DEPARTMENT OF THE INTERIOR

DRAFT
ENVIRONMENTAL STATEMENT

DES-75-56

Proposed

NORTH UMPQUA CANYON MANAGEMENT PLAN

Prepared by

Roseburg District
Bureau of Land Management
Department of the Interior
777 N.W. Garden Valley Blvd.
Roseburg, Oregon 97470

Responsible Official:

Roger C. Francis
District Manager

SUMMARY

(X) Draft ( ) Final Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of action: (X) Administrative ( ) Legislative

2. Brief description of action

The Roseburg District proposes implementing, upon approval, a comprehensive multiple-use management plan for 16,000 acres of O&C lands which are intermingled with 17,000 acres of private and 400 acres of state and county lands within the North Umpqua River Canyon in Douglas County, Oregon. The plan area is part of the larger area covered by the North Umpqua Management Plan and is consistent with its requirements and proposals. The plan includes road construction, timber management practices, development of recreation facilities and management of resources for recreational use and potential.

3. Summary of environmental impacts and adverse environmental effects:

The major controversy surrounding the proposed action centers around the impact of the multi-use road to be constructed on the south side of the North Umpqua River on the fisheries resource and the quality of the fishing experience. Present fishing pressure and expected increases, will be redistributed to both sides of the river without adversely impacting the fisheries resource. However, the quality of the fishing experience will be adversely impacted as a result of increased numbers of fishermen.

Land not currently accessible for timber production or recreational use will be made available for these pursuits. This will result in a loss of esthetic value to some, while others will benefit by an increased opportunity for recreation. Road and recreation facility construction will cause minor and mostly temporary adverse effects to soil and water quality. Some land will be permanently removed from timber production. Sustained-yield timber management practices will cause impacts on vegetation and wildlife which will benefit some species and adversely affect others.

4. Alternatives considered:

1. No action
2. Timber oriented management using a south bank road system
3. Intensive management using alternative road systems
4. Intensified management with recreational emphasis (proposed action)

5. Date draft statement made available to CEQ and public

6. Comments will be requested from the following agencies:

Department of Agriculture

Department of the Interior
- Fish and Wildlife Service
- Bureau of Outdoor Recreation
- Bureau of Reclamation
- National Park Service
- Geological Survey
- Bureau of Indian Affairs

Department of Health, Education and Welfare

Department of Transportation

Environmental Protection Agency

Advisory Council on Historic Preservation

State of Oregon Clearing House

Umpqua Regional Council of Governments (Roseburg, Oregon)

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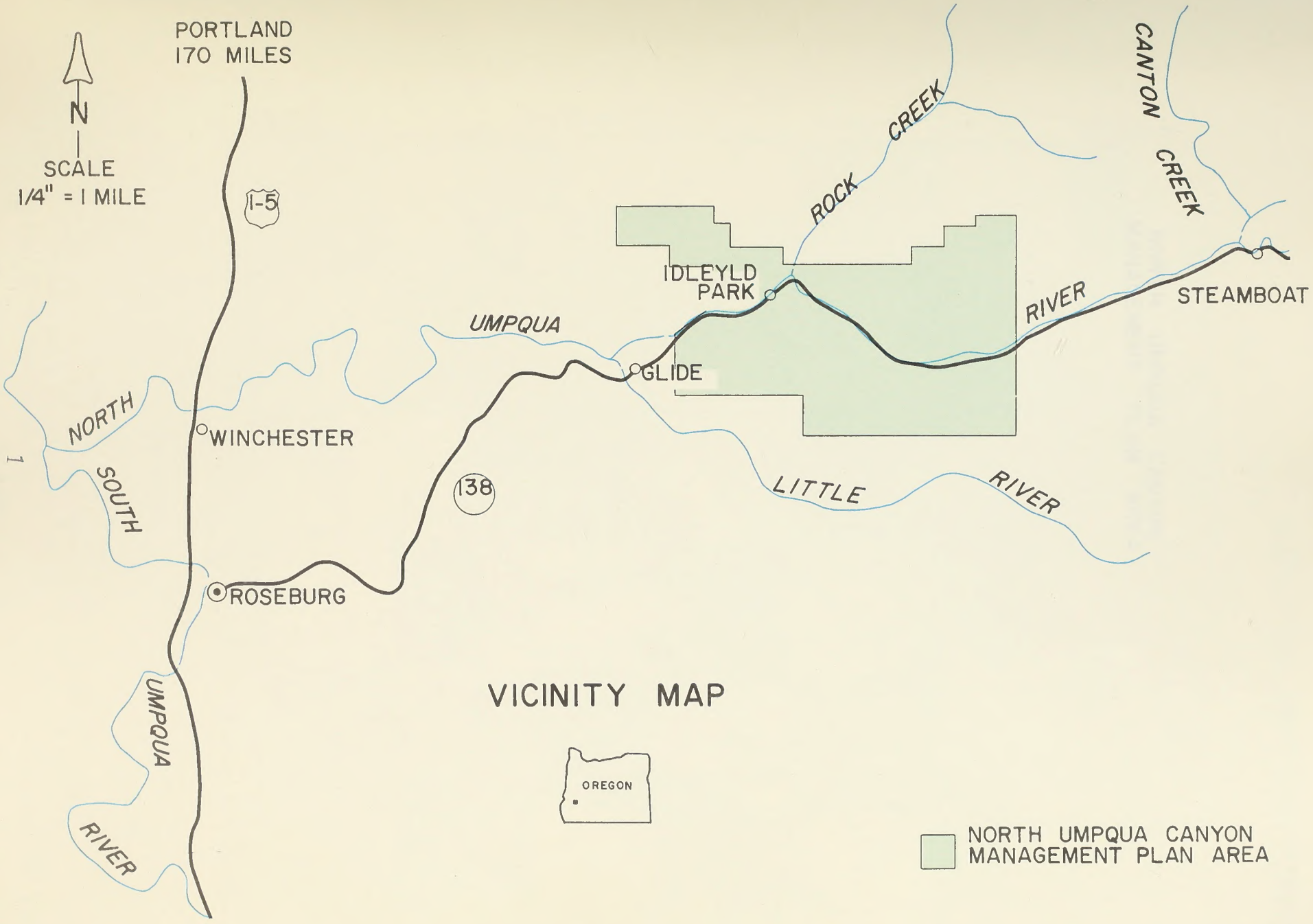
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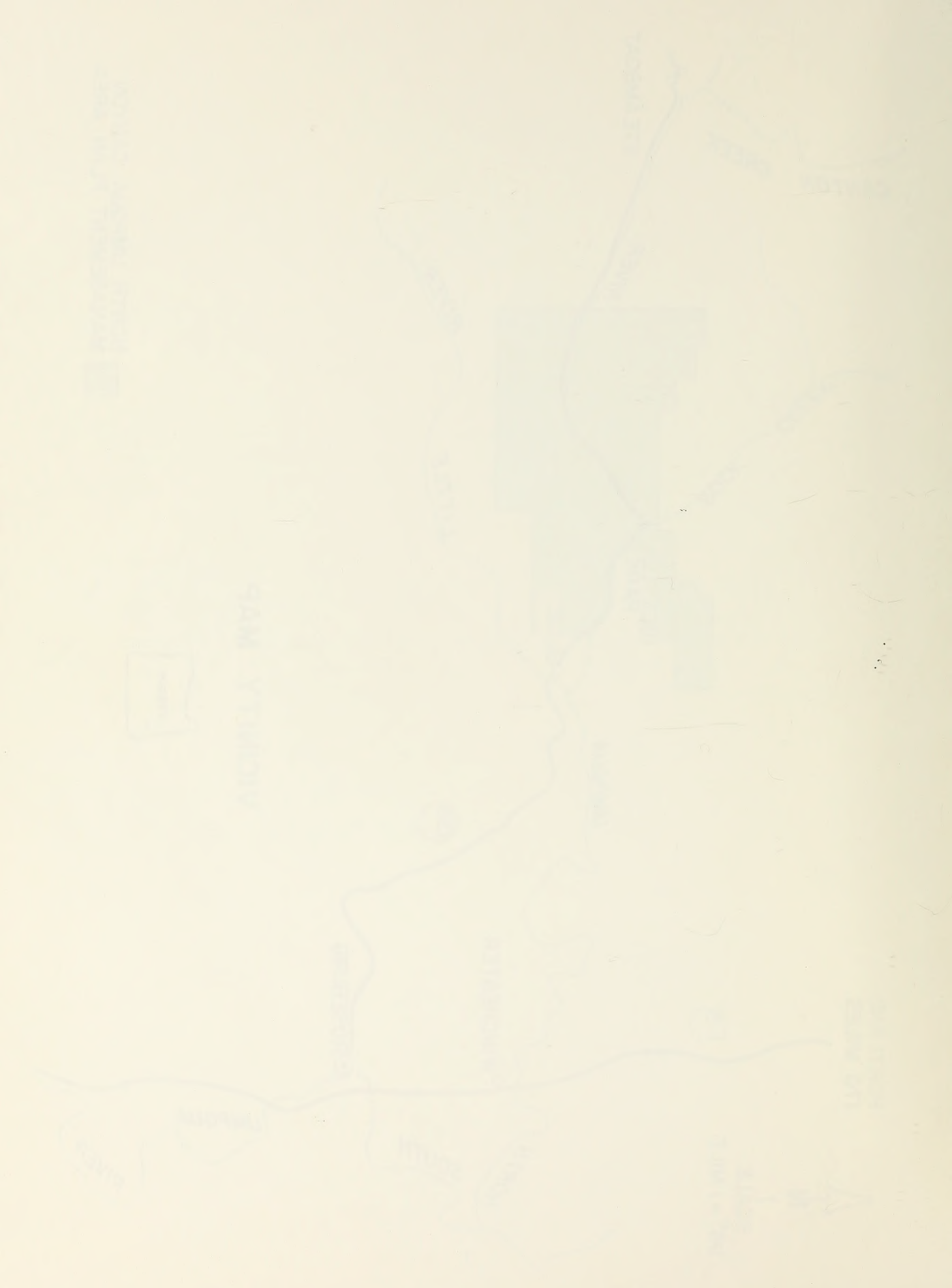
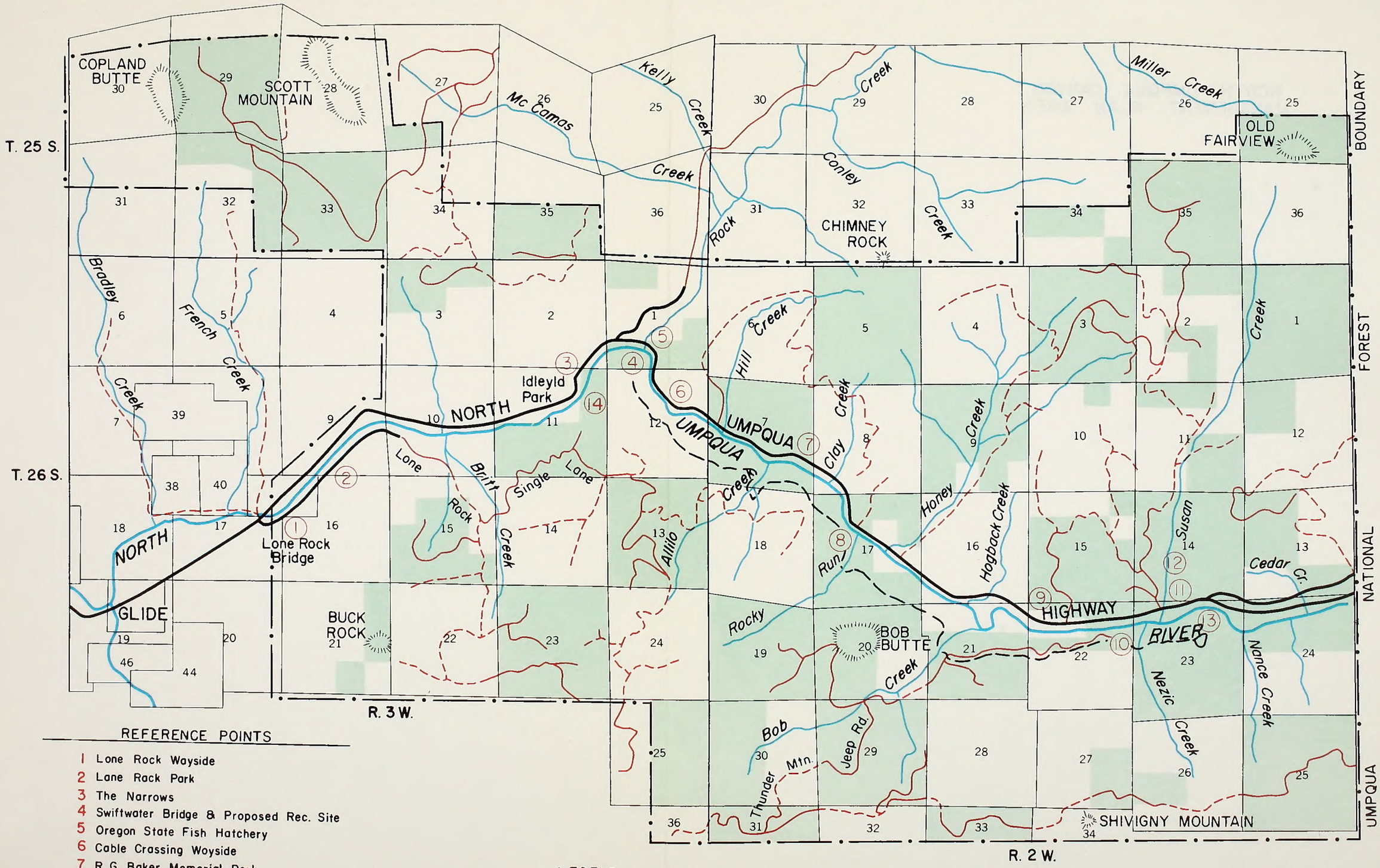


