Springs on the Deschutes River, one mile from the confluence with White River. Black-tailed deer winter in Segment E, often feeding off harvest stubble. Mule deer replace black-tailed deer away from the river and in Segment F.

Segment E supports redband rainbow trout, sculpin, and a small population of mountain whitefish (ODF&W 1985). Segment F supports the same fish species as the Deschutes River and contains anadramous fish. Summer steelhead spawn below White River Falls. Whether spring and fall chinook spawn in White River below the Falls remains unknown. A proposed fish passage facility at White River Falls would open up approximately 100 miles of stream to spring chinook salmon and would produce an expected 1,400-2,100 additional salmon in the Deschutes River basin.

Historically, ODF&W released hatchery rainbow trout in Segment E at the old highway in Tygh Valley and at the present US 197 bridge. The agency has reviewed the hatchery stocking policy in White River and now manages the river under the Wild Fish Management Policy. The Confederated Tribes of Warm Springs have treaty rights for "taking fish at usual and accustomed grounds and stations" along the White River. Mostly, they exercise this treaty right for taking anadramous fish.

Neither ODF&W or the BLM have surveyed fish habitat in Segments E and F, since most of it is privately owned. Hydrothermograph data for Segment F indicate that water temperatures are suitable for cold water fish.

Grazing occurs adjacent to the river in Segment E. Cattle often have direct access to the river for water. Most grazing occurs in winter, but some grazing occurs throughout the year. The isolated tracts of federal land in Segment F do not contain any official allotments. These tracts receive an unknown amount of grazing from livestock grazing on adjacent, unfenced private lands. The extent and season of grazing in Segment F in unknown.

Fuels in Segment E consist of farm crops. Since the owners irrigate most crops adjacent to the river, fire danger is very low. Fuels in Segment F consist of grasses and shrubs. Given the climate, this fuelbed could burn readily; however, the area's dryness breaks fuel continuity. Wildfires depend on strong winds to carry the fire from plant to plant.

Private landowners own virtually all of Segment E, depending mostly on farming for income. One private sand and gravel operation occurs below the Highway 197 crossing and in the main floodplain.

The current land uses in Segment E have hidden or obliterated much of the remains of past human occupation and use. No cultural resource sites have been identified in the segment. Three cultural resource sites lie in Segment F. Looters damaged much of the potential information at the two prehistoric sites, a village site and a rock shelter. The historic Oregon Trunk Railroad line crosses the White River at the mouth. Burlington Northern Railroad still uses this line.

Scenic quality generally rates high in these two segments (Table 3.3). Viewpoints from highways 197 and 216 offer a contrast between the riparian vegetation and the desert steppe outside the farmlands. Tygh Valley itself provides a natural appearing pastoral setting. Rafters, anglers, and other river users enjoy the view from the base of White River Falls to the mouth. The most scenic element in the area, White River Falls, was excluded from the official designation.

None of the recreation opportunities were considered outstanding in either segment. Segments E and F provide opportunities for inner tubing, kayaking, rafting, fishing, and hiking. Visitors need permission from the private landowners to cross their property and may need permission to use the shore on tribal lands in Segment F. White River Falls and the old hydroelectric plant at its base offer sightseeing and photography opportunities, but lie outside the designated corridor.

DESIRED FUTURE CONDITIONS

The IDT developed the Desired Future Conditions (DFCs) based on the landscape analysis, the Forest Plan and Two Rivers RMP, and input from the citizen work group. This section describes what the river corridor should look like and what commodities and amenities it should provide. Using an ecosystem approach (Figure 3.1), the section describes the desired range of vegetative conditions for federal lands within the corridor. Some elements in the DFCs require action beyond the scope of this management plan, requiring action by other local, state, and federal agencies. These elements do not appear in the Alternatives. Desired Future Conditions guide the development of alternative management strategies. All Alternatives listed in Chapter 2 should be compatible with the conditions described below.

All Segments

All river management activities protect, maintain, or enhance the outstandingly remarkable values (Outstandingly Remarkable Values) (Table 3.1). A mix of nature trails, viewpoints, interpretive markers, and written materials interpret Outstandingly Remarkable Value features.

During late summer and fall, the river flows milky white in color and does not show signs of other, darker colors. The river remains free flowing throughout the year.

The distribution and populations of plants and animals within the corridor are similar to those expected under natural conditions. Vegetation management is designed to maintain riparian vegetation communities in proper ecological functioning condition while allowing only those projects which promote biological diversity. Desirable plant species include alder, red-osier dogwood, willows, cottonwoods, and a variety of understory species, such as chokecherry, rushes, and various forbs. Site conditions dictate the specific composition and presence of each riparian community type.

Human activities enhance or protect sensitive species habitat. Public lands provide opportunities to research sensitive species, habitat needs, and management strategies to enhance or protect sensitive species populations. Centralized markers or signs, pamphlets, and brochures provide information on sensitive species and their environment.

Where natural forces cannot operate freely or fully, land management maintains or promotes plant community diversity, including a mix of native and agricultural species on the landscape. As much as possible on public lands, management actions should mimic natural processes, or their effects, to shape the vegetative mosaic and successional stages on the landscape. Noxious weeds are absent or present only at very low levels.

Natural processes operating on the river provide a diversity of insect species at endemic population levels, a mix of pools and riffles, and a rich and biologically diverse riparian vegetative mosaic. Fish populations and habitat quality remain at the highest level the river is naturally capable of providing. Native fish species maintain their genetic integrity and population viability. A healthy and diverse riparian plant community stabilizes banks and filters out sediments. Watershed management prevents unnatural levels of sediment from entering the river. Riverbanks are stable and are not eroding excessively due to human actions and activities.

Fuels management reduces the risk of a large stand-replacing wildfire while providing proper levels of downed woody material and duff needed for high quality fish and wildlife habitat, long term site productivity, and streambank stability. Table 3.6 lists the desired residue profiles and Table 3.7 the acceptable limits of exposed mineral soil levels for the landscape units on public lands. A higher than acceptable level of exposed mineral soil may occur in the short term to move the areas toward meeting the long term goals around the outstandingly remarkable values in the corridor. Visitors to the corridor may encounter evidence of fire from prescribed burning and wildfires.

River corridor management helps maintain or enhance the Wasco County economy, while protecting the river's Outstandingly Remarkable Values. Corridor management should provide opportunities for local employment and assist in expanding the local economy.

Cultural resource sites provide opportunities to increase public knowledge and understanding of the history and prehistory of the White River corridor. Law enforcement activities protect sites from vandalism and theft. Approved plans provide management direction for those sites that need plans. All public agencies and private landowners within the corridor work together to protect, enhance, and interpret cultural resources along White River. Native American traditional use locations on Federal and ceded lands are managed for their traditional values and importance.

Segments A and B

The resculpted sand pit provides safe snow play and a natural-appearing landscape. Native vegetation at population levels typical of the area covers the former mine. Subsurface water flows unimpeded through the sandy soils of the Lodgepole Flats landscape unit.

Vegetation management mimics the natural processes that shape plant communities. The area provides high quality wildlife habitat, scenic quality, views to Mt. Hood and White River, tree species compositions at more naturally occurring levels, and successional stages in proportion to that expected under natural conditions. National Forest lands provide various special forest products; such as firewood, mushrooms, and beargrass; as long as these activities are compatible with managing the Outstandingly Remarkable Values.

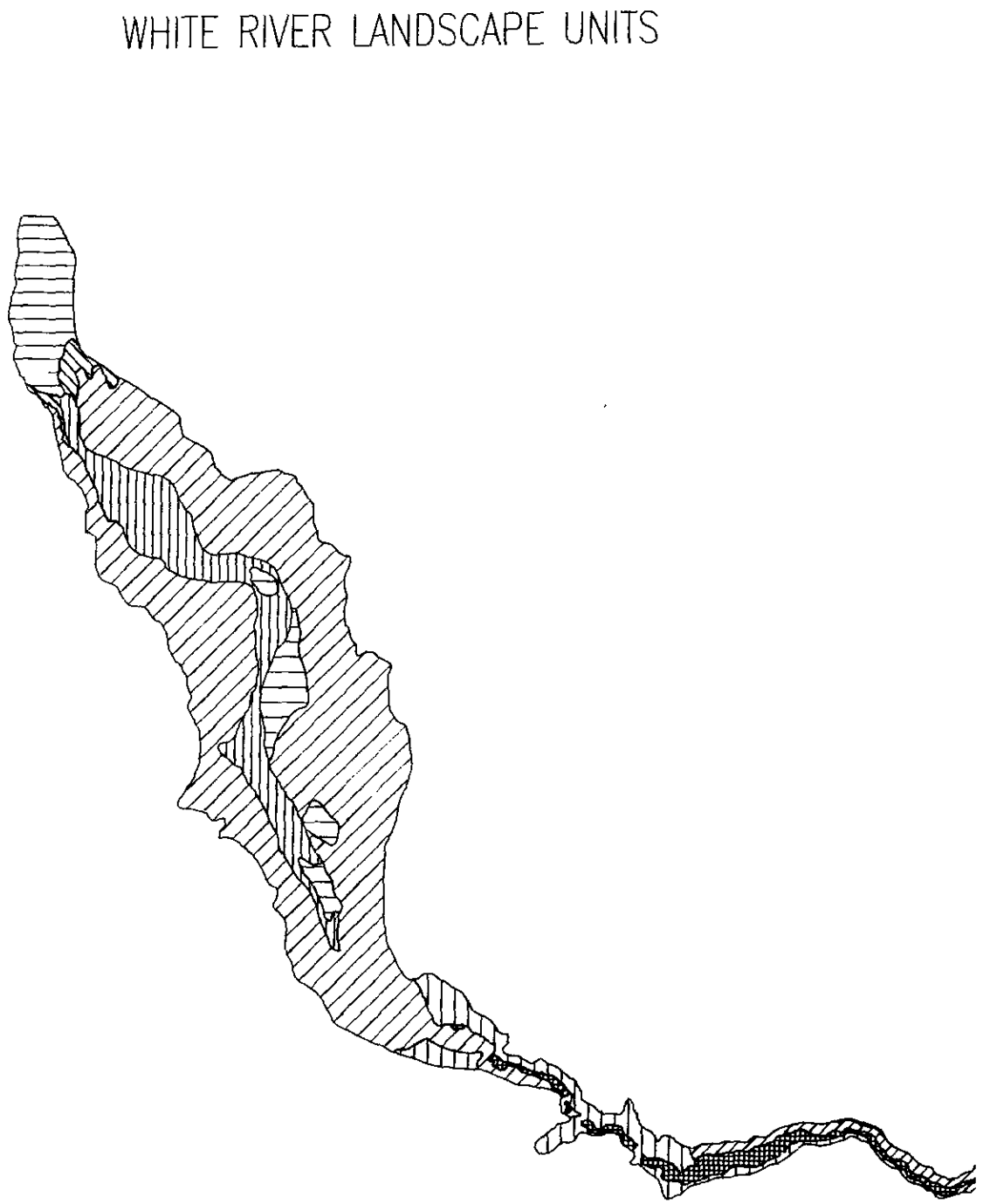


Figure 3.1. White River landscape units used in the ecosystem approach to alternative development.

MAP LEGEND

- ROCKS 'N ICE
- SUBALPINE
- LODGEPOLE FLATS
- WET MIXED CONIFER
- WETLAND
- MESIC MIXED CONIFER
- TALUS/FORESTED ROCK
- DRY MIXED CONIFER
- OAK CONIFER
- RANGE
- TYGH VALLEY
- TYGH VALLEY RIPARIAN
- AG LANDS
- SHRUBLANDS

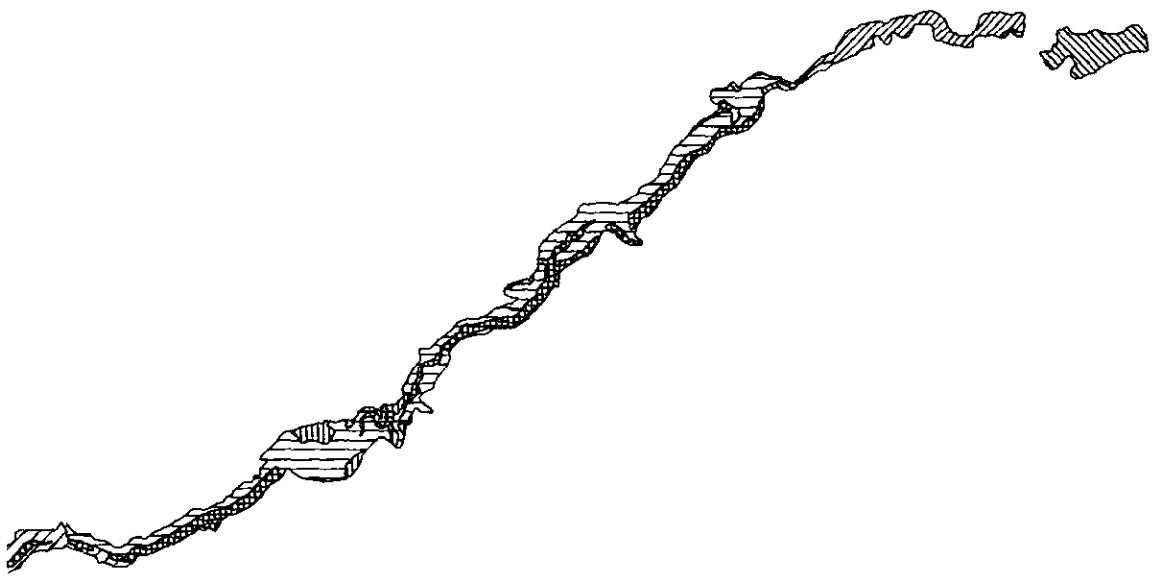


Table 3.6. Range of desired residue profiles by landscape unit and major plant association series on public lands.

Landscape Unit	Plant Series	Tons per Acre[1] 0-3"	3-12"	12-20"	20"+	Fuel Bed Depth[2]	Duff Depth
Rocks 'N' Ice, Talus, Subapline, Open Riparian, Canyon Riparian, Lodgepole Flats, Wetlands	Mountain hemlock, Pacific silver fir	Natural forces decide					
Cool, Wet Mixed Conifer	Western hemlock	3.5-5.5	4.0-6.0	6.5-9.5	6.5-9.5	0.25 ft	1.2-2.0 in
Mesic Mixed Conifer	Grand fir	3.5-5.5	4.0-6.0	6.5-9.5	6.5-9.5	0.25 ft	1.2-2.0 in
Dry Mixed Conifer	Grand fir	3.5-5.5	4.0-6.0	6.5-9.5	6.5-9.5	0.25 ft	1.2-2.0 in
	Douglas-fir	3.5-5.5	4.0-6.0	7.0-10.0	5.5-7.5	0.25 ft	0.8-1.8 in
	Pine-oak	3.5-5.5	2.5-3.5	3.0-4.0	4.0-6.0	0.25 ft	0.4-0.9 in

[1] Tons per acre by diameter classes of downed woody material

[2] Average height of most downed woody material.

Table 3.7. Range of acceptable exposed mineral soil levels by landscape unit and plant association series on public lands.

Landscape Unit	Plant Series	Bare Ground by Successional Stage: Stem Initiation[1]	Stem Exclusion[2]	Stem Reinitiation[3]	Old Growth
Rocks 'N' Ice, Talus, Subalpine, Open Riparian, Canyon Riparian, Lodgepole Flats, Wetlands	Mountain hemlock, Pacific silver fir	Natural forces decide			
Cool, Wet Mixed Conifer	Western hemlock	≤3%[4]	3-2%	2-1%	<1%
Mesic Mixed Conifer	Grand fir	≤5%	5-3%	3-2%	<2%
Dry Mixed Conifer	Grand fir	≤5%	5-3%	3-2%	<2%
	Douglas-fir	17-16%	16-10%	10-5%	<5%
	Pine-Oak	15-9%	9-6%	6-3%	<3%

[1] New openings, seedlings, saplings

[2] Closed canopy with natural thinning beginning

[3] Canopy gaps and second tree layer starting

[4] Percent of the landscape unit within the corridor

National Forest management protects visitors in campgrounds, day use areas, and along the Barlow Road from obvious hazards associated with dead and defective trees. Natural processes shape the vegetative mosaic on the landscape, including associated downed logs, other woody debris, and snags, and successional pathways in the Subalpine, Open Riparian, Canyon Riparian, Talus, Lodgepole Flats, and Wetlands landscape units. Where some or all these natural processes cannot occur in the these six landscape units due to other constraints, vegetation management mimics those processes.

The other landscape units in Segment B (Cool, Wet Mixed Conifer and Mesic Mixed Conifer) contain a mix of stand structures (Table 3.8 and Figure 3.2). Old growth stands contain suitable numbers of large trees (Table 3.9). Primary cavity nesters, such as woodpeckers, find enough snags, downed logs, and wildlife trees to meet 100% of their needs on individual harvest units and 80% of their needs over the landscape unit as a whole.

Livestock do not use Segment A due to the lack of forage. Recreational livestock do not use the segment due to the lack of suitable trails. Livestock grazing and use of recreational livestock continues

in Segment B where it is compatible with management of Outstandingly Remarkable Value features and where it does not interfere with public use of the river corridor. Range conditions rate good to excellent.

Human activities do not significantly disturb wildlife in Segment A. Large continuous blocks of old growth and large, undisturbed travel corridors within Segment B provide habitat and security for a variety of species. These features cross the river and run down the corridor. Healthy, viable populations of various threatened, endangered, and sensitive species occur within the area, including several nesting pairs of northern spotted owls. Approved plans guide management activities in the pileated woodpecker and pine marten management areas and Key Site Riparian areas within the corridor. Vegetation management provides all successional stages, including thermal cover and optimal thermal cover for deer and elk.

Table 3.8. Range of desired percentages of each landscape unit in each stand structure category.

		Landscape Units[1]		
Stand Structure	Description	Cool, Wet Mixed Conifer	Mesic Mixed Conifer	Dry Mixed Conifer
Stem Initiation	New openings, seedlings, and saplings	≤10%	≤10%	≤5%
Stem Exclusion[2]	Closed canopy with natural thinning	10-30%	10-30%	5-20%
Stand Reinitiation	Gaps appearing in canopy and new conifer regeneration starting	15-30%	15-30%	15-30%
Old Growth	See R6 description	30-50%	30-50%	45-70%

[1] Percentages represent percent of landscape unit within the corridor in each stand structure

[2] Includes both single-story (poles) and two-story (mature) stands.

Table 3.10 lists the desired VQOs for the river corridor and the designated viewshed. Ski facilities at Timberline Lodge and Mt. Hood Meadows do not block scenic views. These facilities do not compete with any scenic views and meet a VQO of Partial Retention. Visitors can take photos or videotapes of the characteristic landscape, know scenic views exist, and want to linger at viewpoints. Sno-park amenities meet Partial Retention from within the sno-parks.

Visitors see Mt. Hood from several viewpoints along the Barlow Road. The plant communities and general landscape along the Barlow Road resembles that seen by the original pioneers and meets Retention in the foreground. Campgrounds and dispersed camp sites provide an aesthetic setting. Deciduous trees and shrubs as well as western larch grow along Forest Road 48. Turnouts and viewpoints meet VQO's and provide interesting views of Mt. Hood and White River. Forest road 48 provides safe access on a smooth surface; its traffic control structures meet Partial Retention and blend with the landscape. Travelers along Road 48 do not see any geometrically shaped harvest areas.

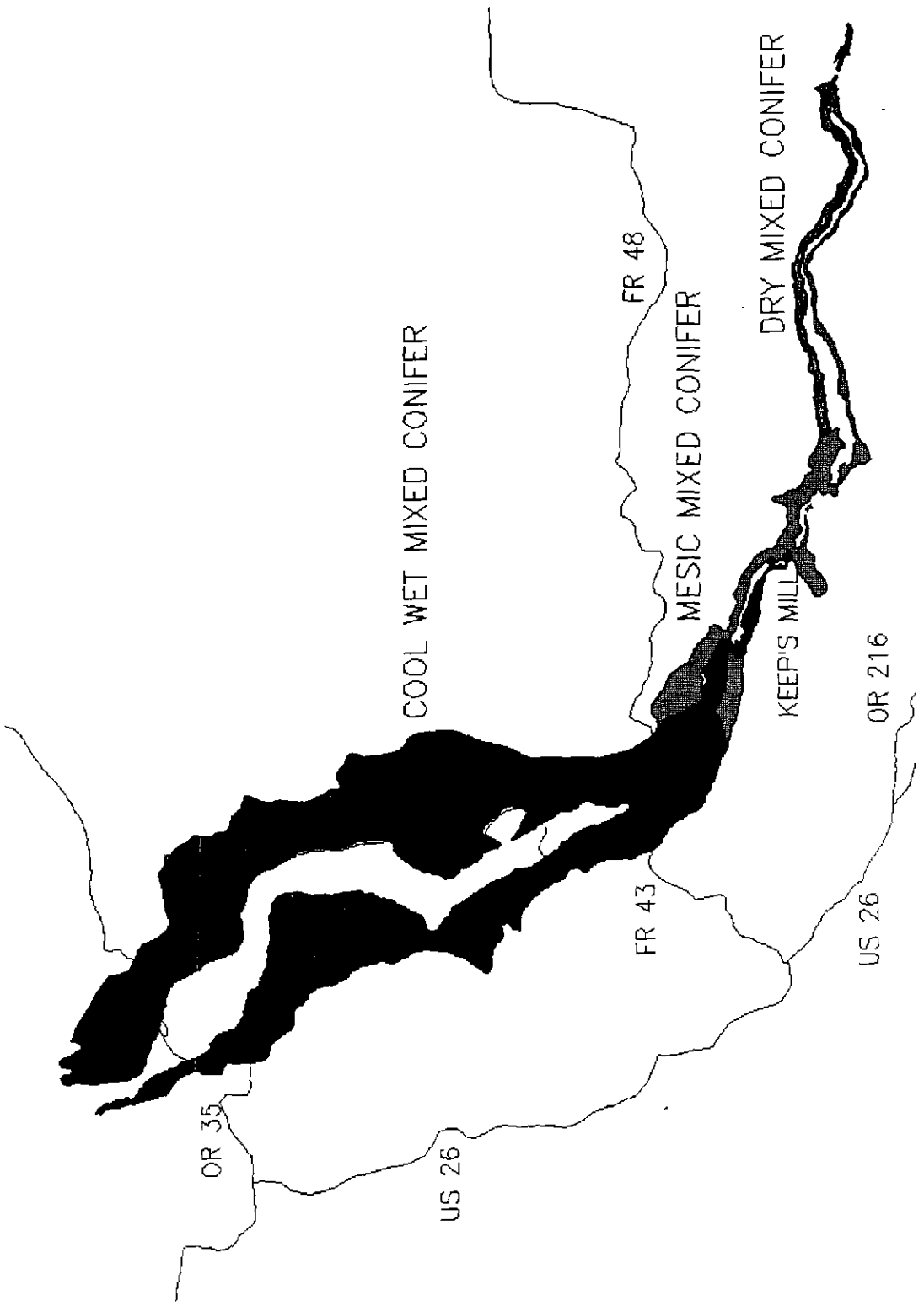


Figure 3.2. Landscape units with listed range of desired percentages of each stand structure.

Table 3.9. Target tree sizes for old growth stands by forest zone.

Forest Zone	Key Species	Target DBH (inches)
Mountain hemlock	mountain hemlock	24
	Douglas-fir	36
	noble fir	40
	Pacific silver fir	26
	western hemlock	36
	western white pine	18
	western larch	24
	lodgepole pine	15
Pacific silver fir	Pacific silver fir	32
	Douglas-fir	36
	western hemlock	36
	mountain hemlock	24
	western white pine	20
	western redcedar	36
	noble fir	46
Western hemlock	western hemlock	48
	Douglas-fir	48
	western redcedar	48
	noble fir	48
	grand fir	36
Grand fir	Grand fir	32
	Douglas-fir	32
	ponderosa pine	36
	Pacific silver fir	22
	mountain hemlock	22
Douglas-fir	Douglas-fir	32
	ponderosa pine	36
	Oregon white oak	19
Ponderosa pine	ponderosa pine	32
	Oregon white oak	27

Table 3.10. Desired VQOs for the river corridor by management alternative, boundary alternative, and designated viewshed alternative.

Segment	Management Alt.	Corridor Alt.	Viewshed Alt.	Preservation	Retention			Partial Retention			Modification
					Fg[1]	Mg	Bg	Fg	Mg	Bg	
A/B	A	1	1					X	X	X	Views from Bonney and Barlow Buttes, middleground and background from Road 48
	B	2 and 3	2		X	X	X				
	C	2 and 3	2		X				X	X	
	D and E	2 and 3	2					X	X	X	
	B	2 and 3	3		X	X	X				
	C	2 and 3	3		X				X	X	
	D and E	2 and 3	3					X	X	X	
C	A	1	1		X				X	X	
D	A	1	1	X[2]	X	X	X				
C/D	B and C	2 and 3	2 and 3		X	X	X				
	D and E	2 and 3	2 and 3					X	X	X	
E	A	1	1					X	X	X	
F	A	1	1		X	X	X				
E/F	B and C	2 and 3	2 and 3		X				X	X	
	D and E	2 and 3	2 and 3					X	X	X	

[1] Distance zones: Fg = Foreground, Mg = Middleground, Bg = Background

[2] From Forest Boundary to Graveyard Butte and from 1/2 mile below Graveyard Butte to Threemile Creek

In middlegrounds, visitors see some evidence of vegetative management activities, such as harvest units or prescribed burns, but these activities do not dominate the scene. Openings mimic naturally occurring landscape events for the particular landscape unit but meet Partial Retention at least from all viewpoints. Views from viewpoints outside the corridor at least meet Modification. Western larch and other fall color trees appear throughout the segments. Backgrounds receive similar management as Middlegrounds except management activities in Backgrounds affect larger areas and still meet VQO's. Visual Quality Objective allocation is appropriate to the quality of scenic views each location provides. Viewpoints have good access and viewing opportunities.

Visitors to older stands in the Cool, Wet Mixed Conifer landscape unit travel through a cool, dark forest dominated by large trees of several species. In the Mesic Mixed Conifer landscape unit, visitors travel through a more open and light forest than in the Cool, Wet Mixed Conifer unit. Large ponderosa pine, Douglas-fir, western white pine, and other earlier successional species dominate the older stands.

Table 3.11 lists the desired ROS class for each river segment and each management alternative. Recreational settings, experiences, access, use levels, and development levels are consistent with these ROS classes. Most facilities should be rustic with native materials on the exteriors. Visitors experience moderate evidence of human development, but the natural characteristics of the landscape dominate. User groups rarely conflict with each other. Motorized vehicles travel only on designated routes. Historic reenactments related to the Barlow Road protect trails and river crossings from damage and excessive wear. Visitors have limited access to the river for floating and kayaking. Recreational activities do not damage sensitive plants and animals or disrupt their life cycles.

Low key on-site visitor management controls and regulations help protect the campgrounds, day use areas, sensitive areas, and Outstandingly Remarkable Value features from excessive use and wear and help minimize visitor conflicts. Visitors may find simple information facilities and will contact Forest Service personnel in the campgrounds. Campsites and heavily used dispersed sites may have hardened

paths, barriers, parking spots, and tent sites. Generally, dispersed sites should contain trees, shrubs, and forbs with little or no evidence of human use.

Table 3.11. Desired Recreational Opportunity Spectrum Class for each river segment by management alternative.

River Segments and Designation	ALTERNATIVES				
	A	B	C	D	E
Segment A: Recreation[1]	Roaded Natural	Roaded Natural	Roaded Natural	Roaded Natural;	Roaded Natural
Segment B: Recreation	Roaded Natural	Semi-primitive Motorized	Semi-primitive Motorized	Roaded Natural	Roaded Natural
Segment C: Scenic	Semi-primitive Nonmotorized; Keeps Mill - Semi-primitive Motorized	Semi-primitive Nonmotorized; Keeps Mill - Semi-primitive Motorized	Semi-primitive Nonmotorized; Keeps Mill - Semi-primitive Motorized	Semi-primitive Nonmotorized; Keeps Mill - Roaded Natural	Semi-primitive Nonmotorized; Keeps Mill - Roaded Natural
Segment D: Scenic	Semi-primitive Nonmotorized; Graveyard Butte-Semi-primitive Motorized	Semi-primitive Nonmotorized; Graveyard Butte-Semi-primitive Motorized	Semi-primitive Nonmotorized; Graveyard Butte-Semi-primitive Motorized	Semi-primitive Nonmotorized; Graveyard Butte-Roaded Natural	Semi-primitive Nonmotorized; Graveyard Butte-Roaded Natural
Segment E: Recreation[2]	Roaded Natural	Semi-primitive Motorized	Semi-primitive Motorized	Roaded Natural	Roaded Natural
Segment F: Recreation	Semi-primitive Nonmotorized	Semi-primitive Nonmotorized	Semi-primitive Nonmotorized	Semi-primitive Nonmotorized	Semi-primitive Nonmotorized

[1] Based on number of expected encounters due to Mt. Hood Meadows Ski Area expansion

[2] Based on desired setting only

Segments C and D

The county gravel pit at Graveyard Butte blends with the characteristic landscape and native vegetation covers the former pit. Mining and mineral leases cause no negative impacts to Outstandingly Remarkable Values. Vegetation management mimics the natural processes that shape the plant communities. The segments provide high quality wildlife habitat, scenic quality, views to Mt. Hood and White River, tree species compositions at more naturally occurring levels, and successional stages in proportion to that expected under natural conditions. Federal lands provide various special forest products, such as firewood and mushrooms, as long as these activities are compatible with managing the Outstandingly Remarkable Values and do not promote trespass on private lands.

In the Canyon Riparian and Talus landscape units on public lands natural processes shape the vegetative mosaic on the landscape and successional pathways. Where some or all these natural processes cannot occur due to other constraints, vegetation management may occur to mimic those processes or their effects.

The other landscape units on public lands in Segments C and D (Cool, Wet Mixed Conifer, Mesic Mixed Conifer, and Dry Mixed Conifer) contain a mix of stand structures (Table 3.8 and Figure 3.2). On federal lands, primary cavity nesters find enough snags, downed logs, and wildlife trees to meet 100% of their needs in individual harvest units and 80% of their needs over the landscape unit as a whole.

Large, continuous blocks of old growth and large, undisturbed travel corridors provide habitat and security for a variety of wildlife species. These features cross the river and run along the corridor. Healthy, viable populations of various threatened, endangered, and sensitive species occur within the

area. Forested lands provide all successional stages, including thermal and optimal thermal cover for deer and elk.

In Segment C, motorized vehicle use causes minimal disturbance to wildlife. Segment C provides high quality habitat for several nesting pairs of northern spotted owls in those plant communities that can provide such habitat over the long term. Drier plant communities that can do so provide suitable northern spotted owl habitat over the short term until higher quality habitat develops elsewhere. Approved plans guide management actions in the pileated woodpecker and pine marten management areas within the corridor. Both segments provide habitat for turkeys, gray squirrels, and other small game animals, and winter range for deer and elk.

Livestock grazing and recreational livestock use continues in Segment C and on public lands in Segment D where it is compatible with management of Outstandingly Remarkable Value features and where it does not interfere with public use of the river corridor. Range conditions rate good to excellent. Landowners may use prescribed fires to meet their objectives. All unplanned ignitions in Segment D are designated as wildfires and suppressed using appropriate strategies and tactics. The north aspects of federal land in Segment D have a low risk of large, destructive wildfire.

Private irrigation systems maintain proper drainage to manage high flows during snowmelt without causing excessive erosion or other water damage to Outstandingly Remarkable Value features. Private irrigation ditches may develop small hydroelectric projects on private lands, but these projects minimize affects on scenic quality. The Forest Service allows access for maintenance of the irrigation ditches under special use permit and permanent easement.

In Segment C, Keeps Mill and the road to Keeps Mill provide river access and views of south aspects in the canyon. Large diameter ponderosa pine stands dominate those views. Keeps Mill Campground provides an aesthetic setting while protecting the riverbank and other Outstandingly Remarkable Value features . Rustic signs interpret the site's historic aspects. Keeps Overlook and forest roads 2110-270 and 4885-160 provide secluded and little-used viewpoints into the canyon and serve as informal picnic or photo spots. Visitors perceive the canyon as pristine and remote. All other views in the Foreground at least meet Partial Retention. All views in the Middlegrounds and Backgrounds at least meet Modification (Table 3.10).

In Segment D, viewpoints at Graveyard Butte and the Juniper Flat Road provide panoramic vistas where White River contrasts with the desert steppe landscape. Any visitor use facilities near Graveyard Butte; such as parking, photo point turnouts, and dispersed campsites; provide an aesthetic setting and protect the river, Outstandingly Remarkable Value features, and private lands from damage and excessive wear. Any visitor use facilities help protect private lands from trespass.

Visitors to older stands in the Cool, Wet Mixed Conifer landscape unit (Segment C) travel through a cool, dark forest dominated by several species. In the Mesic Mixed Conifer landscape unit on public lands, visitors travel through a more open and light forest than in the Cool, Wet Mixed Conifer unit. Large ponderosa pine, Douglas-fir, western white pine, and other earlier successional species dominate the older stands. Visitors to the Dry Mixed Conifer unit on federal lands travel through open, park-like stands with some combination of ponderosa pine, Douglas-fir, and Oregon white oak. Grasses and shrubs dominate the understories in the pine-Douglas-fir stands and the pine-Douglas-fir-oak stands. The latter plant community supports fewer shrubs than the former. Grasses dominate understories in the pine-oak stands.

Recreational settings, experiences, access, use levels, and development are consistent with the desired ROS class in both segments (Table 3.11). In Segment D, recreational activities do not interfere with landowner uses and do not cause property damage or result in trespass. Visitors must obtain permission from the landowner to enter or cross closed private lands. Camping and campfires occur only in designated areas.

Segments E and F

Management activities under the White River Plan end where White River corridor meets the Lower Deschutes corridor. All landowners practice sustainable forestry and provide wood products, healthy forests, wildlife habitat, and scenic quality. Public agencies and private landowners work together to provide and manage habitat and forage for watchable wildlife, such as deer, ducks, and raptors. Healthy, viable populations of various threatened, endangered, and sensitive species occur within the corridor. Segment F provides high quality wildlife habitat for a variety of species.

Aesthetic visitor facilities compliment the site and scene, protect visitor safety, and interpret the old hydroelectric facilities. Highway 197 and State Highway 216 provide views into the canyon at either end of Segment E. Commercial and residential developments in the foreground areas of Segment E do not compete with the view of the river beyond. Devil's Half Acre provides a sweeping vista. Table 3.10 lists the desired visual management objectives.