NORTH UMPQUA CANYON MANAGEMENT PLAN AREA



REFERENCE POINTS

1. Lone Rock Wayside
2. Lane Rack Park
3. The Narrows
4. Swiftwater Bridge & Proposed Rec. Site
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6. Cable Crassing Woyside
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8. Racky Run Rec. Site (Patential)
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- O & C Lands
- Private Lands
- B. L. M. Raads
- Private Raads
- County Raads
- Baundary of Planning Area
- Proposed Bob Butte Road

SCALE 1"=1 MILE

N

D R A F T

ENVIRONMENTAL IMPACT STATEMENT

Title: Draft Environmental Impact Statement for the North Umpqua Canyon Management Plan

1. Description of the Proposed Action

A. Description - The North Umpqua Canyon Management Plan is a multiple-use plan which outlines the management, protection, and improvement of all resources existing on O&C lands administered by the Bureau of Land Management in the canyon area. The plan includes:

- Building an 8-mile mainline multi-use access road along with 1 mile of connecting spurs

- Restoration of timber management program on portions of the area not currently managed due to lack of access. Continuation of management on presently accessible areas.

- Development of a recreation site and cooperative visitor information center

- Identification of other potential recreation sites and their management for that resource value

- Construction of a major trail along the river's south bank

- Establishment of a scenic management zone designed to protect the esthetic values existing within the canyon

Management of the canyon's timber resource has been in effect to some degree since the late 40's resulting in extensive road development, timber harvesting, and recreational development. Since the 1964 flood, very little activity has occurred in the southern area of the canyon. Management continued on the accessible northern area until 1972. Since that time, no activity has taken place. The purpose of this proposal is to institute a comprehensive management plan for the North Umpqua Canyon that would include activities on the now inaccessible south portion.

The plan itself encloses an area of approximately 34,000 acres of intermingled private, county and O&C lands. O&C lands include 16,000 acres and lie in the main canyon east of Glide and extend to the Umpqua National Forest boundary. (See North Umpqua Canyon Management Plan area map.)

B. Proposed Actions - Action portions of the North Umpqua Canyon Management Plan mainly involve areas on the south side of the river which have gone unmanaged since 1964. The impact of these activities which follow years of inactivity is analyzed in this document. The impact of activities on the north bank is also considered, but because they are relatively minor in comparison, less discussion is accorded to them.

1. Bob Butte Road - This involves the building of 8 miles of 2-lane paved access road extending from the Swiftwater Bridge to or near a possible recreation area in Section 23 opposite Susan Creek State Park. The road will be 20-feet wide and suitable for recreational as well as commercial log-hauling traffic. This road is proposed for construction in segments, the first of which is currently built and extends less than ¼ mile from the end of the bridge. The second segment will extend 5 miles east to join the existing Thunder Mtn. road on a switchback east to Bob Creek. This segment will include 1 mile of connecting spurs. The last segment will include 1 mile of connecting spurs. The last segment will consist of 3 miles of new construction and reconstruction to provide access to the region east of Smith's Ford. This segment may also link up with the potential South Shores recreation area if this site is to be developed with road access. Refer to pages 147-170 in the Appendix for detailed soils and design data for the Bob Butte Road.

We anticipate that public use will be high since access is easy from the heavily-travelled North Umpqua Highway. Therefore, safety measures will be designed and built into the road. The design speed is 25-30 m.p.h. A deceleration lane will be constructed by the Douglas County Road Department on the south side of Highway 138 before exiting onto the Swiftwater Bridge. This additional lane will prevent traffic congestion at the north end of the present bridge.

Although safety will be an important consideration, the road is not being designed to accommodate high speed traffic. It is being designed to conform as much as possible with the land. This will result in sharper horizontal and vertical curves, shorter tangents, and steeper grades. The result of this will be lower fills, less excavation and a slower road. The road will be more pleasant visually and will require less disturbance of the soil. The road will take advantage of natural slope breaks.

Eight different points of access were considered. A discussion of the reasons for the proposed location of the Bob Butte Road is given in Section IX, Routes Considered, Pgs. 117-120.

Access to approximately one-fourth of the planning area is via this road. Timber triburary to the road is as follows:

Ownership	Total Acres	Cutover	Remaining Merch. Acres	Remaining Merch. Volume (MBF)
BLM	4,250	937	3,313	145,772
Private	3,200	1,985	1,215	53,460
Total	7,450	2,922	4,528	199,232

2. Swiftwater Recreation Site and Visitor Information Center

There are two developments planned adjacent to the Swiftwater Bridge. On the south end, a 55-acre area has been studied for the location of an overnight and day-use recreation site. On the north end, a building with informational material and exhibits would make up the Visitor Information Center.

Swiftwater Recreation Site

The recreation site will be the first overnight recreational development by the BLM in the canyon. Esthetics and environmental compatibility will govern the design and development of the site. Structures, trails, and roads will blend with natural features. Connective devices for modern comforts and conveniences such as water, sewer, telephone, and power will be concealed in the soil. Utilities are contained within the bridge with a capability for sewage transport. In this manner, connection can be made to the proposed public sewer system for Glide and Idleyld if it is constructed. Current plans call for treatment and disposal by septic tank and leach fields. Soil investigations indicate satisfactory conditions for this type of disposal without danger of contaminating the river with septic material.

Overnight camping sites will be on a bench on the west side high above both the river and the access road from where they cannot be seen. A maximum of 35-40 overnight camping units will be provided.

The day-use area also will provide 35-40 picnic units, play areas, and a fish-cleaning station. On the easterly undeveloped fringes of the day-use area, a few tent campsites are planned.

Interpretive and demonstration resource management trails will be developed in the later stages of

the Swiftwater Site Development. One of these trails will extend from Swiftwater to the Rock Creek Fish Hatchery which is contingent upon re-activating the hatchery. The other trail would go to the Douglas Forest Protection Association (DFPA) fireguard station. From the hatchery, it can extend a short distance up the bluff southeast of the hatchery for an easily-reached viewpoint. The county has agreed to place a sidewalk on the Rock Creek bridge to accommodate this trail.

Visitor Information Center

A Visitor Information Center is planned at the north end of the Swiftwater Bridge. It will contain restrooms, informational exhibits, and other material. Plans are to have the VIC manned. Exhibits will detail the natural and human history of the North Umpqua Area. They will also explain management and use of the forest, the life cycle of anadromous fish, and watershed protection.

The center may act someday as a check point for recreation accommodations from the Umpqua River Forks to Crater Lake. When campgrounds are full, people can be directed away from there to vacant campgrounds.

The information center structure will be a building approximately 58 feet in diameter. It will be constructed of wood materials with concrete base. The building will fit within an existing grove of trees but the approach road for the parking lot will require the removal of one tree. Landscaping of the area will be with indigenous species. A parking lot will occupy a portion of the site and be landscaped to effect as much screening as possible. Sewage will be transported either to a proposed public system or to the Swiftwater disposal system.

3. Other Recreation Proposals - Two more areas tributary to the Bob Butte Road have been identified on the south side of the river as having recreational potential. These are Rocky Run and South Shores. Myrtle Bench, also on the south side of the river, possesses development potential. It can be reached via the Lone Rock Road. Development of these sites will bring about the same impact as will Swiftwater. They can be developed if further analysis indicates this to be the wise course to follow; however, no

decision has been made as to the ultimate use of these areas. Additional intensive environmental impact analysis must be completed prior to proceeding with development of these areas. In the interim their recreational values will be protected by appropriate management actions.

Development of access and sites will encourage the use of large areas for extensive recreation. This will include hiking, unimproved area camping, four-wheel drive, motorcycle use of roads and driving for pleasure. Hunting access will also be restored.

Potential exists for development of minor trails within the area. A trail to Chimney Rock and its natural arch could be developed. In addition, a trail to the falls on Upper Susan Creek would be desirable. Other trail opportunities exist with cliffs, caves, rock outcrops and other natural features being the focal points. Rocky Run and South Shores, if developed, will undoubtedly have trails for their internal circulation as well as associated interpretive and points of interest trails. These trail sites will have their potential protected, until a decision to construct them is made, with management practices designed with this potential in mind.

4. Tioga Trail - This trail is proposed to extend along the south shore of the river to provide foot or equestrian access to the water. Its development will be segmentized, but it will eventually extend from the Idleyld vicinity to the National Forest boundary. Extension from there to the existing Mott Trail by the Forest Service and additional construction could result in a trail extending eventually to the Pacific Crest Trail, and could become an addition to the National Scenic Trails System. Interconnecting trails at 2-mile intervals will be constructed from the Bob Butte Road to the river trail. This will permit parking at designated places on the road and hiking down to the river for fishing, rock hounding or other such pursuits.

This trail will be designed and located to minimize its visual intrusion and to control stream bank damage. Through much of the terrain, it could be located just in the tree line or benches. Some areas will require locations which climb a considerable distance away from the river due to steep bluffs.

Motorized conveyances will not be permitted on the Tioga Trail or on connecting trails from the Bob Butte Road.

5. Scenic Management Zones - Visual impacts from a timber management point of view are to be determined primarily as they

relate to the viewer on the North Umpqua Highway, the river, and designated or developed recreation sites.

Secondary visual impact viewpoints are the Bob Butte Road and trails extending to regions somewhat removed from the river environs.

All other viewing positions (tertiary level) in the planning area are located well away from the river and recreation roads.

Consideration of visual impact will be made in all zones but it will occupy a descending order of priority in the decision making process as the viewer progresses from the North Umpqua Highway to the back country.

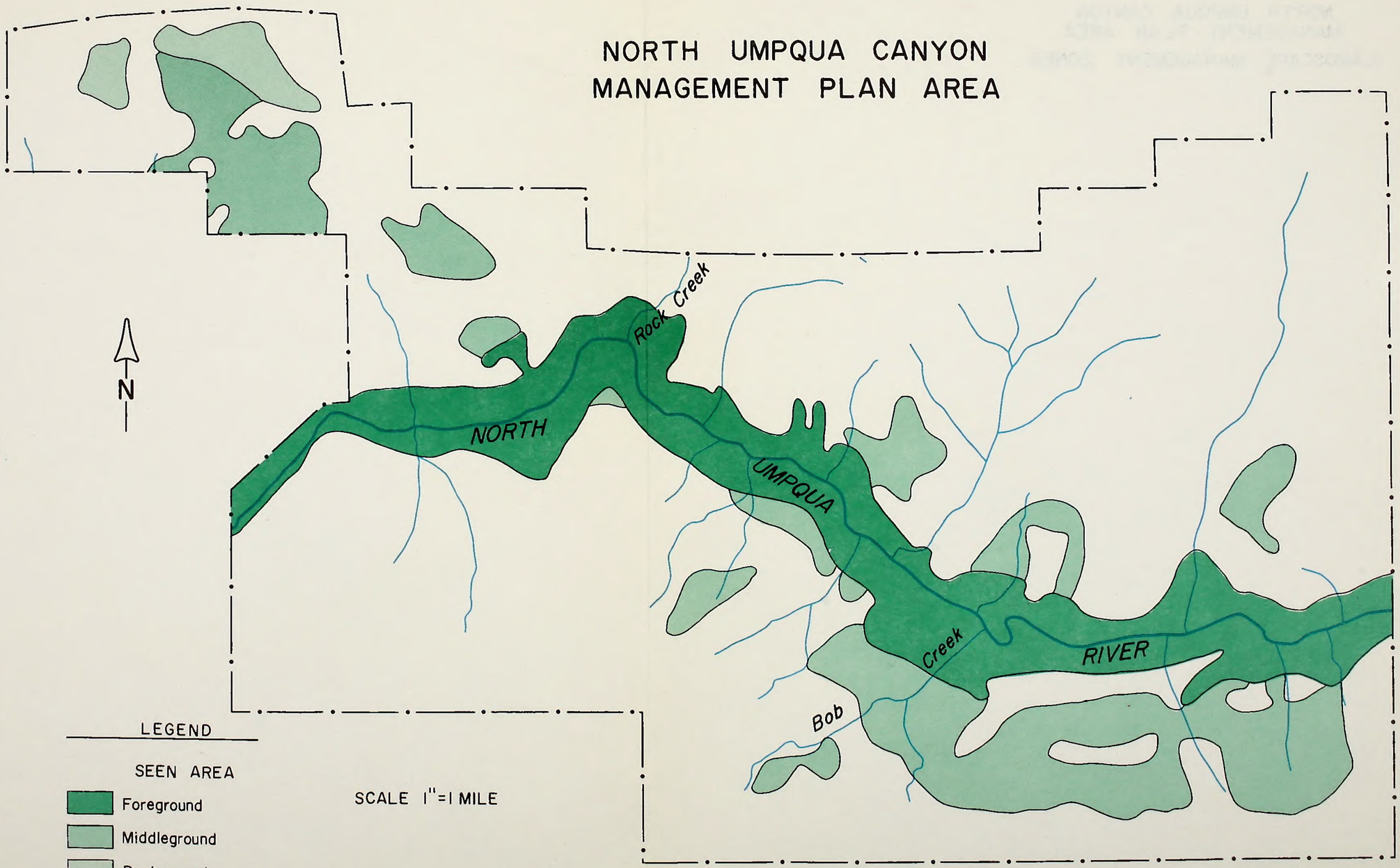
North Umpqua Highway seen area has been mapped in a general way. Refinements will occur as the ground is covered more thoroughly in the development of management plans for specific acreages. This will require alterations on the map. The seen area is divided into three zones: foreground, middleground and background. (See appendix)

Foreground - Management within this zone is designed with esthetics as the primary objective. This is not to be construed as banning cutting entirely, but timber removal will be aimed at attaining or preserving esthetic values. This means that management will be designed to promote a thrifty, healthy, natural appearing forest. Some lands will be classified as inoperable under present technologic and economic situations. Timber severance on these lands will be delayed pending change. Steep ground, thin soils and proximity to the river bank or road are some reasons why land will be classified as inoperable.

Modified harvest activities in the vicinity of the river will aim at maintaining an essentially continually wooded environment which will provide ample opportunity for off-trail hiking and enjoyment of the relatively undisturbed environment. The advantages of trail-oriented recreation are manifest. Horesmen will be afforded the opportunity to use an area reasonably close to the Roseburg area. Wildflowers and other plants will be undisturbed in the Foreground zone for the enjoyment of amateur botanists. Ecologists, both amateur and professional, will find conditions ranging from undisturbed to those in pioneer stage in plant succession.

Along the North Umpqua River and Highway, 1,978 acres have been placed in a reduced-yield status for purposes of protecting the Foreground. The average stand age will be maintained at 160 years compared to the normal 80 years at rotation age for managed forests. Annual mortality has been determined to be about 176 board feet per acre per year in a 160-year-old stand and this will constitute the average annual cut necessary to maintain a thrifty stand and salvage under the level which would be maintained if the lands were managed for timber production only.

NORTH UMPQUA CANYON
MANAGEMENT PLAN AREA



Landscape Management Zones

In the Foreground, carefully planned clearcutting will be used only where vista points can, and should, be developed and to create openings or glades to engender visual interest or opportunities to observe game and other creatures.

In some cases, pathologic or storm damage may justify limited clearcutting. In such situations, clearcutting will be used only where the stand is so damaged or decadent that scenic values or safety for the adjacent stand or recreationists cannot be maintained by selective removal of individual trees.

Middleground - Continuous canopy management will govern timber harvest in the Middleground whenever topography and timber stand conditions permit. This will be accomplished through group selection, single tree selection, shelterwood and narrow strip clearcuts which will be oriented so as not to show from important viewing perspectives. It has been estimated that slopes of 35% or less exist over 60% of the area. Tractor-logged areas will be partially cut to retain a green appearance throughout the harvest period.

Clearcutting will be used as a management practice in the Middleground area only where steep ground prohibits the use of tractors or skidders and clearcuts can be molded into the general scene without untoward intrusion. Individual circumstances will vary, but these units will generally be in the size range of 5 to 15 acres. Larger units may be justified where patch cutting would be disruptive. Clearcuts will be designed with irregular natural-appearing boundaries and feathered edges. Skylines will not have standing walls of timber left. Layout will ensure that skyline trees are either totally removed or the cutting lines cross the ridge at an angle which gives a smooth transition. A few scraggly trees left standing on the skyline are very unsightly and will be removed.

Landings will be small and located out of view wherever possible. Waste materials from landing construction will be end-hauled whenever it would otherwise be visible from a primary perspective point. Landings will be thoroughly cleaned up upon completion of the yarding. In many cases, landings will be ripped and treated to hasten their revegetation. Some situations may require regrading of the surface to obtain a more natural contour. Cutbanks for landings may create a visual problem and will be treated as prescribed for road cuts. Dressing with top-soil may be required in some circumstances. Where sidecast of yarding roads has created landing visibility, mulching and seeding will promote immediate soil stabilization and green-up while planting with large stock will care for the long term. Mulching and seeding of landings will be done in all cases.

Clean yarding will be required on areas that have a disproportionately high percentage of cull volume and where burning of slash material is not desired. Efforts will be made to increase utilization of cull or marginal logs. Slash disposal, when necessary, will be done carefully to insure rapid reforestation without scorched and damaged soil.

High lead or skyline cable equipment will be used in other instances. Aerial yarding equipment will be used where soil disturbance must be kept to minimal levels or nil. Where unusual instability or potential visual problems exist, road density can be lowered through the employment of aerial yarding systems. Developments in portable cable yarding equipment coupled with increasing unavailability of timber on fragile or sensitive sites should result in equipment being developed which can operate in such areas with minimal damage.

Another possibility which could enjoy limited deployment is helicopter logging. This method could be used to remove widely spaced, high-value trees or widely scattered pockets of timber. Some examples are: disease or insect infested stands and overstory removal in two staged stands. Helicopters might also be used in areas where soil or esthetic factors precluded any road building.

Background - Management of this zone will be to mitigate stark vegetation change lines and poor skyline appearances. Most of the background area has been harvested, and two discordant strips of timber which were under a previous contract have been removed since the plan was written; this has improved the view. Reforestation will present a green appearance here within a few years as the young trees grow large enough to show from a distance.

Blind Areas - In areas out of view of primary and secondary viewing perspectives, greater latitude in management activities can be had. Here, visual impact is non-existent off-site and the additional cost in terms of lost forest production, management investment, and more difficult harvesting is not justified. Consideration for off-site effects of on-site activities as well as the maintenance of continued site productivity will dominate management decisions here.

6. Intensive Timber Management - Resumption of timber harvest is planned on areas opened and reopened to access. All O&C lands, except those which have been designated for such purposes as recreation sites and environmental protection of streams, fragile soils, and esthetics, have been included in the allowable cut land base. The forest management plan is based upon ongoing practices such as: 1) reforestation; 2) precommerical thinning; 3) commercial thinning; 4) salvage of dead and dying timber; 5) and harvest cutting of mature timber.

Other practices will be used and include: 1) use of approved herbicides and pesticides to aid in seedling establishment and seedling release; 2) planting genetically-superior seedlings; and fertilization.

Timber in the canyon will be offered for sale in an amount which is sustainable by the forest management plans. The annual cut for the planning area with no restriction is approximately 8,000,000 bd. ft. The restrictions due to recreation sites, landscape management zones, streamside buffer strips, and fragile sites will reduce the annual cut to 7,104,000 bd. ft. The total cut in the Roseburg District is 201,000,000 bd. ft.

The anticipated yearly timber management activities within the planning area during the next decade are as follows:

Areas harvested	-	180
Miles of road construction	-	2
Miles of road improvement	-	1
Acres of commercial thinning	-	15
Acres of precommercial thinning	-	70
Areas planted	-	180
Acres mortality salvaged	-	50
Acres fertilized	-	70
Acres treated with herbicides	-	90

Plans for the specific on the ground location of the above activities have not been developed for the entire decade. However, timber harvesting practices will be concentrated in the oldest stands (refer to the age class distribution map on page 24) outside of the landscape management zones shown on page 9. In the course of planning every timber management action, along with all other actions not specifically addressed as to actual location in this proposal, an environmental analysis report will be prepared and an environmental impact statement written, if necessary.

C. Time Frame Envisioned -

1971 -Swiftwater Bridge and 1/4 mile of access road were completed.

1976 -Design for swiftwater compground and recreation area.

1976 -Phase I of Swiftwater constructed including 2 miles of trail along the river.

1976 -Visitor Information Center Constructed.

1976 -Bob Butte Road -(5 miles of mainline, 1 mile of connecting spurs.) Construction started to tie into existing Smith Ford Road System.

1977 -Timber management and harvest operations resumed in the south area and continued in the area north of the river.

1977-8 -Phase II-IV of Swiftwater Site construction completed and approximately 8 miles of trail completed to the forest boundary.

1978-9 -Three miles of reconstruction slated for extension of Bob Butte road along existing Smith Ford Road and 1 mile of new construction.