Recreational settings, experiences, access, and use levels are consistent with the desired ROS class in both segments (Table 3.11). Recreational activities do not interfere with landowner uses nor result in property damage or trespass. Boaters find legal places to take out of the river. Developed campgrounds and other recreational facilities encourage visitor use. Visitors must obtain permission from the landowner to enter or cross closed private land. Camping and campfires occur only in designated areas. Landowners who provide public access through a publicly provided incentive program and do not charge for that access are not liable for accidents, injuries, or deaths that may befall visitors.

Tygh Valley remains an agrarian community complimented by a free flowing, natural-appearing river. Human development is prevalent and impoundments, diversions, or channel modification may be evident. Visitors have legal nonmotorized access to the river at designated points. They commonly find moderate evidence of others and may encounter large numbers of users on-site and in nearby areas. Sites contain enough controls and visitor regimentation to prevent most visitor/visitor and visitor/landowner conflicts and to help protect Outstandingly Remarkable Value features. Sophisticated information exhibits may occur.

Recreational experiences, access, use levels, and development are consistent with a ROS of Semi-Primitive Nonmotorized in Segment F (see description under Segments A and B). Nonmotorized trails and watercraft supply public access to the river. The river mouth and the state park provide access points on the north side. Visitors must obtain permission from private landowners to cross closed private lands. Camping and campfires happen only in designated areas. Public agencies encourage private land uses and activities that protect, enhance, or maintain the Outstandingly Remarkable Values.

Chapter 4
Environmental Consequences

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter forms the scientific and analytic basis for comparing alternatives. It identifies, summarizes, and compares environmental impacts of each alternative on the river corridor resources and land uses described in Chapter 3. In each section, Alternative A describes the impacts to resources and uses that would occur if the managing agencies take no additional actions beyond those already described in the Mt. Hood Forest Plan and the Two Rivers RMP. The remaining alternatives describe the expected impacts if the managing agencies take the additional actions described in Chapter 2. Short-term, long-term, direct, indirect, and cumulative effects are considered.

Not all impacts are quantifiable due to the lack of appropriate data. The ID Team resource specialists used professional judgment to estimate the environmental consequences where they lacked quantifiable data.

The effects are displayed differently than the affected environment. This chapter discusses environmental effects by alternative for each resource rather than for each segment pair. This alternate organization should make it easier for the reader to understand effects on each resource of interest and to better compare the alternatives affecting that resource. Resources are grouped under Issues, Social Effects, Biological Effects, and Physical Effects. Analysis indicates no known impacts to climate and geology outside of mining; they will not be discussed further.

The end of the chapter contains several tables which summarize impacts to various resources. Management actions which are not expected to cause significant or noticeable changes are indicated with "NC" (no change). Some tables use Alternative A, the no action alternative, as a baseline and compare the other alternatives to it. In those cases, "0" represents the baseline in Alternative A and no change in any other alternative.

MANAGEMENT ALTERNATIVE EFFECTS

EFFECTS ON ISSUES

Issue 1. Commodity Production

This section discusses the effects of Alternatives on mining, grazing, and timber production and their associated industries and permittees. The effects of these commodity production activities are discussed under the various resources they would affect. The section on Physical Effects contains the effects of mining on the Old Maid deposits in Segment B. The Forest Plan FEIS (1988) discusses the effects of withdrawing locatable minerals, the "No surface occupancy" stipulation for leasable minerals, and prohibiting further permits for salable minerals within the Wild and Scenic River corridors on the Forest. The entire White River corridor has low potential for locatable and leasable minerals. There are no known mining claims on National Forest lands within any of the boundary alternatives.

The discussion of effects on the timber industry are based on the Allowable Sale Quantity (ASQ) and expected harvest methods documented in the Forest Plan. The IDT recognizes that changing conditions within the agency and the Region will affect harvest levels, but those effects are beyond the scope of this plan. Comparison Table 1 displays the differences between the alternatives based on the measures listed under Issues in Chapter 1.

Alternative A

Mining. This alternative would have no significant negative effects on mining. Although the National Forest lands would remain closed to all but leasable mineral development, the lack of known claims and

the low potential would result in little or no impact to the mining industry. All BLM lands would remain open to entry, having no impact on mineral production. This alternative would allow the greatest level of development in the Highway 35 pit by allowing removal of an additional 600,000 cubic yards of material over the next 10-12 years. At the end of that time, ODOT would need to locate a new source of sanding material. Alternative sand sources on the Forest are unlikely. Any other type of sanding material, such as crushed rock, would cost much more to develop than the Highway 35 pit. The permittee would have responsibility for site rehabilitation and restoration at the Highway 35 pit.

Grazing. Achieving desired vegetation management goals could result in changes in livestock numbers or season of use and may result in removal of livestock from some areas on a temporary or permanent basis. Permanent removal of livestock is more likely in riparian areas than in uplands. Temporary fencing and high intensity management may be required to meet vegetation management goals, increasing permittee costs. Use of other vegetation management tools, such as fire or mechanical treatment, could require temporary changes in livestock numbers or season of use or in temporary removal of livestock from the treated area. Management plans for threatened, endangered, and sensitive species could also result in changes in livestock numbers, use seasons, or rest periods, or in the exclusion of livestock from selected areas.

Actions proposed under hydrology would have no impacts to livestock grazing. Grazing would continue on federal lands under the provisions developed through allotment management plans and allotment evaluations. Changes in grazing levels, patterns, and so forth would occur as appropriate under the allotment management plan and allotment evaluation processes. Grazing on other ownerships would continue, subject to state and local rules and regulations governing land use.

Timber. The viewshed alternative has a larger impact than the boundary alternative that may combine with this management alternative. Regulated harvest combined with Viewshed Alternative III would reduce the Forest ASQ by 1.2% or 2.2 million board feet per year (MMBF). Regulated harvest combined with Viewshed Alternative I and Boundary Alternatives 1 and 3 have no significant effect on ASQ. These combinations would cause a 0.2 MMBF reduction or less in ASQ. All other boundary and viewshed alternative combinations would reduce ASQ by 0.5% (1.0 MMBF).

Alternative B

Mining. This alternative would cause the greatest potential negative impacts to mining. No mining would occur on federal lands under this alternative; however, the potential for locatable and leasable minerals is low enough to not cause a significant impact. Oregon Department of Transportation would lose the Highway 35 pit as a sand source and would need to locate another source immediately. Alternative sand sources on the Forest are unlikely. Any other type of sanding material, such as crushed rock, would cost much more to develop than the Highway 35 pit. Funding for rehabilitation and site restoration of the Highway 35 pit would shift from the permittee to the Forest.

Grazing. This alternative would have the same effects on grazing as Alternative A with the following additions. Controlling nonpoint pollution sources may result in reductions of livestock numbers or use season, or complete removal of livestock from the corridor, depending on the degree of the problem documented in monitoring. Excluding cattle from campgrounds and day use areas in Segment B and from the river canyon in Segment C would have no effect on grazing levels or use patterns. These areas are little used at present. additional fencing may be needed along roads 4885 and 2120 to keep cattle from drifting into the canyon.

Removing livestock from below the rims on BLM lands would result in the loss of approximately 57 AUMs of grazing on 510 acres of BLM land. This alternative would require approximately 5 miles of drift fencing in Segments D-F at a cost of $25,000.

Timber. The viewshed alternative has a larger impact than the boundary alternative that may combine with this management alternative. Unregulated harvest combined with Viewshed Alternative III would reduce the forest ASQ by 2.8% or 5.3 MMBF. Unregulated harvest combined with Viewshed Alternative

l and Boundary Alternatives 1 and 3 have no significant effect on ASQ. These combinations would cause a 0.5 MMBF reduction or less in ASQ. All other boundary and viewshed alternative combinations would reduce ASQ by 1.5% (2.8 MMBF).

Alternative C

Mining. Highway 35 pit development would be allowed to continue through Phase II, the next scheduled entry. This entry would allow for the removal of an additional 200,000 cubic yards, supplying ODOT with an estimated four year supply of sand. However, it would forego the removal of another 400,000 cubic yards of material. Oregon Department of Transportation would need to locate another source of material within four years. Alternative sand sources on the Forest are unlikely. Any other type of sanding material, such as crushed rock, would cost much more to develop than the Highway 35 pit. The permittee would have responsibility for site rehabilitation and restoration. Impacts to the remaining mineral resources would be the same as Alternative A.

Grazing. This alternative would have the same effects as Alternative B.

Timber. This alternative would have the same effects as Alternative B.

Alternative D

Mining. This alternative would have the same effects as Alternative A, except with the Highway 35 pit. Pit development would be allowed to continue through Phase III, removing an additional 400,000 cubic yards and supplying ODOT with an estimated eight year supply of sand, but foregoing removal of 200,000 cubic yards. After that material is exhausted, ODOT would need to locate another source of material. Alternative sand sources on the Forest are unlikely. Any other type of sanding material, such as crushed rock, would cost much more to develop than the Highway 35 pit. The permittee would have responsibility for site rehabilitation and restoration. Impacts to the remaining mineral resources would be the same as Alternative A.

Grazing. This alternative should have the same effects as Alternative B with the exception of the grazing season on BLM lands. Restricting the grazing period to Nov. 1-May 1 below the rims on BLM lands would not have a significant impact on grazing. However, if private landowner cooperation for management in Segments E and F can not be achieved then this alternative would require approximately 3 miles of drift fencing at a cost of $15,000.

Timber. The viewshed alternative has a larger impact than the boundary alternative that may combine with this management alternative. Regulated harvest combined with Viewshed Alternative III would reduce the forest ASQ by 1.2% or 2.2 MMBF. Regulated harvest combined with Viewshed Alternative I and Boundary Alternatives 1 and 3 have no significant effect on ASQ. These combinations would cause a 0.2 MMBF reduction or less in ASQ. All other boundary and viewshed alternative combinations would reduce ASQ by 0.5% (1.0 MMBF).

Alternative E

Mining. This alternative would have the same effects as Alternative A, including the level of development at the Highway 35 pit.

Grazing. This alternative should have the same effects as Alternative B, with the exception of grazing on BLM lands. This alternative would eliminate grazing on 971 acres of BLM lands in Segments D-F, resulting in the loss of 78 AUMs and affecting 6 permittees. The BLM would need to construct approximately 26 miles of fencing at a cost of $130,000 to separate BLM lands from private lands.

Timber. This alternative would have the same effects as Alternatives A and D.

Issue 2. Recreation and Scenic Resources

This section first discusses general effects of different activities on recreation and effects common to all or most alternatives. It then discusses the differences between alternatives regarding recreational opportunities, use levels, quality of experience, and the relative emphasis of motorized and nonmotorized recreation. The analysis focuses on known recreational uses. As new uses appear, the managing agencies would evaluate the appropriateness of the use and determine what restrictions and regulations, if any, should apply to the new use. Comparison Tables 2a and 2b display the differences between the alternatives based on the measures listed under Issues in Chapter 1.

Recreation opportunities are the result of landscape character, level and type of development, presence of fish and wildlife, the amount and type of people in an area, the type of recreation experiences, the type and location of public access, facilities and improvements, interpretation and education efforts and on- or off-site regulations. Changes in any of these characteristics could change the type of recreation user or quality of recreation experience that occurs within the river corridor. Actions that have the greatest impact on recreation users would be those that encourage or restrict use levels in order to maintain recreation ROS class and protect the outstandingly remarkable values on public lands within the corridor.

GENERAL EFFECTS

Commodity Production

Mineral development creates ground disturbance, noise, dust, industrial wastes, and facilities that do not blend with the characteristic landscape. Mining tends to displace some users and lower the quality of experience of others even when people cannot see but do hear the operations. The only mining of any consequence expected in the corridor is the continued operation of the Highway 35 pit. Some geothermal development may occur. If the operations are located adjacent to the corridor this activity could displace some users.

Vegetation management usually creates stumps, slash, brown or blackened vegetation, geometric harvest shapes, and other changes in vegetation appearance. Geometric harvest shapes from past entries created a landscape character that looks "unnatural." Inappropriate design and location of vegetation management projects can cause the site or area to not meet VQOs and require rehabilitation. Vegetation management techniques that negatively alter an area's appearance tend to displace some users and lower the quality of experience for others. Conversely, some vegetation management activities create suitable conditions for certain plant and animal species, promoting specific uses such as hunting and gathering morel mushrooms. It can promote more rapid development of desired stand structures. Timber harvest, prescribed burning, and herbicides tend to cause the greatest changes in landscape character. Biological methods, manual methods, and chemical pesticides generally go unnoticed. See Table 4.6 for how the level of vegetation management allowed in the five alternatives would affect scenic quality.

Grazing and many recreation uses do not mix well. Livestock grazing and grazing management results in the sights and smells of livestock, excrement, fences, and trampled ground and trails. Actions which separate visitors and livestock tend to improve the quality of recreation experience.

Other Resource Management

Managing flows and water quality help maintain or promote fishing and boating opportunities. Visitors prefer to camp, picnic, and hike along clean water, rather than dirty water. The glacial milk in late summer and fall is an exception since the river turns milky white rather than brown.

Recreation use may be restricted in locations with significant cultural resources and resulting from actions taken to manage threatened, endangered, and sensitive plant and animal species. These actions

or features may reduce the allowable use or change the type and season of use. The more stringent the proposals, the more restrictions become likely. Efforts to manage wolverine, harlequin duck, and peregrine falcon habitat are likely to produce the greatest restrictions. These restrictions would be most evident in Segments A, C, and D.

Generally, wildlife and fish habitat improvement projects would have little or no adverse effects on recreation use, opportunities, and quality of experience. If the public follows the fishing recommendations, fishing levels may decline initially, but quality of the experience should increase in the long-term. All actions that tend to maintain or improve fish and wildlife habitat also maintain or improve the associated recreational activities.

Fire suppression tactics usually do not adversely affect recreation use or opportunities. Visitors may notice discoloration of rock features and culturally important structures if colored retardant is used.

Visitors from other areas can introduce noxious weeds, insects, and diseases which enter the corridor on the vehicles or animals or in animal feed. These introductions can have a major adverse impact on the native plants and animals. This problem is beyond the scope of this management plan. Similarly, vehicles and animals can pick up seed, insects, or spores from noxious weeds and pests in one part of the corridor and transport them to another part. These introductions usually have a minor adverse impact on the local plants and animals since transport via forest visitors is relatively minor compared to transport via other methods.

Recreation Use

Restricting Mt. Hood Meadows from further expansion into the corridor would have no adverse impact. The ski area can expand to the north and northeast, away from White River. Limiting further expansion also reduces risks to scenic quality. Nordic skiing would continue on ungroomed trails in all alternatives.

Adding barrier-free facilities would provide opportunities for visitors confined to wheelchairs to enjoy parts of White River. No such facilities currently exist. Topography limits opportunities for barrier-free facilities to Segments B and E and along the rims of Segments C and D.

Topography and the physical structure and flow regime of the river limit boating opportunities. This use would remain around current levels in all alternatives. Commercial wagon train trips may increase in Segment B, depending on the level of interest in the Oregon Trail. Limited opportunities exist for guided hunting, fishing, mountain biking, and horseback riding due to the level of access, lack of trails except in Segment B, and low quality habitat for fish in the river.

Scenic quality in Segments E and F depends on maintaining the current pastoral landscape. Increased development along the corridor may introduce elements not associated with this landscape and decrease scenic quality.

SPECIFIC ALTERNATIVE EFFECTS

Alternative A

Types of Use. This alternative slightly favors nonmotorized use over motorized. Some road closures are needed in Segment B to meet Forest Plan standards and guidelines. No additional road construction is expected in Segments C, and D. Other landowners either restrict motorized access during all or part of the year and have no plans to provide any additional public roads. The river character does not allow use of motorized boats. No new viewpoints or upgrades to existing viewpoints are planned. Off road vehicles are restricted by regulations on National Forest lands and by terrain on BLM lands. New over snow routes are possible on National Forest lands. New road construction may adversely affect scenic quality.

No comprehensive trail plan would be required, although one could happen under the current direction for both agencies. However, this alternative has a greater likelihood that trail development and designated uses would occur piecemeal with little coordination between ranger districts and agencies. Little separation of the main user groups may occur. The lack of trails and plans to construct trails disfavors pack and riding stock use, mountain bike use, and off road vehicle use in Segments D-F.

Level of Use. Developed recreation capacity (campgrounds, day use areas, parking areas, etc.) could increase to the theoretical optimum, or maximum, allowed under the ROS classes for each segment. Above Highway 35, most use would occur in the winter after Mt. Hood Meadows Ski Area constructs Lifts 22 and 26. Below Highway 35 in the remainder of Segment B, use would occur year-round, although more use may occur in summer than in winter. In the remaining segments, use would tend to occur primarily in summer and fall.

Limited access and limited public ownership concentrates use in Segment B, at Keeps Mill in Segment C, and at Graveyard Butte in Segment D. The BLM expects only to acquire the minimum public access needed to meet management objectives. Over the long-term, popular locations would become over-crowded. Little change is expected in the recreation use on the scattered public lands within Segments E-F.

Bare ground and poorly vegetated areas would become common in these sites. Where sites occur close to live water, streambanks may collapse and erode, reducing water quality and fish habitat and populations. Some use may occur on the less rugged private and state lands with landowner permission. Visitors would continue to hike cross country or hike on informal user developed trails and game trails. In the long-term, increased use on these trails could create an uncontrolled trail network with resulting increases in erosion, vegetation loss, and disturbance to wildlife.

Of the species sensitive to disturbance from recreation use, this alternative would likely displace any wolverines in the area over the long-term and may displace nesting harlequin ducks and peregrine falcons. Elk and deer would continue to travel through the corridor but may not linger or use the available calving and fawning areas. Additional road construction for recreation access in Segment A could increase erosion and sediment delivery into White River, potentially changing the river color and degrading fish habitat.

In terms of scenic quality, Graveyard Butte would especially look battered and disorganized. Use levels and the lack of site design to accommodate the use would lead to devegetation of a disproportionately large area. Visitors would continue to use the existing informal viewpoint. Several trails in Segment B would not meet the scenic quality normally associated with wild and scenic rivers. The Forest Plan would continue to lack specific guidelines for maintaining road 48 as a scenic road; its current VQOs would remain inconsistent with the scenic quality of the river landscape.

Supply of Recreational Experiences. The 1993 FEMAT report identified a lack of primitive and semi-primitive recreation opportunities in the Cascades. Roaded Natural would be the most common ROS class in this alternative, assigned to Segments A, B, and E. The canyons in Segments C, D, and F would continue to provide Semi-primitive Nonmotorized recreation opportunities and a narrow corridor of Semi-primitive Motorized along the roads into Keeps Mill and Graveyard Butte crossing.

Table 4.1 displays the expected effects of this alternative on various recreation opportunities. Neither managing agency plans to establish use restrictions for either private or commercial use. Commercial use is self-regulating in many respects due to the limitations of the river and the corridor. Visitors would have the maximum freedom of the five alternatives to choose where to go and what to do.

Cumulatively, the quality of recreational experiences would decline and then level out. The actual ROS class may change to a setting which accepts more frequent encounters, higher levels of visitor controls, and more obvious signs of visitor use. This alternative would favor users who prefer more developed sites and are more tolerant of crowding, noise, bare ground, and litter. Livestock grazing in recreation use areas could displace some visitors and lower the quality of the recreational experience.

Scenic Quality. Continued use of the Highway 35 sand and gravel operation would reduce opportunities for safe snow play until operations ended 10-12 years from present, and is incompatible with the scenic quality value in this segment. Both the current rehabilitation efforts and pit operations could not meet Retention in the foreground of Highway 35 and the river. Based on current efforts, future rehabilitation attempts may not meet VQOs either. Any other mining activities in Segments D-F would have difficulty meeting the VQO of Partial Retention.

Timber harvest and prescribed burning of activity fuels would occur at the highest levels of the five alternatives, while prescribed burning of natural fuels would occur at the lowest level. Regulated harvest provides funding for vegetation management, which places the area at periodic risk that a project may not meet the required VQO, but also provides a system to meet scenic quality needs with timber harvest, if necessary. Use of chemical herbicides would be very limited on National Forest lands, but possibly more widespread on BLM, state, and private lands.

The Barlow Road IRA calls for returning the characteristic landscape which the pioneers may have seen in this road corridor. Implementing this recommendation would provide increased views of Mt. Hood and of stands adjoining the Barlow Road, decreased evidence of defoliating insects, and more diversity in tree ages and sizes.

Table 4.1. Mix of recreation opportunities and alternative effects.

Activity	Expected Alternative Effects
Snow Play	Increase in long-term as pit developed and rehabilitated, improved safety
Nordic Skiing	No change to slight increase with planned trail reconstruction
Alpine Skiing	Increase over time
Over Snow Vehicles	No change to slight increase
Off Road Vehicles	Decrease with planned shift to McCubbins Gulch ORV Play Area
Driving for Pleasure	Slight decrease in Segment B with planned road closures
Hiking	Increase with planned trail construction, reconstruction, road conversions
Horses/Llamas	Increase with planned trail construction, reconstruction, road conversions
Mountain Bikes	Increase with planned trail construction, reconstruction, road conversions
Boating	No change
Camping	No change
Picnicking	No change
Sightseeing	No change to slight decrease with planned road closures
Hunting	No change
Fishing	No change
Photography	No change
Commercial Use	Slight increase in wagon trains, otherwise no change

Other Effects. No comprehensive interpretive plan is required in this alternative. Interpretation may occur in a piecemeal fashion with little or no coordination between ranger districts and agencies. Nordic trails may or may not remain ungroomed. Continued on-site firewood gathering would eventually deplete firewood at popular sites and would make gathering more difficult for future users.

Alternative B

Types of Use. This alternative favors nonmotorized use over motorized use. Many of the proposed actions would freeze or, in the case of over snow vehicles and open road density, slightly reduce motorized access to the river corridor. Allowable open road density on National Forest lands would drop to 1.5 miles per square mile. No additional road construction would occur on federal lands in Segments A, C, and D. Other landowners in the corridor either restrict motorized access during all or part of the year and have no plans to provide any additional public road access. The river character does not allow use of motorized boats. Existing viewpoints would remain undeveloped, no new viewpoints are planned, and the road to Bonney Butte overlook would be converted to a trail. Off road vehicles would be restricted throughout the corridor, reducing the acres of open designation on BLM lands by an insignificant amount. The number of over snow vehicle routes would decline slightly. The Keeps Mill road would continue to limit access to those with high clearance vehicles.

The lack of trails and plans to construct trails disfavors pack and riding stock use, mountain bike use, and off road vehicle use in Segments D-F. Primitive trail standards would continue to limit use and accessibility. The lack of constructed river crossings would create a barrier for some users, especially during high water. Developing and implementing a comprehensive trail plan would minimize conflicts between main user groups, ensure use is consistent with ROS classifications, and better protect the outstandingly remarkable values. Trail management would be better coordinated between ranger districts and agencies.

Excluding commercial use on BLM lands would affect one permittee with less than 10 user days per year. Over the long-term, horse use may periodically displace other visitors in the same campground. The development of a small group campsite in Segment B would help facilitate group use but may increase demand for additional group sites and alter the existing use patterns.

Level of Use. Developed recreation capacity would decline over present levels through site redesign. While the number of campsites would not decline in the campgrounds, available parking in campgrounds and at trailheads would decrease. The seasons of dominant use throughout the corridor would be the same as Alternative A.

Use would remain concentrated in Segment B, at Keeps Mill in Segment C, and at Graveyard Butte in Segment D. Site redesign should help keep these sites from becoming over-crowded and help alleviate the impacts associated with concentrated use. However, prohibiting the construction of additional campgrounds will keep use concentrated at the existing sites. If BLM is able to acquire additional public access in Segments D and F, then use may become better distributed through the corridor.

Rehabilitation efforts on the more heavily used dispersed sites would reduce the potential for further devegetation along the river and should allow some areas to revegetate. Limited recreation use within the canyon would maintain habitat effectiveness for species which do not tolerate much human presence, such as wolverine and nesting harlequin ducks and peregrine falcons. Deer and elk calving and fawning areas would remain adequately protected.

Some use may occur on the less rugged private and state lands with landowner permission. Visitors would continue to hike cross country or hike on informal user developed trails and game trails. In the long-term, continued use on these trails could create an uncontrolled trail network with resulting increases in erosion, vegetation loss, and disturbance to wildlife.

After recreation site redesigns, the area would encounter no further risk to scenic quality due to increased use unless the management plan changes. The BLM would protect Graveyard Butte from further scenic degradation and control traffic. Any projects designed to meet these objectives might not occur or might fail to meet scenic quality objectives. Degraded areas would be rehabilitated, improving scenic quality. All trails within the corridor and designated viewshed would be managed at Sensitivity Level I and existing level II and III trails rehabilitated. Trail rehabilitation and ending new road construction would

reduce the risks to scenic quality. Road closures and obliterations would need to meet VQOs. Road 48 would be managed as a scenic road and its VQOs changed accordingly.

Supply of Recreation Experiences. Semi-primitive Motorized would be the most common ROS class in this alternative, assigned to Segments B and E and to narrow corridors along the roads to Keeps Mill and Graveyard Butte crossing. Semi-primitive Nonmotorized would cover almost as much area as Semi-primitive Motorized, assigned to Segments C, D, and F. Roaded Natural would occur only in Segment A.

Changing the ROS class in Segment B would increase the available supply on the Forest for Semi-primitive recreation experiences. It would also place additional restrictions on timber harvest and road construction beyond the level discussed in the Forest Plan. However, the effects are minimal for the Forest overall.

Table 4.2 displays the expected effects of this alternative on various recreational opportunities. Site redesigns may displace some visitors to other locations outside the river corridor, but should help preserve high quality experiences for those that remain.

The more detailed cultural resource survey may result in new restrictions in some areas and should create additional opportunities for interpretation. A comprehensive interpretive plan would promote better understanding of the river's resources and values, cultural lifeways, and history and prehistory of the area, potentially improving the quality of recreation experience. Interpretation is one positive method to increase visitor awareness of the consequences of some actions and reduce vandalism, littering, and unintentional resource damage, thus maintaining the desired setting. Excluding livestock from the recommended areas would help maintain the quality of the recreation experience.

Cumulatively, the quality of recreation experience should remain high. The managing agencies would actively strive to maintain the desired ROS class. Low levels of vegetation management would maintain scenic quality over the short-term, although the increasing risk of unplanned disturbances, such as fire and insects, may lead to a short-term declines in scenic quality. Natural disturbance events, regardless of scale, would improve scenic quality over the long-term since these events shaped the highly-desired and diverse landscape typical of areas undisturbed by extractive resource use. This alternative favors users who prefer a more primitive experience.

Scenic Quality. Mineral withdrawals on federal lands would eliminate most potential impacts to recreation and scenic quality from this activity. Mining could continue on nonfederal lands. Rehabilitating the Highway 35 pit now would improve long-term scenic quality at the sno-parks and river at the earliest opportunity, if adequate funding could be obtained. Traditional funding sources available to the Forest may not be adequate, in which case the pit would not be properly rehabilitated. Total mineral withdrawal within the corridor would place only the designated viewshed at risk from mining operations.

Timber harvest and prescribed burning of activity fuels would occur at the lowest levels and prescribed burning of natural fuels at the second lowest levels of the five alternatives. Neither federal agency would use chemical herbicides, although state and private landowners may continue to use these substances.

This alternative would have unregulated harvest in the corridor and regulated harvest in the designated viewshed outside the corridor. Unregulated harvest would shrink the available timber base and would increase pressure on scenery in other locations remaining in the timber base. The area may lack funding for vegetation management to enhance forest health and, thus, scenery. Unregulated harvest would reduce the risk to scenic resources of vegetation management projects which do not meet the required VQO within White River corridor. Effects of regulated harvest on the designated viewshed are similar to Alternative A.

Other Effects. Encouraging the use of fire pans between Keeps Mill and the mouth of White River may slightly reduce the potential for human-caused wildfires. Allowing firewood gathering for on-site use

would eventually delete firewood in popular sites and would make gathering more difficult for future users.

Table 4.2. Mix of recreation opportunities and alternative effects.

Activity	Expected Alternative Effects
Snow Play	No change, improved safety
Nordic Skiing	Increase with planned trail reconstruction, road closures, exclusion of over snow vehicles on Road 48 north of Road 43
Alpine Skiing	Decrease over time
Over Snow Vehicles	Decrease with loss of route along Road 48 north of Road 43 and Road 4890
Off Road Vehicles	Decrease with planned shift to McCubbins Gulch ORV Play Area
Driving for Pleasure	Decrease in Segment B with planned road closures
Hiking	Increase with planned trail construction, reconstruction, road conversions
Horses/Llamas	Increase with planned trail construction, reconstruction, road conversions, facilities at one campground
Mountain Bikes	Increase with planned trail construction, reconstruction, road conversions
Boating	No change
Camping	Slight increase with addition of one group site, barrier-free units and facilities
Picnicking	No change
Sightseeing	Decrease with planned road closures
Hunting	No change; road closures should improve quality
Fishing	No change to slight increase
Photography	No change
Commercial Use	Slight increase in wagon trains, decrease in boating

Alternative C

Alternative C closely resembles Alternative B in its effects with a few exceptions.

Types of Use. This alternative favors nonmotorized use over motorized use. However, more viewpoints within and outside of the corridor would increase the diversity and availability of scenic views. It would also increase the risks that developments might not meet their assigned VQOs and ROS classes. Over the long-term, horse use may periodically displace other visitors White River Station and Barlow Creek campgrounds. The development of small group campsites at all campgrounds in Segment B would facilitate group use but may increase demand for additional group sites and alter the existing use patterns. A trail constructed from White River Crossing to Keeps Mill would provide excellent trail opportunities in an area with limited access.

Level of Use. Developed recreation capacity would not change from present levels. However, site redesign should reduce the area covered by bare ground and little vegetation, better protecting water quality. Disturbance from recreation use may further delay peregrine falcon or harlequin duck use in the Rocks 'N' Ice landscape unit. Trail construction from White River Crossing to Keeps Mill would slightly reduce habitat suitability for wolverine, elk, and harlequin duck over the long-term.

Supply of Recreation Experiences. This alternative provides the same mix of ROS classes as Alternative B. Table 4.3 displays the expected effects of this alternative on various recreational opportunities. Higher levels of recreation use could occur under this alternative than Alternative B. Additional trail construction in Segments A and C would help spread some use through the upper corridor. If BLM is able to acquire additional public access in Segments D and F, then use may become better distributed through the lower corridor. Site redesigns may displace some visitors to other locations outside the river corridor, but should help preserve high quality experiences for those that remain.

Cumulatively, the quality of recreation experience should remain high. This alternative favors users who prefer a slightly less primitive experience than that provided in Alternative B. Higher standard trails and some challenging barrier-free trails or trail segments would exist in Segment B. Maintaining the current developed capacity would maintain the current level of sights of people and litter and may cause a short-term loss of scenery to redevelopment. Site redesign may also lead to an increase in the quality of facilities due to new investment.

Scenic Quality. The effects of mining are the same as Alternative A, except that the Highway 35 pit would remain in operation longer, increasing the risk that rehabilitation efforts would fail to meet scenic quality objectives. Timber harvest and prescribed burning of activity fuels would occur at the second lowest levels and prescribed burning of natural fuels at the midlevel of the five alternatives. Selective harvesting to provide views to Mt. Hood would increase the long-term diversity of views and increase the short-term risks associated with any vegetation management project.

Table 4.3. Mix of recreation opportunities and alternative effects.

Activity	Expected Alternative Effects
Snow Play	Increase, improved safety
Nordic Skiing	Increase with planned trail reconstruction, road closures, exclusion of over snow vehicles on Road 4890
Alpine Skiing	Decrease over time
Over Snow Vehicles	Net increase with formal route designation of Road 48 north of junction with Road 4890
Off Road Vehicles	Decrease with planned shift to McCubbins Gulch ORV Play Area
Driving for Pleasure	Decrease in Segment B with planned road closures
Hiking	Increase with planned trail construction, reconstruction, road conversions; barrier-free trails or trail segments
Horses/Llamas	Increase with planned trail construction, reconstruction, road conversions, facilities at White River Station and Barlow Creek campgrounds
Mountain Bikes	Increase with planned trail construction, reconstruction, road conversions
Boating	No change
Camping	Increase with addition of 3 group sites, barrier-free units and facilities
Picnicking	No change
Sightseeing	Decrease with planned road closures, partially offset with new viewpoints
Hunting	No change; road closures should improve quality
Fishing	No change to slight increase
Photography	Increase with new viewpoints
Commercial Use	Slight increase in wagon trains, no change in boating

The Barlow Road IRA calls for returning the characteristic landscape which the pioneers may have seen in this road corridor. Implementing this recommendation would provide increased views of Mt. Hood and of stands adjoining the Barlow Road, decreased evidence of defoliating insects, and more diversity in tree ages and sizes.

Alternative D

Types of Use. This alternative favors nonmotorized use over motorized use, although to a lesser degree than Alternatives B and C. New trail and campground construction, higher trail standards, and increased access via easements should help distribute use through the corridor. Private day use and camping facilities would increase the diversity of recreation opportunities and may spread use more evenly across the river corridor. Constructed river crossings would provide greater access to both sides of the corridor during high water periods. If a trail is feasible between Graveyard Butte to Keeps Mill, recreation use could increase substantially. Restricting off road vehicles to designated routes would reduce the number of acres in the open designation on BLM lands by an insignificant amount.

Horse use may periodically displace other visitors at all campgrounds in Segment B. The development of small group campsites at all campgrounds in Segment B would facilitate group use but may increase demand for additional group sites and alter the existing use patterns.

If the BLM can acquire the necessary access and it is feasible, a trail constructed from White River Crossing to Keeps Mill and between Keeps Mill and Graveyard Butte would provide developed trail opportunities in an area with limited access. Additional trail use could also occur on private lands in Segments E and F if landowners provide these opportunities. Developing and implementing a comprehensive trail plan would minimize conflicts between main user groups, ensure use is consistent with ROS classifications, and better protect the outstandingly remarkable values.

Level of Use. Developed recreation capacity would increase but to a level below that of the theoretical optimum, or maximum, allowed by the ROS class in each segment. The expected dominant seasons of use throughout the corridor are the same as Alternative A.

Redesigning existing sites and designing new sites should reduce the risk of extensive areas of bare ground and little vegetation, better protecting water quality. However, increasing the developed capacity usually leads to an increase in dispersed use, which the managing agencies cannot control very well. New areas of bare ground, little vegetation, collapsing and eroding streambanks may appear as visitors look for and begin using less developed camping areas. Designing a formal trail system in Segments C and D would reduce the risk of erosion and vegetation loss expected under Alternatives A-C.