1980-2 - Possible initiation of programming for either Rocky Run or South Shores based on further analysis of their environmental impacts and public need.

Beyond 1982 - Additional recreation management expansion if needs require.

D. Interrelationship With Other Projects, Proposals, and Jurisdictions

The BLM has met with personnel of the USFS to discuss the proposal. Similar standards of management are used by both agencies and both use the same landscape management principles.

Douglas County has been consulted concerning this proposal and pledges full cooperation in planning and protecting the use of the area.

The North Umpqua Canyon Management Plan is not in conflict with the State Scenic Waterways Act, should it be implemented on the North Umpqua River.

The area covered by the proposed action is part of a larger area identified as the North Umpqua Planning Unit. In accordance with the principles and procedures of the Bureau Planning System a management framework plan was developed for the North Umpqua Planning Unit in 1972 (refer to page 139 of the Appendix). The development of the plan was coordinated with other agencies, groups and individuals as described in Chapter X. The management framework plan set forth land use designations and also general objectives for resource programs. A detailed management plan was subsequently developed for the North Umpqua Canyon portion of the planning unit and this plan represents the proposed action.

The North Umpqua Canyon Management Plan complies with the guidelines established in the North Umpqua Planning Unit Management Framework Plan (MFP). The MFP specifically recommended developing the Swiftwater Recreation Site and identifying other potential recreation areas on the south bank of the river. Provisions were also made for additional recreation development of the south bank which would include the proposed trail. The Visitor Information Center would comply with the directive outlined in the MFP to enter into a program of public information on BLM activities in the area. Sustained-yield timber management practices on areas not restricted were also recommended. Consequently, the North Umpqua Canyon Management Plan, which was also subjected to public comment and review, is consistent with the guidance provided by the earlier development management framework plan. An analysis of the comments received on the North Umpqua Canyon Management Plan are included in the Appendix, pages 202-208.

While this statement adequately describes the proposed action, particularly for the purpose of identifying environmental impacts, the two aforementioned planning documents are available for review at the BLM District Office, Roseburg, Oregon, if more details regarding the proposed action are desired. They were not included in the statement because of their bulk and degree of detail.

II. Description of the Environment

A. Geographical Location - The North Umpqua Canyon is located 25 miles east of Roseburg, Oregon. (See Vicinity map Pg. 1) It is approximately 400 air miles north of San Francisco, 150 miles due south from Portland, Oregon, and 65 miles east of the Pacific Ocean.

B. Physiography and Geology - The planning area includes portions of two physiographic provinces, the Western Cascades and the South Coast Range. Elevation ranges from 695' at Glide to approximately 3,800' on the west shoulder of Thunder Mt. and 4,030' at Scott Mountain. Flat land adjacent to the river is at a premium from Lone Rock east and occurs on old river terraces and benches as well as some flatter ridgetops somewhat away from the river. The remainder of the region ranges from relatively flat in areas such as Susan and Honey Creeks to extremely steep in other portions. (See Topographic map on Pg.16)

The North Umpqua River is the most important watercourse in the planning area. Measured from Rangeline 1 W., W.M., to the west line of Section 16, T. 26 S., R. 3 W. (vicinity of Lone Rock Bridge), the river stretches 13 miles. It enters the area at approximately 926 feet elevation and crosses the 680 feet contour less than 1,000' west of the Lone Rock Bridge.

Most of the streams draining the canyon area are short with high gradients and low-volume flows. They drain small watersheds and many are ephemeral or seasonal. The larger, more improtant perennial streams are Bradley Creek, Britt Creek, French Creek, Honey Creek, Susan Creek, and Bob Creek. It is these streams which have fishery potential. They produce low flows, particularly in the summer and their effect both individually and cumulatively on the main stem water temperature is negligible. The remaining streams support no resident trout or anadromous fish.

Rock Creek, a large tributary with a discharge averaging 385 cfs, enters the planning area in T. 26 S., R. 3 W. Sec.1 SE¼SW¼. It has been excluded from consideration in this plan because the extensive size and different character of its watershed merits its inclusion as the subject of a separate intensive management plan. Its relationship to the North Umpqua Canyon has been coordinated in the overall Management Framework Plan developed in 1972 for the North Umpqua Planning Unit on file at the district office.

Young topography combined with high rainfall creates instability in a watershed with mass movement of the soil mantle being common and natural. Much of the geologic erosion occurring in the North Umpqua Basin is effected by mass slope failures. Numerous old slides are evident in the region. Some are stabilized and support timber of considerable size and age. Others are still

mobile. The rocks are almost entirely igneous in nature. They range in age from 14 million to 58 million years and largely consist of andesitic tuffs and flows. Some basalts and some intrusives appear. Most of these strata are within the Little Butte Formation and a few lie within the Coalestin Formation.

A line dividing the Western Cascades and the South Coast Range physiographic provinces bisects the planning area from north to south in the Rock Creek area. The Western Cascades are an older range consisting of Tertiary flows, tuffs and intrusive rocks.

Coast Range Province rocks form the western-most portion of the planning area. The Umpqua Formation is the main member present and consists of marine sedimentary sandstone and siltstone which, in the vicinity of Glide, is highly fossiliferous It forms the foothills of the Cascades in the Glide area and is part of a broad arch of anticlinorium, the axis of which trends north-eastward through Roseburg. At Glide, the formation dips gently eastward to underlie the Cascades. In age, the Umpqua Formation is lower Eocene or about 63 million years old.

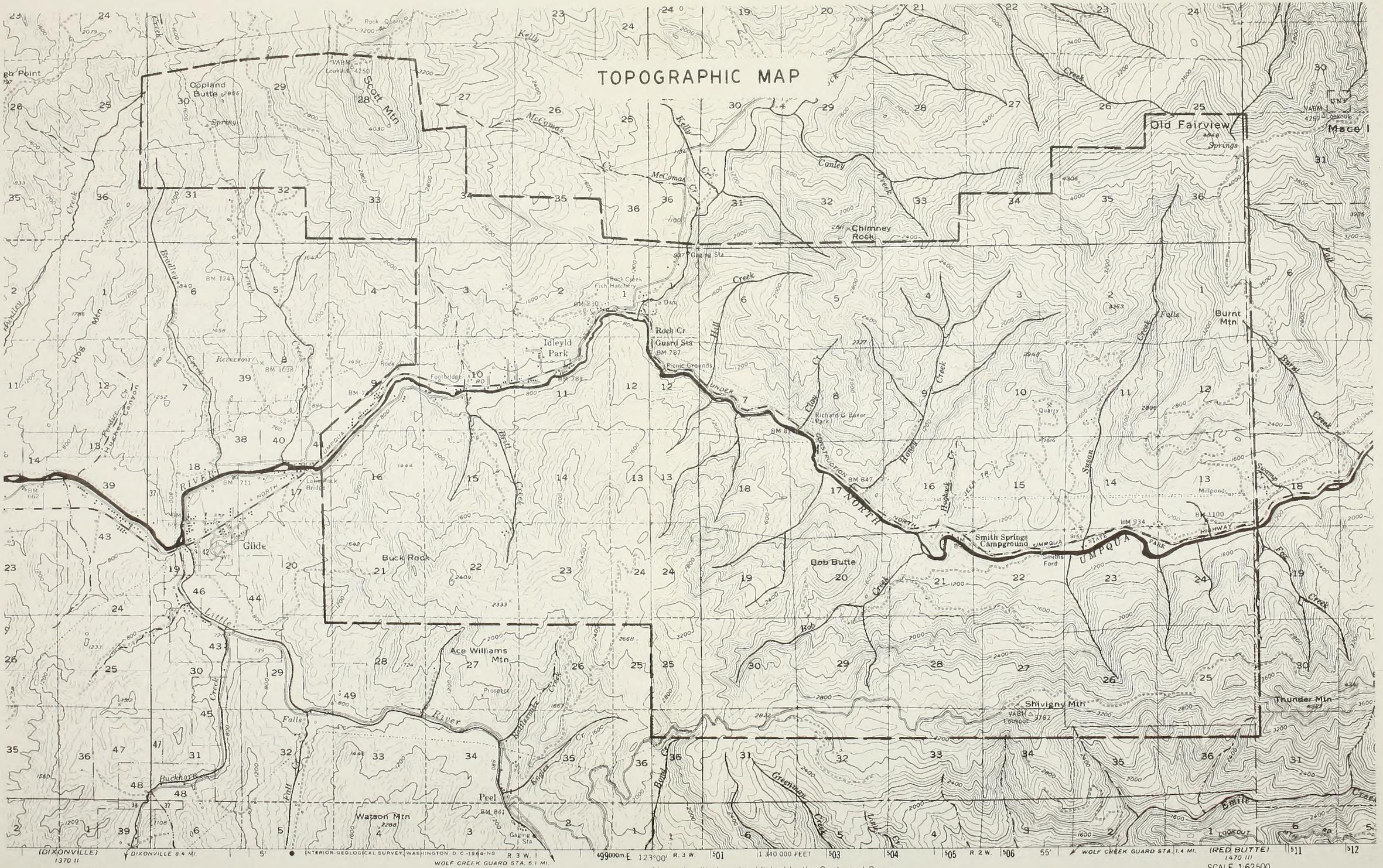
A thin wedge of Tyee formation is exposed between Glide and the Lone Rock bridge. Here the Tyee overlies the Umpqua Formation. The Tyee formation consists of rhythmically bedded estuarine and marine sandstone and siltstone.

The last member of Coast Range formation consists of Upper Eocene massive andesite lapilli tuff and breccias, stratified volcanic conglomerate with basalt flows, dacite welded tuff and coal. This volcanic ejecta reflects conditions which occurred in the Cascade Range Province, the boundary of which lies in the vicinity of Idleyld Park.

Massive dark-gray porphyritic andesite and gray porphyritic andesite flows and breccia inter-bedded with pyroclastic rocks form the rocks just west of Idleyld Park to the vicinity of the hogback in T. 26 S., R. 2 W., Sec. 21. The flows predominate west of the Hogback while pyroclastics dominate the area easterly from that point. These are Oligocene and lower Miocene (25-36 million years) and are the very resistant rocks forming the "narrows" at various points along the river.

The top of Scott Mountain is an intrusive granitic material. An intrusion of basaltic rock stretches from a point approximately one mile east of Lone Rock to the N½NW¼ of the Copeland Butte area.

TOPOGRAPHIC MAP



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INTERIOR-GEOLOGICAL SURVEY, WASHINGTON, D. C.-1964-NS

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods

Aerial photographs taken 1952. Field check 1955

These intrusives are of Eocene or Pliocene age of 13 to 63 million years ago.

The oldest rocks in the region are Jurassic in age (180 million years) and occur in the northern-most point of the Klamath Mtn. province just to the south of Buck Rock. These are metamorphic gneiss, peridotite and serpentine. An excellent example of this formation is the serpentine which outcrops along Little River in fault contact with the Umpqua Formation.

There is little evidence of major tectonic activity within the study area.

C. Minerals - Mineralization by valuable elements is almost totally lacking. There are no locatable mineral deposits known within the planning area nor are any mining claims filed. Semi-precious stones such as agates and geodes occur in bar gravels on the river. Petrified wood, quartz, geodes and semi-precious stones have been reported in T. 25 S., R. 3 W., Sec. 29. Coal has been reported occurring in thin seams in road cuts and along the creek in T. 26 S., R. 2 W., Sec. 26 It has also been identified in T. 26 S., R. 3 W., Secs. 8, 9, 10, along the North Umpqua River. The coal appears in thin seams and is of no commercial value. Apparently it is formed from bog or lake deposits which occurred in the Little Butte Formation. The district Minerals Resource Inventory indicates no mining claims in the past have been filed for locatable minerals. The same reference indicated sales of rock used in road construction and free use of this resource for timber access road construction from some quarries located in the unit.