Disturbance from recreation use and trail development would reduce habitat effectiveness over the long-term for wolverines, harlequin ducks, and other species intolerant of human presence. Harlequin ducks and peregrine falcons probably would not occupy the potential habitat in the Rocks 'N' Ice landscape unit. Construction of a trail between White River Crossing and Keeps Mill would slightly reduce elk habitat effectiveness. Elk and deer may stop using calving and fawning areas closest to new developments and trails.

Graveyard Butte would be completely redesigned in order to accommodate a campground and could involve some site hardening to protect resources. This activity would carry the risk of not meeting VQOs and ROS requirements, but would increase the efficiency of an inefficient, undesigned area. Increased development in Segments E and F may not be consistent with the desired future condition unless scenic easements are encouraged along with the recreation developments. All trails within the corridor and designated viewshed would be managed at Sensitivity Level I and existing level II and III trails rehabilitated. Trail rehabilitation and ending new road construction in Segments A, C, and D would reduce the risks to scenic quality. Road closures and obliterations would need to meet VQOs. Road 48 would be managed as a scenic road and its VQOs changed accordingly.

The level of potential construction offers high risks that projects would not meet VQOs and ROS requirements as well as introducing higher use intensities and risk to the experience now enjoyed by White River users. However, this alternative also brings new users to enjoy the area, some of which is seldom seen at present. The effects of varying trail standards would depend on what work is needed on a particular trail. Getting a trail to high standards may cause many structures, cuts, and fills, creating a roadlike appearance. A trail from Graveyard Butte to Keeps Mill would change the setting and recreation experience from very primitive and secluded to semi-primitive but well within the VQOs for the area.

Supply of Recreation Experiences. This alternative would provide the same mix of ROS classes as Alternative A. Table 4.4 displays the expected effects of this alternative on the various recreation opportunities. Use would remain concentrated in Segments B-D and could increase to high levels. If private landowners elect to create wetlands in Segment E, opportunities for hunting, sightseeing, and wildlife photography should increase.

The comprehensive cultural resource survey may result in more use restrictions than in Alternatives A-C and should create even greater opportunities for interpretation. A comprehensive interpretive plan would promote better understanding of the river's resources and values, cultural lifeways, and history and prehistory of the area, potentially improving the quality of recreation experience. Interpretation is one positive method to increase visitor awareness of the consequences of some actions and reduce vandalism, littering, and unintentional resource damage, thus maintaining the desired setting. Excluding livestock from selected areas in Segments B and C and shifting the grazing season on BLM lands below the canyon rims should reduce any competition for space between visitors and livestock.

Cumulatively, quality of the recreational experience would remain moderately high. The more popular locations would become more crowded. Users desiring more developed facilities would displace users preferring smaller, more primitive facilities. Over the long-term, continued firewood collection for camp use would deplete firewood in popular sites and would make gathering more difficult for future users. Increasing the number of facilities for sightseers, campers, pack and riding stock users, boaters, and winter users would create a more developed recreation experience. Increased recreation use would double the effects expected under Alternative B--increased sights of people, litter, devegetated areas, and possibly additional losses of scenery to new development.

Scenic Quality. Continued use of the Highway 35 pit would reduce opportunities for safe snow play until operations ended after Stage III and continue a use incompatible with the scenic quality values of this segment. Both the current rehabilitation efforts and pit operations could not meet Retention in the foreground of Highway 35 and the river. Based on current efforts, future rehabilitation attempts may not meet VQOs either. Any other mining activities in Segments D-F would have difficulty meeting the VQO of Partial Retention.

Timber harvest and prescribed burning of activity fuels would occur at higher levels than Alternatives B and C, but lower levels than Alternatives A and E. Prescribed burning of natural fuels would occur at the next highest potential level. Partial Retention may be the best VQO to move towards the desired future condition quickly. In turn, risks that management might not meet VQOs would increase. Those risks would be lower under this alternative than under the Forest Plan. Effects would be the same as those mentioned for Alternative B but would most likely be more evident on the landscape. Alternative D is a regulated harvest alternative with effects to scenic quality similar to Alternative A. Use of chemical herbicides would be very limited on National Forest lands, but possibly more widespread on BLM, state, and private lands.

The Barlow Road IRA calls for returning the characteristic landscape which the pioneers may have seen in this road corridor. Implementing this recommendation would provide increased views of Mt. Hood and of stands adjoining the Barlow Road, decreased evidence of defoliating insects, and more diversity in tree ages and sizes.

Other Effects. Campfire restrictions in the east 1/2 of Segment C and Segments D-F should reduce the risk of human caused wildfires during the period of highest fire danger, even with increased recreation

use and public access. Closure dates consistent with the Deschutes and Crooked Rivers would made user education easier as well as enforcement. Visitors would still have some campfire opportunities in a controlled environment at Graveyard Butte.

Table 4.4. Mix of recreation opportunities and alternative effects.

Activity	Expected Alternative Effects
Snow Play	Increase, improved safety
Nordic Skiing	Increase with planned trail reconstruction, road closures
Alpine Skiing	Decrease over time
Over Snow Vehicles	Increase with formal route designation of Road 48 north of junction with 4890
Off Road Vehicles	Decrease with planned shift to McCubbins Gulch ORV Play Area
Driving for Pleasure	Decrease slightly in Segment B with planned road closures; offset with new viewpoints
Hiking	Large Increase with planned trail construction, reconstruction, road conversions; barrier-free trails or trail segments
Horses/Llamas	Potentially large increase with planned trail construction, reconstruction, road conversions, facilities at all campgrounds in Segment B
Mountain Bikes	Potentially large increase with planned trail construction, reconstruction, road conversions
Boating	No change to slight increase with launch and takeout facilities
Camping	Increase with addition of 3 group sites, campground at Graveyard Butte, barrier-free units and facilities, private facilities
Picnicking	No change to increase with private facilities
Sightseeing	Decrease slightly with planned road closures, offset with new viewpoints
Hunting	No change to slight increase; road closures should improve quality
Fishing	No change to slight increase
Photography	Increase with new viewpoints
Commercial Use	Slight increase in wagon trains, no change in boating

Alternative E

This alternative resembles Alternative D in its effects with some exceptions.

Types of Use. This alternative places about equal emphasis on motorized and nonmotorized recreation. Horse use may periodically displace other visitors at all campgrounds in Segment B. The development of a group campground in Segment B would facilitate group use and separate large parties from single users and small parties. A trail constructed between Highway 35 and Graveyard Butte would provide an excellent long distance trail opportunity. Additional trail use could also occur on private lands in Segments E and F if landowners provide these opportunities. Emphasizing habitat for big game species would likely increase hunting opportunities for those species.

Level of Use. Developed recreation capacity would increase to its theoretical optimum, or maximum, allowed under the ROS class for each river segment. At carrying capacity, no additional adverse impacts are acceptable. The effects of increased sights of people, litter, devegetated areas, and possibly additional losses of scenery to new development would be at maximum.

Only Alternative A would have a greater level of adverse impacts on wildlife species intolerant of human presence. Harlequin ducks and peregrine falcons probably would not occupy the potential habitat in the Rocks 'N' Ice landscape unit. Without careful recreation use management, harlequin ducks would leave Segments B and C. Recreation related disturbance and open road density would reduce elk habitat suitability more than Alternative D.

Road building down to the river on private land is a high risk activity for meeting the VQO of Partial Retention. With good cooperation between the landowners and the managing agencies and with scenic easements these roads could meet VQOs. New viewpoints or upgrades to existing viewpoints are planned in several locations. This alternative carries a very high risk that the development necessary to control recreation use would not consistently meet VQO requirements.

Supply of Recreation Experiences. This alternative would provide the same mix of ROS classes as Alternative A. Table 4.5 displays the expected effects of this alternative on the various recreation opportunities. Recreation use levels throughout the corridor would increase to the maximum the land can sustain and still protect the other river values and maintain the minimum quality of experience envisioned in the ROS classification. This alternative carries a very high risk that the development necessary to control recreation use would not consistently meet the ROS class requirements.

Cumulatively, quality of the recreational experience would remain moderate. The more popular locations would become quite crowded. Users desiring more developed facilities would displace users preferring smaller, more primitive facilities. Increasing the number of facilities for sightseers, campers, pack and riding stock users, boaters, and winter users would create a more developed recreation experience. Eliminating grazing from BLM lands within the corridor should improve the quality of the recreation experience along the rims.

Scenic Quality. Continued use of the Highway 35 pit would have the same effects as Alternative A. Timber harvest and prescribed burning of activity fuels would occur at the second highest levels of the five alternatives. Prescribed burning of natural fuels would occur at the highest potential levels. Risks to and effects on scenic quality would be lower under this alternative than under the Forest Plan. Effects would be the same as those mentioned for Alternative B but would most likely be more evident on the landscape.

Other Effects. Campfire restrictions in the east 1/2 of Segment C and Segments D-F should reduce the risk of human caused wildfires during the period of highest fire danger, even with increased recreation use and public access. Closure dates consistent with the Deschutes and Crooked Rivers would made user education easier as well as enforcement. Visitors would still have some campfire opportunities in a controlled environment at Graveyard Butte. Requiring that campers at Graveyard Butte bring their own firewood should help maintain needed downed woody material for wildlife, fish, riverbank stability, and long-term site productivity.

Only Alternative A would have a greater level of adverse impacts on wildlife species intolerant of human presence. Harlequin ducks and peregrine falcons probably would not occupy the potential habitat in the Rocks 'N' Ice landscape unit. Without careful recreation use management, harlequin ducks would leave Segments B and C. Recreation related disturbance and open road density would reduce elk habitat suitability more than Alternative D.

Road building down to the river on private land is a high risk activity for meeting the VQO of Partial Retention. With good cooperation between the landowners and the managing agencies and with scenic easements these roads could meet VQOs. New viewpoints or upgrades to existing viewpoints are planned in several locations. This alternative carries a very high risk that the development necessary to control recreation use would not consistently meet VQO requirements.

Supply of Recreation Experiences. This alternative would provide the same mix of ROS classes as Alternative A. Table 4.5 displays the expected effects of this alternative on the various recreation opportunities. Recreation use levels throughout the corridor would increase to the maximum the land can sustain and still protect the other river values and maintain the minimum quality of experience envisioned in the ROS classification. This alternative carries a very high risk that the development necessary to control recreation use would not consistently meet the ROS class requirements.

Cumulatively, quality of the recreational experience would remain moderate. The more popular locations would become quite crowded. Users desiring more developed facilities would displace users preferring smaller, more primitive facilities. Increasing the number of facilities for sightseers, campers, pack and riding stock users, boaters, and winter users would create a more developed recreation experience. Eliminating grazing from BLM lands within the corridor should improve the quality of the recreation experience along the rims.

Scenic Quality. Continued use of the Highway 35 pit would have the same effects as Alternative A. Timber harvest and prescribed burning of activity fuels would occur at the second highest levels of the five alternatives. Prescribed burning of natural fuels would occur at the highest potential levels. Risks to and effects on scenic quality would be lower under this alternative than under the Forest Plan. Effects would be the same as those mentioned for Alternative B but would most likely be more evident on the landscape.

Other Effects. Campfire restrictions in the east 1/2 of Segment C and Segments D-F should reduce the risk of human caused wildfires during the period of highest fire danger, even with increased recreation use and public access. Closure dates consistent with the Deschutes and Crooked Rivers would made user education easier as well as enforcement. Visitors would still have some campfire opportunities in a controlled environment at Graveyard Butte. Requiring that campers at Graveyard Butte bring their own firewood should help maintain needed downed woody material for wildlife, fish, riverbank stability, and long-term site productivity.

Table 4.5. Mix of recreation opportunities and alternative effects.

Activity	Expected Alternative Effects
Snow Play	Increase over long-term, improved safety
Nordic Skiing	Increase with planned trail reconstruction, road closures
Alpine Skiing	Decrease over time
Over Snow Vehicles	No change
Off Road Vehicles	Decrease with planned shift to McCubbins Gulch ORV Play Area
Driving for Pleasure	Decrease slightly in Segment B with planned road closures; offset with new viewpoints
Hiking	Large increase with planned trail construction, reconstruction, road conversions; barrier-free trails or trail segments
Horses/Llamas	Potentially large increase with planned trail construction, reconstruction, road conversions, facilities at all campgrounds in Segment B
Mountain Bikes	Potentially large increase with planned trail construction, reconstruction, road conversions
Boating	No change to slight increase with launch and takeout facilities
Camping	Increase with addition of group campground in Segment B, campground at Graveyard Butte, barrier-free units and facilities, private facilities
Picnicking	No change to increase with private facilities
Sightseeing	Decrease slightly with planned road closures, offset with new viewpoints
Hunting	No change to slight increase; road closures should improve quality
Fishing	No change to slight increase
Photography	Increase with new viewpoints
Commercial Use	Slight increase in wagon trains, no change in boating

Issue 3. Water Quality and Quantity

GENERAL EFFECTS

Comparison Table 3 displays the differences between the alternatives based on the measures listed under Issues in Chapter 1.

Water Quality. Forestry and agricultural practices, residential and commercial development, increasing demands for water withdrawal, and recreational development within the watershed could affect future water quality and quantity. Areas of concern include change in the color of glacial "milk", and potential increases in sediment, runoff, chemicals, trash, and bacteria. While protection of water quality would be prescribed and implemented for projects and activities under all alternatives, the risk of water quality problems would increase in proportion to increased development. Private land adjacent to the river in segments D, E, and F would remain in private ownership. Runoff from agricultural land would continue to add chemicals and sediment to the river via irrigation ditch overflow channels. The gravel operation below Tygh Valley would continue to disturb the river banks and channel resulting in a continued sediment source.

Any activities which disturb the soil and vegetation can increase sediment entering the river and its tributaries. This sediment is not the same as the river's glacial milk and can occur at times when the glacial milk does not flow. Thus, sediment from surface disturbing activities may have different effects

on water quality than the glacial milk. Increasing the river's sediment load may reduce the available spawning and rearing habitat and fish populations by filling the spaces between cobbles where juvenile fish and aquatic insects hide and by smothering eggs and fry. It could reduce the chances of successfully introducing anadromous fish above White River Falls.

Timber harvest in steep areas or close to the river may increase soil erosion and sediment input into the river. The effects of the management recommendations in the Barlow Road IRA on water quality are not known since the Forest Service still must determine what the characteristic landscape was and the types of treatments needed to provide it. Roads and trails can continue eroding over the long-term due to improper location, maintenance, grade, or alignment and use levels that exceed the designed capacity. Wheeled vehicles, both motorized and nonmotorized, can increase erosion by developing a continuous rut or ruts.

Rehabilitation and restoration projects and habitat improvement projects tend to produce short-term disruptions to water quality similar to any other surface disturbing activity. However, these effects tend to be very localized and at a much smaller scale than other surface disturbing activities. Further, they improve water quality over the long-term by reducing sediment, maintaining or promoting desirable plant communities, or increasing fish habitat complexity and cover.

Water quality monitoring would establish water conditions now, so the managing agencies will know if water condition changes. Eliminating or controlling non-point sources of sediment pollution should maintain or increase water quality.

Water Quantity. Population growth within the Portland metropolitan area and increased recreation demand in the vicinity of the Mount Hood National Forest could have an impact on the water quality of the White River. Since a majority of the White River watershed consists of public lands and high value agricultural lands, population growth within the watershed will be slight. Water demand for both consumptive use and recreation is expected to increase with all alternatives. Rules adopted by the Oregon Water Resources Council concerning the issuance of new water rights, limits the purposes to domestic, minor commercial domestic, livestock, and public instream uses.

SPECIFIC ALTERNATIVE EFFECTS

Alternative A

Water Quality. Under this alternative, water quality, including purity of the glacial milk, would remain stable or decrease somewhat from current levels. Recreational use within the corridor will increase as population increases in areas adjacent to the National Forest. Higher levels of recreational use could increase the number of user-created trails, and the amount of damage to streambanks, riparian areas, and sideslopes resulting in increases in the amounts of compaction and erosion, sediment delivered to the river, trash, and bacterial contamination.

The Highway 35 pit in Segment B would be developed through Stage IV, widening the flood plain on the west side of the river. This effect could result in damage to the Highway 35 bridge, the west approach, and the sno-park during flood events. During large flood events, the river could breech the divide along Mineral Creek by the sno-park and change course into Mineral Creek. The county rock pit at Graveyard Butte would continue to be a sediment source. Mining of locatable, leasable, and salable resources would be permitted on Segments D-F, and mining of leasable resources would be permitted on National Forest land. Allowing this type of activity to occur could create sources of sediment that would adversely affect water quality.

Mitigation of surface disturbing mining operations would be difficult. Operating with a "No Surface Occupancy Stipulation" for leasable minerals would limit potential impacts on water quality during development and operational phases of projects. Exploration and development of leasables, such as geothermal sources, may have unknown long-term effects on fish habitat and populations. Development

of additional salable minerals would continue in Segments D-F, increasing the risk of sediment flow into the river. Further mineral development in Segment E may lead to higher than expected sediment during flood events, particularly since the soils immediately adjacent to the river consist of loosely consolidated sand. Whether this effect is significant is difficult to quantify since high erosion would be normal during flood events in this soil type. Exploration and development of locatable minerals in Segments D-F is unlikely, due to the low potential for these types of minerals. Should such exploration and development occur, the effects would be similar to those expected for salable minerals.

Grazing would continue on federal lands in Segments B and C and would probably not decrease water quality unless livestock use increases. Grazing could continue to restrict the growth of riparian vegetation rather than allow certain plants to reach a mature size (cottonwoods could be continually grazed back to a re-sprouting shrub rather than reaching a mature tree). This affects the vegetation's potential for stream shade and bank stability.

Retardant used for fire suppression could enter the river, causing a slight change in water chemistry and color. This would be a short-term impact lasting one month or less, depending on the amount of retardant dropped and it's proximity to live water.

All vegetation management tools would be available. In the short-term, any one of these activities can reduce water quality though the effects discussed above. With proper planning, implementation, and monitoring, vegetation management may reduce soil erosion, increase plant quantity and diversity, and increase riparian area habitat effectiveness in the long-term. Road closures to meet Forest Plan standards and guidelines should reduce the sediment potential in Segment B. However, construction of additional roads for recreation access in Segment A would increase sediment flow into the river. Segment A contains fresh sands and gravels with a severe erosion potential.

This alternative places no restrictions on developed recreation capacity. Too much use in the riparian zone can result in the eventual loss of riparian vegetation and can cause streambanks to collapse and erode. These effects, in turn, increase sediment, channel width, and water temperature. Pack and riding stock and mountain bikes should have no impact on water quality, provided river banks and riparian areas are protected from adverse impacts.

Water Quantity. Determining minimal in-stream flows needed to maintain the Outstandingly Remarkable Values should sustain those values. However, if later studies reveal these values need more water than previously thought and the water in "excess" of minimum flow needs is allocated to other uses, then this alternative may result in a damage or degradation to those values. Minimum in-stream flows may also leave some water available for future withdrawals to meet increased demands for agricultural, domestic, or industrial uses.

Alternative B

Water Quality. Water quality would improve under this alternative due to reduced sedimentation. Developed recreation capacity on federal lands would decline to levels that would not adversely affect water quality. Restricting off-road vehicle use to designated roads and trails would reduce the number of unplanned trails. Using straight water for fire suppression in the corridor would eliminate the chance of contamination of the river.

Operation of the Highway 35 pit operation in Segment B would end. More of the channel, floodplain and banks would remain intact, insuring the resiliency of the river system during flood events. The county rock pit at Graveyard Butte would continue to be a sediment source. Eliminating mining on federal lands would lead to maintenance or long-term improvements in water quality. Working with other landowners and other agencies to protect water quality during mining operations may sustain Outstandingly Remarkable Values dependent on water quality at their present levels. Encouraging mining in segment E to occur outside of the river flood channel would protect water quality.

Redesigning recreation sites, rehabilitating various locations to meet VQOs, reducing open road density, and stabilizing road surfaces would greatly reduce the sediment load in Segment B over the long-term. Road obliteration and site rehabilitation may increase sediment in the short-term. Limited trail construction may occur on Forest Service lands. Properly located trails and use of the trail system, regardless of use type, should have no adverse impacts on water quality as long as river and streambanks remain protected.

Grazing impacts would be similar to those expected in alternative A. There would be an effort to modify the allotment plan to exclude areas with little grazing use, reducing the potential for compaction and browsing in riparian areas. Eliminating grazing from day use areas and campgrounds in Segment B may increase riparian vigor, depending on the current condition and levels of recreation use. Excluding grazing below the rims on federal lands in Segments C-F may improve water quality and riparian plant community vigor. Riparian vegetation could achieve and maintain a proper functioning condition. Succession would move toward a climax state.

Most vegetation management tools would remain available. In the short-term, any one of these activities can reduce water quality though the effects discussed above. With proper planning, implementation, and monitoring, vegetation management may reduce soil erosion, increase plant quantity and diversity, and increase riparian area habitat effectiveness in the long-term.

Water Quantity. Determining optimal flows to enhance the Outstandingly Remarkable Values should improve the condition of those values. Obtaining water rights would help stabilize water flows, possibly keeping water temperatures cooler. This alternative would establish monitoring stations, allowing earlier detection of changes in water quality and flow.

Alternative C

Water Quality. Water quality would improve under this alternative, but somewhat less than alternative B. Developed recreation capacity would remain the same, but no effort would be made to reduce existing trails. The number of user trails and, thus, streambank, riparian and sideslope damage may increase. This could lead to increases in the amounts of compaction and erosion, sediment delivered to the river, trash, and bacterial contamination.

The Highway 35 pit in Segment B would be developed through Stage II which would disturb less ground than Alternative A but more ground than Alternative B. More of the channel, floodplain and banks would remain intact insuring the resiliency of the river system during flood events. The pit is designed to direct runoff from the quarry floor into the wildlife ponds or away from White River. Short-term surface disturbance and increased sediment input may occur during the stabilization and rehabilitation phase, potentially diminishing water quality.

The county rock pit at Graveyard Butte would continue to be a sediment source. Mining of locatable, leasable, and salable resources would be permitted on all segments of BLM lands, and mining of leasable resources would be permitted on National Forest land. Allowing this type of activity to occur could create sources of sediment that would adversely affect water quality.

Grazing impacts would be similar to those expected in alternative A. There would be an effort to modify the allotment plan to exclude areas with little grazing use reducing the potential for compaction and browsing in riparian areas. Uncolored or fugitive retardant used for fire suppression could enter the river causing a slight change in water chemistry. This would be a short term impact lasting less than one month depending on the amount of retardant dropped and its proximity to live water.

Removing trees to accommodate views may affect water quality, depending upon the location and size of these areas. The closer to the river and the larger the project, the greater the potential for effects on water quality and the riparian areas.

Water Quantity. This alternative would have the same effects as Alternative B.

Alternative D

Water Quality. Water quality would improve under this alternative, but somewhat less than alternative B and C. Recreation would be allowed to increase which could result in an increase in the number of user trails and streambank, riparian and sideslope damage. This could lead to increases in the amounts of compaction and erosion, sediment delivered to the river, trash, and bacterial contamination.

The Highway 35 pit in Segment B would be developed through Stage III which would disturb less ground than Alternative A but more ground than Alternatives B and C. More of the channel, floodplain and banks would remain intact insuring the resiliency of the river system during flood events[14] Since mining operations at the pit would occur in two entries, the reduction in water quality may be more severe, take longer to recover, or both, compared to Alternative C.

The county rock pit at Graveyard Butte would continue to be a sediment source. Mining of locatable, leasable, and salable resources would be permitted on all segments of BLM lands, and mining of leasable resources would be permitted on National Forest land. Allowing this type of activity to occur could create sources of sediment that would adversely affect water quality. Working with other owners during their mining operations may help sustain water quality at present levels.

Grazing impacts would be similar to those expected in alternative A. There would be an effort to modify the allotment plan to exclude areas with little grazing use reducing the potential for compaction and browsing in riparian areas. Fall grazing on BLM lands in Segments D-F would favor grasses and forbs over woody species. Late winter or early spring grazing would favor woody species over grasses and forbs. Grazing systems would be designed to meet the specific resource objectives for that tract of land within the November 1-May 1 grazing season. Grazing management prescriptions developed in cooperation with private landowners may improve more riparian habitat and water quality than Alternatives A, B, and C.

Uncolored or fugitive retardant used for fire suppression could enter the river causing a slight change in water chemistry. This would be a short term impact lasting less than one month depending on the amount of retardant dropped and its proximity to live water.

Several actions would improve water quality. Reconstructing the road to Bonney Butte overlook would reduce erosion. Closing and obliterating roads in Segment B may initially increase sedimentation, but would reduce it over the long-term. Avoiding additional road construction below the rim in Segment D would prevent the development of new sediment sources.

All vegetation management tools would be available. In the short-term, any one of these activities can reduce water quality though the effects discussed above. With proper planning, implementation, and monitoring, vegetation management may reduce soil erosion, increase plant quantity and diversity, and increase riparian area habitat effectiveness in the long-term. Vegetation management would occur at a lower level than Alternatives A and E and a higher level than Alternatives B and C, posing a moderate risk to water quality from these activities.

This alternative emphasizes high recreational use. As use levels rise the risk that construction and reconstruction of various facilities to accommodate that use would degrade water quality increases. Improperly located trails and river crossings and too much use can increase sediment, degrade riparian areas, and water quality. All construction projects would increase sediment input into the river over the short-term.

Water Quantity. This alternative would have the same effects as Alternative A.

Alternative E

Water Quality. Water quality would decrease under this alternative. Recreation use would be developed to its full potential, which could lead to more developed sites and increased runoff. Higher recreation use could lead to more concentrated dispersed and cross-country use, and the amount of damage to streambanks, riparian areas and sideslopes. This could result in increases in compaction and erosion, sediment delivered to the river, trash, and bacterial contamination. The risk that recreation related construction and reconstruction projects and vegetation management projects would fail to protect water quality would near or at its maximum.

The effects of mining would be similar to alternative A with an increase in the width of the river channel in Segment B and the higher risk of damage to the White River sno-park and Highway 35 bridge during flood stages. Excluding grazing from all BLM lands would have the same effects on water quality as Alternative B. Otherwise, grazing impacts would be similar to Alternative A with decreased water quality resulting only if livestock use increased in Segment B.

Fire suppression tactics which include using retardant and water additives would have the same impact as alternative A. Retardant used for fire suppression could enter the river causing a slight change in water chemistry and color. This would be a short term impact lasting one month or less depending on the amount of retardant dropped and it's proximity to live water. The effects related to vegetation management would be similar to Alternative D, except that the level of vegetation management may be higher.

Water Quantity. This alternative would have the same effects as Alternative A.

Issue 4. Vegetation Management

Many of the effects related to vegetation management are discussed under other Issues or topic areas. Effects on water quality are discussed under that issue and are not repeated here. Effects on other resources not tied to a specific issue, such as old growth dependent wildlife species, are repeated here. Comparison Table 4 displays the differences between the alternatives based on the measures listed under Issues in Chapter 1.

Alternative A

Risks to Other Resource Values. This alternative poses moderately high or high risks to other resource values associated with the river. Timber harvest would be the most common vegetation management activity. The level of risk is associated more with the potential amount of the activity, rather than the activity per se. Generally, the more acres harvested, the greater the risk that the project or a portion of the project will not perform or function as designed.

The interim designated viewshed only considers view originating within the river corridor. Only Segments A-C have a designated viewshed with assigned VQOs. Other critical river associated views, including those from Timberline Lodge, Barlow and Bonney Buttes, Road 48, and Highway 35 have VQOs that overlap each other and the river designated viewshed. The complexity of requirements greatly complicates the task of meeting VQOs and the risk of failure is relatively high.

Table 4.6 displays the probable percentage of the stem initiation phase from vegetation management activities under Forest Plan standards and guidelines but does not account for potential effects related to the aesthetics of the activity nor account for vegetative screening. Harvest and burn unit layout and design can result in failure to meet VQOs even though the percentage of the stem initiation phase lies within the allowable limits. The risk that this effect would happen within the river associated views is higher than within the designated viewshed since more management is expected in that area under Forest Plan direction.

Table 4.6. Percent disturbance expected in critical river associated viewsheds--Alternative A and Viewshed Alternative I.

River Segment	Viewshed (Acres)	Viewpoints	Landscape in Stem Initiation Phase at Any One Time (percent)	VQL Equivalent (Distance Zone)
A/B	Interim (20,627)	River	16%	Partial Retention (Fg/Mg/Bg)
	River Associated (17,606)	Bonney, Barlow Buttes	25%	Modification (Mg)
		Timberline Lodge	16%	Partial Retention (Mg/Bg)
		Road 48	16%	Partial Retention (Fg)
			25%	Modification (Mg/Bg)
		Highway 35	8%	Retention (Fg/Mg)
			16%	Partial Retention (Bg)
C/D	Interim (2,024)	River	8%	Retention (Fg)
			16%	Partial Retention (Mg/Bg)
	River Associated (1,200)	Keeps Mill Overlook	25%	Special Place (Fg), Modification (Mg/Bg)
		Graveyard Butte	?	

Fg = Foreground, Mg = Middleground, Bg = Background

Returning the characteristic landscape that the pioneers may have seen along the Barlow Road would increase the views to Mt. Hood, increased views into the stands adjacent to the road, less evidence of defoliating insects, and more diversity in tree ages and stand structures than seen presently. Short-term effects, such as stumps, slash, evidence of fire, and soil disturbance, would tend to be more negative and may need mitigation to meet the required VQOs. Scenic quality of the view into the canyon from Keeps Mill Overlook may decline from the current condition in the Middleground and Background. In Segments E and F, land use changes, such as increased development, may introduce elements not associated with a pastoral landscape as seen from the river and river associated viewpoints.

This alternative would increase fragmentation and disturbance over much of the upper corridor, reducing habitat for northern spotted owls, wolverines, peregrine falcons, and harlequin ducks. Over time, the risk of catastrophic habitat losses would gradually increase for those species which depend on mature and old growth forests. Within the Habitat Conservation Area and the Key Site Riparian area limited harvest opportunities would allow a long slow shift to old growth.

Management Intensity and Intent. All vegetation management tools would be available in this alternative. Vegetation management to enhance the river-related resources is allowed and encouraged. Harvest, both regeneration cuts and thinnings, and planting would occur to produce the desired species compositions and stand structures over the landscape. The corridor is expected to produce wood volume for market although harvest objectives must be tied to management of the outstandingly remarkable values.

Natural Patterns. This alternative does take an ecosystem approach to land management. Most large scale natural forces would be allowed to operate above timberline, in the river floodplain, and in the canyons. Small scale natural forces, such as endemic levels of insects and disease would be allowed to operate throughout the corridor. Fire would only operate on a small scale, even where it normally can serve as a large scale force in ecosystem functioning.

Most management actions would have a limited ability to emulate natural forces. Generally, most management actions probable under this alternative would disturb the vegetation in frequencies, scales, and patterns at odds with most natural forces. Over the landscape, management actions would tend to occur at a large scale, but most cutting units would be at the wrong size to emulate natural forces. The

natural fuels prescribed burning program would attempt to operate within the range of natural variation but could not operate at the needed scale due to the lack of logical control points.

Alternatives B and C

Risks to Other Resource Values. Both alternatives pose low risks to other resource values from vegetation management activities. Timber salvage and prescribed burning would be the most common activities. Stands would shift towards late-successional species and old growth structures, favoring wildlife species dependent on those conditions. In Segments B-D, the lack of vegetation management would increase the risk of catastrophic habitat losses from large wildfire and epidemic insect and disease outbreaks. Restricting vegetation management to nonchemical and nonbiological methods, with the exception of grazing, would have little or no effect. Neither method is used extensively at present. Restricting the use of nonbiological methods may prove more costly in the future and difficult to enforce. Once released into the environment elsewhere or in the corridor on nonfederal lands, preventing movement of biological agents into the corridor and onto federal lands would prove impossible.

Thinnings would likely be more common than regeneration cuts. Although thinnings have less overall effects to scenic quality than harvests that reduce canopy closure to less than 40%, they do affect scenery, especially in the foreground. In the short-term, the effects from cutting and burning would be the same as described in Alternative A. Large areas of thinnings would need to have variable spacings, untreated islands, and irregular boundaries to meet VQOs.

Alternative B prohibits tree cutting to open views to Mt. Hood, limiting the diversity of scenic views from Segment B. However, this prohibition also reduces the risk that such a project would not meet its VQOs. Alternative C allows tree cutting to open views to Mt. Hood, increasing scenic diversity and increasing the risk of not meeting VQOs.

Both alternatives would have unregulated harvest in the corridor and regulated harvest in the designated viewshed. Unregulated harvest would shrink the base to meet wood demand and increase pressure on the scenery in other areas. Lack of funding for vegetation management would reduce opportunities to improve forest health and thereby improve scenic quality. Conversely, unregulated harvest reduces the risk to existing scenic resources from vegetation management projects that might not meet the required VQOs within the river corridor. Effects of regulated harvest on the designated viewshed would be similar to Alternative A. Tables 4.7 and 4.8 display the expected percent of area in the stem initiation stage at any one time for the two alternatives.

Management Intensity and Intent. Mechanical, manual, and prescribed burning would be available as vegetation management tools on federal lands. Biological pesticides would be available in Alternative C. Chemicals would not be used on federal lands in either alternative. Limited harvest and prescribed burning would restrict the ability to enhance or improve conditions associated with wildlife habitat for species needing more open forest conditions, scenic quality, and historic resources. The characteristic landscape associated with the Barlow Road would appear only by accident through natural events, and not by design. The corridor would not be expected to produce wood for market but may as a result of clean up efforts following a wildfire, root rot pocket, or insect outbreak.

Natural Patterns. These alternatives take an ecosystem approach to land management. Most natural forces would be allowed to operate in the Rocks 'N' Ice, Subapline, Lodgepole Flats, Wetlands, Oak-Conifer, Shrublands, Talus and Forested Rock, Open Riparian, Canyon Riparian, and Tygh Valley Riparian landscape units. Fire is the only exception in all landscape units. Landowners in and along the Tygh Valley Riparian landscape unit would probably try to control most flood events.

Most management actions would attempt to mimic natural forces. Since these two alternatives essentially react to the results of natural forces, most actions would occur at the same frequency, scale, and pattern as those forces. Alternative C attempts to forestall some of the more negative aspects, from a human perspective, of allowing natural forces to operate as freely as possible. The natural fuels prescribed burning program would attempt to operate within the range of natural variation but could not

operate at the needed scale due to the lack of logical control points. More prescribed burning may occur under Alternative C than Alternative B.

Table 4.7. Percent disturbance expected in critical river associated viewsheds--Alternative B.