Portions of the area have been examined and published under Public Law 167, the Multiple Surface Use Act., which establishes the right of the government to manage the surface resources on unpatented mining claims. However, the lack of locatable minerals obviates the need for much use of P. L. 167 in this area.

The lack of economic minerals in the North Umpqua Planning area restricts use demands. With the exception of road construction rock, future outlook is for no increase in demand or development. The planning area is not unique as far as the minerals identified above are concerned. The planning area is similar to much of the region and area outside the planning unit.

D. Soils - Soils in the scenic corridor along the North Umpqua are developing from volcanic rocks. Most of the soils are underlain by tuffs, breccias, andesite, and basalt.

A general soil report and soil map was made in 1971. The

full report is available at the BLM Roseburg District Office. The report basically points out there are two broad classes of soils in the corridor. They are the dry soils (xeric) and the moist soils. Climate is the main factor in separating moist from xeric soils.

Xeric Soils - The dry soils are in the rain shadow caused by Shivigny and Thunder Mountains. They are found in the lower stretches of Susan, Honey, and Hill Creeks. They make up 22% of the corridor. There are two basic groups of dry soils. They are the red clay soils and the brown gravelly loam soils. The red clay soils compact easily when moist. Reforestation records on the red soils show there is a 50% chance of success from the first planting. Grass competition and high soil temperatures seem to be the major causes for failure. The brown gravelly loam soils have a severe reforestation problem on south aspects. High soil temperatures and low moisture are the causes for failure. Few road failures occur from the xeric soils.

A. Freezner - Unit 362 Association

This is an association of two major soil series on slopes less than 35%. Freezner soils are deep, red, clay soils. Unit 362 soils are deep, very gravelly loam soils. Both soils have a medium success rate for regeneration. They also can be tractor logged during summer months.

This association contains 40% Freezner soils, 30% Unit 362 soils, and 30% inclusions. The inclusions are wet gravelly clay soils and moderately deep brown clay loam soils.

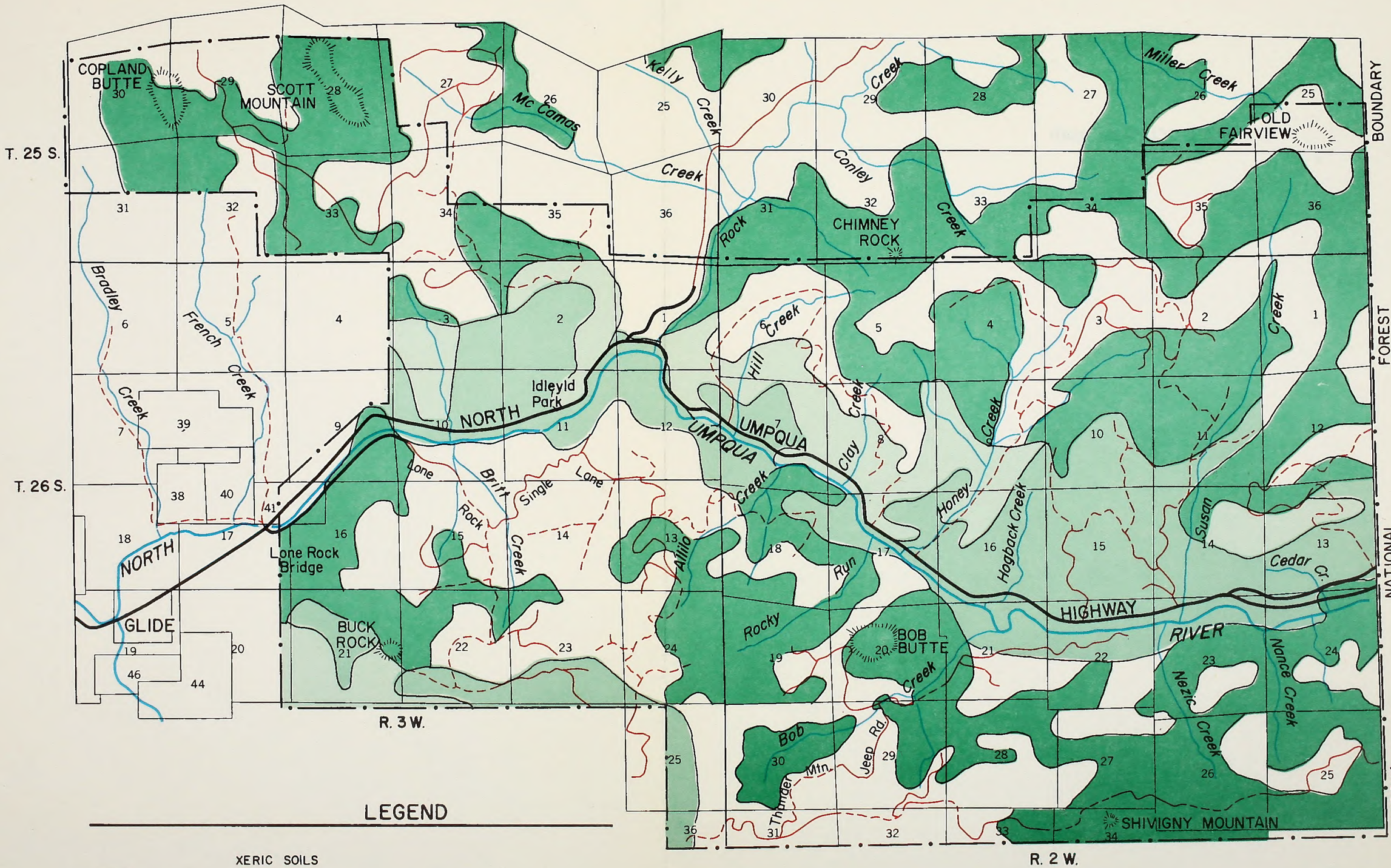
B. Straight - Vena Association

This is an association of two major soil series that occur on slopes over 35%. Straight soils are moderately deep gravelly loam soils. Vena soils are less than 20 inches deep and have a very gravelly loam texture. Both of these soils have a low regeneration success on south aspects. The Vena especially needs some type of shade to hasten regeneration. Shelter wood cut, use of shingles, or a nurse crop would all provide shade. Approximately 900 acres of Straight and Vena soils need shade treatment. These areas are located east of Susan Creek and in the Honey Creek area.

These soils require hi-lead logging.

This association contains 60% Straight soils, 20% Vena soils, and 20% inclusions. The inclusions are deep clay loam soils and moderately deep very poorly drained soils.

SOIL ASSOCIATION MAP



LEGEND

XERIC SOILS

- FREEZNER – UNIT 362 ASSOCIATION
- STRAIGHT – VENA ASSOCIATION

MOIST SOILS

- HONEYGROVE – UNIT 300 ASSOCIATION
- KLICKITAT – UNIT 323 KILCHIS ASSOCIATION

- B.L.M. Roads
- Private Roads
- County Roads
- Boundary Of Planning Area

SCALE 1"=1 MILE

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Moist Soils - The moist soils make up 67% of the corridor. There are three basic groups of soil in this category. They are red clay soils, deep brown soils, and the brown gravelly loam soils. These soils have the same appearance as the dry ones.

The moist red clays are highly productive, easily compacted, and easily reforested. The deep brown loam soils occur as pockets on the landscape. They occur frequently on 50-60% slopes. When these pockets are cut by roads on steep slopes, failures may occur. The cutbanks slide and in some cases the subgrade also sluices out. In many cases, these soils can be avoided or failures greatly minimized by reducing amount of road cut and application of soil stabilizing measures.

Brown gravelly loam soils occur on steep slopes. Reforestation on south slopes can be a problem on these soils.

A. Honeygrove - Unit 300 Association

This association of two major soil series occurs on slopes less than 35%. Honeygrove soils are deep, red clay soils. Unit 300 soils are very similar to Honeygrove except they have gravel in the subsoil. Both soils can be tractor logged in the summer months. They compact easily when moist. Both soils have a high regeneration success.

B. Klickitat - Unit 323 - Kilchis Association

This association contains three major soil series on slopes over 35% . Klickitat soils are moderately deep, reddish brown gravelly loam soils. Unit 323 is deep, reddish brown clay loam soils. Kilchis is a shallow brown gravelly loam soil. All three soils require hi-lead logging. The Kilchis soil has a low regeneration success while the other two soils have a high success rate.

E. Water - Some 93% of the runoff in this region originates on forested lands. This tremendous contribution of water to streams points up the importance of watershed protection in the upland areas.

Although the watershed area in the planning zone is only 4% of the total watershed of the North Umpqua, activities within the plan area that result in soil movement can have a pronounced influence on the quality of the water leaving the planning area.

Aquifer yields are unpredictable with massive non-porous andesites producing little or nothing, while perched water tables on alluvial terraces provide good well production.

Groundwater recharge occurs rapidly when heavy fall rains begin and by mid-winter any two-or-three-day period of steady precipitation results in heavy discharge from drainage portions of the aquifers into depressions and watercourses and rejection of potential recharge.

The larger streams within the planning area are listed in the Appendix, Pg. 151. Other smaller streams occur but are not shown on quadrangle maps and thus are not tabulated there. They run only in winter and some only during and shortly after precipitation occurrences. The chief water quality concern with these streams would be the small volume of sediment and debris that they could flush into the main streams.

There are no gauging stations on the smaller streams so no data is available on a regular basis as to their volume. U.S.G.S. gauging stations are located near Copeland Creek (About 22 miles east of the planning unit boundary) and at Brown's Bridge (about 27 miles west of Lone Rock Bridge) both on the North Umpqua main stem.

The Copeland Creek gauge located 4.7 miles west of Toketee, measures a watershed of 475 square miles. (See Appendix, Pg.152 for water-flow date.) Some flow regualtion is afforded by Diamond and Lemolo Lakes. Power plants upstream cause considerable fluctuation; however, recent cooperation by PP&L with the Oregon State Game Commission has resulted in water releases, designed to minimize level changes.

The Winchester gauge located 3 miles west of Winchester, measures a watershed of 1,344 sq. miles. (See Appendix, Pg.153 for water flow data.) Design calculations for the Swiftwater Bridge indicate that a 50-year flood at that site would involve a flow of 70,000 cfs at a center channel surface elevation of 776.7 feet. The lowest portion of the bridge super structure is at an elevation of 782.5 feet.

Withdrawal of water within the canyon is limited to small landowners in the area between Honey Creek and SE¼ of Sec. 22. The largest downstream withdrawals are by the community of Glide and the Oregon Water Corporation, which provides water for Roseburg and vicinity. Umpqua Basin Water Association supplies water largely for domestic uses to unincorporated areas west of Roseburg. Water is also withdrawn for agriculture and domestic use by smaller riparian users. Current water quality is generally excellent with periods of degraded qualtiy coinciding with high precipitation rates or rapid snow melt periods. Special water-quality standards apply under state statutes and regulations.

F. Climate and Air - The climate of the study area is borderline marine-continental. Summers are warm and dry with cool, very wet winters. Precipitation normally ranges from 48" annually at Glide to 56" at the National forest boundary. Seasonable distribution is such that 94% of the total average annual precipitation occurs in the period of October through May with the heaviest accumulations occurring in the October-March period.

Snow predominates at the higher elevations with constant snow cover occuring in many years during the winter months. Lower elevations adjacent to the river receive alternating rain and snow cover seldom attaining any significant depth or tenure.

Pacific impulses generally dominate the winter weather and a somewhat maritime climate prevails. Significant numbers of fog-free days show a more continental influence when compared with Roseburg and points further west.