River Segments	Viewshed (Acres)	Viewpoints	Landscape in Stem Initiation Stage at Any One Time (percent)	VQL Equivalent (Distance Zone)
A/B	Interim (20,627)	River	0-5%	Retention (Fg/Mg/Bg)
	River Associated (17,606)	Bonney, Barlow Buttes	25%	Modification (Mg)
		Timberline Lodge	16%	Partial Retention (Mg/Bg)
		Road 48	16%	Partial Retention (Fg)
			25%	Modification (Mg/Bg)
		Highway 35	8%	Retention (Fg/Mg)
			16%	Partial Retention (Bg)
	Alternative II (20,627)	River	0-5%	Retention (Fg/Mg/Bg)
	River Associated (17,606)	Bonney, Barlow Buttes	25%	Modification (Fg/Mg/Bg)
		Timberline Lodge	16%	Partial Retention (Mg/Bg)
		Road 48	16%	Partial Retention (Fg)
			25%	Modification (Mg/Bg)
		Highway 35	8%	Retention (Fg/Mg)
			16%	Partial Retention (Bg)
	Alternative III (38,233)	River, Bonney and Barlow Buttes, Timberline Lodge, Road 48, Highway 35	0-5%	Retention (Fg/Mg/Bg)
C/D	Interim (2,024)	River	0-5%	Retention (Fg/Mg/Bg)
	River Associated (1,200)	Keeps Mill Overlook	25%	Special Place (Fg), Modification (Mg/Bg)
		Graveyard Butte	?	
	Alternative II (5,873)	River	0-5%	Retention (Fg/Mg/Bg)
	River Associated (1,200)	Keeps Mill Overlook	25%	Special Place (Fg), Modification (Mg/Bg)
		Graveyard Butte	?	
	Alternative III (7,073)	River, Keeps Mill Overlook, Graveyard Butte	0-5%	Retention (Fg/Mg/Bg)

Table 4.8. Percent disturbance expected in critical river associated viewsheds--Alternative C.

River Segments	Viewshed (Acres)	Viewpoints	Landscape in Stem Initiation Stage at Any One Time (percent)	VQL Equivalent (Distance Zone)
A/B	Interim (20,627)	River	5-10%	Retention (Fg) Partial Retention (Mg/Bg)
	River Associated (17,606)	Bonney, Barlow Buttes	25%	Modification (Mg)
		Timberline Lodge	16%	Partial Retention (Mg/Bg)
		Road 48	16%	Partial Retention (Fg)
			25%	Modification (Mg/Bg)
		Highway 35	8%	Retention (Fg/Mg)
			16%	Partial Retention (Bg)
	Alternative II (20,627)	River	5-10%	Retention (Fg) Partial Retention (Mg/Bg)
	River Associated (17,606)	Bonney, Barlow Buttes	25%	Modification (Fg/Mg/Bg)
		Timberline Lodge	16%	Partial Retention (Mg/Bg)
		Road 48	16%	Partial Retention (Fg)
			25%	Modification (Mg/Bg)
		Highway 35	8%	Retention (Fg/Mg)
			16%	Partial Retention (Bg)
	Alternative III (38,233)	River, Bonney and Barlow Buttes, Timberline Lodge, Road 48, Highway 35	5-10%	Retention (Fg) Partial Retention (Mg/Bg)
C/D	Interim (2,024)	River	0-5%	Retention (Fg/Mg/Bg)
	River Associated (1,200)	Keeps Mill Overlook	25%	Special Place (Fg), Modification (Mg/Bg)
		Graveyard Butte	?	
	Alternative II (5,873)	River	0-5%	Retention (Fg/Mg/Bg)
	River Associated (1,200)	Keeps Mill Overlook	25%	Special Place (Fg), Modification (Mg/Bg)
		Graveyard Butte	?	
	Alternative III (7,073)	River, Keeps Mill Overlook, Graveyard Butte	0-5%	Retention (Fg/Mg/Bg)

Alternatives D and E

Risks to Other Resources. These alternatives pose a moderate risk to other resource values from vegetation management activities. Timber harvest and prescribed burning would be the most common activities. Vegetation management would reduce the area occupied by late successional species, particularly in Segment D, reducing habitat suitability for animals dependent on those stages. Conversely, the potential for catastrophic habitat losses would also decline. Alternative E would have somewhat greater impact than Alternative D due to the difference in management intent.

Both alternatives have regulated harvest in both the corridor and designated viewshed with effects similar to Alternative A. The risks would be greater that management would not meet VQOs than under Alternatives B and C but less than under Alternative A. The main difference is the standards and guidelines proposed under Alternatives D and E would provide more protection to scenic quality than under the Forest Plan. Table 4.9 displays the expected percent of area in the stem initiation stage at any one time for the two alternatives.

Table 4.9. Percent disturbance expected in critical river associated viewsheds--Alternatives D and E.

River Segments	Viewshed (Acres)	Viewpoints	Landscape in Stem Initiation Stage at Any One Time (percent)	VQL Equivalent (Distance Zone)
A/B	Interim (20,627)	River	8-10%	Partial Retention (Fg/Mg/Bg)
	River Associated (17,606)	Bonney, Barlow Buttes	25%	Modification (Fg/Mg/Bg)
		Timberline Lodge	16%	Partial Retention (Mg/Bg)
		Road 48	16%	Partial Retention (Fg)
			25%	Modification (Mg/Bg)
		Highway 35	8%	Retention (Fg/Mg)
			16%	Partial Retention (Bg)
	Alternative II (20,627)	River	8-10%	Partial Retention (Fg/Mg/Bg)
	River Associated (17,606)	Bonney, Barlow Buttes	25%	Modification (Fg/Mg/Bg)
		Timberline Lodge	16%	Partial Retention (Mg/Bg)
		Road 48	16%	Partial Retention (Fg)
			25%	Modification (Mg/Bg)
		Highway 35	8%	Retention (Fg/Mg)
			16%	Partial Retention (Bg)
	Alternative III (38,233)	River, Bonney and Barlow Buttes, Timberline Lodge, Road 48, Highway 35	8-10%	Partial Retention (Fg/Mg/Bg) [Retention (Fg) Timberline Lodge]
C/D	Interim (2,024)	River--Dry Mixed Conifer	0-5%	Retention (Fg/Mg/Bg)
		River--Mesic Mixed Conifer	8-10%	Partial Retention (Fg/Mg/Bg)
	River Associated (1,200)	Keeps Mill Overlook	25%	Special Place (Fg), Modification (Mg/Bg)
		Graveyard Butte	?	
	Alternative II (5,873)	River--Dry Mixed Conifer	0-5%	Retention (Fg/Mg/Bg)
		River--Mesic Mixed Conifer	8-10%	Partial Retention (Fg/Mg/Bg)
	River Associated (1,200)	Keeps Mill Overlook	25%	Special Place (Fg), Modification (Mg/Bg)
		Graveyard Butte	?	
	Alternative III (7,073)	River--Dry Mixed Conifer, Graveyard Butte	0-5%	Retention (Fg/Mg/Bg)
		River--Mesic Mixed Conifer, Keeps Mill Overlook	8-10%	Partial Retention (Fg/Mg/Bg)

Management Intensity and Intent. All vegetation management tools would be available throughout the corridor. Harvest, both regeneration cuts and thinnings, and planting would occur to produce the desired species compositions and stand structures over the landscape. The corridor is expected to produce wood volume for market although harvest objectives must be tied to management of the outstandingly remarkable values. Alternative D would manage vegetation to prevent catastrophic losses from natural events while Alternative E would manage to enhance the outstandingly remarkable values as well as provide better protection. Whether there is a practical difference between the intents in these two alternatives is uncertain.

Natural Patterns. These two alternatives take an ecosystem approach to land management. Most natural forces would be allowed to operate in the landscape units as Alternatives B and C with the same exceptions for fire and flood.

Most management actions would attempt to mimic natural forces. These two alternatives also attempt to forestall some of the more negative aspects from a human perspective. Most actions would occur at the same frequency, scale and pattern as those forces as best as the managing agencies can determine. Some actions may occur at slightly different scales and frequencies but should fall within the natural range of variation. The natural fuels prescribed burning program may be able to operate at the needed scale in most of the potential area if the private landowners choose to participate. If they do not, then this program may not be able to operate at the needed scale. Alternative E may result in more prescribed burning due to the difference in vegetation management goals between the two alternatives.

Issue 5. Public/Private Lands Conflicts

Alternative A

Comparison Table 5 displays the differences between the alternatives based on the measures listed under Issues in Chapter 1. The number of public access points would not increase over the current condition. Most people would access Segments D-F by foot from Keeps Mill, Graveyard Butte, Tygh Valley, Tygh Valley State Park, and the mouth of the Deschutes River and by floating down White River. All but the mouth of the Deschutes are accessible by vehicle.

Trespass onto private lands in Segments D-F could occur due to the scattered landownership pattern and poorly marked boundaries. This inadvertent trespass would happen most often while visitors are hunting or fishing. Trespass is anticipated to increase over the long-term as use increases. Litter, vandalism, and wildfires are all possible results of trespass.

Escaped prescribed fires that burn onto private lands are always possible, but not very probable under this alternative. Most, if not all, prescribed burning would occur on National Forest lands. With one exception, state lands provide a "buffer" to private lands from escaped fires on National Forest lands. Little natural fuels burning would occur in the canyon due to the lack of good control points. Based on records since the Mt. Hood switched to spring burning the probability of an escaped fire is less than 1%. The probability that an escaped fire would reach private lands is even lower.

Private landowners would be at high risk from wildfires that escape initial attack. Accumulating natural fuels in the canyon increases this risk through time. No additional prevention measures are expected under this alternative.

Alternatives B and C

The number of access points may increase, but methods of access would remain the same as Alternative A. Landowners willing to sell a public easement to BLM would receive some compensation for allowing the public to travel across private land at any time. Better signing around Graveyard Butte would reduce trespass and the associated problems on private lands in one of the heavier used areas. Private lands east of Graveyard Butte would continue to face a higher risk of trespass than lands west of the Butte due to the higher levels of recreation use.

Escaped prescribed fires that burn onto private lands are always possible, but not very probable under this alternative. Most, if not all, prescribed burning would occur on National Forest lands and the lowest level of prescribed burning of the five alternatives. With one exception, state lands provide a "buffer" to private lands from escaped fires on National Forest lands. Little natural fuels burning would occur in the canyon due to the lack of good control points. Based on records since the Mt. Hood switched to spring burning the probability of an escaped fire is less than 1%. The probability that an escaped fire would reach private lands is even lower. The larger natural fuels prescribed burning program in Alternative C may help reduce the risk of high intensity wildfires on the west portion of Segment D.

Private landowners would be at high risk from wildfires that escape initial attack. Accumulating natural fuels in the canyon increases this risk through time. The use of fire pans may reduce the risk of escaped campfires. But, since the action would be voluntary on BLM lands and not required on National Forest lands this prevention measure may not be very effective.

Alternatives D and E

The number of access points and methods of access would increase. If some landowners choose to construct river access roads and then sell a public easement to BLM, then the number of access points would increase. If a trail is feasible between Graveyard Butte and Keeps Mill and if the trail is designated for uses other than foot travel, then the public may access Segment D by horse, mountain bike, off road vehicle, or some other methods.

Landowners willing to sell a public easement to BLM would receive some compensation for allowing the public to travel across private land at any time. A higher level of signing may reduce the risks of trespass and damage throughout Segment D.

The risk of an escaped prescribed fire is similar to Alternatives B and C. If private landowners choose to participate in a natural fuels program the risk of an escaped fire burning onto a non-participating landowner's property would be moderate. Mitigation measures, careful selection of burn block boundaries and prescriptions, burn timing, and tight control of burning operations should reduce this risk. Over the long-term, the risk of a high intensity wildfire burning out of the canyon would decline in the burned areas.

Campfire restrictions in the east 1/2 of Segment C and Segments D-F should reduce the risk of human caused wildfires during the period of highest fire danger, even with increased recreation use and public access. Closure dates consistent with the Deschutes and Crooked Rivers would make user education easier as well as enforcement.

Better signing around Graveyard Butte would reduce trespass and the associated problems on private lands in one of the heavier used areas. However, increased visitor use resulting from a developed trail in Segment D could result in increased trespass, litter, human caused wildfires, and vandalism even with additional signing.

Issue 6. Final Corridor and Designated Viewshed Boundary

Comparison Table 6 displays the differences between the alternatives based on the measures listed under Issues in Chapter 1.

Alternative Boundary Effects

Geology

White River contains many geologic features which have or may have importance in the study of the region's geology and Mt. Hood. Federal and state government agencies and state universities use these features in the study and interpretation of Mt. Hood's geology. During this analysis several new sites, which may have importance, came to light. Among these sites are the pebbled armored surface of the river's sandflats, partially buried tree trunks in Iron Creek similar to those of the Ghost Forest in Segment A, pyroclastic flow deposits on terraces above the river, and boulders which were rafted into the canyon by either glacial ice or pyroclastic flows. These features demonstrate that new sites of geologic interest and research are still to be found in association with White River.

Boundary Alternative 1 wholly or partially excludes some the geologic outstandingly remarkable values and features in Segment B. Boundary Alternatives 2 and 3 include all known geologic features having

outstanding or remarkable values. All three boundaries include the three known mining sites, one each in Segments B, D, and E.

Boundary Alternative 1 adopts the interim Wild and Scenic River corridor with an adjustment in Segment B to include the present course of the river. The 1/4 mile corridor in Segments A, B, and C do not allow for river channel shifting across the alluvial fan below Highway 35. Naturally occurring debris flows move down the river and block one or more of the distributory channels. The river tends to shift from Iron Creek to Mineral Creek and shifts frequently enough to create a sparsely vegetated boulder covered fan. Even though this alternative moves the boundary to include the current course of the river, at some point the river will shift again and lay outside the designated corridor for some distance. Depending on the course of the river, such features as the armored sandflats and the buried forest may lie partially or entirely outside the corridor. These geologic features may be lost to further research and interpretation due to the increased possibly of surface disturbing activities outside the corridor. In Segment D, this alternative includes lands on Juniper Flat and Smock Prairie which are not directly related to the river or its canyon.

Boundary Alternatives 2 and 3 increase the corridor in Segments A, B, and C while reducing it in Segments D, E, ad F. The increased area in the upper segments allow for the natural shifting of White River between Mineral and Iron Creeks. These alternatives include all the geologic features having outstanding and remarkable value in Segments A-D.

Hydrology

The interim boundary provides the least protection to White River's hydrology, particularly in Segment B. Although the boundary would be adjusted to follow the current river course, the river could shift again and flow outside the designated corridor. This boundary does not protect any subsurface flows which may occur beneath the sand flats. Areas outside the boundary would become available for other uses, such as sand and gravel mining. This alternative would fail to protect the free flowing nature of the river and water quality.

River corridor Alternative 2 provides the highest level of protection which could be expected. Virtually all Class IV streams which feed directly into the river would be included, affording a higher level of protection from additional sediment. This alternative would protect all subsurface flows feeding directly into the river and would preclude the possibility of new sand and gravel operations in most of the channel. This alternative offers the best protection to the free flowing nature of the river, its color, and water quality of the three alternatives. This alternative would require Congressional action since it exceeds the acre limitations of the Wild and Scenic Rivers Act.

River corridor Alternative 3 provides an adequate level of protection. It would not include any of the Class IV streams that drain directly into the river in Segment B. It would protect subsurface flows under the sand flats and preclude development of additional sand and gravel pits on White River. This alternative offers the best level of protection to the free flowing nature of the river, its color, and water quality within the acre limitations of the Wild and Scenic Rivers Act.

Botany

None of the corridor alternatives differ in the effects on botanical resources. Adequate protections exist already to protect sensitive plants on state and federal lands. None of the alternatives would alter the level of protection afforded on private lands. The various corridor alternatives would not alter the climate of the area, so would have no effect on plant community diversity. The three alternatives essentially do not differ in Segments C-F.

Fish Habitat and Populations

The effects of the boundary alternatives on fish are essentially the same as for hydrology. Alternative 2 best protects flow regimes and water quality which would best protect fish habitat and populations. Alternative 1, the interim corridor, does not adequately protect fish habitat and populations. Alternative 3 offers moderate protection.

Wildlife

All three boundary alternatives are essentially the same in Segments C-F and encompass virtually all the potential wolverine, spotted owl, peregrine falcon, and bald eagle habitat within the river canyon. The main differences are in Segment B and above Barlow Creek. Alternative 1 does not include most of the spotted owl, wolverine, red-legged frog, Cope's salamander, or sensitive caddisfly species habitat found within the White River canyon upstream from Barlow Creek. Most harlequin duck habitat would be within the boundary. Alternative 2 includes all of the spotted owl, wolverine, harlequin duck, red-legged frog, Cope's salamander, and sensitive caddisfly species habitat. Alternative 3 includes all the harlequin duck habitat, but over 1/2 of the spotted owl, wolverine, red-legged frog, Cope's salamander, and sensitive caddisfly habitat would lie outside the river corridor boundary.

Recreation

The three boundary alternatives do not differ significantly in Segments C-F. Alternative 1 does not include many trails, day use areas, and campgrounds in Segments A and B that depend on White River for a significant part of the recreation experience. Alternative 2 includes all the existing recreational facilities and opportunities and offers the possibility for expanding those opportunities while providing for a high quality experience. Alternative 3 includes the existing facilities and opportunities but offers little possibility for expansion.

Scenic Resources

For Scenic Resources the corridor boundary is less important than the designated viewshed boundary. Corridor boundary Alternative 2 and designated viewshed Alternative III virtually coincide. The viewshed boundary is still larger.

Alternative Viewshed Effects

The designated viewshed primarily affects vegetation management. The following discussion of effects applies only to vegetation management unless otherwise stated. Designated viewshed Alternative I consists of the viewshed as seen from White River in Segments A-C. The BLM did not formally designate a viewshed for Segments D-F, but have generally managed the corridor as seen from White River with a VQO of Partial Retention. Designated viewshed Alternative II consists of the viewshed as seen from the river in all segments. Designated viewshed Alternative III also includes the views seen from Timberline Lodge, Bonney Butte, Barlow Butte, State Highway 35, Forest Road 48, Keeps Mill Overlook, and Graveyard Butte. As a Special Place, the foreground of Keeps Mill Overlook would have its own VQO after a management plan is written for the site. Viewshed Alternatives II and III do not apply to management Alternative A.

Comparison Table 6 displays the differences between alternatives based on the measures listed under Issues in Chapter 1. Alternatives I and II would make no attempt to reconcile the various overlapping designated viewsheds. Determining which VQO applied to a given spot would remain somewhat difficult and confusing. Segment B includes designated viewsheds for Timberline Lodge, Highway 35, Road 48, and the Barlow Road as well as for White River. Seen areas from the river associated viewpoints would undergo more intensive management than the river viewpoints.

Alternative III simplifies management by applying the same VQO over all distance zones, with the exception of management Alternative C. Including many of the river associated viewpoints into the viewshed would result in higher VQOs for those points and less intensive vegetation management over the entire landscape. Moving these viewpoints to a higher VQO would partially reconcile the VQOs for all the overlapping viewsheds. Keeps Mill Overlook would have a foreground VQO assigned now instead of waiting for completion of a Special Place management plan.

Comparison Table 2b displays the expected effects to scenic quality of vegetation management. These percentages do not account for vegetative screening or treatment unit design and layout. For example, although current percent disturbances of the river viewshed are within Forest Plan disturbance guidelines, certain areas do not meet VQOs due to shape and placement of one or more harvest units. Percent visual disturbance is calculated by adding the acres of stem initiation with visual impact potential and dividing the result by acres in the viewshed. Openings are considered visually recovered after trees reach 20 feet in height. Any disturbance which drops canopy closure to less than 40% is considered a potential visual impact. Comparison Table 2b should give a general idea how much the previous and expected vegetation management would affect a given viewshed. It does not rate the aesthetics of that management nor take vegetative screening into account.

SOCIAL EFFECTS

Socioeconomics

Major effects in this topic relate to expected changes in employment opportunities associated with the river-related resources and changes in the quality of resources, such as scenery and recreation. The economic analysis considers the amount of money which would be paid from federal receipts to counties and changes in employment and income resulting from the river related outputs, receipts, and expenditures in the designated corridor under each management alternative. The effects of each corridor boundary alternative and each designated viewshed alternative are also covered. Typically, these changes reflect increases and decreases in the amount of timber harvest and recreation use in the corridor and viewshed.

Five criteria were used to evaluate effects:

1. Degree of change in timber-related employment.
2. Degree of change in tourism and service-related employment.
3. Degree of change in river-related recreation opportunities and land uses.
4. Degree of change in income to counties (Forest Service timber receipts and county property tax roles).
5. Degree of change in amenity values (such as scenery, wildlife, clean air, opportunities for solitude, etc.) in the river corridor.

All changes discussed are relative to the current condition. This condition includes the current and expected reductions in harvest levels resulting from threatened and endangered species management and mandated changes in management practices at the national and regional levels.

Timber-related employment and receipts to counties are not expected to change under corridor boundary Alternative 1 and 3 and designated viewshed alternatives I and II. The lands encompassed by boundary alternatives 1 and 3 support little marketable timber or are unsuitable for timber management. All effects on timber-related employment and receipts to counties apply only to corridor boundary Alternative 2 and designated viewshed alternative III. The effects discussed would be the same regardless of

whether either corridor boundary Alternative 2 or designated viewshed Alternative III or both were selected.

Hood River County and Clackamas County probably would not be affected. The portion of the river corridor in those counties either lies above timberline or does not support marketable timber. The bulk of the affected area lies in Wasco County. Most, if not all, timber harvest would come from Segment B.

No change is expected in private land uses except under cooperative agreements. The current land uses, primarily agriculture, would continue under those agreements with some possible changes in grazing seasons or other activities. The goal of the changes would be protection of one or more outstandingly remarkable river values.

Alternative A

Timber related employment would not change. Tourism would continue to increase with a lesser increase in service-related employment. Current recreation uses would continue with some increases expected in winter sports, trail use, and use related to the Barlow Road. Quality of recreation experience would decline over the long-term due to increasing use levels. Forest Service receipts to the county would stay the same. Federal acquisition of land is not expected so county property tax roles would not change. Amenity values would increase slightly with planned recreation improvements. The level of timber harvest and current road management practices would limit the increase. The corridor boundary alternatives and designated viewshed Alternative I would not affect the items above.

Alternative B

Both timber-related employment and receipts to counties would decrease the greatest amount of the five management alternatives. Tourism and service-related employment would not change or experience a slight decrease. Some recreation projects planned under Alternative A would not occur under this alternative. Recreation opportunities would not change but the quality of experience would remain high. Federal acquisition of land is not expected so county property tax roles would not change. Amenity values should increase greatly with the low levels of timber harvest, expected road closures, and limits on recreation use.

Alternative C

Timber -related employment and receipts to counties would decrease, although not as much as Alternative B. Tourism and service related employment would not change or increase slightly. Recreation opportunities would increase slightly and use would increase moderately. Overall the quality of experience would remain high, although not as high as Alternative B. Federal acquisition of land is not expected so county property tax roles would not change. Amenity values should increase with the low levels of timber harvest, expected road closures, and limits on recreation use.

Alternative D

Timber-related employment and receipts to counties would decrease but remain at higher levels than Alternatives B and C. Tourism and service-related employment would increase, particularly if private recreation developments occur in Segment E. Recreation opportunities and use would increase. Quality of experience would not be as high as Alternatives B and C, but still remain higher over the long-term than that expected in Alternative A. Federal acquisition of land is not expected so county property tax roles would not change. Amenity values would be slightly below that expected in Alternative A due to the levels of timber harvest and recreation use expected.

Alternative E

Timber-related employment and receipts to counties would remain at or near levels expected in Alternative A. Tourism and service-related employment would increase, particularly if private recreation developments occur in Segment E. Recreation opportunities and use would increase to the maximum allowed under the ROS class. Land acquisition may occur; the preferred method is land exchange which would have no effect on county property tax roles. Any land purchases are expected to be small and primarily of low value land which should not cause a significant reduction in county property tax roles. Amenity values would be around that expected in Alternative A due to the expected level of timber harvest, recreation use, and recreation development.

Some economic development may occur in Segment E and would be encouraged under Alternatives D and E. These alternatives would encourage development of privately owned recreation facilities, such as campgrounds and picnic areas. All alternatives propose some level of scenic or public easement purchases from willing sellers in Segments D-F.

Civil Rights, Women, and Minorities

None of the alternatives are expected to have any positive or negative impacts on civil rights, women, and minorities. All alternatives would respect and observe the terms and conditions of the 1855 Treaty concerning the Confederated Tribes of Warm Springs. All actions related to cultural resources should adequately protect these resources on federal lands. Alternatives B-E would take more proactive approaches towards inventory and would encourage private landowners to better manage any cultural resource sites and features on their lands.

Cultural Resources

Adverse effects to cultural resources could result from soil disturbing activities, dispersed camping and day use, motorized and non-motorized recreation use, and the lack of public information and education programs. Any additional sediment deposition could affect cultural resources within the White River floodplain in much the same way as a flood event. However, the sediment could provide a stabilizing cover for any artifact assemblages as well.

Disturbing the ground's surface could result in breakage, movement, and indiscriminate mixing of artifacts and the obliteration of archaeological sites and features. Those activities which disturb the most soil have the greatest possibility of displacing archaeological deposits. Most of the variation in effects depends on the depth of ground disturbance. Activities which disturb the soil include mining, timber harvest, some fuels treatments, noxious weed control using mechanical or manual methods, and all construction and reconstruction projects. At minimum, all surface disturbing activities would require a cultural resource survey that complies with section 106 of the National Historic Preservation Act.

Several different activities can either enhance or damage above ground cultural resources. Timber harvest activities and prescribed fire could potentially destroy cultural resource structures and/or features (e.g. historic buildings or prehistoric "peel" trees). Prescribed burning may also enhance culturally significant plant populations (i.e. those plants still being collected by Indian people). Applying broad spectrum chemicals may harm culturally significant plants not intended for treatment.

Cattle may damage above-ground structures and features by entering or rubbing against them. Areas of concentrated cattle use can damage cultural resource sites and features through trampling, denuding areas of vegetation, and wallowing. Concentrated visitor use can cause similar effects. Visitors may accidentally or deliberately damage or destroy artifacts through pot-hunting, arrowhead collecting, graffiti, or simply from not recognizing a cultural resource.

Alternative A

This alternative has the highest potential to adversely affect cultural resources, due to the number and scale of allowable surface disturbing activities. Mitigation measures designed to protect cultural resources should reduce adverse impacts from other resource management activities.

Colored fire retardant can discolor historic wooden structures. The lack of prescribed burning and campfire restrictions, combined with potentially high levels of recreation use increase the risk that wildfires will damage or destroy certain kinds of cultural resources. Opportunities to enhance certain culturally significant plants would be limited. If the managing agencies elect to use chemical and biological methods to manage pests, diseases, and unwanted vegetation mitigation measures would be needed to protect culturally significant, non-target plants.

Segments C-E would remain generally inaccessible, providing some level of protection from vandalism and inadvertent damage. However, the lack of trespass warning signs between private and public lands increases the risk of looting, vandalism, and inadvertent damage near main access points. Damage to archaeological and historic values would continue to occur where cultural sites and recreation use overlap. Until cultural sites are located and protected, site degradation is likely to continue. No cultural resource assessment has occurred to find out if use by mountain bikes, pack and riding stock, or off-road vehicles is adversely affecting cultural values.

No interpretation is planned for any of the river segments. The lack of public awareness and appreciation regarding the significance of cultural resources and the need for their protection would continue. Existing off-site education efforts would aid in promoting public understanding and appreciation of prehistoric and historic resources in general to prevent vandalism to these resources.

New information about cultural values would remain limited by not emphasizing the need to conduct large scale cultural resource inventories. Conducting inventories on a project-by-project basis would continue to be inefficient, ineffective, and shortsighted. Cultural resource sites not identified in an inventory would be difficult to protect. The lack of incentive programs or cooperative agreements with non-federal landowners may result in cultural resource degradation or loss. Such partnerships are designed to educate the landowner of the educational and scientific value of the resources and to build stewardship for their protection.

Alternative B

This alternative provides the highest level of cultural resource protection from surface disturbing activities due to the small scale of those activities. Working with other agencies and private landowners to lessen the impacts of mining to scenic values may reduce impacts to undiscovered cultural resources. Excluding cattle from selected areas would eliminate any potential adverse impacts in those areas.

The small scale of vegetation management and lack of campfire restrictions increase the risk that wildfires will damage or destroy certain kinds of cultural resources, particularly in Segment C and the west 1/2 of Segment D. Opportunities to enhance certain culturally significant plants would be limited. If the Forest Service elects to use biological methods to manage pests, mitigation measures may be needed to protect culturally significant, non-target plants from indirect effects of this practice.

Segments C-E would remain generally inaccessible, providing some level of protection from vandalism and inadvertent damage. Trespass signing around Graveyard Butte may reduce the threat of looting, vandalism, and inadvertent damage on private lands. Damage to archaeological and historic values would continue to occur where cultural sites and recreation use overlap. Until cultural sites are located and protected, site degradation is likely to continue. Redesigning recreation sites would benefit known cultural resource sites by reducing or eliminating use.

No cultural resource assessment has occurred to find out if use by mountain bikes, pack and riding stock, or off-road vehicles is adversely affecting cultural values. Excluding commercial use in Segments D-F

would reduce adverse impacts to cultural resources stemming from visitor use only if there is a significant decrease in the number of overall users.

Interpreting cultural resources off-site would reduce the risk of vandalism and looting on all lands. Interpretation that promotes public awareness and appreciation of cultural resource values would benefit those resources and would likely build stewardship to help protect the resource and reduce the threat of vandalism. Information may come out of the efforts around managing threatened, endangered, and sensitive species to allow better interpretation of ancient lifeways and the plant and animal species important to the early people using the White River corridor.

Incentive programs would result in landowners better informed of the significance of cultural resource values and the reasons for their protection. More sites might be preserved and more information gained regarding the prehistoric and historic use of the White River corridor. This information could allow for the continuation of traditional lifeways, scientific studies, and future interpretation.

Reconnaissance/sample level (Class II) cultural resource surveys of public lands would likely provide additional information regarding the prehistoric/historic use of the White River corridor. This knowledge would assist in determining management needs and objectives and allow for a more comprehensive interpretation of the area. The move toward conducting inventories on a broader scale would allow for a more efficient and effective cultural resource program as it relates to the management of the White River corridor.

Class II surveys would involve 100% of selected portions of the corridor. Cultural sites not identified in an inventory would continue to be difficult to protect. All surface disturbing activities not covered in the Class II survey would require a cultural resource survey that complies with section 106 of the National Historic Preservation Act. Mitigation measures designed to protect cultural resources should reduce adverse impacts.

Alternative C

This alternative provides the second highest level of cultural resource protection from surface disturbing activities due to the scale of those activities. This alternative closely resembles Alternative B in its effects with some exceptions. Uncolored retardant has no known effects on cultural resources. The higher level of prescribed burning in this alternative may enhance the survival, growth, and yield of culturally important plants.

Alternative D

This alternative provides a moderate level of cultural resource protection from surface disturbing activities compared to Alternatives B and C. Many of the proposed actions in Alternative D are similar to Alternatives B and C. However, more surface disturbing activities would be expected and a higher level of recreation use. Therefore, this alternative poses a higher risk of looting, vandalism, and inadvertent damage to cultural resources than Alternatives B and C, but a lower risk than Alternatives A and E.

Uncolored retardant has no known effects on cultural resources. The scale of prescribed burning and campfire restrictions should reduce the risk that catastrophic wildfires will damage or destroy certain kinds of cultural resources, particularly in Segment C and the west 1/2 of Segment D. Prescribed burning may enhance the survival, growth, and yield of culturally important plants.

Cooperative agreements would help protect significant cultural resources on non-Federal lands in Segments D-F. Cooperators would be informed of the significance of cultural resource values and their role in the protection of those resources. More sites would be preserved and more information gained regarding the prehistoric and historic use of the White River corridor. This information would allow for the continuation of traditional lifeways, scientific studies, and future interpretation. These agreements may partially offset the increased risk associated with an increased number of access points.

A comprehensive (Class III) cultural resource inventory and assessment would result in more information about the location and importance of prehistoric and historic sites. The prehistoric and historic use of the White River corridor would become better understood and the information could be utilized for scientific studies and future interpretation. The federal cultural resource management program involving White River would become much more efficient and effective by having inventory and assessment work completed prior to project design.

The Class III survey would involve a 100% inventory of 100% of the corridor. It should greatly reduce any additional time needed for specific project surveys. However, initially it would be time consuming and very expensive. Until this survey is completed, all surface disturbing projects would require a project level survey that complies with section 106 of the National Historic Preservation Act.

Alternative E

This alternative has the second highest potential to disturb cultural resources, due to the scale of allowable surface disturbing activities and recreation use. The potential is lower than Alternative A since vegetation management would use an ecosystem approach, leading to less intensive harvesting and road construction than expected under Alternative A. This alternative resembles Alternative D in its effects with some exceptions.

Colored retardant can discolor historic wooden structures. The potential level of prescribed burning may enhance the survival, growth, and yield of culturally important plants and reduce the risk of catastrophic wildfires over the largest area of the five alternatives.

The level of recreation use greatly increases the risk of escaped campfires and their potential to damage or destroy historic buildings, prehistoric peel trees, juniper structures and similar resources. The additional signing concerning trespass should help reduce vandalism and unintentional looting of cultural resource sites on private lands. The campfire closure and prescribed burning should reduce this risk.

Acquiring non-federal lands which contain significant cultural resource sites and/or significant artifact assemblages would promote better protection of those sites and artifacts from vandalism or looting and provide for future interpretation of the river's prehistoric and historic use.

Land Ownership

None of the alternatives would have a significant effect on land ownership. Condemnation for fee title is not an option under both the 1968 National Wild and Scenic Rivers Act and the 1988 Omnibus Oregon Wild and Scenic Rivers Act. All land and easement acquisition would depend on willing sellers and donors. Only scenic easement acquisitions are planned in Alternative A. The remaining alternatives would pursue scenic easement acquisition and enough land acquisition to provide legal public access along the riverbanks. Additionally, Alternative E would pursue land acquisitions designed to consolidate federal land holdings in Segment D, and would involve both land purchases and land exchanges.

Wetlands, Floodplains, Prime Farmland, and Rangelands

None of the alternatives are expected to reduce acreages of or have any other negative effects on wetlands, floodplains, prime farmland or rangelands. Prescribed burning may improve range condition Segments C, D, and F. The greatest level of improvement would occur under Alternative E if private landowners choose to participate in a natural fuels program.

Transportation and Access

Alternatives A, D, and E would not have any major reductions in public transportation and access to public lands. These alternatives would at least maintain the present expected level of public access under the Forest Plan and Two Rivers RMP. Alternatives B and C would reduce the open road density on National Forest lands to a lower level than presently directed in the Forest Plan. Segment B is the

only river segment affected by this proposal. The reductions in open road density are not expected to reduce public access to the river corridor.

BIOLOGICAL EFFECTS

Threatened, Endangered, and Sensitive Species

Animals

Alternative A

This alternative would increase disturbance over much of Segments A and B and could increase habitat fragmentation within Segment B. Habitat suitability would decrease for northern spotted owls, wolverines, and peregrine falcons. Implementing the Forest Plan standards and guidelines for the land allocations within the corridor would increase recreation use to levels that would cause high disturbance to wildlife. Most of the areas would fall under a regulated timber harvest regime with even-aged management and short rotations (as short as 125 years) the preferred silvicultural system where it is not readily visible. The Forest Plan does not require vegetation management to work within the natural range of variation. Nor does it require connectivity of landscapes and habitat within and across the corridor be considered. Under these circumstances, the risk of catastrophic habitat losses probably would increase.

Increased disturbance to harlequin ducks in Segment B may or may not occur, depending on trail system location and management. Riparian buffering would protect instream habitat for Cope's giant salamander, red-legged frog, and sensitive caddisfly habitat in Segment B. Protecting the terrestrial habitat of the red-legged frog would depend upon the design of future projects.

In Segments C and D, the mix of land allocations, ownerships, and topography would result in little change in habitat quality or quantity in the short-term. Any increases in recreation use probably would be minimal and would not cause significant adverse disturbance to harlequin ducks, peregrine falcon, northern spotted owls, or wolverines. Over the long-term, increasing recreation use and disturbance during the spring through fall periods would reduce habitat suitability peregrine falcon, harlequin duck, and bald eagle nesting and for wolverine use. Recreation use would have negligible effects on northern spotted owl. Winter recreation use would have little or no adverse effects since little recreation opportunity exists during that season.

The steep and rocky slopes make timber harvest unlikely in Segment C or D, allowing succession to increase the area covered by old growth with greater structural diversity. Assuming no natural disturbances such as wildfire or insect epidemic, habitat for the northern spotted owl should increase through time. Continued low level military flights would continue to interfere with peregrine falcon nesting.

The western portion of Segment E and part of Segment F provide potential nest sites for peregrine falcon, but the continued low level military flights would continue to interfere with nesting. Increased recreation use on the river, such as canoeing, tubing, and kayaking, would interfere with bald eagle nesting. However, existing disturbance levels are such that nesting bald eagles would have to be sufficiently acclimated to disturbance that future increases in recreation use would be unlikely to cause abandonment of a territory if it were already occupied and may have no effect on nesting. Winter roosting habitat suitability should remain unchanged as the area is not suited for winter recreation activity.

Alternative B

Harlequin duck habitat and the potential peregrine falcon habitat in Segment A would be protected from increased disturbance by recreation users over the long-term. These two species may eventually occupy this area. Limited disturbance within the floodplain of Segment B would slowly increase habitat capability for wolverine and harlequin ducks. The Cool, Wet Mixed Conifer landscape unit would continue to provide good to high quality habitat for northern spotted owls, wolverines, red legged frogs, Cope's salamander, and sensitive caddisfly species. Over the long-term, populations of many of these species would increase.

Limited recreation use within the canyon would maintain habitat effectiveness for species which do not tolerate much human presence, such as wolverine. If low level military flights ended during the nesting season, then efforts to reintroduce peregrine falcons into the canyon may succeed. This alternative would not have much effect on habitat quality in Segments E and F. In Segments B-D, the lack of vegetation management would increase the risk of catastrophic habitat losses from events such as large wildfires and epidemic insect and disease outbreaks.

Alternative C

Generally, this alternative would have the same effects on threatened, endangered, and sensitive animals as Alternative B, with some exceptions. Increased disturbance from recreation use may further delay peregrine falcon or harlequin duck occupancy of Segment A. Trail construction from White River Crossing to Keeps Mill would slightly reduce habitat suitability for wolverine and may reduce suitability for harlequin duck over the long-term, depending on the exact location. Risks of catastrophic habitat losses would remain near existing levels.

Alternative D

Disturbance from increased recreation use and trail construction would reduce habitat effectiveness over the long-term for wolverine, harlequin duck, and peregrine falcon. Harlequin ducks and peregrine falcons probably would not occupy the potential habitat in Segment A. The Cool, Wet Mixed Conifer landscape unit would continue to provide good to high quality habitat for northern spotted owls, wolverines, red legged frogs, Cope's salamander, and sensitive caddisfly species. Over the long-term, populations of many of these species would increase.

Vegetation management would reduce the area occupied by late successional species, particularly in Segment D, reducing habitat suitability for animals dependent on those stages. Conversely, this management would favor some prey species of peregrine falcons. Even if low level military flights ended during the nesting season, increased recreation use may still eliminate peregrine falcon nesting in Segments D-F. The potential for catastrophic habitat losses would decline due to the more proactive approach to management.

Alternative E

Disturbance from increased recreation use and trail construction would cause the second greatest reductions in habitat effectiveness over the long-term for wolverine, harlequin duck, and peregrine falcon. Only Alternative A would have greater adverse impacts. Harlequin ducks and peregrine falcons probably would not occupy the potential habitat in Segment A and wolverine use would likely decrease. Without careful recreation use management, harlequin ducks could be prevented from using Segments B and C. The Cool, Wet Mixed Conifer landscape unit would continue to provide good to high quality habitat for northern spotted owls, wolverines, red legged frogs, Cope's salamander, and sensitive caddisfly species. However, the quality of old growth and mature habitat would be at the low end of the natural range of variation. Over the long-term, populations of many of these species may increase, but to a lesser extent than Alternatives B, C, or D.

Vegetation management would reduce the area occupied by late successional species, particularly in Segment D, reducing habitat suitability for animals dependent on those stages. Conversely, this management would favor some prey species of peregrine falcons. Even if low level military flights ended during the nesting season, increased recreation use may still eliminate peregrine falcon nesting in Segments D-F. Recreation use by canoers, kayakers, tubers, and swimmers in Tygh Valley would reduce habitat effectiveness for bald eagles. The potential for catastrophic habitat losses would decline due to the very active approach to management.

Plants

All alternatives provide basic protection for known threatened, endangered, and sensitive species populations that occur on federally owned land. Surveys for threatened, endangered, and sensitive plants are required for all projects and management activities. In general, there is little difference in the effects between alternatives. The following sensitive plant species have been found within the project area: Tygh Valley milkvetch, *Astragalus tyghensis* (a federal C1 candidate and Oregon State category 1 species that is endangered or threatened throughout its entire range), Howell's milkvetch, *A. howellii,* two small grape ferns *Botrychium montanum* and *B. minganense*, and two club mosses *Lycopodium selago* and *L. annotinium*. Howell's milkvetch is a state candidate species. The two grape ferns and the two club mosses are on the Forest Service Region 6 sensitive plant list.

In alternatives B-E the BLM would develop cooperative agreements with private land owners to conduct comprehensive inventories and to develop strategies to protect rare and sensitive plant species. Land exchanges or purchases from willing landowners as part of an effort to gain legal access may also bring some plant sites under federal protection. In the short-term there will be little effect on threatened, endangered, and sensitive plants. The potential combined effect of these actions over the long-run should be greater protection and understanding of the known plants and greater opportunity to discover new plants. Greater public access will result in a proportional increase of risk to rare and sensitive plants from recreational activities; however the risk is likely to remain low since nearly all activity is concentrated on the river and its immediate banks, with little impact on the known plant sites

Alternative A

Current management practices by the Forest Service and BLM would continue with no plan for a change in relationship with private landowners. On National Forest lands, the three ranger districts would continue to plan and implement projects independently. Both federal agencies would survey for threatened, endangered, and sensitive plants and buffer sensitive plant sites in or adjacent to projects that disturb the area, such as timber sales. Grazing practices would continue with some monitoring and change to reduce potential threats to rare and sensitive plants, as problems are recognized. Summer use along the forest roads, such as dispersed camping, would continue to increase. The unroaded portions of the river will remain little used and inaccessible and, therefore, little changed.

In the short-term, few adverse impacts are expected. In the long-term, increasing levels of recreation use and timber harvest would increase the potential for disturbance of sensitive plant sites. While the known populations of sensitive plants and their habitats are protected (mostly by buffering) the potential for cumulative effects from direct disturbance and indirect effects from nearby activities will increase. An inherent risk of buffering is that the buffer may prove inadequate or blow down. Negative effects could be loss in the total area of habitat or a reduction in the total population of any one species though the risk is low because of the protections already in place. Cumulatively, managing only known populations and their habitats could prevent population expansion that could result in delisting the species.

Most of the BLM lands within the corridor will not be affected in the short-term or long-term as they are mostly rugged, inaccessible and little visited. Tygh Valley milkvetch occurs on grazing land within the corridor and on adjacent private land. No short-term effects are expected. The Oregon Department of

Agriculture is conducting a study that should be able to determine the long-term and cumulative effects of current grazing practices on this species.

There is no provision for cooperative agreements with private land owners to collect baseline information on threatened, endangered, and sensitive plants or to develop strategies for their protection throughout the corridor. There will be no direct short-term, long-term, or cumulative negative effect. Indirectly the lack of cooperative agreements may have long-term and cumulative negative effects through failure to act. There will be no improvement in conversation or cooperative action that would allow private land owners and government agencies to better manage rare and sensitive species. As a result some species such as Tygh Valley Milk Vetch may be declining simply because the trend was not observed or positive management strategies were not shared.

Alternative B

In general, this alternative will have the least direct and immediate impact on threatened, endangered, and sensitive plants. Projects and recreation will be at their lowest levels of the five options. Vegetation manipulation would be minimized. There would be little short-term effect either positive or negative. Over the long-term, the potential risk, direct and indirect, from each of these activities both singly and cumulatively should be at their lowest levels. However, limiting vegetation management activities to repair and restoration eliminates options for actions that could reduce the risks of catastrophic events, such as large, high intensity wildfires and insect outbreaks. The risk of preventable catastrophic events will rise over the long-term.

Alternative C

This alternative is essentially the same as B with a few exceptions. The managing agencies would have a little more flexibility to reduce the potential of preventable catastrophic events. The slight increase in project activities and recreation will slightly increase the risk of disturbance to threatened, endangered, and sensitive plants over the long-term. The cumulative effect should be greater protection for rare and sensitive plant species and their habitats from catastrophic events

Alternative D

This alternative includes actions to enhance as well as protect/perpetuate threatened, endangered, and sensitive plants. Visitor numbers and recreation facilities would increase, but with more planning and site development to lessen impacts. In the short-term, there should be few adverse effects. Siting trails, campgrounds and other facilities away from rare and sensitive plant sites will minimize the risk of direct effects such as trampling. Cumulative and long-term risk would increase some as visitor numbers increases. The risk of negative impacts will still be low as the known rare and sensitive plant sites are not in areas that attract visitors. Regulated timber harvest should occur and vegetation manipulation will increase with the goal of improving ecosystem health. As long as these activities are well planned and executed there will be little or no risk to rare and sensitive plants. In the long-term the risk of preventable catastrophic events will decline. Cumulatively, this alternative will likely benefit threatened, endangered, and sensitive plants through improved forest health, and maintenance of habitat.

Alternative E

This alternative places the greatest emphasis on vegetation manipulation to attain the desired future condition as rapidly as possible. Recreation will be allowed and provided for at the highest level that will still protect river-related values. This alternative should have little effect on rare and sensitive plants as long as the increased activities are well planned and carried out. However, the potential of direct and indirect negative effects will increase with the level of activity. Improvements in forest health, and a reduction of vulnerability to devastating large fires will reduce the risk of catastrophic events.

The BLM would eliminate grazing on their lands within the river corridor. All boundary alternatives include known populations of Tygh Valley Milk Vetch. Since cattle eat this plant, removing the grazing pressure will likely result in some improvement in vigor and reproduction.

Other Management Indicator Species

Only the Forest Service has designated management indicator species. Therefore, the discussion below only applies to Segments B-C and only to those species not already discussed under Threatened, Endangered, and Sensitive Animal Species. Discussion of other wildlife species and deer, elk, turkey, and gray squirrel in Segments D-F are found under the Biodiversity analysis. None of the management indicator species discussed below use Segment A.

Alternative A

The mix of land allocations would cause little change in habitat effectiveness and species mixes over the short-term. Over the long-term, increased open road densities and recreation use would reduce habitat effectiveness for elk and may reduce elk use up to 60%. Elk may continue to travel through much of the area, but may not linger or use the calving areas in the Wetlands landscape unit. Since the Key Site Riparian Area (A9) lacks a management plan, effects on wildlife of this alternative are unknown.

The Habitat Conservation Area, Pileated Woodpecker Management Areas (B5), and Pine Marten Management Areas (B5) should gradually shift towards late successional species old growth, increasing stand structural diversity and improving habitat for pileated woodpeckers and pine martens. In B5, however, half the area not managed for old growth would convert to the standards and guidelines of the underlying land allocation, usually Special Interest Area (A4), Scenic Viewshed (B2), and Wild and Scenic Rivers (B1). Over the long-term, Forest Plan standards and guidelines in Scenic Viewsheds (B2) would allow significant reductions in big game thermal cover and old growth. Habitat effectiveness would decline for pileated woodpeckers, pine martens, and elk rearing.

Once the river enters Segment C, vegetation management becomes less likely. The corridor would continue to serve as a major travel route for deer and elk moving to and from winter range. The corridor itself provides some winter range, particularly during winter storm events. Optimal thermal cover development would continue. Little or no new road construction is likely, maintaining that element of big game habitat effectiveness.

Alternative B

Limiting recreation use disturbance would increase elk calving habitat effectiveness over the long-term in the Open Riparian, Wetlands, and Lodgepole Flats landscape units. Habitat quality for pileated woodpeckers and pine martens would slowly increase as stand structural diversity increases in the Cool, Wet Mixed Conifer landscape unit. Ecosystem management would maintain this landscape unit as fully suitable pileated woodpecker and pine marten habitat, negating the need for the B5 land allocation. Reducing open road densities to 1.5 miles per square mile would improve elk habitat effectiveness over the short-term. However, long-term successional changes would reduce habitat effectiveness by reducing forage areas. Elk rearing habitat north of Highway 35 and south of the river would not change appreciably over the long-term since much of the area is already in mature or old growth condition. Any further progression towards old growth would actually increase elk forage as new, small openings appear in the stands.

In the Mesic Mixed Conifer landscape unit, increases in the stand reinitiation stage would improve habitat quality and quantity for pine martens and pileated woodpeckers. Ecosystem management would preserve options for changing management in the B5 land allocation. Elk habitat effectiveness would not change greatly through time. Most of this landscape unit lies in Segment C. The corridor's narrowness means most of its value to elk is as thermal cover and a travel corridor. As the amount of old growth

increases, the Segment's value for these two habitat functions increases. Limiting open road density would have little effect since the current road density is below the limit.

Limited management to native species only would have little or no effect. This action would apply only to the corridor and affect upland game birds and wild turkey. The acres involved in the restriction a negligible compared to the total area used by these species. Further, the action would continue to provide habitat for these nonnative species since the habitat needs of many natives and these nonnatives overlap.

Alternative C

This alternative closely resembles Alternative B in its effects on management indicator species. The slight long-term increase in recreation use is not expected to cause a significant decline in elk habitat suitability in Segment B. Trail construction from White River Crossing to Keeps Mill would slightly reduce elk habitat suitability.

Alternative D

This alternative resembles Alternative B, except recreation use would increase to levels higher than Alternative C. The increased level of disturbance from recreation use and open road densities would reduce habitat suitability for elk. Most of this reduce is road related. As with Alternative C, trail construction from White River Crossing to Keeps Mill would increase disturbance and slightly reduce elk habitat suitability. Effects on all other management indicator species resembles Alternative B.

Alternative E

This alternative would increase recreation use still higher. Recreation related disturbance and open road density would reduce elk habitat suitability more than Alternative D. Effects on all other management indicator species more closely resembles Alternative B.

Fish and Fish Habitat

Many of the expected effects on fish and fish habitat relate to water quality and quantity. Any activities which improve or degrade water quality and quantity would improve or degrade fish habitat and, therefore, affect fish populations in the same direction. Additionally, many pesticides and herbicides can cause mortality of fish in all life stages and other aquatic organisms should the chemicals enter the stream. Fire suppressant chemicals containing ammonium are toxic to all life stages of fish and other aquatic organisms through addition of free ammonia into the stream system. Biological introductions can cause extinction of native organisms through competition, predation, and disease. Biological pesticides, such as *Bacillus thurgensis* (Bt), may kill related organisms in the same life stage as the target pest, potentially reducing food sources for fish. In turn, this reduction may influence the natural food chain, creating difficulties for all life stages of fish.

In Alternatives B through E, screening irrigation diversions would reduce fish losses from stranding in ditches but may prevent fish in the ditches from returning to the river or tributary. If most of the public elects to follow the fishing recommendations then adult redband rainbow trout take and hooking mortality may decline. Over the long-term, native fish populations may increase as the number of adults surviving to reproductive maturity increases. Interpretation and information could indirectly benefit fish and their habitat by encouraging visitor awareness and an understanding of the importance of resource protection.

Alternative A

Using colored retardant should reduce the risk of accidental drops into the river and its tributaries. Continued grazing where cattle have access to the riparian zone in Segments B, D, E, and F would reduce riparian vegetation and fish habitat.

This alternative places no restrictions on recreational use levels. Fishing pressure could increase to its theoretical maximum. All vegetation management tools are available, including chemical and biological methods. Mitigation measures required by existing laws, regulations, and policies should reduce the risk to fish populations and habitat to manageable levels. The use of biological pesticides may cause short-term reductions in fish populations through decreases in food supply.

Alternative B

Freezing recreation use levels should stabilize angling pressure and its associated effects. Eliminating the use of chemical and biological methods and all forms of retardant would eliminate the risk of fish population or food source reductions from these factors. Vegetation management would allow riparian vegetation to achieve and maintain proper functioning condition. Successional would move plant communities towards a climax state. Managing only for the habitat needs of native fish would have little or no effect on nonnative fish species, such as brook trout, since these species have the same habitat requirements as the native trout.

Alternative C

Increased recreation use may increase angling pressure and degrade riparian area vigor. Eliminating the use of chemical methods would eliminate the risk of fish population or food source reductions from that factor. Using colorless retardant increases the risk of accidental drops into streams. Colorless and fugitive retardants contain the same active chemicals as colored retardant. Vegetation management would allow riparian vegetation to achieve and maintain proper functioning condition. Successional would move plant communities towards a climax state. Managing only for the habitat needs of native fish would have little or no effect on nonnative fish species, such as brook trout, since these species have the same habitat requirements as the native trout.

Alternative D

Providing for optimum flows would better protect fish and fish habitat than providing for minimum flows. If later studies reveal that the fish require more water than previously thought sufficient flow would remain in the river to maintain fish populations and habitat. All vegetation management tools are available, including chemical and biological methods. Mitigation measures required by existing laws, regulations, and policies should reduce the risk to fish populations and habitat to manageable levels. The use of biological pesticides may cause short-term reductions in fish populations through decreases in food supply. Using colorless or fugitive retardant would have the same effects on fish populations and habitat as Alternative C. This alternative emphasizes high recreational use. Fishing pressure would probably increase, causing greater catch and keep mortality and accidental hooking mortality. Developing new recreational sites and watercraft launching facilities may influence fish behavior and survival. Increased boating and launching may scatter fish and increase predation. Managing only for the habitat needs of native fish would have little or no effect on nonnative fish species, such as brook trout, since these species have the same habitat requirements as the native trout.

Alternative E

This alternative closely resembles Alternative D in its effects with some exceptions. Using colored retardant for fire suppression would have the same effects as Alternative A. Fishing pressure would be at its theoretical maximum due to the high levels of recreation use. The angling pressure would alter the age structure and composition of the fish population and increase adult fish mortality. Managing only for

the habitat needs of native fish would have little or no effect on nonnative fish species, such as brook trout, since these species have the same habitat requirements as the native trout.

Old Growth

Segment A lies above timberline. Most of Segment D and all of Segments E and F do not support coniferous forest, instead they contain woodlands, savannahs, shrub fields, grasslands, or hardwood forest. These areas have no definitions for old growth. The discussion below applies only to Segments B, C and the west 1/2 of D.

Alternative A

The amount of area in old growth would decline in areas not managed for northern spotted owl, pine marten, and pileated woodpecker habitat in Segments B and C. Little or no vegetation management is anticipated in Segment D, allowing the amount of old growth to increase. Over time, late successional tree species, such as true firs and western hemlock, would dominate the overstory and understory of most old growth stands. Old growth comprised of early successional species, such as Douglas-fir and ponderosa pine, would be limited to areas already harvested or specifically managed for those species.

Alternatives B and C

These two alternatives are very similar. The amount of old growth would increase throughout the area and tend towards the upper end of the acceptable range. Over time, late successional tree species, such as true firs and western hemlock, would dominate the overstory and understory of most old growth stands. Old growth comprised of early successional species, such as Douglas-fir and ponderosa pine, would be limited to areas already harvested or specifically managed for those species.

Alternatives D and E

These two alternatives are very similar. The amount of old growth present would tend towards the low end of the acceptable range. Late successional tree species would dominate the old growth in Segment B. Early successional species would dominate more of the old growth in Segments C and D, although some old growth comprised of late successional species would be present.

Biological Diversity

Threatened, endangered, and sensitive wildlife species are discussed above. Mt. Hood National Forest management indicator species are discussed above. Most wildlife species discussed below do not fall into either of these categories.

Alternative A

This alternative does not use an ecosystem approach to land management. Instead, it continues the current direction in the Forest Plan and Two Rivers RMP. The discussion below focuses primarily on Forest Plan land allocations in Segments A-C, then switches to landscape units in Segments D-F.

Increased recreation use in the Rocks 'N' Ice landscape unit should have little effect on small animals, such as gray crowned rosey finch, gray jay, and mountain chickadee. Little ecological change should occur through time in the main floodplain, with the exception of possible "glacial blowouts" which can scour the floodplain and alter the river's course in Segment B. These events would maintain the Open Riparian and Rocks 'N' Ice landscape units in a condition similar to the current one. Most of the floodplain lies in either Special Interest Area (A4), Winter Recreation Area (A11), and Designated Wild, Scenic, and Recreation River (B1).

After the B1 allocation enters the canyon in Segment C, the glacial blowouts mentioned above do not appear to have much effect on the vegetation. Although timber harvest may occur, with similar effects as discussed under B2, little harvest is likely in the steep rocky slopes of the canyon. Succession would continue in the absence of any other natural disturbances, resulting in more grand fir old growth. The total number of wildlife species should increase.

Potential for large scale, catastrophic disturbances from wildfire, insects, disease, and, possibly, floods, would increase in all allocations except B2. These natural disturbances revert the area to earlier successional stages with concurrent changes in wildlife species and populations. Without disturbance, succession would lead to more old growth and stand reinitiation stages dominated by Pacific silver fir, western hemlock, and grand fir.

Timber harvest in the B2 land allocation would revert the stands to an earlier successional stage. Depending on the silvicultural prescription, environmental conditions within the harvest area could either closely resemble conditions found after a natural disturbance or differ radically. The more radically the harvest area conditions differ from natural conditions, the greater the difference in plant and animal species compositions between the two types of disturbance. Over the long-term old growth would comprise as little as 25% of the B2 allocation. More of the area would be in an earlier successional stage, favoring species such as mountain bluebird, western tanager, and rufous hummingbird.

The Habitat Conservation Area and the Key Site Riparian area should change little in the short term. Over the long-term, these areas would shift to old growth, increasing habitat quality for animal species dependent on those stand conditions. The total number of animal species should also increase.

Half the acres allocated to the Pileated Woodpecker/Pine Marten Habitat Area (B5) would convert to the underlying land allocation (A4, B1, or B2) once B5 management plans are prepared. The effects related to those areas are described above. The remaining B5 area would be managed for mature and old growth stand stages with an emphasis on late successional plant and animal species. Either grand fir or western hemlock would dominate the tree layer.

Most of the landscape units in Segment D are in the later successional stages. The BLM and the state would not actively work to alter the conditions in the corridor. A gradual shift to old growth in the forested areas would occur. Grand fir, Douglas-fir, or ponderosa pine and Oregon white would dominate these stands, depending on aspect and elevation. The more heavily forested areas would provide habitat for pine marten, pileated woodpecker, wolverine, bald eagle roosting, and elk thermal cover.

Landscape units near the river, such as Canyon Riparian and the lower edge of Talus and Forested Rock, would experience the highest recreation use. The increased disturbance could reduce the area's suitability for Townsend's big-eared bat and peregrine falcon. Canyon Riparian and Talus and Forested Rock should not change appreciably over the long-term.

Cattle have grazed much of the Shrubland and Range landscape units. As long as grazing pressure continues, these areas will support lower levels of native perennial bunchgrasses and higher levels of shrubs and non-native annual grasses. Grazed areas tend to contain both fewer numbers of species and lower populations of species than ungrazed areas. Most ungrazed areas are protected from grazing either by rock or topography. Both the ungrazed and grazed areas contain as much species richness and abundance as they are capable of supporting under existing grazing levels.

Tygh Valley Riparian covers most of Segment E. The potential for large scale, catastrophic disturbances is low and expected to remain so. The larger glacial blowouts may send material as far as Tygh Valley, depositing more sand and logs and opening the stands. As recreation use increases along the river, the area would lose habitat effectiveness for disturbance sensitive species such as the great blue heron, bald eagle, and various waterfowl. Over the long-term, cottonwood, alder, and willow may decline where grazing occurs. Year-long grazing would eventually eliminate the most palatable species of grasses and shrubs. Species richness and abundance would decline as would habitat suitability for deer, waterfowl,

herons, and other shorebirds. Reductions in bird species richness and abundance would reduce the peregrine falcon prey base, discouraging nesting in the nearby cliffs.

Alternative B

Overall, the potential for large scale catastrophic events would increase greatly. Early successional stages would occur at the low end of the acceptable range in the desired future condition. Later successional stages would occur at the upper end of the acceptable range. Late successional plant and wildlife species would tend to occupy most of the area.

True firs and western hemlock would dominate the overstory and understory of the Wetlands, Cool, Wet Mixed Conifer, and Mesic Mixed Conifer landscape units, and much of the Dry Mixed Conifer unit. Natural disturbances, such as wildfire, insects, disease, floods, and glacial blowouts, would create most new openings. It is questionable whether enough new openings would occur in the needed size and distribution to provide suitable conditions for earlier seral species, such as ponderosa pine, Douglas-fir, western larch, western white pine, Oregon white oak, beaver, bluebirds, tanagers, and so forth.

Little change would occur in the Talus and Forest Rock, Oak-Conifer, Range, Canyon Riparian, and Tygh Valley Riparian landscape units. Successional pathways are very short in these units, such that the areas quickly resemble their predisturbance state after wildfire, insects, disease, and other events occur. The lack of vegetation management would not affect the wildlife habitat suitability of these units as much as increased disturbance from recreation use.

Most disturbances would have little effect on the Shrublands landscape unit, except for fire. Fire would replace the shrub dominated plant community with a grass dominated community with a concurrent change in wildlife species.

Alternative C

With the exceptions noted below, most of the direct, indirect, and cumulative effects of Alternative C are the same as described in Alternative B. The overall potential for large scale, catastrophic events is still high, but less than Alternative B. Recreation use should increase over that expected in Alternative B, reducing the use of otherwise acceptable habitat by disturbance sensitive wildlife species.

Prescribed burning in areas formerly under a frequent fire regime would allow earlier successional stages and species to persist on the landscape. Within the burn areas, biological diversity would decrease since these communities tend to support both fewer species overall and lower populations of plants and animals. On the landscape, prescribed burning would increase biological diversity. These communities may support plant and animal species that are rare or missing from the current biological community in the corridor. Alternative C is the first alternative where prescribed burning could occur on a large enough scale to notice these effects.

Alternative D

The potential for large scale, catastrophic losses would decline somewhat over the long-term, due to more proactive management. Increased recreation use would reduce the use of otherwise suitable habitat by disturbance sensitive wildlife species. Late successional tree species (true firs and hemlock) would be less dominant, particularly in Segments C and D, while early successional trees would be more dominant (Douglas-fir and ponderosa pine). Stands may become more open in Segments C and D, reducing habitat suitability for big game thermal cover. Otherwise, most of the direct, indirect, and cumulative effects are the same as described in Alternative B.

Alternative E

The potential for large scale, catastrophic disturbance would decline over the long-term, due to very active management. Increased recreation use would reduce the use of otherwise suitable habitat by disturbance sensitive wildlife. Late successional tree species (true firs and hemlock) would be less dominant, particularly in Segments C and D, while early successional trees would be more dominant (Douglas-fir and ponderosa pine). Stands may become more open in Segments C and D, reducing habitat suitability for big game thermal cover. The area covered by the stem initiation and stem exclusion stages would occur at the upper end of the acceptable ranges. The stand reinitiation and old growth stages would occur at the lower end of the acceptable ranges. Some of the old growth present would be comprised of early successional tree species rather than late successional species. Otherwise, most of the direct, indirect, and cumulative effects are the same as described in Alternative B.

Ecosystem Health

Alternative A

Ecosystem health would continue to decline. Although the federal agencies are expected to manage on a ecosystem basis neither the Forest Plan nor the Two Rivers RMP were written with ecosystem management in mind. In many cases the standards and guidelines do not adequately consider the various plant associations and community types that various land allocations cover. The result is a piecemeal approach to vegetation management with only scattered attempts to identify or work within the natural variation of those systems. Certain vegetation management activities, such as prescribed burning, would not occur on a large enough scale to significantly improve forest health in the drier plant communities.

Alternatives B and C

Although these two alternatives use an ecosystem approach to land management, ecosystem health would continue to decline. Both alternatives are reactive and make few attempts to correct past mistakes in land management direction. Certain vegetation management activities, such as prescribed burning, would not occur at a large enough scale in Alternative B to significantly improve ecosystem health. Prescribed burning could occur at a large enough scale in Alternative C to significantly improve forest health in some of the drier plant communities.

Alternatives D and E

These two alternatives also take an ecosystem approach but are more proactive than Alternatives B and C. Some attempts would be made to correct past mistakes in land management direction. Vegetation management would more fully mimic natural forces at the same frequencies, scales, and patterns. Desired conditions and expected management would incorporate a range of acceptable conditions that varies across the landscape rather than forcing one ideal across all boundaries. Most vegetation management activities would occur at a large enough scale to improve ecosystem health. Prescribed burning would favor earlier successional species and reduce overall stocking of trees or shrubs in the Dry Mixed Conifer, Oak-Conifer, and Shrublands landscape units.

Fuels and Wildfire Risk

Natural fuels management is primarily a concern in part of Segment B and in Segments C, D, and F. The discussion below focuses on those segments. In all alternatives, prescribed burning would convert some areas back to earlier successional stages, favoring species such as ponderosa pine, Oregon white oak, and grasses over species such as true fir, Douglas-fir, western juniper, sagebrush, and bitterbrush. These stand conversions would favor wildlife species associated with open forest, savannas, and grasslands over species associated with closed forest and shrublands. They would also favor low

intensity fire over high intensity fire. Overall, fire severity would decline with lower suppression costs and resource losses. Average fire size may not change significantly. Reducing natural fuels would lower scenic quality over the short term but may improve scenic quality over the long term.

Returning fire to these areas would also replace a missing element important to proper ecosystem functioning, in particular the poorly understood chemical and thermal effects fire produces in these systems. No other technologies and practices can fully replace the chemical functions of fire and none can even partially replace the thermal functions of fire. In drier plant communities, prescribed burning could significantly reduce the risk of insect and disease epidemics associated with tree overstocking. Prescribed burning may result in a longer period of stream flow in Class IV streams where burning reduces stocking levels of either trees or shrubs. If this effect happens, then better developed riparian plant communities may appear along some Class IV streams.

Alternatives B-E probably would lead to a fire management action plan integrated and coordinated between the various landowners. With such a plan, firefighters would have strategic and tactical guidelines that integrate river concerns throughout the corridor, such as preattack control lines, identified water sources and fire camp locations, and clearly defined areas too dangerous to place firefighters.

Alternative A

The full range of suppression tools would remain available, restricted only by terrain and standard constraints. All fire suppression efforts must avoid dropping retardant into water bodies. The Mt. Hood National Forest must avoid dropping retardant, foam, or water directly on spotted owl nest trees during the nesting season unless no other method is available to save the tree.

When used, retardant would stain some rock and cultural resource features red. Within 2-5 years, the staining would be unnoticeable to visitors more than 600 feet away or traveling faster than a walking pace. It may remain noticeable to visitors closer than 600 feet or traveling at a walking pace. Retardant drops may land directly into some water bodies, despite the best efforts of the pilot. In that event, fish kills are possible and invertebrate and microorganism kills are probable. The magnitude of the effect would depend on the amount of retardant reaching the stream and the streamflow rate at the time. The effect would continue until the retardant becomes sufficiently diluted. Dropping foam directly into a water body may have a similar effect on invertebrates and microorganisms as retardant, however mixed foam is very dilute when applied. Foam concentrate would have similar effects as retardant. Currently, foam is not mixed at portable pumps, such as Mark IIIs, which are set up next to water bodies. Instead, it is mixed in helicopter buckets or engines and then dropped or pumped to the fire, thus keeping foam concentrate out of direct contact with water bodies.

Each district on the Mt. Hood National Forest would develop its own natural fuels management plan. The BLM, State, Confederated Tribes of Warm Springs (CTWS), and private landowners may or may not develop natural fuels plans. Coordination between the various landowners along the river is possible but unlikely overall. Barlow and Bear Springs Ranger Districts would coordinate plans. The BLM and State or BLM and CTWS would probably coordinate plans if they elected to develop any. The private landowners probably would not develop any natural fuels plans. This alternative would result in the smallest natural fuels burning program of the five alternatives.

Poor coordination between the landowners would likely result in limited burning due to the lack of logical control lines, leaving some areas too risky to burn. Natural fuels would continue to accumulate. More fires would escape initial attack. The risk of a high intensity wildfire would increase. High intensity wildfires would be larger, more costly to control, and cause more resource damage. In Segment C and parts of D, a large stand-replacing wildfire would convert closed timber stands of mixed conifers to grasslands, shrublands, and woodlands. Riparian areas would be more likely to burn under a high intensity fire. In turn, the larger wildfires would reduce habitat for wildlife species associated with closed stands and riparian areas and reduce fish habitat quality. The risk that a high intensity wildfire would leave the river corridor would increase with an associated risk increase to private lands and buildings.