Occasionally, thunderstorms contribute some summer precipitation with their frequency increasing easterly and with altitude. Pleasant outdoor recreation weather prevails from about mid-June to September when some rain may occur, but these rainy periods are usually followed by another month or so of Indian summer. Spring weather will run the entire gamut of cold, extended rains to hot, summer-like days.

Low humidities prevail through July, August, and September. These are accentuated by incursions of dry air from the high desert east of the Cascades. This air flow affects the higher more easterly peaks fairly often and occasionally penetrates the canyons. Morning canyon winds occur in the summer. Prevailing winter winds are from the southwest.

Air quality is generally good with only limited urbanization and one small sawmill within the immediate airshed. Agricultural burning during some periods of time causes visual restrictions.

G. Vegetation - Natural vegetation in the area is dominated by Douglas-fir with an admixture of hemlock and grand fir. Western redcedar, incense cedar, sugar and ponderosa pine, and Pacific yew, round out the conifers. Hardwoods include bigleaf and vine maple, myrtle wood, madrone, chinkapin, dogwood, oaks, several species of willow, and red alder.

Small species comprising the lower shrub level are salal, varnish leaf ceanothus, manzanita, several varieties of blackberry, ocean spray, wild lilac and thimbleberry. Several dozens of members of the composite family thrive in old clearcuts along with fireweed and iris. In shady places, columbine, ginger, oxalis, trillium, calypso orchid, coralroot, pine drops, bleeding hearts, violets and hounds tongues grow. Sword, bracken, maidenhair, licorice and other ferns, along with mosses, numerous fungi and a multitude of grass species complete the list. This is of necessity only a partial listing of vegetation.

Timber is one of the major natural resources within the canyon. It has attracted attention from the earliest days of pioneer settlement. Difficulty of access in the early period combined with concern for the canyon's esthetics resulted in reaching only a moderate level of timber harvest. Increasing emphasis on the North Umpqua's other major resource values of spectacular scenery, recreation and fishery will increasingly effect a lowered flow of forest products in the future.

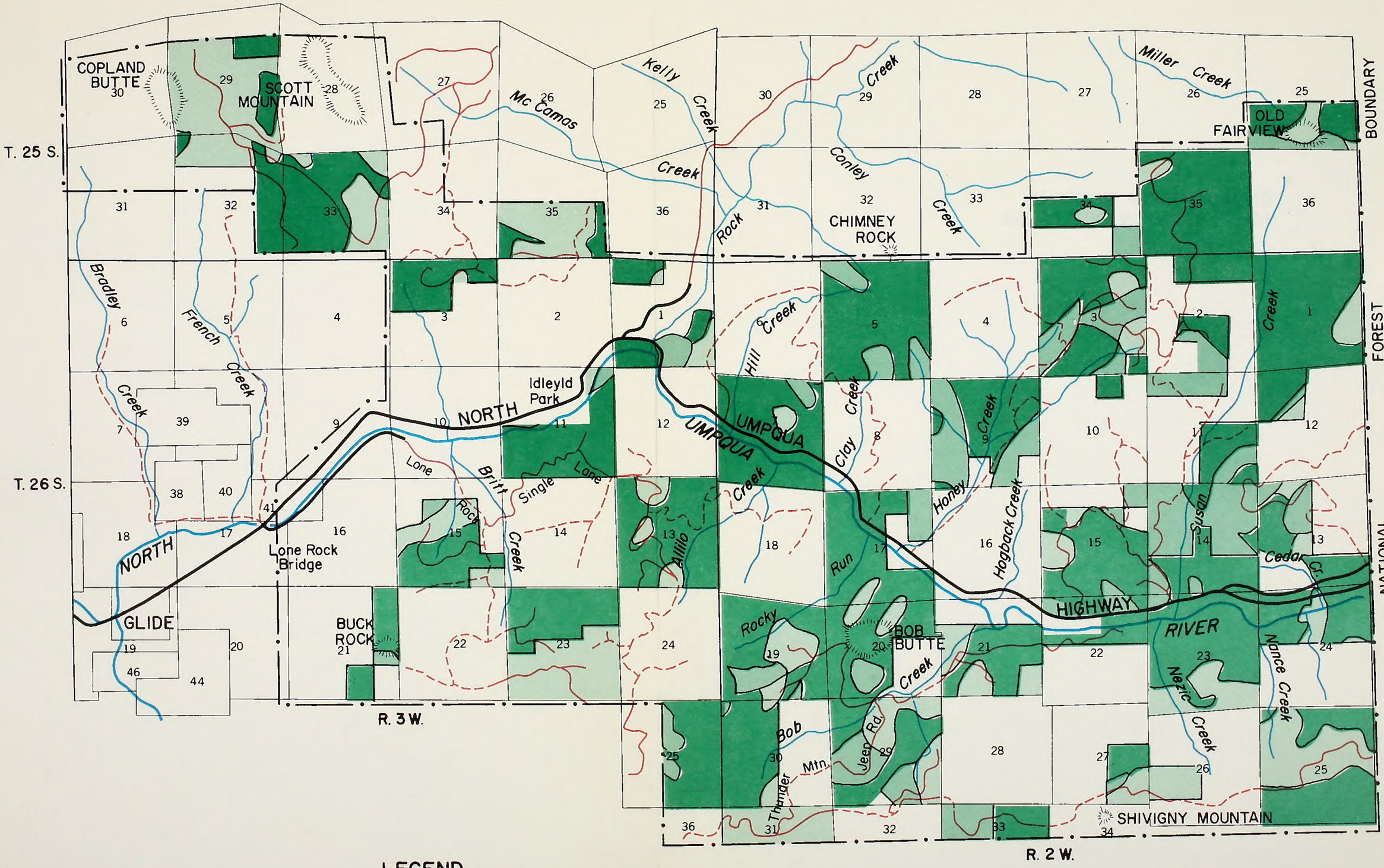
The first BLM timber sold in the planning area was to the North Umpqua Timber Co. in 1944. Douglas-fir sold for $1 per thousand board feet. Since that initial sale, another 135 million board feet has been sold.

Management of the O&C timber lands is governed by the O&C Act of 1937. Some of the Act's provisions are:

> "Lands ... classified as timberlands ... be managed ... for permanent forest production - the timber thereon be sold, cut, and removed in conformity with the principal (sic) of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating streamflow, and contributing to the economic stability of local communities and industries, and providing recreational facilities (sic) - the annual productive capacity for such lands should be determined and declared as promptly as possible ... - not less than the annual sustained-yield capacity ... shall be sold annually, or so much thereof as can be sold at reasonable prices on a normal market."

This law, passed in 1937, was the nation's first multiple-use legislation. The intent and purpose of the Act is the sustained yield of all forest resources needed for community stability. Timber must be offered for sale in an amount equal to the sustained annual rate of production and this is computed for the district as a whole, then apportioned to each forest management area. All lands except those which have been zoned for such purposes as recreation

DISTRIBUTION OF TIMBER BY AGE CLASSES ON O&C LANDS



LEGEND

TIMBER AGE	ACRES
0 - 20	3400
21 - 80	3000
81 - 200 +	9600

- B.L.M. Roads
- Private Roads
- County Roads
- Boundary Of Planning Area

SCALE 1"=1 MILE

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sites and environmental protection of streams, fragile soils and esthetics have been used in the allowable cut base.

The annual cut for the planning area with no restriction is approximately 8,000,000 bd. ft. The restrictions due to recreation sites, landscape management zones, stream-side buffer strips, and fragile sites included in the proposal will reduce the annual cut to approximately 7,000,000 bd. ft.

The following is a breakdown of BLM & private timber in the planning area:

		Total Acres	Acres Cut	Acres Remaining Merch. Timber 11" & Over D.B.H.O.B.	Remaining Merch. Tbr.
BLM	North Side of Planning Area	9,300	1,670	7,630	335,720 MBF
	South Side of Planning Area	6,700	1,730	4,970	218,680 MBF
	Total BLM	16,000	3,780	12,600	554,400 MBF
PRIVATE	North Side of Planning Area	9,420	5,640	3,780	166,320 MBF
	South Side of Planning Area	8,580	6,360	2,220	97,680 MBF
	Total Private	18,000	12,000	6,000	264,000 MBF
ALL TOTAL		34,000	15,400	18,600	818,400 MBF

Timber Age	Acres*
0-20	3,400
21-80	3,000
81-200	6,600
201.	3,000

*O&C Land Only

Age 0 - 20

Approximately 3,400 harvested acres have been surveyed within the planning area and about 94% of them are considered stocked with young trees. Approximately 200 acres are in units which have failed and have been retreated but not resurveyed and classified as stocked, or are awaiting sufficient stock for retreatment. The ban on direct aerial seeding has resulted in somewhat of a backlog

of units to be treated. Approximately 750 acres will be ready to precommercially thin in 2 to 5 years. The foregoing data are current through 1970.

Age 21 - 80

The approximate 3,000 acres in this age group are scattered throughout the area. In most instances it exists in individual tracts big enough to thin, Growth in this age group is 430 bd. ft. per acre per year.

Age 81 - 200 and 201 +

Acreage in rotation-age and over timber is approximately 9,600 acres. This timber is scattered throughout the area and varies from vigorous to decadent. Average growth is around 200 board feet per acre per year.

Forest Service timber immediately east of the planning area will be managed from roads emanating from the Wright Creek Bridge. This Bridge is located four miles east of the planning area. The Forest Service currently has some of the roads constructed and additional roads will be built when needed.

The condition of this Forest Service timber is similar to the BLM timber. The Forest Service plans to manage their timber utilizing the same basic landscape management concepts proposed in this plan.

H. Animals

Terrestrial Wildlife - Animals in the area include black bear, cougar, coyote, and bobcat as the large predators, with the larger ungulates being the Columbia black-tailed deer and Roosevelt elk. Squirrels, chipmunks, foxes, weasels, skunks,raccoon, mice, and pack rats are common. Beaver and river otter also inhabit the area.

Many of the smaller birds are represented such as warblers, nuthatches, juncos, creepers, wrens, sparrows, robins, jays, thrushes, ouzels, and kingfishers. Large birds are pheasant, valley quail, ruffed and blue grouse, bandtail pigeons, ravens, crows, many hawks of all sizes (the redtail being the common large one), turkey vultures, and golden eagles. Although ducks are not common, various species are present.

Numerous invertebrates occur, the most important economic species being the Douglas-fir beetle (Dendroctonus pseudotsugae Hopk). This species annually kills millions of board feet of Douglas-fir. It is the major cause of the so-called "bug patches" seen on hillsides. Timber killed by the beetle has generally lost all of its high value wood within the first three years and approximately 50% of its total volume by the eighth year after death.

Insects are not a major problem in the area, but constitute a presistent one.

Black-tailed deer are distributed throughout the planning area. Population figures relative to this area are maintained by the Wildlife Commission for the Dixon Management Unit which incorporates a considerably larger area than the subject zone. Populations within this general area have been on a declining trend since 1968. In the period 1964-1968, the average number of deer per mile on the census route was 4.3, declining to 2.9 in 1970. A major portion of the decline is attributed to heavy winter kill in 1968-69. Black-tail deer is the major mammal hunted in the canyon.

Roosevelt elk numbers in the planning area are low and distribution is restricted. The largest of the big game animals within the region, elk, are highly sought after by both the hunter and the wildlife observer. Suitable areas to expand elk habitat within the planning area are limited by the size of the planning area, topography, land ownership patterns and a lack of knowledge concerning elk habitat. Development of extensive public access will probably reduce elk use in the area.

Black-Bear are widely distributed in the planning area. Populations are thought to be low, but data on bear is not available. At the present time, Wildlife Commission management objectives in the area are to maintain present populations.