No restrictions on campfires would not change or mitigate any risks associated with recreation use, especially in segments C, D, and F. As recreation use levels increased, wildfire risk would increase. The rate of risk increase would be greater in areas of accumulating natural fuels.

Alternative B

Straight water is not as effective in fire suppression since it does not alter the flammability and quantity of the evolving gasses, unlike retardants (Chandler et al. 1983, Pyne 1984) nor does it penetrate duff and wood as effectively as water either retardant or surfactants (foam or "wet water"). The risk of a wildfire escaping initial attack would increase slightly. Average fire size would likely increase as would the risk that a fire burning on public lands would reach private lands. In turn, suppression costs and resource losses would increase over that expected in Alternative A.

Using straight water would have no effects on scenic quality and would allow a wider area of air operations. Pilots need only to avoid spotted owl nests during the nesting season. Leaving aircraft free to cover a larger area partially mitigates the lower effectiveness of straight water.

This alternative would result in fuels management plans only for federal lands and establish the second smallest potential program. Plans would be better coordinated between the federal agencies, allowing slight improvements in the ability to select logical control lines and would allow establishment of burn block priorities. The resulting lower risk of an escaped fire would result in burning some areas that otherwise would not be considered. Natural fuels would decline in some areas and alter in some areas. Areas of natural fuels accumulation would decline and become more isolated. Initial attack success probability would increase.

Succession would continue on state and private lands, favoring late successional plant and animal communities. Areas dominated by older stands of tall shrubs and closed canopy forests would favor high intensity fire over low intensity fire. Fire severity would remain the same or increase, as would suppression costs and resource losses. Private lands would not experience any burning caused reductions in visual quality.

The lack of campfire restrictions would not change or mitigate any risks associated with recreation use, especially in segments C, D, and F. As recreation use levels increased, wildfire risk would increase. Encouraging the use of fire pans on BLM lands would partially mitigate this risk. The prevention effect would be relatively minor since no such encouragement would occur on adjoining Forest Service lands. If the State, CTWS, and private landowners adopt similar regulations, the mitigation effects would cover a longer area and likely be more effective.

Alternative C

This alternative resembles Alternative B in its effects with a few exceptions. Uncolored and fugitive retardant would not stain rocks red. However, uncolored retardant is very difficult for the air tanker pilots to see. The color in fugitive retardant last long enough for the pilots to place their drops effectively and fades to a neutral color within 2-6 weeks, depending on sunlight intensity (Raybould 1993). Using uncolored retardant increases the risk that retardant drops may land directly into some water bodies, despite the best efforts of the pilot. Since the pilots cannot see previous retardant drops very well, retardant use would not be as efficient. Some portions of the fire would not receive sufficient coverage and other portions would receive too much. Average fire size might increase.

Using fugitive retardant would have the same effects as colored retardant except on visual quality. Once the fugitive retardant fades, it should not signifcantly detract from visual quality. Since retardant is a fertilizer, areas receiving too much retardant would display the effects of over-fertilization on plants and, possibly, water quality, depending on location.

This alternative would include all public land in the natural fuels program. The potential for natural fuels prescribed burning would be higher than Alternatives A and B, but lower than Alternatives D and E. Plans would be better coordinated between the various landowners than in Alternative B, allowing easier establishment of burn block priorities. Logical control lines would be more likely as burn unit boundaries could cross some ownership boundaries. The resulting lower risk of an escaped fire would result in burning some areas that otherwise would not be considered. Natural fuels would decline in some areas and alter in some areas. Areas of natural fuels accumulation would decline and become more isolated. The probability that initial attack success would increase. This alternative would have the same effects on wildfire risk from campfires as Alternative B.

Alternative D

Nearly the full range of suppression tools would remain available, restricted only by terrain and standard constraints. The effects would be the same as Alternative C for uncolored and fugitive retardant.

This alternative would result in fuels management plans for all public lands and probably for some of the larger private landowners. The potential level of prescribed burning would be the second highest of the five alternatives, due to the vegetation management criterion for initiating activities. Plans would be better coordinated between the various landowners, allowing establishment of burn block priorities. Logical control lines would be more likely as burn unit boundaries could cross some ownership boundaries. The resulting lower risk of an escaped fire would result in burning some areas that otherwise would not be considered. Natural fuels would decline in some areas and alter in some areas. Areas of natural fuels accumulation would decline and become more isolated. The probability that initial attack success would increase.

Campfire closures would reduce the risk of human caused fires away from Graveyard Butte and east of Keep's Mill. Recreation users would have easily identifiable boundaries to the closure by including Forest Service lands between the boundary and Keep's Mill. Encouraging the use of fire pans on BLM lands would partially mitigate the risk during the open season. These campfire regulations would be even more effective if other landowners adopt the same or similar regulations.

Alternative E

This alternative would have the same effects on firefighting efficiency and effectiveness and other resources as Alternative A. It would have the same effects on natural fuels, wildfire risk, suppression costs, resource losses, and so forth as Alternative D. The potential for natural fuels prescribed burning would be the highest of the five alternatives.

PHYSICAL EFFECTS

Air Quality

Emissions from burning, either a prescribed fire or a wildfire, are directly related to the amount of biomass consumed. Monitoring pre- and posttreatment activity fuels shows that under spring-like weather and fuel moisture conditions the following expected levels of biomass consumption:

Similar consumption rates occur when burning natural fuels in the spring. Summer wildfire and summer or fall prescribed burning produce much higher rates of consumption (Table 4.10). Prescribed burning consumes less material than wildfires due to fuel moisture conditions at the time of burning. The exact level of consumption in a summer wildfire depends on fuel moistures and species involved.

Ninety percent of emissions from burning are particles less than ten microns in size (PM_{10}), the size of concern for human health and visibility. The more biomass consumed, the greater the expected PM_{10} emissions. Table 4.11 displays typical loadings for slash, timber litter, shrub, and grass fuelbed with expected consumption under spring and summer conditions. The loadings for the slash, timber litter, and shrub models are standardized models that represent White River. The grass model is a custom model that includes some shrubs and better represents White River. The loadings shown are for comparative purposes only and do not depict actual loadings.

Table 4.10. Expected biomass consumption under two different burning conditions.

Size Class of Material	Percent Reduction in Loading	
	Spring-like Prescribed Burning	Summer Wildfire
0-0.25 in	90-100%	100%
0.25-1.0 in	80-95%	90-100%
1.0-3.0 in	70-90%	90-100%
>3.0 in	20-30%	30-70%
Duff	<50%	>50%
Live material	Variable	50-100%

Table 4.11. Representative fuel loadings for various fuelbeds representative of White River and expected fuel consumption under spring and summer conditions.

Fuel Model	Tons/Acre		
	Total Loading	Spring Consumption	Summer Consumption
Slash (FM 12)[1]	87	37-61	---
Timber Litter[2] (FM 10)	56	17-25	26-42 (UB) 33-50 (CF)[3]
Shrubs (FM 6)[4]	7.5	5.5-7.2	5.9-7.5
Grass (Custom)[5]	2.3	2.3	2.3

[1] Includes additional 38 tons/acre of 3"+ material and 1 in duff @ 14 tons/acre/in

[2] Includes additional 32 tons/acre of 3"+ material and 1 in duff @ 14 tons/acre/in

[3] UB--Underburn, CF--Crown Fire

[4] Includes additional 1.5 tons/acre of foliage and no duff

[5] No duff and no additional loading for shrub foliage

No summer consumption shows for the slash since we expect only to burn harvest units in the spring. The Forest Service has not fall burned activity fuel units since the early 1980s and has not experienced a wildfire in a slash unit since 1983.

Alternatives A and E

No change expected in average wildfire size in most landscape units, therefore expected emissions from that source would not change. Prescribed burning of activity generated fuels would probably occur on a regular basis. Alternative A would likely result in the highest emissions and Alternative E the second highest emissions from activity fuels burning. Alternative A would produce the lowest emissions from natural fuels burning and Alternative E the highest. Prescribed burning in FM 10 would reduce the total loading and the risk of crown fire. Repeated burning, particularly in the Dry Mixed Conifer and Oak-Conifer, and Shrublands landscape units would result in lower expected total emissions over time as total biomass and crown fire risk decline.

Alternative B

Average wildfire size would probably increase, resulting in increased emissions in the Cool, Wet Mixed Conifer, Mesic Mixed Conifer, Wetlands, Subalpine, and Lodgepole Flats landscape units. Prescribed burning of activity fuels would occur on an irregular basis, resulting in the lowest expected emissions of any alternative. Prescribed burning of natural fuels may occur in part of Segment B and in the Dry Mixed Conifer and Oak-Conifer landscape units in Segments C and D. Initially, expected emissions would be quite high. Over time, expected total emissions should decline as prescribed burning reduces total biomass and crown fire risk. The area potentially covered under a natural fuels burning program does not differ significantly from Alternative A.

Alternative C

No change to a slight increase in average wildfire size would occur in the Cool, Wet Mixed Conifer, Mesic Mixed Conifer, Wetlands, Subalpine, and Lodgepole Flats landscape units. Prescribed burning of activity fuels would occur on an irregular basis, resulting in somewhat higher emissions that Alternative B, but less than Alternatives A, D, and E. Prescribed burning of natural fuels may occur in part of Segment B and in the Dry Mixed Conifer and Oak-Conifer landscape units of Segments C and D. Initially, expected emissions would be quite high. Over time, expected total emissions should decline as prescribed burning reduces total biomass and crown fire risk. Alternative C covers a larger potential area for natural fuels than Alternative B, but less than Alternatives D and E.

Alternative D

No change to a slight increase in average wildfire size would occur in the Cool, Wet Mixed Conifer, Mesic Mixed Conifer, Wetlands, Subalpine, Lodgepole Flats, Oak-Conifer, and Shrublands landscape units. Prescribed burning of activity generated fuels would probably occur on a regular basis. This alternative would generate less emissions from activity fuels burning than Alternatives A and E, but more than B and C. Prescribed burning of natural fuels may occur in part of Segment B and in the Dry Mixed Conifer, Oak-Conifer, Range, and Shrublands landscape units in Segments C, D, and F. Initially, expected emissions would be quite high. Prescribed burning in the Shrublands landscape unit would produce almost as many emissions as a summer wildfire, given the existing condition. Over time, expected total emissions should decline as prescribed burning reduces total biomass and crown fire risk. The Shrublands landscape unit would convert from a shrub fuel type to a grass fuel type.

Geology

Alternatives A and E

This alternative permits the **irreversible** removal of an additional 600,000 cubic yards of the Old Maid pyroclastic flow deposits. Additional potential sand sources exist along the river channel; however, that material is the same as the current pit.

Alternative B

This alternative would halt removal of the Old Maid pyroclastic flow deposits. It would provide the maximum level of protection from human causes of any of the alternatives.

Alternative C

This alternative permits the **irreversible** removal of an additional 200,000 cubic yards of the Old Maid pyroclastic flow deposits. Additional potential sand sources exist along the river channel; however, that material is the same as the current pit.

Alternative D

This alternative permits the **irreversible** removal of an additional 400,000 cubic yards of the Old Maid pyroclastic flow deposits. Additional potential sand sources exist along the river channel; however, that material is the same as the current pit.

Required Disclosures

The interdisciplinary team determined that the five management alternatives met all applicable national laws and executive orders with specific direction regarding wild an 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. The team 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 Statements for the Mt. Hood National Forest Land and Resource Management Plan and the Two Rivers Resource Management Plan. There are wetlands, floodplains, prime farmlands, and rangelands within the planning area. Any effects on these are evaluated in this chapter under the appropriate section. Until research can resolve some major scientific uncertainties, evaluation of climate changes 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. Effects on socioeconomics and civil rights, women, and minorities are discussed under the appropriate sections.

Alternative A, the No Action alternative, complies with the Forest Plan and the Two Rivers RMP. The other alternatives would require an amendment to the Forest Plan and Two Rivers RMP before they could be implemented.

Comparison Table 1–Commodity Production from federal lands.

MEASURES		ALTERNATIVES				
		A	B	C	D	E
Commercial Products by Segment	Segment A	None	None	None	None	None
	Segment B	Sand & gravel, timber, grazing	Timber salvage	Sand & gravel, timber salvage, grazing	Sand & gravel, timber, grazing	Sand & gravel, timber, grazing
	Segment C	Timber, grazing	None	None	Timber,	Timber
	Segment D	Gravel, grazing	Gravel	Gravel	Gravel, grazing	Gravel
	Segment E	None	None	None	None	None
	Segment F	None	None	None	None	None
Relative changes in output levels [1]	Sand and gravel	0	-	- (FS), NC (BLM)	- (FS), NC (BLM)	NC
	Timber	0	-	-	-	-
	Grazing	0	NC[2]	NC[2]	-	-
Type of Harvest		Regulated	Unregulated	Unregulated	Regulated	Regulated

[1] Alternative A serves as baseline, all other alternatives compared relative to Alternative A where levels either not documented or difficult to separate from a larger area. NC = No Change.

[2] Very little to no grazing currently occurs in the proposed exclusion area.

Comparison Table 2--Recreation (estimates apply only to federal lands)

MEASURES		ALTERNATIVES				
		A	B	C	D	E
Opportunities	Alpine skiing	Limited	No change	No change	Slight increase	Slight increase
	Nordic skiing	Yes	Increase	Increase	Increase	Increase
	Snowmobiles	Yes	Decrease	Decrease	Decrease	Decrease
	Snow Play	Yes	Increase	Increase	Increase	Increase
	Off Road Vehicles	Yes	Decrease	Decrease	Decrease	No change
	Hiking	Yes	No change	No change	Increase	Increase
	Camping	Yes	Add 1 group campsite	Add 3 group campsites	Add 3 group campsites and 1 campground	Add 1 group campground and 1 campground
	Fishing	Catch and keep	Catch and release for redband rainbow recommended	Catch and release for redband rainbow recommended	Catch and release for redband rainbow recommended	Catch and release for redband rainbow recommended
	Hunting	Yes	No change	No change	No change	Increase
	Pack and Riding Stock	Yes, no facilities	Add facilities at 1 campground	Provide facilities at Barlow Creek and White River Station CGs	Add facilities at 3 campgrounds, develop facilities on rim above Keeps Mill	Add facilities at 3 campgrounds, develop facilities on rim above Keeps Mill
	Mountain Bikes	Yes, no designated routes	Designate routes	Designate routes	Designate routes	Designate routes
	Kayaking	Yes, no facilities	No change	No change	Provide facilities in Segment B, at Graveyard Butte, and Tygh Valley	Provide facilities in Segment B, at Graveyard Butte, and Tygh Valley
	Tubing	Yes	No change	No change	Increase	Increase
	Outfitters and Guides	Issue permits	No permits issued on BLM	Issue permits	Issue permits	Issue permits
	Sightseeing, photograpghy	Yes	No change	No change	No change	No change
	Driving for pleasure	Yes	Decrease open roads	Decrease open roads	Decrease open roads	Decrease open roads
Relative Use Levels		Increase developed capacity to theoretical optimum, or maximum	Decrease from current developed capacity	Maintain current developed capacity	Increase developed capacity to level below optimum, or maximum	Increase developed capacity to theoretical optimum, or maximum

MEASURES		ALTERNATIVES				
		A	B	C	D	E
Acres available for each ROS class	Semi-Primitve Nonmotorized	Boundary Alt. 1: 7,785 Boundary Alt. 2: 6,026 Boundary Alt. 3: 5,951	Boundary Alt. 1: 7,785 Boundary Alt. 2: 6,026 Boundary Alt. 3: 5,951	Boundary Alt. 1: 5,854 Boundary Alt. 2: 21,097 Boundary Alt. 3: 10,207	Boundary Alt. 1: 7,785 Boundary Alt. 2: 6,026 Boundary Alt. 3: 5,951	Boundary Alt. 1: 7,785 Boundary Alt. 2: 6,026 Boundary Alt. 3: 5,951
	Semi-Primitve Motorized	Boundary Alt. 1-3: 36	Boundary Alt. 1: 5206 Boundary Alt. 2: 18,712 Boundary Alt. 3: 8,131	Boundary Alt. 1: 5206 Boundary Alt. 2: 18,712 Boundary Alt. 3: 8,131	Boundary Alt. 1-3: 36	Boundary Alt. 1-3: 36
	Roaded Natural	Boundary Alt. 1: 5,854 Boundary Alt. 2: 21,097 Boundary Alt. 3: 10,207	Boundary Alt. 1: 683 Boundary Alt. 2: 2,420 Boundary Alt. 3: 2,112	Boundary Alt. 1: 683 Boundary Alt. 2: 2,420 Boundary Alt. 3: 2,112	Boundary Alt. 1: 5,854 Boundary Alt. 2: 21,097 Boundary Alt. 3: 10,207	Boundary Alt. 1: 5,854 Boundary Alt. 2: 21,097 Boundary Alt. 3: 10,207
Open Road Density	Forest Service	2.5 miles/sq mile	1.5 miles/sq mile	1.5 miles/sq mile	2.5 miles/sq mile	2.5 miles/sq mile
Campground and Day use Area Capacities	White River Sno-parks	2	No change	No change	No change	No change
	Barlow Creek CG	5 sites	5 sites (possibly 1 group site)	5 sites (1 group site)	5 sites (1 group site)	5 sites
	Barlow Crossing CG	5 sites	5 sites (possibly 1 group site)	5 sites (1 group site)	5 sites (1 group site)	5 sites
	White River Station CG	6 sites	6 sites (possibly 1 group site)	6 sites (1 group site)	6 sites (1 group site)	6 sites
	Keeps Mill CG	5 sites	5 sites	5 sites	5+ sites	5+ sites
	Graveyard Butte	Undeveloped	Undeveloped	Undeveloped	Small campground	Small-medium campground
	New facilties	None	None	None	None	1 group campground in Segment B
Risk to disturbance sensitive wildlife		High	Low	Low	Moderate	High

Figure 4.1. Comparison of acres available for each ROS class by management alternative and boundary alternative.

Comparison Table 2b--Scenic quality

DESIGNATED VIEWSHED ALTERNATIVE I (Interim)						
		Alternatives and VQL Equivalent (Distance Zone)				
Viewpoints	% Expected Disturbance at Any One Time	A	B	C	D	E
River (Seg. A/B)	See Alt.-->		0-5% - Retention (Fg/Mg/Bg)	5-10 % - Retention (Fg)		
	See Alt.-->	16% - Partial Retention (Fg/Mg/Bg)		Partial Retention (Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)
River (Seg C/D)	See Alt.-->	8% - Retention (Fg)	0-5% - Retention (Fg/Mg/Bg)	0-5% - Retention (Fg/Mg/Bg)	0-5% - Retention (Fg/Mg/Bg) - DMC	0-5% - Retention (Fg/Mg/Bg) - DMC
	See Alt.-->	16% - Partial Retention (Mg/Bg)			8-10% - Partial Retention (Fg/Mg/Bg) - MMC	8-10% - Partial Retention (Fg/Mg/Bg) - MMC
Bonney, Barlow Buttes	25%	Modification (Fg/Mg/Bg)	Modification (Fg/Mg/Bg)	Modification (Fg/Mg/Bg)	Modification (Fg/Mg/Bg)	Modification (Fg/Mg/Bg)
Timberline	16%	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)
Road 48	16%	Partial Retention (Fg)	Partial Retention (Fg)	Partial Retention (Fg)	Partial Retention (Fg)	Partial Retention (Fg)
	25%	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)
Highway 35	8%					
	16%	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)
Keeps Mill Overlook	?		Special Place--Foreground VQO to be established later			
	25%	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)

DESIGNATED VIEWSHED ALTERNATIVE II						
		Alternatives and VQL Equivalent (Distance Zone)				
Viewpoints	% Expected Disturbance at Any One Time	A	B	C	D	E
River (Seg. A/B)	See Alt.-->	N/A	0-5% - Retention (Fg/Mg/Bg)	5-10% - Retention (Fg)		
	See Alt.-->	N/A		- Partial Retention (Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)
River (Seg C/D)	0-5%	N/A	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg) - DMC	Retention (Fg/Mg/Bg) - DMC
	8-10%	N/A			Partial Retention (Fg/Mg/Bg) - MMC	Partial Retention (Fg/Mg/Bg) - MMC
Bonney, Barlow Buttes	25%	N/A	Modification (Fg/Mg/Bg)	Modification (Fg/Mg/Bg)	Modification (Fg/Mg/Bg)	Modification (Fg/Mg/Bg)
Timberline	16%	N/A	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)
Road 48	16%	N/A	Partial Retention (Fg)	Partial Retention (Fg)	Partial Retention (Fg)	Partial Retention (Fg)
	25%	N/A	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)

Highway 35	8%					
	16%	N/A	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)
Keeps Mill Overlook	?		Special Place--Foreground VQO to be established later			
	25%	N/A	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)	Modification (Mg/Bg)

DESIGNATED VIEWSHED ALTERNATIVE III

		Alternatives and VQL Equivalent (Distance Zone)				
Viewpoints	% Expected Disturbance at Any One Time	A	B	C	D	E
River (Seg. A/B)	See Alt.-->	N/A	0-5% - Retention (Fg/Mg/Bg)	5-10% - Retention (Fg)		
	See Alt.-->	N/A		Partial Retention (Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)
River (Seg C/D)	0-5%	N/A	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg) - DMC	Retention (Fg/Mg/Bg) - DMC
	8-10%	N/A			Partial Retention (Fg/Mg/Bg) - MMC	Partial Retention (Fg/Mg/Bg) - MMC
Bonney, Barlow Buttes	See Alt.-->	N/A	0-5% - Retention (Fg/Mg/Bg)	5-10 % - Retention (Fg/Mg/Bg)		
	See Alt.-->			Partial Retention (Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)
Timberline	0-5%	N/A	Retention (Mg/Bg)			
	8-10%			Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)	Partial Retention (Mg/Bg)
Road 48	See Alt.-->	N/A	0-5% - Retention (Fg/Mg/Bg)	5-10 % - Retention (Fg)		
	See Alt.-->	N/A		Partial Retention (Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)
Highway 35	See Alt.-->		0-5% - Retention (Fg/Mg/Bg)	5-10% - Retention (Fg)		
	See Alt.-->	N/A		Partial Retention (Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)	8-10% - Partial Retention (Fg/Mg/Bg)
Keeps Mill Overlook	0-5%	N/A	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg)		
	8-10%	N/A			Partial Retention (Fg/Mg/Bg)	Partial Retention (Fg/Mg/Bg)
Graveyard Butte	0-5%	N/A	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg)	Retention (Fg/Mg/Bg)

	Alternatives				
MEASURE	A	B	C	D	E
Risk of not meeting VQOs	High	Low	Low	Moderate	Moderate

Comparison Table 3--Water Quality and Quantity

MEASURES	ALTERNATIVES				
	A	B	C	D	E
Potential change in: Mining[1]	0[2]	No mining	---	--	NC
Grazing[1]	0	Slight decrease in Segment D	Slight decrease in Segment D	NC	Eliminated in Segment D
Timber harvest[1]	0	----	---	--	- to NC
Open Road density (Forest Service only)	2.5 miles/sq. mile	1.5 miles/sq. mile	1.5 miles/sq. mile	2.5 miles/sq. mile	2.5 miles/sq. mile
Sediment production potential	High	Low	Low	Moderate	Moderate-High
Water temperature increase potential	Moderate	Low	Low	Low	Low-Moderate
In-stream flow recommendation	Minimum	Optimum	Optimum	Minimum	Minimum

[1] Federal lands only

[2] 0 = Baseline, NC = No Change, number of '-' equals estimated level of decrease

Comparison Table 4–Vegetation Management (federal lands only)

MEASURES		ALTERNATIVES				
		A	B	C	D	E
Risk to wildlife species dependent on late-successional plant communities		High	Low	Low	Moderate	High
Risk to water quality and fish habitat		Moderate	Low	Low	Low	Low-Moderate
Risk of not meeting VQOs		Moderate-High	Low	Low	Low-Moderate	Low-Moderate
Risk of not maintaining ROS setting		High	Low	Low	Moderate	Moderate-High
Available methods		Fire, mechanical, hand, chemical, biological methods	Fire, mechanical, hand methods[1]	Fire, mechanical, hand, biological methods	Fire, mechanical, hand, chemical, biological methods	Fire, mechanical, hand, chemical, biological methods
Natural Forces	Segment A	All	All	All	All	All
	Segments B and C	Flood, limited insect and disease	All but fire in Subapline, Lodgepole Flats, Wetlands, Talus and Forested Rock landscape units. Limited insect and disease in Cool, Wet Mixed Conifer landscape unit.			
	Segment D			All but fire		
Management ability to emulate natural patterns	Segments B, C, & D	Low	Low-Moderate	Low-Moderate	Moderate	High
Scale of management activities	Segment B	Variable	Very small	Small	Small-moderate	Variable
	Segment C	Variable	Very small	Small-moderate	Small-moderate	Variable
	Segment D	No actions planned	Very small	Very small	Very small-small	Very small-small
Intent of management activities		Protect and enhance the outstandingly remarkable values while producing some timber volume and continuing grazing	Protect the outstandingly remarkable values, while continuing limited grazing, and removing dead trees	Protect the outstandingly remarkable values while continuing limited grazing and removing dead and dying trees.	Protect the outstandingly remarkable values while continuing limited grazing and removing dead, dying, and high risk trees.	Protect and enhance the outstandingly remarkable values while continuing limited grazing.

[1] Grazing allowed to continue

Comparison Table 5--Private/Public Lands Conflicts Segments D-F

MEASURES	ALTERNATIVES				
	A	B	C	D	E
Public access methods	Kayak, foot, vehicle	Kayak, foot, vehicle	Kayak, foot, vehicle	Kayak, foot, vehicle, possibly horse and mountain bike	Kayak, foot, vehicle, possibly horse and mountain bike
Number and location of public access points	3--White River, Graveyard Butte, mouth of the Deschutes River	5--White River, Graveyard Butte, old 197, Tygh Valley State Park, mouth of the Deschutes River	5--White River, Graveyard Butte, old 197, Tygh Valley State Park, mouth of the Deschutes River	6--White River, Graveyard Butte, old 197, Tygh Valley State Park, mouth of the Deschutes River, possibly Keeps Mill	7--White River, Graveyard Butte, old and new 197, Tygh Valley State Park, mouth of the Deschutes River, possibly Keeps Mill
Actions to manage trespass	None	Sign roads and use trails around Graveyard Butte	Sign roads and use trails around Graveyard Butte	Sign roads, use trails, and developed trails around Graveyard Butte	Sign roads, use trails, and developed trails around Graveyard Butte
		Pursue easements up from old 197 and down from Tygh Valley State Park	Pursue easements up from old 197 and down from Tygh Valley State Park	Pursue easements up from old 197 and down from Tygh Valley State Park and watercraft takeouts on Seg. E.	Pursue easements along all of Segments E and F
					Acquire lands form willing sellers to "block up" federal lands within Segment D.
Risk to private lands from public land management	Moderate-high risk from increasing visitor use in canyon	Low	Low	Moderate risk if prescribed fire used extensively in canyon and from increased visitor use in canyon	Moderate risk if prescribed fire used extensively in canyon, moderate-high risk from increased visitor use in canyon

Comparison Table 6a–Final Corridor Boundary

MEASURES	ALTERNATIVES		
	1	2	3
Encompass Outstandingly Remarkable Values	No	Yes	No
Outstandingly Remarkable Values protected by other agency or national direction	No	Yes	No[1]
Total Acres	13,697	27,160	16,188
Private Land Acres	2,866	1,902	1,902
Ease of on-the-ground identification	Difficult	Easy in Segments A-E, Moderately difficult in Segment F	Easy in Segments A, C-E, Moderately difficult in Segments B and F

[1] Based on ISC strategy for managing threatened, endangered, and sensitive species

Comparison Table 6b–Final Viewshed Boundary

MEASURES	ALTERNATIVES		
	I	II	III
Number of important viewpoints not included	7	6	0
Total acres	22,651[1]	29,068	47,873
Additional acres over corridor boundary		12,880 - 1,908	31,685 - 20,713

[1] No Interim Viewshed designated for Segments D-F

Comparison Table 7. Estimated costs for each action alternative to implement projects not already mentioned in the Forest Plan or RMP.

MACTAAA[1] Projects	Costs
Limits of Acceptable Change Study	$60,000
Power Site Withdrawal Reviews	$4,500
Water Quality and In-stream Flow Study	$53,000
Cooperative Riparian Monitoring Program Development and Downed Log Study	$25,000
Research Threatened, Endangered, and Sensitive Species	$85,000
Fish Habitat and Genetics Studies	$38,000
Campground Fencing	$10,000
Toilet at White River East Sno-park	$10,000
New Site Rehabilitation Plan for Highway 35 Pit	$8,000
Comprehensive Interpretive Plan	$29,000
TOTAL	$322,500

[1] Managment Actions Common to All Action Alternatives

Projects	Alt. B	Alt. C	Alt. D	Alt. E
MACTAAAs	$322,500	$322,500	$322,500	$322,500
T,E, and S species surveys	$17,000	$17,000	$17,000	$17,000
Other Wildlife Surveys	$5,000	$5,000	$2,000	$5,000
Gap Fencing	$25,000	$25,000	$15,000	$130,000
Cultural Resource Surveys				
Corridor Alt. 1	$41,052	$41,052	$164,088	$164,088
Corridor Alt. 2	$81,504	$81,504	$325,908	$325,908
Corridor Alt. 3	$48,588	$48,588	$194,316	$194,316
Scenic Waysides	$60,000	$635,000	$748,000	$748,000
Recreation Developments	$54,950	$113,750	$299,000	$428,050
Trails	$146,000	$202,000	$382,000	$439,300
Access Easements	$60,000	$60,000	$73,000	$113,000
Keeps Mill Road				$60,000
Scenic Easements				
Corridor Alt. 1	$358,250	$358,250	$358,250	$358,250
Corridor Alts. 2 & 3	$237,750	$237,750	$237,750	$237,750
TOTALS	$0.97-1.13 million	$1.66-1.82 million	$2.26-2.54 million	$2.66-2.95 million

NOTE: Alternative E includes possibility of land acquisition by BLM to consolidate public lands, acres unknown at this time. Costs include $8,000 per acre for title work, survey and design, document preparation, appraisal, negotiation, and title clearance, plus cost of land if purchased.

Chapter 5
Consultation with Others

CHAPTER 5: CONSULTATION WITH OTHERS

Interdisciplinary Team Members

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Appendix A

White River Falls

APPENDIX A--WHITE RIVER FALLS

The IDT proposes that the managing agencies conduct an eligibility and suitability study to include White River Falls into the White River Wild and Scenic River designation.

When Congress designated White River as a Wild and Scenic River, they excluded 0.6 miles of the river around White River Falls. This exclusion was to allow Northern Wasco County People's Utility District (PUD) the option of rehabilitating or reconstructing the abandoned power generation facilities. The PUD had obtained a conditional permit from the Federal Energy Regulatory Commission (FERC) and a water right from Oregon Water Resources Department. In addition, PUD made a cooperative agreement with Oregon Department of Parks and Recreation to manage Tygh Valley State Park.

In early July 1993, the PUD Board of Directors decided to discontinue the White River Falls hydroelectric project. The agency plans to return both the water right to the state and the permit to FERC. Management of Tygh Valley State Park has been returned to the state. The PUD would not object to including White River Falls into the wild and scenic river designation and recommends that the managing agencies secure the water right permit being abandoned by PUD.

White River Falls has at least three Outstandingly Remarkable Values that make it worthy of consideration. First, the Congressional Record - Senate of October 7, 1988, specifically recognizes the scenic value of White River Falls. Several residents along White River and in Tygh Valley and Maupin have expressed confusion and dismay as to why White River Falls was excluded. They also believe the Falls are one of the scenic values in Tygh Valley.

Second, the abandoned hydroelectric facilities constitute an outstandingly remarkable cultural resource value. This plant was constructed in the 1920s and operated until the 1960s. The dam and diversion facilities on White River, portions of the penstocks , a dam on a side drainage above the powerplant, and the powerhouse itself remain along with miscellaneous other facilities associated with the plant.

Third, the Falls offers outstanding recreational opportunities for the area. It lies within the boundaries of Tygh Valley State Park. Visitors to the park view the falls, photograph them, and hike to the old powerhouse and the diversion dam to explore them. Opportunities exist for short day hikes to the ridges above the falls and along the river below the falls. While the upper falls is unrunnable, kayakers occasionally run the lower falls and the short series of rapids below the falls. The river next to the old powerhouse is a popular swimming hole.

These events have taken place too late for the IDT to respond in a more comprehensive manner than an appendix to the White River Management Plan EA. The Team recommends the following:

1. The managing agencies conduct the necessary studies to recommend to Congress inclusion of White River Falls in the White River Wild and Scenic River designation.
2. The 0.6 miles of river around White River Falls should become part of Segment F and that Segment F be designated a Scenic river.
3. Adopt the selected management, corridor boundary, and designated viewshed boundary alternatives as the management plan for the area around White River Falls. The corridor boundary should follow the same rim-to-rim concept used in the current Segment F. The designated viewshed alternatives, except Alternative I, would require only minor adjustments to include a viewshed around White River Falls.

Based on input received to date, the ID Team believes this recommendation would not cause any great controversy in the local area. Little or no additional private land would be affected by inclusion. The inclusion would recognize and protect one of the major scenic, cultural, and recreational values in Tygh

Valley. This proposal is not intended to preclude options to upgrade existing recreational facilities or construct new ones, such as buildings, picnic areas, campgrounds, or trails.

Introducing anadromous fish above White River Falls has been an issue since the 1960s. Under the terms of the Northwest Regional Power Planning and Conservation Act, the anadromous fish passage project constitutes an enhancement opportunity to compensate for other losses to anadromous fish runs in the Columbia River basin that are directly associated with hydropower development. It also constitutes an opportunity to increase anadromous fish production in the Deschutes River basin. This plan does not analyze the current status regarding introduction of anadromous fish above White River Falls because the affected area is greater than the wild and scenic river boundary. The Confederated Tribes of Warm Springs would like to retain the opportunity to evaluate the introduction of anadromous fish above the Falls. This proposal is not intended to preclude chances to explore this option or to construct facilities designed to introduce anadromous fish above White River Falls, such as fish handling facilities and access roads if the project is allowed to proceed.

Appendix B
Integrated Landscape Analysis

APPENDIX B: INTEGRATED LANDSCAPE ANALYSIS

The ID Team decided to integrate landscape ecology concepts into the White River Management Plan. We used an approach that, in essence, asks:

1. What can the landscape produce?

2. Where can we get the things we want?

3. How much of these things do we get?

The process applies to both commodities and amenities. It emphasizes what we leave, rather than what we take. The approach to the land becomes ecologically-based, resource-neutral, rather than the other way around. The process helps us view structures and ecological functions at the landscape level. The results of each step in the process are listed below.

To start, we separated the analysis area into patches that contain similar vegetation, similar productivity, and similar land form. These are the major patch types.

I. Major Patch Types

A. **Rocks 'n' Ice** - at the base of the glacier. Generally bare ground with occasional shrubs, forbs, and very stunted trees.

B. **Subalpine** - near timberline. Typical tree species include whitebark pine, lodgepole pine, and mountain hemlock. Trees often stunted and flagged. Very rugged with little human use, currently. Most human use is in winter. Possibly wolverine habitat.

C. **Lodgepole Flats** - sandy flats along upper White River. Bare ground common. Lodgepole pine dominates tree layer. Alder, willow, and cottonwood common along old river channels. Area braided with old channels. Mix of mesic and cold, arid plant indicator species. Chinkapin present in shrub layer. Discontinuous moss patches dominate forb layer, may have spring ephemerals present. Fluvial glacial and glacial lacustrine deposits. Main Off Highway Vehicle (OHV) play area.

D. **Wetlands** - spaghnum bogs, skunk cabbage bogs, and sedge and bulrush marshes. Lots of surface water throughout the year, even in current drought period. High water table, many seeps and springs, unusual Threatened, Endangered, and Sensitive (TES) plant species, openings (see page 8 of the Resource Assessment). Fluvial glacial and glacial lacustrine deposits. Little evidence of human use in the sites visited. Heavily forested, similar to Cool, Wet Mixed Conifer.

E. **Cool, Wet Mixed Conifer** - high diversity in both overstory and understory. Upland areas contain hemlock, noble fir, Douglas-fir, grand fir, western white pine, and, possibly, western larch in tree layer; Pacific yew, rhododendron, Oregongrape, vine maple, and Douglas maple in the shrub layer. Benches include the above plus Engelmann spruce, western redcedar, and cottonwood in the tree layer and willows and alder in the shrub layer. High diversity of forbs in both uplands and benches. Slopes range from gentle to steep. Current human use includes trail use and timber harvest for variety of products.

F. **Talus and Forested Rock** - steep, loose rock areas with little or no vegetation and areas with trees growing out of rock fields. Plant species present in any given location depends on aspect and elevation. Cliffbrake fern, mosses, elderberry, and thimbleberry not uncommon. Pika habitat. Little or no human use.

G. **Open Riparian** - upper river area. Sandy, cobble substrate with fast moving water. River meanders and changes course occasionally. Cobble and sand deposition nearly constant. Dense alders, willows, and cottonwoods with few conifers along stream edge.

H. **Canyon Riparian** - middle and lower river except for Tygh Valley. Rocky substrate with fast moving water. River entrenched with very narrow floodplain (few feet on either side). Exposed bedrock and large boulders common in riverbed. Trees found along edge all the way to the confluence with the Deschutes River. Exact tree species mix depends on elevation but species found include western redcedar, grand fir, Douglas-fir, and ponderosa pine. Common shrubs include willows, alders, and Douglas maple. Occasional Pacific yew between Tygh Valley and upper river. Harlequin duck habitat. Human use primarily recreation related.

I. **Tygh Valley Riparian** - low gradient with generally slow moving water. Meandering streambed with oxbow ponds. Tree species present include ponderosa pine, Douglas-fir, and non-native hardwoods. Willows common. Cattails grow in slower moving, less disturbed areas. Adjacent to farmland. Sand and gravel operation in lower portion near White River Falls.

J. **Mesic Mixed Conifer** - grand fir, western larch, western white pine, Douglas-fir, and ponderosa pine characterize tree layer. Occasional Pacific yew and few shrubs in shrub layer. Many forbs with little or no grass. Indicator species include ferns, such as lady fern and deer fern, vine maple, Douglas-maple, thimbleberry, elderberry, snowberry, Oregongrape, trillium, and other moist site forbs. Cottonwood appears at seeps and springs. Type found only on north aspects in lower portions of the river canyon. Dominant human use has been timber harvest, grazing, and hunting with some other recreational uses in the canyon.

K. **Dry Mixed Conifer** - grand fir, Douglas-fir, ponderosa pine, and an occasional Oregon white oak characterize tree layer. Ceanothus and manzanita common and tend to dominate openings. Vine maple common shrub in slight moister sites. Fewer and more drought tolerant ferns, such as bracken fern, typical. Lady slipper an uncommon, drought tolerant lily. Grassy openings may appear. Dominant human use has been timber harvest, grazing, and hunting with some other recreational uses in the canyon.

L. **Oak-Conifer** - more open tree canopies; woodlands and savannahs. Oregon white oak mixed with either ponderosa pine and/or western juniper. Typical shrubs include antelope bitterbrush, manzanita, sage, and rabbitbrush. Amounts of grass varies, depending on canopy closure, shrub density, depth of needle layer, and aspect. Surface rock common. Basaltic soils, with steep slopes, cliffs, and talus patches common. Pacific or Cope's giant salamander in springs (awaiting positive ID of species). Species of interest include medusahead (noxious weed), Tygh Valley milkvetch (TES plant), and Howell's milkvetch (TES plant). Wild turkey habitat. Dominant human uses includes grazing and hunting.

M. **Shrubland** - Only scattered trees of any species. Shrubs dominate; typical species include sage and rabbitbrush. Grasses and dry site forbs dominate forb layer. Surface rock common, basalt. Generally steep and cliffy, with some cliffs nearly vertical. Peregrine falcon habitat.

N. **Range** - grazed and ungrazed native grasses dominate the type.

O. **Ag Lands** - plowed and unplowed fields used for commercial crop production. Common crops include wheat and hay. Includes stubble and fallow fields.

II. Landscape Flows

We described the major flow phenomena for the area. Flow phenomena are elements or organisms that move through the entire area, and into and out of the area. It helped to first identify the major flow routes. We limited the discussion of wildlife as a flow phenomena to species mentioned in the Resource Assessment, federally listed threatened and endangered species, management indicator species, and commercially important species. We believe this limitation is necessary in order to keep the analysis manageable.

A. Flow Routes

1. Major roads (State 35, US 197, forest roads 48, 43, 3530, Graveyard Butte road)
2. Trails
3. White River/Iron Creek/Mineral Creek
4. Canyon rim
5. Bonney Butte, Barlow Butte, Graveyard Butte

B. Flow Phenomena

1. People
2. Wind
3. Fire
4. Water
5. Soil (upper river)
6. Insects and Diseases (pest species)
7. Peregrine falcon (TES)
8. Fish (Outstandingly Remarkable Value)
9. Livestock (commercial importance)
10. Wildlife
    - Bald eagle (TES)
    - Northern spotted owl (TES)
    - Harlequin duck (Resource Assessment)
    - Black rosey finch (Resource Assessment)
    - Pileated woodpecker (Mt. Hood LRMP indicator species)
    - Goshawk (potential TES)
    - Wild turkey (Mt. Hood LRMP indicator species)
    - Gray squirrel (Mt. Hood LRMP indicator species)
    - Wolverine (TES)
    - Pine marten (Mt. Hood LRMP indicator species)
    - Deer (Mt. Hood LRMP indicator species)
    - Elk (Mt. Hood LRMP indicator species)
    - Giant salamander (TES, Resource Assessment)

III. Matrix of Interactions (Table 1)

A matrix helped us understand how the flow phenomena interact with the patch types. We tried to focus on functions, such as human use and ecology, and ways of functioning, such as capture, production, and cycling. We did not go into much detail, but tried to capture the main thoughts with short lists and phrases.

IV. Succession and Natural Disturbances

We asked what types of disturbance each patch likely experienced prior to white settlement, and how the disturbances affected the patch types. We attempted to describe the probable succession following disturbance. Due to limited knowledge, we mostly described what each patch type might have looked like shortly after each disturbance. We did not look at a very small scale, such as the disturbances caused by fires less than one acre in size and individual tree death caused by insects and disease. Another disturbance we did not discuss was volcanic eruption. Mt. Hood is a dormant volcano, not a dead one. However, eruptions are too unpredictable to evaluate. Further, a major eruption, such as experienced at Mt. St. Helen's, would essentially change the landscape so completely that we cannot effectively discuss its effects on the landscape. Therefore, we limited our discussion to larger scale disturbances that are more-or-less predictable and known.

A. Rocks 'N' Ice

1. Disturbances - typical events include glacial advances and retreats on a very long time scale, glacial outwash bursts on an infrequent basis, and avalanches or heavy rains on a more frequent basis. Wind and freeze/thaw erosion occur every year. These events tend to scour out vegetation and soil, change topography, and change the river channel form and location. The size of disturbance varies greatly, although glacial outwash burst, glacial advances and retreats, and avalanches tend to affect larger areas than the other disturbance types. Disturbance shape tends to be linear and flow downhill. Wind erosion, when detectable, occurs in the direction of the strongest winds.
2. Succession - in areas heavily scoured, primary succession begins as wind and animal borne seeds and spores recolonize the disturbed area. In other areas, some deeper rooted vegetation will resprout and wind and animal borne seed and spores will recolonize the site. We have little information of the probable species involved. Recovery to the previous level of vegetation is very slow due to very short growing seasons, limited soil development, and limited organic matter for nutrients. Disturbed areas can experience the freeze/thaw erosion on a larger scale, delaying and slowing recovery. Initially, the area may have limited plant diversity.

B. Subalpine

1. Disturbances - typical events include glacial advances and retreats on a very long time scale; glacial outwash bursts, debris flows, fire, and epidemic insect outbreaks on an infrequent basis, and avalanches or heavy rains on a more frequent basis. Wind and freeze/thaw erosion occur every year. These events tend to scour out vegetation and soil, change topography, and change the river channel form and location. The size of disturbance varies greatly, although glacial outwash bursts, debris flows, glacial advances and retreats, and avalanches tend to affect larger areas than the other disturbance types. Disturbance shape tends to be linear and flow downhill. Wind erosion, when detectable, and fire kill occurs in the direction of the strongest winds. Insect mortality tends towards a ameboid shape, although wind may play an important role in dispersing insects at this exposed elevation.
2. Succession - Successional patterns are similar to that described in Rocks 'N' Ice except this patch type contains trees. Due to harsh conditions, the species present now are the most likely recolonizers after disturbance. Disturbed areas can experience the freeze/thaw erosion on a larger scale, delaying and slowing recovery. Freeze/thaw erosion would decrease as trees begin to shade the area and reduce daily temperature variations.

C. Lodgepole Flats

1. Disturbances - typical events include glacial outwash bursts, debris flows, fire, flooding, and epidemic insect and disease attacks on a infrequent basis. Fire may or may not occur during an insect outbreak; however, large fire is unlikely without some event to open the canopy and allow fuels to dry. Insect outbreak is the most likely source of such an opening. Glacial outbursts, debris flows, and flooding tend to create long, linear openings. These

events may also change the river channel, thus changing the patch type. Insect and disease outbreaks and fire tend to create irregular openings of varying size and shape.

2. Succession - Immediately following disturbance conditions favor cottonwoods, lodgepole, lupines, and other plants with wind borne seed. We do not know of any species stored in a below surface "seed bank" that might germinate following disturbance. Initially, cottonwoods may dominate the scene. Stands tend to be even-aged. If the river changes course, then riparian vegetation will likely dominate the scene for a long time and the new river banks will tend to be unstable and easily eroded. If the patch type remains undisturbed long enough the adjacent upland vegetation will eventually "invade" and change the patch type.

D. **Wetlands**

1. Disturbances - typical events include flooding, debris flows, epidemic insect outbreak, fire, blowdown, and beaver ponding on an infrequent basis. Flooding and debris flows tend to create long, linear openings. Epidemic insect outbreaks, fire, and beaver ponding tend to create irregular shapes and sizes. Blowdown may create either a long, linear opening or an irregularly shaped opening. Flooding can create channels that drain the wetland and change the patch type. Debris flows may bury the wetland, changing the patch type. Epidemic insect outbreak, blowdown, and fire may occur in some combination of the three events over a relatively short time scale (10-20 years). Any event which creates an opening without creating a drainage channel will raise the water table. Ponding will drown the existing species.
2. Succession - Disturbances which raise the water table favor Engelmann spruce and western redcedar over other conifers. Cottonwoods, alders, and other riparian vegetation will tend to dominate new openings. Initial diversity would be quite high, especially in the forb layer. As trees successfully reestablish, the water table lowers, the canopy closes, and diversity drops.

E. **Cool, Wet Mixed Conifer**

1. Disturbances - typical events include epidemic insect and disease outbreaks, fire, blowdown, and landslides on an infrequent basis. Openings created by epidemic insect outbreaks and fire tend to be large (several hundred to several thousand acres) and irregularly shaped. Openings created by disease outbreaks tend to be small or medium sized and somewhat circular. Blowdown created openings are irregular in size and shape. Landslides create long, linear openings. All these events may occur in some combination. A large fire requires an existing opening of small or medium size to allow fuels to dry. The fires tend to be stand replacing events with little underburning. Landslides rarely happen without a large fire to remove protective vegetation and duff. Blowdown may occur at any successional stage. The other events occur most frequently in the later successional stages; the closer a given site is to the climax stage, the more likely a major disturbance will happen.
2. Succession - initially, the more shade intolerant tree species would dominate the site. Typical species include Douglas-fir, noble fir, western white pine, and western larch. Cottonwoods, alders, and willows may dominate some areas on benches. Many understory shrubs would resprout, with maples, rhododendron, and Oregongrape common. Pacific yew may resprout or germinate from soil stored seeds. Plants with wind borne seed would dominate the forb layer. Generally, all species present now would reestablish following disturbance, but some species may be present only at very reduced levels, such as trillium, and other species would not dominate the scene, such as western redcedar. Stands would have an even-aged structure.

F. **Talus and Forested Rock**

1. Disturbances - typical events include fire and rock slides. Rock movement may occur annually due to freeze/thaw action loosening rocks. Fire may spot across a talus area, burning the vegetation patches. Removing the vegetation and heating from fire causes rocks to loosen and slide.
2. Succession - eventually soil and organic matter accumulate in semi-stable pockets, allowing plants with wind or animal borne seed to colonize or recolonize the spot. The nutrient flush

created by fire may allow shrubs to rapidly resprout and promote rapid recolonization by some forbs.

G. **Open Riparian**

1. Disturbances - typical events include glacial advances and retreats on a very long time scale, glacial out wash bursts and debris flows on an infrequent basis, and flooding and avalanches on a frequent basis. These disturbances can change the river channel and form, and increase erosion, bank wash, sediment , and water turbidity. Riparian vegetation may be uprooted or buried. Even minor flooding may cause changes to the river, particularly below Highway 35.
2. Succession - riparian vegetation, such as alders and willows, reestablish and begin to stabilize the bank. Accumulated sediment eventually scours out of the main bed, except in some pools.

H. **Canyon Riparian**

1. Disturbances - typical events include debris flows, flooding, and, to a limited extent, fire. These disturbances cause only minor changes to river location since this patch type occurs in deep canyons. They can change pool numbers, sizes, and locations.
2. Succession - riparian vegetation reestablishes either through seeding or resprouting. Initial conifers may include Engelmann spruce and western redcedar in the upper portions of the type. Should fire destroy the seed source below White River Falls conifers may be eliminated from the canyon for many decades.

I. **Tygh Valley Riparian**

1. Disturbance - flooding and, to a limited extent, fire and debris flows, caused most changes. Flooding can alter the river channel and form. Sediment would tend to accumulate in pools and slower channels. Riparian vegetation may be uproot or toppled.
2. Succession - if the hardwood trees and shrubs maintained some connection with the ground, they could resprout from roots and epicormic buds in the main bole. Cattails could colonize or recolonize pools and slow moving channels.

J. **Mesic Mixed Conifer**

1. Disturbances - typical events include epidemic insect and disease outbreaks, fire, and blowdown. These events may occur in combination. The disturbance pattern is similar to Cool, Wet Mixed Conifer, but on a smaller scale. Fires will underburn more areas than in Cool, Wet Mixed Conifer, but stand replacing fire is the dominant fire type. Within the canyon, soil creep, ravel, and small landslides may create additional disturbance, usually following fire.
2. Succession - important initial conifers include ponderosa pine and Douglas-fir. Western white pine, western larch, and lodgepole pine are important minor species. Soil stored seed may germinate, with ceanothus and manzanita the most common species. Maples, Oregongrape, snowberry, elderberry, and thimbleberry would resprout. Plants with wind borne seed, such as fireweed, could dominate the scene initially. Cottonwood would dominate in wet areas. Without continued disturbance or very limited disturbance, grand fir would recolonize and eventually dominate the type. Most stands have an even-aged structure.

K. **Dry Mixed Conifer**

1. Disturbances - fire is the most common major disturbance. Insects and disease create very small openings and epidemic outbreaks are rare. The normal pattern is underburning with occasional patches of torching and crowning. Burned areas would be large and irregularly shaped.
2. Succession - ponderosa pine and Douglas-fir are the most common species, with Oregon white oak an important minor component. Incense-cedar may be an important minor species

on the south side of the river. Shrubs resprout or germinate from soil stored seed. Forbs with wind borne seed may dominate patches. Grasses become more dominant in the understory as conditions become drier. As disturbance continues, the tree canopy becomes vertically stratified. Without disturbance, grand fir recolonizes and eventually dominates the type. Stands typically have an uneven-aged structure.

L. **Oak-Conifer**

1. Disturbance - fire is the most important major disturbance, typically underburning large areas at frequent intervals. Burned areas would be very large and irregularly shaped. Insect and disease attacks reached epidemic levels only after a long fire-free interval allowed tree stocking to become quite dense.
2. Succession - underburning mostly served to create very small openings and suitable seedbeds for tree regeneration. Ponderosa pine and Oregon white oak dominate the type with stands showing an uneven-aged structure. Frequent fire restricted juniper to rocky areas that burned infrequently. Burning typically would rejuvenate the understory and create sites suitable for short-lived species. Most of these short-lived species spread via wind borne seed.

M. **Shrubland**

1. Disturbance - fire is the most important major disturbance, typically burning very large areas at infrequent intervals.
2. Succession - burning favors grasses over shrubs at relatively frequent intervals. Both sage and antelope bitterbrush are sensitive to fire. Fire favors rabbitbrush. Burning rejuvenates grasses and forbs and creates sites suitable for short-lived species. Most of these short-lived species spread via wind borne seed.

N. **Range**

1. Disturbance - fire is the most important major disturbance on the area as a whole. Range in the biscuit-scabland formation also experiences inundation during snowmelt. The clayey and slow draining "scabs" tend to create vernal ponds and streams. The size and duration of the ponds and streams depends on snowpack and rate of snowmelt.
2. Succession - burning rejuvenates grasses and forbs and creates sites suitable for short-lived species. Most of these short-lived species spread via wind borne seed. If the fire return interval is long enough, fire tends to disfavor bunchgrasses as long term smoldering in the "bunch" kills buds.

O. **Ag Lands**

1. Disturbance - prior to white settlement these areas fell into the Range or Shrubland patch types and experienced the same type of disturbances. Currently these lands are plowed on a regular basis and either planted or allowed to lie fallow for a year.
2. Succession - prior to white settlement succession probably followed the same patterns as Range and Shrubland.

P. **All Patch Types - Disturbance Consequences**

1. Generally - opening favor wildlife species associate with edge habitat and early successional plant communities and disfavor wildlife species associated with closed canopies and later successional plant communities. Recreation use in the summer may decrease until forests regenerate. Recreation use in the fall and winter may increase due to better habitat for game species and fewer obstacles to skiers and snowmobilers. Some areas may become good to excellent for morel mushrooms but poor for chantrelle mushrooms. Safety concerns increase, especially in areas burned with stand replacement fire and subject to landslides and debris flows. As fire severity increases, soil erosion hazard increases. Retardant drops can stain rock formations and talus slopes for several years. Noxious weeds and weedy natives tend to increase in disturbed areas, particularly where the disturbance exposes

mineral soil. Fire and fire suppression can both expose and damage cultural resource sites. Forage quality and quantity generally increases.

2. Specifically - the riparian patch types may experience increased water temperatures and sediment, and major ash input can degrade fish habitat and cause fish kills. Ag Lands and Range can experience major financial losses for private landowners if fire burns crops and homes.

V. Functional Links

Describing links into and out of this analysis area to connect the river corridor to the larger landscape. We looked at routes where living and nonliving things crossed the borders of the river corridor.

A. US Highway 197 and State Highway 35 - move people into, through, and out of the area rapidly.

B. White River

1. Recreational human use concentrated on upper end
2. Private land ownership and farming concentrated on lower end
3. Wind funneled down the river canyon
4. Fire locally burns upslope but generally burns down drainage
5. Big game movement is up and down river
6. Fish movement between White River Falls and upper end

C. Minor roads

1. Barlow Road and Forest Road 48 parallel river in upper end
2. Warnic Crossing only public access to river by road between Keep's Mill and Tygh Valley
3. Most roads access canyon rim
4. Forest Road 43 connects Road 48, Barlow Road and US Highway 26

D. Side drainages

1. Access to fish spawning areas
2. Big game travel corridors
3. Water diversions for irrigation and drinking

E. Major ridges

1. Barlow Butte and Bonney Butte help define viewshed in upper end
2. Canyon rim encloses river and defines viewshed in canyon area.

VI. Other Considerations

We listed important elements we need to consider in developing a management plan for the river. One element is important landscape pieces we want to maintain, enhance, or protect. These landscape pieces are included in the patch types, but not a specific indicator of a patch type. Another is how to deal with human-caused fragmentation. We need to insure that animal travel corridors and migration routes remain to connect patch types. Lastly, we need to figure out how much we should mimic natural process in producing the various goods and services from the river corridor.

A. Rare, Unusual, Critical, and Unique Landscape Elements

1. Grassy balds in Cool, Wet Mixed Conifer
2. Aspen groves in Talus
3. Old homesteads and current homes
4. Rare plants
5. Pacific yew
6. Cultural resource sites
   - Barlow Road
   - Keep's Mill
   - Prehistoric sites

B. Fragmentation

1. Background - openings in forest created to supply commercial products and to convert stands to earlier successional stages
2. Human perspective - not necessarily bad since provides visual diversity. Geometric shapes and clearcutting not preferred by much of public, but do not like unhealthy appearing, defoliated trees either. Federal laws limit opening size.
3. Biological perspective - need to provide habitat for old growth dependent species and big game security. Losing habitat for species which use closed or denser canopy stands than in regeneration cuts and defoliated areas on moister end. Losing habitat for species dependent on open canopy, vertically stratified forests on drier end. Laws do not allow openings large enough to mimic natural processes in Cool, Wet Mixed Conifer and Mesic Mixed Conifer. Human created openings larger than that provided by natural processes in Dry Mixed Conifer and Pine-Oak. Oak-Juniper probably unaffected by human-caused fragmentation.
4. Watershed/Fisheries - watershed begins to deteriorate once a certain amount of area gets opened. Upper watershed naturally unstable and produces much sediment, river changes course on occasion. River still has not recovered from latest course change in 1967.

C. Missing pieces in the Landscape

1. Intermediate sized (11-20" DBH) trees throughout forested area
2. Open, parklike stands of ponderosa pine and Oregon white oak
3. Semi-open stands of ponderosa pine and Douglas-fir with vertically stratified canopy
4. Grassy understory in Dry Mixed Conifer and in Pine-Oak on flatter ground
5. Interpretation of human and natural history
6. Accessible facilities, campgrounds, and trails
7. Ground vegetation in and around primitive campgrounds
8. Rotten logs in older harvest units
9. Organic soil cover in harvest units

D. Extent to Mimic Nature

1. Maintain seral stages of plant associations on drier end of forest types
2. Provide more shrubs and mesic forbs than a frequent fire may have provided
3. Retain appropriate levels of snags and downed logs
4. Protect private landowners from financial and personal losses due to fire
5. Want to more closely mimic presettlement stand conditions ***only*** on National Forest lands

VII. Final Landscape Units

The Major Patch Types described in section I became our final landscape units. Refer to Section I for a description of those landscape units. Briefly, they include:

A. Rocks 'N' Ice

B. Subapline

C. Lodgepole Flats

D. Wetlands

E. Cool, Wet Mixed Conifer

F. Talus and Forested Rock

G. Open Riparian

H. Canyon Riparian

I. Tygh Valley Riparian

J. Mesic Mixed Conifer

K. Dry Mixed Conifer

L. Oak-Conifer

M. Shrublands

N. Range

O. Ag Lands

Patch Type	Flow Phenomena		
	People	*Wind*	*Fire*
Rocks 'n' Ice	Nonmotorized winter sports and snowplay, summer hiking. Timberline Trail. Seen from Timberline Lodge, Mt. Hood Meadows, and other viewpoints. Native American religious areas, possible lithic material gathering, travel, hunting.	Creates krummholtz structure, erosion that pedestals plants, life threatening situations in winter (wind chill, blizzards, white outs). Creates scenic cloud formations on Mt. Hood.	Almost never burns (500+ years). Nutrient cycling, degrades scenic quality.
Subalpine	Nonmotorized winter sports and snow play, summer hiking. Timberline and White River trails. Seen from Timberline Lodge and other viewpoints. Formerly summer camping areas for Native Americans, hunting and gathering in earlier successional stages, burning.	Creates flagged trees, erosion that pedestals plants, life threatening situations in winter. Pollen and seed dispersal.	Very long return interval (300+ yrs). Stand replacing. Mainly spreads by spotting and crowning. Nutrient cycling, creates snags and downed wood, increases huckleberry production, degrades scenic quality.
Lodgepole Flats	Sno-parks, winter sports and snow play, photography, sightseeing, dispersed camping, hunting, horseback riding, OHVs (illegal use), timber harvest. Primitive campgrounds (White River Station and Barlow Crossing). Hwy 35, Barlow Road, road 43. Bonney Creek and White River trails. State sand and gravel operation. Seen from Timberline Lodge and other viewpoints. Native Americans--plant collection, temporary camps, travel route.	Pollen and seed dispersal. Creates cooler, moister microclimate. Cool air off Mt. Hood settles and creates frost pockets. Venturi effect at outhouses.	Long return interval (200+ yrs). Stand replacing. Mainly spreads by spotting and crowning. Nutrient cycling, creates snags and downed wood, degrades scenic quality.
Wetlands	Plant collecting for cultural uses by tribes, plant photography, possibly some skiing, sightseeing. Little used. Native Americans--plant collection, hunting.	Pollen and seed dispersal, blowdown problems along edges of new openings, nutrient cycling.	Very long return interval (300+ yrs). Stand replacing. Often provides a fuel break for surface fires. Area in type may increase after fire. Nutrient cycling, creates snags and downed wood, degrades scenic quality.

Patch Type	Flow Phenomena		
	People	*Wind*	*Fire*
Cool, Wet Mixed Conifer	Hunting, timber harvest, horseback riding (?), skiing, mountain biking, mushroom collection, huckleberry gathering (?), cedar bark collection, potentially yew collection (taxol), sightseeing. Barlow Creek and Klinger's CGs. White River, Barlow Ridge, and Bonney Creek trails. Road 48 and Barlow Road. Seen from Timberline Lodge and other viewpoints. Native Americans--plant collection, hunting, timber harvest.	Pollen and seed dispersal, blowdown problems along edges of new openings, nutrient cycling.	Long return interval (200+ yrs). Stand replacing. Mainly spreads by crowning. High severity burn probable. Nutrient cycling, creates snags and downed wood, degrades scenic quality.
Talus	Keep's Mill flume. Roads 2120 and 4885. Natural openings, scenic diversity. Seen from Timberline Lodge, spots along canyon rim, river. Native Americans--collect elderberries and rocks, religious uses.	Pollen and seed dispersal. Some cooling on hot days.	Variable return interval. Spreads mainly by spotting. Larger areas serve as fuel breaks for surface fire. potential safety zones. Nutrient cycling, creates snags and downed wood, degrades scenic quality. Retardant drops may alter rock color for several years.
Open Riparian	Fishing, hiking, swimming from White River Station and below, dispersed camping, inappropriate OHV use. Barrier to skiing. Primitive campgrounds (Barlow Creek, Barlow Crossing, White River Station). Native Americans--plant collection, fishing, travel routes, rock collection, camps.	Pollen and seed dispersal. Blows macroinvertebrates and woody material into streams.	Rarely burns. Nutrient cycling, creates snags and downed wood, degrades scenic quality. Increases water temperature, sediment input, macroinvertebrate populations. Stimulate hardwood regen. Ash alters chemistry. Large ash inputs and retardant drops directly into stream can kill fish and amphibians.
Canyon Riparian	Fishing, kayaking Keep's Mill-Tygh Valley and White River Falls-mouth, dispersed camping, swimming below White River Falls. Keep's Mill CG. Clear Creek and Camas Creek trails. Seen from White River Falls State Park, Graveyard Butte, and other viewpoints. BN railroad tracks at mouth. BPA powerline. Inaccessible and primitive. Native Americans--fishing, camps, plant collection.	Pollen and seed dispersal. Blows macroinvertebrates and woody material into streams. Wind funneled and strengthened.	Moderate to long return intervals (50-200 yrs). Nutrient cycling, creates snags and downed wood, degrades scenic quality. Somewhat increase water temps (topography shades), higher potential for ash, rock and sediment input. Stimulate hardwood regen. Large ash inputs and retardant drops directly into stream can kill fish and amphibians.

	Flow Phenomena		
Patch Type	*People*	*Wind*	*Fire*
Tygh Valley Riparian	Swimming, tubing, canoeing, fishing, horseback riding, birding, bird hunting, irrigating. Agriculture adjacent and into area; Mtn. Fir mill site adjacent and into area. Private sand and gravel operations. Scenic diversity from US 197/OR 216, Tygh Valley. Seen from State Park, Juniper Flat Road. Native Americans--fishing, camps, plant collection, travel routes, hunting.	Pollen and seed dispersal. Blows macroinvertebrates and woody material into streams. Blows sprayed pesticides and fertilizer into streams.	Wildland/urban interface. Degrade surface water for drinking purposes. Nutrient cycling, creates snags and downed wood, degrades scenic quality. Increases water temperature, sediment input, macroinvertebrate populations. Stimulate hardwood regen. Large ash inputs and retardant drops directly into stream can kill fish and amphibians. Capture ash and sediment washed into stream in Open and Canyon Riparian types.
Mesic Mixed Conifer	Timber harvest, mushroom and firewood collection, hunting, photography, sightseeing. Rimrock Trail (not maintained), Clear Creek Trail. Keep's Mill Road. Road 4885 unsafe to drive in canyon. Seen from Keep's Mill, river, rock outcrops on rim, forest roads. Native Americans--plant collection, hunting.	Pollen and seed dispersal. Blowdown possible along edges of new openings. Flags trees in canyon. Funneled and strengthened in canyon. Strong diurnal winds.	Moderate return interval (50-150 yrs). Mix of crown fire and underburning. Nutrient cycling, creates snags and downed wood, degrades scenic quality. Favors earlier successional species and stages, noxious weeds. Promotes morel mushrooms, ceanothus, and manzanita in new openings. Increases biodiversity.
Dry Mixed Conifer	Hunting, timber harvest and firewood collection on adjacent flats. McCubbin's Gulch OHV area adjacent. Only access is Keep's Mill Road. Seen from river. Native Americans--plant collection, hunting.	Pollen and seed dispersal. Flags trees in canyon. Funneled and strengthened in canyon. Strong diurnal winds.	Moderate return interval (25-75 yrs). Primarily underburning. Nutrient cycling, creates snags and downed wood. Favors pine and oak, noxious weeds. Promotes morel mushrooms, ceanothus, and manzanita in new openings. Potential for human caused fires.
Pine-Oak	Hunting, plant and fruit/nut collecting and camps by tribes. Homes and homesteads. Seen from Graveyard Butte, Wamic Crossing, US 197, OR 216, Tygh Valley, Juniper Flat Road. Much private ownership.	Pollen and seed dispersal. Flags pines in canyon. Funneled and strengthened in canyon. Strong diurnal winds.	Short return interval (5-25 yrs). Nutrient cycling, creates snags and downed wood. Favors cheatgrass, noxious weeds, fire dependant/adapted forbs. Rejuvenate decadent native grasses. Creates and maintains open, parklike stands. Wildland/urban interface. Potential for human caused fires.

	Flow Phenomena		
Patch Type	*People*	*Wind*	*Fire*
Oak-Juniper	Hunting, plant and fruit/nut collecting by tribes. Homes and homesteads. BPA powerline. Possibly seen from Graveyard Butte and Tygh Valley. Native Americans--hunting, plant collection, camps.	Pollen and seed dispersal. Embeds sand in juniper bark.	Short to moderate return interval (5-50 yrs). Underburns. If frequent enough, reduces juniper populations. If reduce juniper, then increase stream flows. Creates snags and downed wood. Favors cheatgrass, medusahead, noxious weeds, fire dependent/adapted forbs. Wildland/urban interface. Potential for human caused fires.
Shrubland	Hunting, plant collecting by tribes. BN railroad tracks at mouth. Seen from Deschutes River and State Park.	Pollen and seed dispersal. Typically, very strong winds.	Moderate return interval (50-100 yrs). Nutrient cycling. Favors cheatgrass, medusahead, noxious weeds, fire dependant/adapted forbs. Potential for railroad caused fires.
Range	Bird hunting, horseback riding. Homes and homesteads. BPA powerline. Native American hunting.	Pollen and seed dispersal. Typically, very strong winds.	Moderate to long return interval (25-150 yrs). Biscuit scabland tends to long interval due to discontinuous fuels. Nutrient cycling. Favors cheatgrass, medusahead, noxious weeds, fire dependant/adapted forbs. Wildland/urban interface.
Ag Lands	Farming, irrigating, spraying pesticides and fertilizers, hunting. BPA powerline. Scenic diversity. Seen from US 197/OR 216, Tygh Valley, Juniper Flats Road.	Pollen and seed dispersal. Erosion. Typically, very strong winds.	Return interval greatly altered. Field burning. Plowed fields and green field serve as fuel breaks. Volunteer and rural fire departments or no organized fire protection.

Patch Type	*Water*	*Insects & Disease*
Rocks 'n' Ice	Capture via ice dams with sudden failure. Mostly surface flow, shape river channel. Avalanches scour vegetation and soil. Melting deposits glacial flour in river.	N/A
Subalpine	Snow slides scour vegetation and soil. Capture, storage, transfer through subsurface flow. Minimal nutrient cycling. Run-out area for avalanches, create downed logs.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality.