Pheasants and valley quail are found in lowland areas adjoining agricultural land. For the most part, these populations are supported on private land. Available habitat within the management zone and the opportunity to increase suitable habitat is limited.

Ruffed grouse can be found along most of the stream bottoms throughout the planning area. Populations are not high. Typical of grouse populations, their numbers fluctuate widely. Maintaining brushy areas on flats along streams is the only feasible method of habitat improvement.

Blue grouse are found in the planning area in association with mature coniferous forest stands. They favor ridge top areas with natural openings interspersed in the stand. Utilization during summer and fall is made of clear-cut

areas adjacent to timber stands, but penetration of cut over areas is low.

Bandtail pigeons are found in small numbers within the planning area. Pigeons use some of the clear-cut areas for feeding and nest in associated conifers. The lack of data on the bandtail pigeons or its habitat is one of the key management problems at this time. The birds are vulnerable to overshooting, especially at mineral springs where birds can be found concentrated. At the present time, no mineral springs have been located in the area.

Waterfowl use of the North Umpqua Canyon planning area is confined to the areas along the river.

Aquatic Wildlife - The North Umpqua supports a variety of aquatic life. Its runs of salmon and steelhead are its primary attraction. Almost all the Umpqua spring chinook and summer steelhead are produced in the North Umpqua. This stream has long been considered by the Oregon Wildlife Commission to be outstanding for steelhead and salmon fishing.

Primary concern of management is for those fishes of sport or commercial value.

Salmon, steelhead, and trout support the sport fishery on the North Umpqua. Salmon produced in the North Umpqua do enter the commerical off-shore fishery, but regulations do not allow a commercial fishery in the North Umpqua or main Umpqua.

The Oregon Wildlife Commission has operated a counting station at Winchester Dam since 1946 providing an accurate measure of anadromous fish runs:

Spring chinook - In 1946, a total of 2,507 spring chinook passed Winchester Dam. In 1950, the spring chinook reached a low of 2,321 fish and efforts to stop the decline were initiated. Since 1950, the wild spring chinook run has shown a steady increase in numbers. (See Appendix, p.p.177

In 1952, for the first time, returning adults from hatchery reared smolts showed up at Winchester. Hatchery-produced smolts contribute an increasing number of adult fish to the spring chinook run. Between 1966 and 1972, the spring chinook run in the North Umpqua average 13,167 fish.

The current Oregon Wildlife Commission program calls for the production of 150,000 spring chinook smolts per year for the North Umpqua.

Since 1957, the spring chinook fishery has increased from 2,033 angler trips to a high of 12,986 angler trips in 1969. In this period, chinook harvest in the North Umpqua increased from 183 fish to 5,714 fish.

Fall chinook - Fall chinook runs in the North Umpqua have historically been very low. In 1949, thirteen fall chinook passed Winchester Dam and reached a low of one fall chinook in 1954. Since 1949, the highest number of fall chinook passing Winchester Dam was 719 fish in 1967.

Interest in development of a large fall chinook run in the North Umpqua has been small because of its low contribution to the sport fishery.

Coho salmon - The coho salmon is the second species of salmon native to the North Umpqua. Coho runs have ranged from 346 fish to 3,066 fish.

Coho do not produce a large sport fishery in the North Umpqua.

Steelhead - Two races of steelhead ascend the North Umpqua. Winter steelhead runs between 1946 and 1973 have ranged from 4,188 fish to 12,115 fish. Since 1966, the winter steelhead run has averaged 9,446 fish. The lowest point in the winter steelhead run occurred in 1949.

Summer steelhead runs between 1946 and 1973 have ranged from 1,672 fish to 16,185 fish. As did the winter steelhead, the summer steelhead reached a low point in 1949. Since 1966, the summer steelhead run has averaged 10,714 fish.

To supplement the summer steelhead run, the Oregon Wildlife Commission started releasing hatchery-reared smolts. This program has been very successful in building the summer steelhead run. In 1969, the summer steelhead run contained 14,390 fish and exceeded 15,000 fish in 1970 and 1971.

The Oregon Wildlife Commission's current program calls for the production of 150,000 smolts for the North Umpqua.

Since 1957, the steelhead fishery has increased from 2,157

angler trips to 89,848 angler trips in 1971. Steelhead harvest has increased from 410 fish in 1957 to 10,707 fish in 1972 for the North Umpqua. (See Appendix, p.179 .)

Trout - Estimates of the trout populations in the North Umpqua have not been made. Based on the angler catch rate, the coastal cutthroat is the most numerous of the native trout followed by rainbow and brown trout.

Although the brown trout has been found throughout the North Umpqua, its population is the greatest between Apple Creek and Soda Springs Dam. Coastal cutthroat and rainbow have more widespread distribution throughout the system.

Angler trips ranged from 1,169 in 1959 to 18,009 in 1962. During the sample period, trout anglers averaged 14,187 angler trips. During this period, the trout harvest ranged from 30,200 fish to 44,700 fish; the average trout harvest during this period was 36,770 fish.

Most of the trout caught in the North Umpqua are hatchery rainbows. Between 1958 and 1964, hatchery rainbow trout harvest ranged from 19,450 fish to 38,964 fish and averaged 29,287 fish. Hatchery trout made up 79% of the trout harvest during this period. Since the adoption of an 8-inch minimum size limit, hatchery trout make up 90% of the trout harvest.

The Oregon Wildlife Commission in the past has released 60,000 to 90,000 hatchery-reared rainbow each trout season. The current program calls for 70,000 hatchery-reared rainbow trout.

A listing of known or suspected wildlife within the planning area is included in the Appendix, p.p. 195-201. Threatened or endangered species are noted; however, none have been physically located within the planning area.

I. Microorganisms - A whole host of microorganisms exists within the planning area. Only the important ones that live in the soil, trees, and water will be discussed.

Soil - Soil microorganisms are most important in decomposing litter that falls to the forest floor and making nutrients available to plants. The forest soil in the canyon contains millions of bacteria per gram of soil. Cellulomonas are one group of bacteria that decomposes cellulose. Bacillus bacteria are responsible for breaking down protein into ammonia. Nitrosomonas group produces nitrites while nitrobacter produces nitrates. Azotobacter and Clostridium have the ability to make nitrogen in the air available to plants.

In addition to bacteria, algae also occurs in the soil and on rocks. Algae hasten the solubility of minerals and increase the soil organic matter.

Other very small organisms such as protozoa, rotifers, and earthworms each do their part to decompose litter, recycle nutrients to plants, and aerate the soil.

Trees - Fungi are the most important group of microorganisms that affect trees in the canyon. A group called mycorrhizal fungi live symbiotically on the tree roots. The mycorrhizae permit exchange of soluble carbohydrates, nutrients, and perhaps growth-promoting substances. The mycorrhizae can dissolve rocks such as feldspar and make the nutrients available to the tree. They are necessary to the normal health and functioning of the plant. In their absence, the tree exhibits chlorosis, stunting and other evidence of reduced nutrient transfer.

Another symbiotic fungi is Actinomyces Alni. It forms nodules on the roots of alder and makes atmospheric nitrogen available to the tree. This enriches the forest organic matter.

Purshia and Podocarpus genera live symbiotically with certain brush species such as snowbrush and deer brush (ceanothus). Both of these brush species are present in the planning unit, coming in after clearcuts. The nodules on the roots fix nitrogen, thus increasing the amount of nitrogen for tree growth and also increase the protein content of the foliage for wildlife.

The fungi family has its beneficial members and it also has its destructive members. Fomes Pini causes white pocket rot or conk rot which is a destruction of heart wood especially in Douglas-fir. Echinodontium tinctorium causes rust-red stringy rot. This is a rot that destroys heart wood of mostly western hemlock and true firs. Polyporus schweinitzii causes red-brown butt rot which affects the lower portion of the tree by causing heart wood to turn brown, brittle, and crumbly. Armillaria mellea causes a shoestring root rot. Fomes annosus causes a root rot mostly in western hemlock. Poria weirii causes laminated root rot principally in Douglas-fir. This is the most common root rot in planning area. It affects single trees and occasionally small pockets of trees. Cronartium ribicola causes white pine blister rust. The fungi is fatal to sugar pine and white pine. It has an intermediate host plant of gooseberries and currants. These host plants are present in the planning area as, is the fungus.

Water - The aquatic environment varies with the size of the body of water, water velocity, temperature, mineral, and organic nutrients constituents, turbidity, suspended sediment concentration, etc. It is not practicable to enumerate even the most important species of microorganisms because of the number of species involved and in many cases, surveys of numbers and kinds of these organisms have not been made on the North Umpqua River.

Pacific Ocean ecosystems and microorganisms intertie with those of the North Umpqua through anadromous fish. Ocean ecosystems will not be discussed as they are beyond the scope of this document.

Freshwater river ecosystems in western Oregon, such as the North Umpqua, are characteristically low in basic productivity. Stream productivity is determined by a supply of adequate nutrients, light, suitable temperature, and time for growth to take place. Although ample light is available, growth of true plankton is greatly limited. Limiting factors are low temperatures, short time for growth due to steep gradients, and low nutrient levels. Plankton are the basic producer organisms in a food chain, thus they limit the total system productivity. Increases in sediment loads can also reduce plankton by impeding light penetration.

There are many factors which determine the nature of a stream. Some important ones are: (1) the geographical location of the basin, including the character of the bedrock and soils, (2) the size, shape, and general topography of the basin, (3) the character, amount, annual distribution, and rate of precipitation, and (4) the natural vegetative cover of the land which is responsible to the preceding factors and which is also subject to the activities of man. Natural vegetation is one of the major factors which determine runoff versus infiltration. The biological resultant of all physical and chemical factors is the quantity of life that is actually present. The ability to produce this "biomass" is often referred to as the "productivity" of a body of water. A productive water may be desirable or have a nuisance value. A water of low productivity is a "poor" water biologically, and also a relatively "pure" or "clean" water and, therefore, desirable as a water supply. A productive water may be desirable if it supports a trout fishery, but have a nuisance value if it is a weed-choked swamp. Primary productivity is the rate at which organic material is produced by green plants. Secondary productivity is the rate at which organic material is produced by consumers. Relative lack of plankton and other microorganisms in the North Umpqua is evidenced by the water's clarity. Even so, the North Umpqua is relatively productive even though it has clean water because it draws from the ocean's productive resources. The importance of maintaining its productivity lies in its smolt production. These young salmon and steelhead must grow to migratory (smolt) size within the North Umpqua system to maintain the native fishery. They are thus dependent on microorganisms for a critical portion of their life cycle.

Other important microorganisms are periphyton, the communities of microscopic organisms associated with submerged surfaces of any type of depth. This includes bacteria, algae, protozoa, and other microscopic animals, and often the young or embryonic stages of algae and other organisms..

J. Human Settlement and Land Use

Settlement History

The first known habitation by humans of the region was by the Umpqua Indians whose occupancy is thought to have commenced sometime after the fourteenth century. It is speculated that they were driven from the mid-continent area by drought. With the arrival of the Umpquas, game trails were taken over and modified by the nomadic Indians on their way to and from hunting, fishing, and berry picking areas. Fur traders may have entered the Umpqua drainage in 1812, but only occasional whites passed through until settlers began arriving in some numbers in the 1840's and 50's. Little use was made of the trails upriver by whites until gold was discovered just over the Umpqua Divide in the Bohemia Country in 1860. Interest in the route grew and Aaron Rose commissioned Lt. Williams to survey a road route from Roseburg up the North Umpqua to The Dalles and California trail. Williams reported that, while a good pack trail was feasible by relocating portions of the old trail around bad areas, no wagon road could be built. And so it remained for a hundred years, access only by trail above Rock Creek. In the later decades of that span, a winding gravel road dictated by the narrow canyon was built extending through Steamboat. By 1925, the U. S. Forest Service had completed a road to Diamond Lake and a one-way, nine-foot road connected Steamboat with downstream areas by 1926. It wasn't until 1955, that a paved all-weather road was initiated and completed by 1964. When the North Umpqua Highway, as it became known, succeeded in tying Highway 97 (The Dalles and California Trail), Diamond Lake and Roseburg together, it ended a century of effort expended to construct it.