Patch Type	Flow Phenomena: *Water*	Flow Phenomena: *Insects & Disease*
Lodgepole Flats	Capture, storage, transfer through subsurface flow. Spread hazardous material spills from major roads and state rock storage areas. Run-out area for ice dam failures, create downed logs and changes river channel. Flooding changes river channel, creates downed logs and snags, can drain wetlands. Seed dispersal. Channeled area at Hwy 35 reduces flood energy and spread of sediment, rocks, and any organic debris south of the highway.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality.
Wetlands	Primarily capture and storage. Limited transfer through subsurface and surface flow. Nutrient sinks.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality.
Cool, Wet Mixed Conifer	Capture, storage, and transfer through surface and subsurface flow. Nutrient cycling. Seed dispersal. Form channels in small streams. Some fish spawning habitat in larger side streams. Shift organic and inorganic material to alter pool and riffle size, location, and frequency.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality. Spruce budworm at epidemic levels.
Talus	Capture and transfer through subsurface flow. Some nutrient cycling.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat.
Open Riparian	Flooding alters river channel. Shift organic and inorganic material to alter pool and riffle size, location, and frequency. Insect and seed dispersal. Mixes oxygen. Transfer hazardous material spills from major roads and litter from campsites.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality.
Canyon Riparian	Flooding alters river channel. Shift organic and inorganic material to alter pool and riffle size, location, and frequency. Insect and seed dispersal. Mixes oxygen. Transfer hazardous material spills from major roads, and litter and human waste from campsites and other human uses.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality.
Tygh Valley Riparian	Flooding alters river channel. Shift organic and inorganic material to alter pool and riffle size, location, and frequency. Insect and seed dispersal. Mixes oxygen. Transfer hazardous material spills from major roads, farm chemicals, and litter.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality.

Patch Type	Flow Phenomena: *Water*	Flow Phenomena: *Insects & Disease*
Mesic Mixed Conifer	Capture, storage, and transfer through surface and subsurface flow. Nutrient cycling. Seed dispersal. Form channels in small streams. Some fish spawning habitat in larger side streams. Shift organic and inorganic material to alter pool and riffle size, location, and frequency.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality. Spruce budworm at epidemic levels.
Dry Mixed Conifer	Capture, storage, and transfer through subsurface flow. Nutrient cycling. Seed dispersal. Form channels in small streams. Some fish spawning habitat in larger side streams. Shift organic material in channels.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps, degrades scenic quality. Spruce budworm and, possibly ,fir engraver beetle at epidemic levels.
Pine-Oak	Capture in developed ponds. Storage and transfer through subsurface flow. Nutrient cycling. Shift organic material in channels.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat, degrades wood quality, creates canopy gaps.
Oak-Juniper	Capture and transfer through subsurface flow. Nutrient cycling.	Create snags and downed logs, nutrient cycling, mistletoe creates nesting habitat.
Shrubland	Capture and transfer through subsurface flow. Nutrient cycling.	Nutrient cycling.
Range	Capture and transfer through subsurface flow. Capture and storage in developed ponds.	Nutrient cycling.
Ag Land	Capture, storage and transfer through subsurface and surface flow. Transfer farm chemicals and soil through surface and subsurface flow.	Nutrient cycling, reduce crop yields.

Patch Type	*Fish*	*Wildlife*	*Livestock*
Rocks 'n' Ice	Limited food supply, little cover, low water temperatures, limited fish growth. Limited shelter and space. No spawning habitat. Source of suspended sediments (glacial milk).	Potential foraging habitat for peregrine falcons.	N/A
Subalpine	N/A	Nesting and foraging habitat for black rosey finches. Potential wolverine habitat where isolated from intensive human use. Summer forage for deer, elk.	N/A

Patch Type	Flow Phenomena		
	Fish	*Wildlife*	*Livestock*
Lodgepole Flats	N/A	Nesting and foraging for black rosey finches. Potential foraging for peregrine falcons. Dispersal habitat for spotted owls, goshawks, pine martens. Potential wolverine habitat where isolated from intensive human use. Summer forage for deer, elk.	Grazing allotment on Bear Springs. No improvements. Very low utilization.
Wetlands	N/A	Foraging and dispersal habitat for spotted owls, goshawks. Nesting/denning, foraging, and dispersal habitat for pileated woodpeckers, pine martens. Potential wolverine habitat where isolated from intensive human use. Calving/fawning, thermal cover, and summer forage for deer, elk.	Grazing allotment on Bear Springs. No improvements. Very low utilization.
Cool, Wet Mixed Conifer	N/A	Nesting/denning, roosting, foraging, and dispersal habitat for spotted owls, pileated woodpeckers, goshawks, pine martens. Potential wolverine habitat where isolated from intensive human use. Calving/fawning, summer forage, thermal cover for deer, elk.	Grazing allotment on Bear Springs. No improvements. Very low utilization on Bonney Butte.
Talus	N/A	N/A	N/A
Open Riparian	Mix of gradients, cobble substrate with fine sediment. Moderate productivity of fish. Approximately 30% riparian canopy cover, limited pools, source of coarse sediment. Riparian production has not caught up with most recent channel change. No spawning habitat.	Potential foraging habitat for bald eagles. Dispersal habitat for spotted owls, goshawks, pine martens. Calving/fawning in lower 1/2, summer forage, travel corridor for deer elk. Giant salamander habitat.	Grazing allotment on Bear Springs. No improvements. Low utilization.

Patch Type	Flow Phenomena		
	Fish	*Wildlife*	*Livestock*
Canyon Riparian	Low to moderate gradient. Heavier sediment load than Open Riparian. Greater riparian stability, older plants, more plant diversity produces greater fish productivity. Topographic and vegetative shading. Below WR Falls, vegetative shading more from alders and willows than conifers. Mean water temperature gradually increases between NF boundary and mouth. No spawning habitat.	Foraging and potential nesting and rearing for harlequin ducks between Open and Tygh Valley Riparian. Wintering habitat, potential nesting and foraging habitat for bald eagles. Dispersal habitat for spotted owls, pileated woodpeckers, goshawks, pine martens. Travel corridor, summer and winter forage (depends on elevation) for deer, elk. Giant salamander habitat.	Grazing allotment on BLM lands. Private land grazing. No known improvements.
Tygh Valley Riparian	White River Falls is barrier to fish passage. Low gradient, cobble substrate, high sediment load. Most productive pool habitat on main stem; moderate-high fish growth and maintenance. Diversity of vegetation, both species and age; woody, herbaceous and grassy species well distributed. Very little or no spawning habitat.	Wintering habitat, potential nesting and foraging habitat for bald eagles. Winter forage and cover for deer, elk. Giant salamander habitat.	Some private land grazing in stubble fields. Fields fenced.
Mesic Mixed Conifer	N/A	Nesting/denning, roosting, foraging, and dispersal habitat for spotted owls, pileated woodpeckers, goshawks, pine martens. Nesting and foraging for turkey and gray squirrel. Summer forage in openings, thermal cover for deer, elk. Giant salamander habitat in seeps and springs.	Grazing allotments on Barlow and Bear Springs. Spring development on Bear Springs. No improvements on Barlow.
Dry Mixed Conifer	N/A	Potential nesting and foraging habitat for peregrine falcons. Wintering habitat, potential nesting habitat for bald eagles. Nesting, foraging, wintering habitat for turkey and gray squirrel; roosting habitat in large pines and DF for turkeys. Potential foraging, denning, rearing, and dispersal habitat for pine martens in late successional stands. Winter forage, Thermal and hiding cover for deer, elk. Giant salamander habitat in seeps and springs.	Grazing allotments on Barlow and Bear Springs. Fence along forest boundary and around Keep's Mill seed orchard. Corrals at Camas Prairie. Spring development on Bear Springs.

Patch Type	Flow Phenomena		
	Fish	*Wildlife*	*Livestock*
Pine-Oak	N/A	Potential nesting and foraging habitat for peregrine falcons. Wintering, potential nesting habitat for bald eagles. Potential nesting and foraging habitat for pileated woodpeckers if have large pines. Foraging, roosting, wintering habitat for turkeys. Foraging and nesting habitat for gray squirrel. Winter forage and minimal cover for deer, elk. Giant salamander habitat in seeps and springs.	Grazing allotment on BLM land. Some private land grazing. Canyon rim fenced on private land.
Oak-Juniper	N/A	Potential nesting and foraging habitat for peregrine falcons. Wintering habitat for bald eagles. Foraging and wintering habitat for turkeys. Foraging and nesting habitat for gray squirrels. Winter forage and travel corridor for deer, elk. Giant salamander habitat in seeps and springs.	Grazing allotment on BLM lands. Some private land grazing. Canyon rim often fenced on private land.
Shrubland	N/A	Potential nesting (at river mouth) and foraging habitat for peregrine falcons. Wintering habitat for bald eagles. Year-round range for mule deer. Winter forage for elk in very severe winters.	N/A
Range	N/A	Potential foraging habitat for peregrine falcons. Wintering habitat for bald eagles. Foraging habitat along fringes with forest for turkeys and gray squirrels. Winter forage for deer, elk.	Private land grazing with fences and watering ponds.
Ag Lands	N/A	Potential foraging habitat for peregrine falcons. Wintering habitat for bald eagles. Winter forage for deer, elk.	Private land grazing with fencing.

Appendix C
Scenic Resource Management

APPENDIX C: SCENIC RESOURCE MANAGEMENT

The Forest Service and BLM manage scenic resources using similar methods with different terms and slightly differing definitions. This appendix attempts to explain the two different schemes and acquaint readers with the two sets of terms. Both agencies use the Visual Resource Management (VRM) system to manage scenic resources based on the characteristic landscape. This document uses the Forest Service terms throughout the discussion of alternatives and environmental consequences to simplify alternative comparisons. The Forest Service adopted the current VQOs for White River in 1990. The recommended VQO alternatives in this document were derived using the results of the 1983 scenic resources inventory (updated in 1989), the corresponding BLM inventory, and the Desired Future Condition discussed in Chapter 3.

The characteristic landscape is a function of the basic vegetative patterns, landforms, rock formations, and water features which natural forces have established. Foothill landscapes and farmlands are transition areas between landscapes accepted as natural and landscapes dominated by human development. These developed landscapes are generally accepted as managed in appearance. The transition zones between forest and city have a long aesthetic and social history with strong representation in art and literature. Thus, the farms and fields of Tygh Valley appear to "fit" the landscape. The harvest units on Mt. Hood National Forest may not fit the landscape unless they are designed to mimic the natural patterns.

Human-caused changes to the form, line, color, and texture of the characteristic landscape create a particular scenic condition. These results, known as visual quality levels, refer to the degree of change from the characteristic landscape. Both agencies evaluate scenic quality from various locations, known as viewpoints. These viewpoints can be a single spot, such as Graveyard Butte, or a corridor, such as White River.

Generally, geometric shapes stand out in most landscapes since natural shapes rarely have regular edges or shapes. Within recreation sites the color of and materials in a given facility may influence how that facility affects scenic quality. For example, a toilet with a light colored exterior would look very out-of-place in a forested area but may blend with the characteristic landscape in a desert area.

Before Forest Service Management decided on scenic quality goals for the Forest Plan, the Forest landscape architect complied a scenic resources inventory. This inventory identified Visual Quality **Levels** for each viewshed. Management adjusted or adopted these levels, which then became Visual Management **Objectives**. These are the scenic quality **goals** to be achieved on the landscape. Objectives should not be confused with either existing conditions or projected future conditions (consequences of alternatives), which are expressed in the same terms. At this point the two agencies use differing schemes.

The Forest Service manages scenic quality using Visual Quality Objectives (VQOs). The VQO refers to the goal that landscape management should achieve. Visual Quality Objectives vary with distance from the viewpoint. Distance zones consist of the foreground, middleground, and background for most viewpoints. Trails have distance zones of near-foreground, far-foreground, middleground, and background (Table C-1). Generally, the further away an object or form is from the viewer, the larger it must be for the viewer to notice it.

Sensitivity levels reflect how much interest visitors have in the scenic characteristics of the landscape. Sensitivity Level I includes landscapes seen from primary and secondary travel routes where visitors have a major concern for scenic quality. Sensitivity Level II includes landscapes seen from primary and secondary travel routes where about 1/4 of visitors have a major concern about scenic quality. Sensitivity Level III includes landscapes seen from trails intended for administrative use and from secondary routes where fewer than 1/4 of the visitors have a major concern for scenic quality.

Table C-1. Forest Plan distance zones for viewpoints and trails from activity along roads, waterbodies, or use areas.

Viewpoint	Zone	Distance
Observation points, roads, waterbodies, campgrounds, etc.	Foreground	0-1/2 mile
	Middleground	1/2-5 miles
	Background	5 miles and beyond
Trails	Near-foreground	0-660 feet
	Far-foreground	660-1320 feet
	Middleground	1320 feet - 5 miles
	Background	5 miles and beyond

The Forest Service has four different VQOs applied across the Mt. Hood National Forest: Preservation, Retention, Partial Retention, and Modification, defined below. Another visual level exists that reflects past activities and which Management decided did not meet the Forest's scenic quality goals--Maximum Modification.

- Preservation - Only ecological changes are permitted.
- Retention - Human activities are not evident to most observers.
- Partial Retention - Human activities may be evident but remain subordinate to the characteristic landscape.
- Modification - Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in the foreground and middleground.

Unacceptable Modification occurs when activities do not blend with the landscape when seen from a viewpoint. The activities are visually unrelated to natural occurrences in scale and shape. Because this condition is not an acceptable change, it is not one of the VQOs.

The BLM manages scenic quality using VRM Classes. These classes are similar to VQOs with similar guidance on what meets or does not meet a given visual quality objective or class.

- Class I - Preserve the existing character of the landscape. Natural ecological changes are the primary altering force in the landscape. Very limited management activities are permitted.
- Class II - Retain the existing character of the landscape. Changes in any of the basic elements caused by a management activity should not be evident. Changes are seen but do not attract the attention of the casual observer.
- Class III - Partially retain the existing character of the landscape. Changes to the basic elements are evident, but should remain subordinate to the existing landscape.
- Class IV - Provide for management activities which require major modification of the existing landscape character. Changes may be high and attract attention.
- Class V - Rehabilitation is required for the area so that it will meet the objectives of the target classification

The main difference between the BLM and Forest Service VRM systems is that the Forest Service uses the Distance Zone concept in implementation of VQOs. The BLM incorporates distance zones into the

class determination. The Class is partially based on the most important distance zone or zones for the viewpoint. At hypothetical Viewpoint A for example:

Forest Service VQO	BLM Class
Retention--Foreground	II
Partial Retention--Middleground and Background	

Part of the reason the BLM would consider Viewpoint A as Class II would be because it is a view seen mostly in the Foreground distance zone.

Appendix D
Mt. Hood Meadows Expansion

APPENDIX D--MT. HOOD MEADOWS EXPANSION

INTRODUCTION

The 1988 Omnibus Oregon Wild and Scenic Rivers Act specifically stated that designation of White River should not preclude the expansion of Mt. Hood Meadows Ski Area. In 1990, the Forest Service released the Final Environmental Impact Statement covering expansion of the ski area. The White River Management Plan cannot change any of the decisions in the Record of Decision for the ski area expansion.

This appendix details what portions of the Mt. Hood Meadows expansion fall within the proposed wild and scenic river boundary. It lists what proposed facilities fall within each of the boundary alternatives and briefly describes those facilities. It discusses what decisions have not been finalized and may be influenced by the White River Management Plan.

PROPOSED FACILITIES WITHIN THE RIVER CORRIDOR

The expansion area, approximately 700 acres, lies in or near Segment A of White River (Figure D.1). Because of the expansion proposal, Segment A was designated a Recreation River. Part of the expansion area lies within all proposed boundary alternatives. Part of the 1978 permit area lies within two of the boundary alternatives.

The interim corridor (Boundary Alternative 1) contains a piece of the expansion area at the base of Lift 22. The area covered was so small that no acreage estimates were made. The interim corridor does not include any of the 1978 permit area. It does include most of the proposed Service Road B.

Boundary Alternative 2 includes 691 acres of the expansion area and 71 acres of the 1978 permit area. Proposed facilities within the expansion area and the proposed wild and scenic river corridor include Lifts 22 and 26, Service Road E, and 16 acres of the proposed Westside Base Resort Center development area. It also includes the entire potential route for Service Road B.

Boundary Alternative 3 includes 176 acres of the expansion area and 61 acres of the 1978 permit area. Proposed facilities within this boundary include Lifts 22 and 26, Service Road E, and the entire potential route for Service Road B.

DESCRIPTION OF FACILITIES

SKI LIFTS

Lift 22 would be a Detachable Grip Quad Chair with a 1403 skier carrying capacity. The lower terminal of the lift would lie 1/8 mile east of White River on the adjacent slope. The lift would cross an unnamed tributary that feeds either White River or Iron Creek, depending on the current course of the river. At present, the unnamed tributary feeds White River. All or part of this lift may be visible from White River, White River pit, and Highway 35.

Lift 26 would be a Fixed Grip Triple Chair with a 1239 skier carrying capacity. This lift lies approximately one mile east of and would parallel Lift 22. Lift 26 travels up a main ridge without crossing any streams. Little or none of this lift may be visible from White River, White River pit, or Highway 35.

ROADS

Service Road E, 0.25 miles long, would connect the Red Lift service road to the upper terminal of Lift 26. Service Road B is proposed to connect the lower terminal of Lift 22 to Highway 35, using an abandoned utility road with high erosion potential. As mapped in the FEIS (Forest Service 1990c), this road would

begin along the South Fork of Iron Creek, cross the slope opposite White River pit and travel up the unnamed tributary shared by White River and Iron Creek.

WESTSIDE BASE RESORT CENTER

This resort would be a full season facility with up to 500 units of overnight housing and 14 acres of parking. An 18-20 acre "village" would eventually be developed on the 88 acres set aside for the base. Some land recontouring may be necessary, causing long-term soil erosion, according to the FEIS (Forest Service 1990c).

DECISIONS AND ITEMS SUBJECT TO CHANGE

The Record of Decision for Mt. Hood Meadows Ski Area Expansion approved development of Lifts 22 and 26, Service Road E, and the Westside Base Resort Center within the White River expansion area (Forest Service 1991). This decision was appealed and remanded back to the Forest Service for further analysis. A new decision has not been made yet. This analysis was based on the best available information at the time, which is the FEIS and 1991 Record of Decision.

Facilities approved for the Westside Base Resort Center include overnight housing (up to 500 units), parking, skier services such as ski rentals and repairs, retail and commercial services, conference facilities, office and administrative services, and summer recreational amenities. Decisions regarding specific elements and the location and types of buildings will occur after further engineering investigations and submission of a detailed development plan. Service Road B will need environmental analysis at a later date.

CONSIDERATIONS FOR FUTURE ANALYSES

Consider the following in future analyses concerning implementation of the Mt. Hood Meadows Ski Area expansion:

1. Development proposals for the Westside Base Resort Center should incorporate the Desired Future Conditions and management intent of the selected alternative for White River if Boundary Alternative 2 is also selected. Regardless of the boundary alternative selected, development should minimize sediment input into White River and its tributaries.
2. Reconsider Service Road B due to the potential impacts to water quality, river color, fish habitat, and scenic quality. The last three items are outstandingly remarkable values for White River in Segment A and/or immediately downstream in Segment B.
3. Design Lift 22 to minimize impacts to scenic quality as seen from White River, White River pit, and Highway 35.
4. Design all service roads to minimize long- and short-term sediment input into White River or any of its tributaries. Service roads within the White River boundary should allow only administrative vehicle use by the permittee and the Forest Service.

Figure D.1. Mt. Hood Meadows White River expansion in relation to the White River corridor, Alternatives 2 and 3.

Appendix E

Glossary

GLOSSARY

Airshed - a geographical area that shares the same air due to topography, meteorology, and climate.

Allowable Sale Quantity (ASQ) - the quantity of timber that may be sold from the area of land covered by the Forest Plan for a time period specified in the plan, usually expressed on an annual basis as the average annual allowable sale quantity. Applies only to the lands determined to be suitable for timber production and to utilization standards specified in the Forest Plan.

Anadromous fish - those species of fish that mature in the ocean and migrate into streams to spawn, such as salmon steelhead, and shad.

Andesite - a volcanic rock composed essentially of plagioclase feldspar, resembling trachyte in appearance.

Animal Unit Month (AUM) - the quantity of forage required by one mature cow (1,000 pounds) or the equivalent for one month, based on average daily forage consumption of 26 pounds of dry matter per day (800 pounds per month).

Aquatic ecosystems - stream channels, lakes, marshes, ponds, and so forth and the plant and animal communities they support.

Aquatic habitat - habitat related directly to water.

Aquifer - a geologic formation or structure that contains and transmits water in sufficient quantity to supply the needs for water development, usually saturated sands, gravel, or fractured rock.

Archaeological Site - a place where human activity occurred and material remains were left.

Archeology - a method for studying past human cultures and analyzing material evidence (artifacts and sites).

Artifact - any object made or used by humans

Background - the visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the landscape.

Best Management Practices (BMPs) - a practice or combination of practices that are the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals, includes technological, economic, and institutional considerations.

Big game - those species of large mammals normally managed for sport hunting.

Biological control - the use of parasites, predators, or disease pathogens (bacteria, fungi, viruses, etc.) to control pest populations.

Biomass - the total quantity at a given time of living organisms of one or more species per unit if space (species biomass) or the total quantity of all the species in a biotic community (community biomass).

Clearcutting - harvesting in one entry all trees in an area for the purpose of creating a new, even-aged stand; usually at least 3 acres in size.

Climax species - the species that would dominate the landscape in either numbers per unit area or biomass if no factors, environmental or human, were to disturb the site.

Commercial thinning - selective removal of felling of trees in an immature stand, primarily to accelerate growth on the remaining stems, maintain a specific stocking or density range, and improve the vigor and quality of the trees that remain where the trees harvested are sold for various wood products.

Created opening - breaks in the forest canopy resulting from human activities, such as timber harvest for regeneration purposes.

Critical habitat - specific areas within the geographic area occupied by threatened or endangered species which provide physical or biological features essential to conservation of the species. This habitat may require special management considerations or protection. Protection may also be required for additional habitat area outside the geographical area currently used by the species if the Secretary of the Interior finds that such areas are essential for the conservation of the species.

Cultural resources - includes the remains or records of districts, sites, areas, structures, buildings, networks, neighborhoods, memorials, objects, or event from the past which have scientific, historic, or cultural value. They may be historic, prehistoric, archaeological, or architectural in nature and usually are more than 50 years old.

Cumulative effects - the combined results or impacts of two or more management activities. The impacts may be related to the number of individual activities or the number of repeated activities on the same piece of ground. They may result from individually minor but collectively major actions taking place over a period of time.

Data recovery - the systematic removal of the scientific, prehistoric, historic, or archaeological information that provides a cultural resource property with its research of information value.

Debris torrent - a large slide charged with water and confined to a steep stream channel; may travel several thousand feet to several miles.

Developed recreation - outdoor recreation that takes place in designated areas where a certain level of facilities are provided, such as picnic tables, outhouses, fireplaces, and so forth.

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 resources management plan (36 CFR 219.3).

Ecosystem - an interacting system of organisms considered together with their environment, for example a riparian ecosystem or pine-oak ecosystem.

Effects - environmental consequences resulting from or expected to result from management activities. **Direct effects** are caused by the activity and occur at the same place and time. **Indirect effects** are caused by the activity but occur later in time or further removed by distance and are reasonably foreseeable. Indirect effects may include changes induced by population growth; changes in land use patterns, population densities, or growth rates; and related changes to air and water and other natural systems, including ecosystems.

Effects may be related to ecological (such as changes in natural resources and on the components, structures, and functioning of ecosystems), scenic 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).

11-40 Rule - a guideline for managing northern spotted owl habitat; tree diameter at breast height must average 11 inches or greater and crown closure must average 40% or greater. Also known as the **50-11-40 Rule** or **50-11-40** since 50% of each quarter township containing spotted owl habitat must meet this guideline.

Endangered species - any species of animal or plant which is in danger of extinction throughout all or a significant portion of its range. Members of the class Insecta are not included which the Secretary of the Interior has decided constitute a pest whose protection under the provisions of the 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.

Environmental assessment (EA) - a concise public document required by regulations implementing the National Environmental Policy Act (NEPA).

Escaped fire - any wildland fire which is burning outside prescription parameters and cannot be brought back into prescription with available project funds; any wildland fire which is burning more rapidly that initial attack forces and available reinforcements can contain within a reasonable period of time. All escaped fires are also wildfires.

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.

Ethnography - description of a culture based on observation of and interaction with living people.

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. The difference on age between trees forming the main canopy levels of a stand usually does not exceed 20% of the age of the stand at harvest rotation age. Regeneration in a particular stand occurs over s short period or nest 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)

Fluvial - produced by or found in a river.

Forbs - non-woody plants other than grasses.

Foreground - the area immediately adjacent to a selected viewpoint.

Fumarole - a hole, in or near a volcano, from which vapor arises.

Fumarole field - a group of two or more fumaroles.

GIS - Geographic Information System. A computer modeling and mapping system based on data such as elevation, waterbodies, roads, trails, vegetation, and other mappable information.

Group selection cutting - removal of trees in an area ranging from less than one acre to no more than two acres.

Habitat - the place where a plant or animal naturally or normally lives and grows.

Habitat capability - the estimated ability of an area to support a selected plant or animal species population, measured in terms of the potential population and based on existing or predicted conditions.

Historic - people, places, things, and events which have occurred or pertain to the last 50 years.

History - people, places, things, or 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.

Indicator species - a wildlife management scheme in which the welfare of a selected species is presumed to represent the welfare of other species which require similar habitat conditions.

Instream flow - 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 federal land management objectives.

Integrated pest management (IPM) - a process for selecting strategies to regulate forest or rangeland pests in which all aspects of the pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of unregulated pest population on various resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural or range management 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).

Interdisciplinary team (IDT or ID Team) - a group of people that collectively represent several resources areas and whose duty is to coordinate and integrate planning activities.

Irretrievable - the loss of production, harvest, or use of renewable natural resources for an extended period of time, such as several years or several decades. The loss may or may not be permanent.

Irreversible - the loss of the use of nonrenewable resources, such as minerals or cultural resources, or of those factors that are renewable only over very long time periods, such as soil productivity. Includes the loss of future options.

Key Site Riparian - 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 rearing habitat; wildlife cover; and diverse plant communities.

Landscape Unit - a portion of a larger area united by some common feature or set of features, such as vegetation, landform, or dominant use.

Leasable mineral - all minerals except salable minerals on acquired lands. All minerals on the Outer Continental Shelf. Coal, phosphate, oil, gas, sulphates, carbonates, borates, silicates or nitrates of sodium and potassium, native asphalt, solid and semi-solid bitumen and bituminous rock including oil impregnated rock or sands from which oil is recoverable only by special treatment after the deposit is mined.

Locatable Mineral - 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 include certain nonmetallic minerals and uncommon varieties of mineral materials.

Loess - a loamy deposit formed by wind.

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 claim - 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.

Modification - a visual quality objective where human activity may dominate the characteristic landscape but must, at the same time, utilize the naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in the foreground or middleground.

Monitoring - a process to collect data from defined sources to identify departures or deviations from expected plan or project outputs or effects.

Mop-up - actions taken to completely extinguish a fire.

National Environmental Policy Act (NEPA) - an Act, to declare a National policy which will encourage productive and enjoyable harmony between humans and their environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate human health and welfare; to enrich the understanding of ecological systems and natural resources important to the nation; and to establish a Council on Environmental Quality.

Non-point - area sources of water pollution, such as a watershed or field.

Off road vehicle - any motorized vehicle designed for or capable of cross country travel on or immediately over land, water, snow, ice, or other natural terrain.

Old growth - the stage in stand development where large gaps develop in the tree canopy, the existing advanced regeneration begins to grow and develop, and a new layer of regeneration may appear; the start of a multi-storied stand.

Outstandingly remarkable value - river-related resource features or processes that are considered rare, unique, or exemplary and are significant at a regional or national level.

Partial Retention - a visual quality objective where human activities may be present 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; the main component of smoke that reduces visibility and causes human health problems

Patented mining claims - a mining claim in which the applicant receives title to the property and over which the United States has no property rights, except as may be covered 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 lands 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 (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).

Plant associations - the collection of plants believed to represent the climax plant community in the absence of disturbance, such as fire, wind, insects, disease, or harvest and in the absence of climate change.

Plant communities - a vegetation complex unique in its combination of plants which occur in a particular location under particular influences. A plant community reflects the integrated environmental influence on a site such as soils, temperature, elevation, solar radiation, slope, aspect, and precipitation.

Pool - a portion of a stream with reduced water velocity and often deeper than surrounding areas, frequently used by fish for resting and cover.

Precommercial thinning - selective removal of felling of trees in a young stand, primarily to accelerate growth on the remaining stems, maintain a specific stocking or density range, and improve the vigor and quality of the trees that remain but that does not produce salable wood products.

Prehistory - people, places, things, and events which have occurred or pertain to the time before written record.

Prescribed fire - any wildland fire burning under a preplanned set of environmental and management parameters which will accomplish certain planned objectives.

Primitive - a category on the recreational opportunity spectrum describing an environment of fairly large size and essentially unmodified by human activities and development. Interaction between visitors 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 prohibited.

Pyroclastic flow - debris torrents composed chiefly of rock fragments of volcanic origin, such as aggregate, tuff, and certain other rocks.

Recreation Opportunity Spectrum (ROS) - a framework for understanding and defining various classes of recreation environments, activities, and experiences. The classes are defined in terms of the opportunities to have different kinds of experiences; examples are "roaded natural" and semi-primitive.

Reforestation - restocking an area with trees by natural means or by planting, most commonly used to refer to tree planting.

Regeneration - the actual seedlings and saplings in a stand; the act of establishing young trees naturally or artificially.

Regeneration harvest - any removal of tree to make regeneration possible.

Regulated harvest - harvest that contributes chargeable timber volume to the allowable sale quantity.

Retention - a visual quality objective where human activities are not evident to most visitors.

Riffle - a stream feature having swift-flowing, turbulent water; can be either deep or shallow and are generally cobble- or boulder-dominated.

Riparian areas - geographically delineate areas with distinctive resource values and characteristics that are comprised of aquatic and riparian ecosystems. 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 terrestrial ecosystem, identified by soil characteristics and distinctive vegetation communities that require free or unbound water

Riparian vegetation - plants growing on or near the banks of a stream or body of water in soils that exhibit some wetness characteristics during some portion of the growing season.

Roaded Natural - a category on the recreational opportunity spectrum describing areas that appear predominantly natural with high evidence of the sights and sounds of humans. Such evidence may not harmonize with the natural environment. Interaction between visitors is moderate to high with 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 facility design.

Rural - a category on the recreation opportunity spectrum describing areas characterized by a natural environment that has been substantially modified by structure development, vegetation 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.

Salable mineral - minerals available for purchase from the government, usually very common such as sand and gravel.

Scenic easement - the right to control the use of a piece of private land, including the air space above the land, within the authorized boundaries of a component of the Wild and Scenic River system for the purpose of protecting the natural qualities of a designated river area. Such control shall

not affect, without the owner's consent, any regular use exercised prior to the acquisition of the easement.

Scenic wayside - a parking area located along a scenic road intended for use by visitors to stop and enjoy or photograph scenery.

Sediment - solid material, both mineral and organic, in suspension and being transported from its site of origin by air, water, gravity, or ice or has come to rest on the earth's surface. Most commonly refers to material carried in water.

Selection cut - the periodic removal of mature trees individually or in small groups from an uneven-aged forest. Both regeneration cutting and thinning are accomplished at each entry.

Semi-Primitive Motorized - a category on the recreation opportunity spectrum describing an area where natural or natural-appearing characteristics dominate in a moderate to large sized environment. Concentration of visitors is low but there is often evidence of others. On site controls are minimal 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.

Semi-Primitive Nonmotorized - a category on the recreation opportunity spectrum describing an area where natural or natural-appearing characteristics dominate in a moderate to large sized environment. Concentration of visitors is low but there is often evidence of others. On site controls are minimal 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.

Sensitive species - species of plants and 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 are recognized by the Regional Forester as needing special management to prevent being placed on federal or state lists.

Seral - a biotic community which is a developmental, transitory stage in an ecological succession

Shelterwood cutting - any regeneration cutting in a more or less mature stand designed to establish a new stand under the protection, or shelter, of the old stand, usually involving two entries. The first entry is designed to create space and seed production to establish new trees. The second entry is designed to remove the remainder of the old stand before it interferes with the growth of the new stand and usually occurs within 10 years of the first entry.

Silvicultural system - a management process for tending, harvesting, and replacing forests resulting in a forest of distinctive form. Systems are classified according to the logging methods that removes the mature crop and provided for regeneration and according to the type of first produced (36 CFR 219.3).

Silviculture - the art and science of growing and tending trees for specific management goals.

Snag - a standing dead tree.

Smolt - a young salmon during its migration downstream to the sea.

Stand - trees possessing uniformity with regard to type, age class, risk class, vigor, size class, and stocking class.

Stand reinitiation - the stage of stand development where small gaps develop in the tree canopy allowing forest floor herbs and shrubs and regeneration again appear and survive in the understory; the start of a two-story stand.

State Historic Preservation Officer (SHPO) - 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 SHPO 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.

Stream discharge - the volume of water flowing past a point per unit of time, commonly expressed as cubic feet per second (cfs), million gallons per day, gallons per minute (gpm), or cubic meters per second.

Stream scour or channel scour - erosion of the channel bottom or banks caused by high flows, loss of channel stability, or debris torrents.

Stream structure - the arrangement of logs, boulders, and meanders which modify the flow of water and cause the formation of pools and gravel bars in streams. Generally, there is a direct relationship between complexity of structure and fish habitat and watershed stability.

Stem initiation - the stage of stand development that occurs after a natural or human caused disturbance when tree regeneration appears, also known as the seedling/sapling stage.

Stem exclusion - the stage of stand development when new individuals do not appear and some of the existing ones die. The surviving trees grow larger and express differences in height and diameter; first one species and then another may appear to dominate the stand. Can occur at two different times in stand development; between the stem initiation and stand reinitiation stages, also known as the pole stage; and between stand reinitiation and old growth stages, also known as the mature stage.

Suppression - the act of extinguishing or confining a fire.

Threatened species - any plant or animal species 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 the Interior.

Turbidity - the degree of opaqueness or cloudiness produced in water by suspended sediment, measured by light filtration or transmission and expressed in Jackson Turbidity Units (JTU).

Uneven-aged management - applying a combination of actions needed to simultaneously maintain high forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes and providing 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).

Unregulated harvest - cutting trees from those lands which are not organized to provide sustained yields of timber.

Viewshed - the total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

Water quality - the biological, physical, and chemical properties of water that make it suitable for given specified uses.

Wetlands - 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).

Wildfire - any wildland fire which does not meet land management objectives and is not designated and managed as a prescribed fire within an approved prescription; any formerly prescribed fire which is no longer burning within prescription parameters and cannot be brought back into prescription with available project funds.

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 F

References

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