Indians, miners, and mountain men used the primitive trails up the river in the early days while the Glide area slowly grew with the influx of homesteaders and Donation Land Claimants. Small enclaves of settlers sprang up in Rock Creek, Little River, and Glide, but nowhere did the population attain high levels. The land with few exceptions does not lend itself to development of agricultural values even with modern technology and standards. Thus it is understandable that even bonafide homesteaders were generally absent. People from the valley farms and ranches went up the river to hunt and pan gold, while loggers cut small amounts of sugar pine and Douglas-fir. Chinese were relatively numerous at times, prospecting for gold in the river canyon.

Most land disposal occurred after the turn of the century until the mid 1930's through Cash and Homestead entries. Within the planning area portion of the canyon, homesteaders, apparently in most cases, only remained long enough to prove up entry and obtain patents before moving out.

With the subsidence of the land settlement and mining boom, the population changed slowly both in composition and numbers. Small communities and enclaves died as the offspring of original settlers moved away. Remnants of the old families still provide the framework of the citizenry in the Glide area. Many land ownerships still carry the names of the older settlers. Ties to this very beautiful region are strong and emotion with nostalgia is understandably present.

Lavola Bakken, a local writer, in the Lone Rock Free State sums up the feeling very well in the following excerpt:

> "The younger generation usually emigrates from Lone Rock Free State, or so it seems at first. They leave as soon as they are old enough for college, space-age jobs, or military service, but somehow the pull of the home places stays with them. In their forties they come back and buy an acre or two and in their fifties and sixties they return to the North Umpqua to stay. Ask them if this is the best place they've ever been, and like as not they'll tell you it's the only place to be. It's part climate, part good neighbors, part heritage, but most of all - it's home."

Home has been invaded, for mixed among all of the wandering sons and daughters who have returned, are people from other regions and states who have more-or-less recently also discovered the attributes of living, working, and retiring in the Glide area.

Small population concentrations exist at Idleyld Park, Rock Creek, the Frontier Store area, the Hogback and the Lone Rock area. There are trailer parks in Sec. 10, at Idleyld Park and at Susan Creek. In addition, single residences are scattered about in various drainages north of the highway.

Improved access coupled with the burgeoning movement of people out of urban environments has created a climate favorable to, and a demand for country homesites on small acreages. To date, this does not pose a serious threat to the private lands within the Canyon Management Plan area. Land in the canyon subdivided to small lots is minimal. Most of the land near the river is publicly owned and the remaining private ground is held by large landowners for timber production.

Archaeological values exist on O&C lands at the Susan Creek Indian Mounds. Other evidence of Indian occupation exists on private lands. In the canyon, sewage is disposed of by septic tank systems. In the lower canyon at Idleyld Park, the use of unsuitable soils for drainfields has created sanitation problems. A sewer district had been formed to deal with the problems and a plan had been proposed that would have served the Glide - Idleyld Park area and extended a line up to Rock Creek. A dissolution election dissolved this district and public sanitation issue has not yet been satisfactorily resolved for the area.

By far, the greatest land uses of the canyon are recreation and timber production.

2. Background

Land and Timber - Federal lands in the area are composed of revested Oregon and California railroad grant lands and small tracts of unappropriated public domain lands. Management of these lands was largely custodial in nature until the 1950's when dwindling old-growth supplies elsewhere focused attention on relatively more remote southwestern Oregon timber stands.

Private lands belong mostly to large timber companies with a scattering of small owners. Harvesting of private timber in the planning area east of Rock Creek commenced in the 1940's and grew in tempo through the 1950's. The Young's Bay Lumber Co. bridge was constructed at Smith's Ford enabling private timber to be removed from much of the south side of the river. This system developed the eastern portions of that area and connects, via a low-standard fire protection road, to the Thunder Mtn. Road System which crosses the high ridge to the south into the Little River drainage. The bridge serving this area was destroyed in the 1964 Christmas flood.

Prior to the bridge failure, most of the private timber in this area was harvested, along with significant though lesser amounts of BLM timber. Remaining small amounts of private timber combined with the obvious expense dulled private incentive to reopen access to the area. Natural catastrophies continued to create damage to the remaining stands, meanwhile the allowable-cut fraction represented by this unavailable land was obtained elsewhere in the Roseburg District.

Interest has grown in re-establishing access to the southern area and the public was involved in several ways concerning alternative plans.

In 1971, a 2-lane concrete bridge was built by the BLM across the North Umpqua near the mouth of Rock Creek. Known as the Swiftwater Bridge, it is the first bridge connection within the planning area to the south side of the river since the Smith's Ford (Young's Bay) bridge was washed away.

Timber harvesting north of the river has taken place utilizing many of the roads which branch from the old North Umpqua Highway. Completion of Highway 138, the North Umpqua Highway, in 1964, facilitated both recreational and timber harvest development.

Ownership - There are approximately 34,000 acres in the planning area. The land is nearly equally divided between public and private ownership. Approximately 17,440 acres are in private ownership, 16,218 acres are administered by the Bureau of Land Management; 389 acres are owned by Douglas County, and the state of Oregon possesses 56 acres in the vicinity of Susan Creek State Park.

Fishery - The North Umpqua is nationally famous for its excellent summer and winter steelhead fishing. The trout fishery is maintained on a put-and-take basis by the Oregon State Game Commission by planting legal-sized releases.

Winter steelhead, coho, salmon, and coastal cutthroat use tributaries within the planning area. Spring Chinook, steelhead, and coastal cutthroat move through the planning area to reach upstream spawning areas. The North Umpqua above Rock Creek is closed to salmon angling. The remaining fishery above this point is open to fly fishing only.

3. Recreation and Esthetic Resources

Tourists and vacationers have discovered the North Umpqua Canyon and are entering it in escalating numbers, particularly since the new highway was completed. This road ties together central Oregon with the coast.

The first recreational development began in Idleyld Park in 1920. It combined picnicking, overnight camping, cabins, a dance hall and store. Other campgrounds were maintained by service organizations. A dude ranch and the Steamboat Inn were constructed to form the nuclei of several other resorts on the river. The first public construction of camps was by the USFS when they constructed trail shelters and camps. Some of these rudimentary shelters still remain although the trails they served have been superseded by roads. By 1937, there were campgrounds at Apple and Canton Creeks, and at Island.

Douglas County Parks entered the canyon for the first time with Richard G. Baker Memorial Park in 1952. This is a wayside.

Susan Creek State Park was constructed in 1956 by the State Park Department and expanded under a Recreation and Public Purposes Lease with BLM in 1962.

View westward. Planning area boundary is near lower edge of photo. Bob Creek occupies the prominent canyon to the upper right of center.

Recreation attractions range from the river to the adjacent lands on which a wide variety of activities can be pursued. However, the North Umpqua's proximity to the highway, its excellent fishery and its inherent beauty tend to concentrate people along its banks.

The North Umpqua Highway is a preferred route by many to reach the east side of the Cascades because of the beauty of the drive. Areas along the river range from old-growth stands to logged over units. Past high-grade cutting on the river banks in some places has left a canopy of trees such that, to casual observation, the area looks untouched. Powerlines interfere with the views in some areas.

Fishing for summer steelhead provides a great number of hours of quality fishing for many people. It is the steelhead resource which this river provides that gives the North Umpqua its nationally famous reputation. Trout fishing is rated as fair with the fishery being maintained almost entirely by the Oregon Department of Fish & Wildlife hatchery program. Refer to pages 171-186 in the Appendix for the "Analysis of the Angler Use of the North Umpqua River Salmon and Steelhead Fisheries."

Many feeder streams along the river have falls which are scenic attractions. Susan Creek has two falls with recreational potential. The lower one in Section 14 has a trail and picnic table development.

Also, in the Susan Creek area are some rock piles throught to have been built by Indian youths as a part of an initiation ceremony. They were examined in 1962 by the University of Oregon Museum of Natural History and it was recommended that they be protected. Some disturbance has been noted although they contain no artifacts. A 6-foot fence has been erected around them for protection purposes. On November 20, 1974, the Susan Creek Indian Mounds Site was entered in the National Register of Historic Places. There are no other known archeological or historical sites known to exist within the proposed plan area at this time.

Chimney Rock, a prominent feature in T. 25 S., R. 2 W., Sec. 32, lies over the ridge from the Umpqua Valley, but the best approach would be from the South or North Umpqua side. The peak itself lies on Weyerhaeuser Company land, so any trail development would necessarily be a cooperative endeavor.

A natural rock bridge or arch also exists in the bowl below the eastern shoulder of Chimney Rock and the combination of features would make this a worthwhile trail development.

Recreation Sites

The following is a complete list of developed recreation sites within or affecting the planning area:

Douglas County Park Department

Whistler's Bend is the only overnight camping facility operated by Douglas County in the vicinity of the study area. Any development by the county to expand overnight camping will most likely be at this park. The county would like to keep Whistler's Bend as rustic as possible so

not too much development is contemplated there. Smith Springs is the only other county park in the area which possesses overnight camping potential. Its capacity will be six units and requires the installations of showers, improved restroom facilities and a caretaker.

The remainder of Douglas County Parks in the area are all waysides. Most of these waysides were established to cope with existing heavy use for fishing or sightseeing access to the North Umpqua River. The intent is to provide basic sanitation and minimal facilities.

State of Oregon

Susan Creek State Park occupies 147.99 acres of BLM land in T. 26 S., R. 2 W., Secs. 23 and 24 under the terms of a Recreation and Public Purposes Act lease. This lease is for 20 years and will expire April 10, 1982. The park has been well developed for both overnight and day use. Considerable land, suitable for recreational development, adjoins the present site on both sides of the highway.

U. S. Forest Service

Forest Service developments have occupied all areas suitable for campground development within the National Forest in the North Umpqua Canyon with the exception of one site which is currently programmed for construction. With the completion of Dry Creek Campground, sometime in the next five years, Forest Service campground development on the main river will be completed. At this point, the intention is to convert Apple and Island to day-use areas since they are marginal sites for overnight use.

Some of the smaller Forest Service sites are developed mainly to provide basic sanitation at trail heads and popular fishing holes. Several trails are developed leading away from the river and the Mott Trail which parallels the river on its south bank, leads from Steamboat to the vicinity of Bogus Creek before climbing up the ridge. Existing Forest Service trails are popular with the public and their use is high.

The Forest Service recreation developments are dispersed along the canyon from 2 to 30 miles east of the plan area.

Bureau of Land Management

The Bureau of Land Management has one wayside and one trail in the North Umpqua Canyon. These are Lone Rock picnic area and Susan Creek Falls Trail. There are no BLM campgrounds near the river. BLM campgrounds in Rock Creek are Millpond and Rock Creek. Both areas have overnight and day-use facilities. Millpond has a large shelter and irrigated lawns which make this area very popular for organizational use.

On the north side of the highway along Susan Creek, there is a summer home tract. This was offered for lease in 1959 and some of the tracts went unclaimed at the initial offering. All but three were terminated for failure to construct improvements within 5 years or to maintain annual lease payments.

Land Suitable for Site Development - Beginning in the western portion of the area, a recreation site potential exists on the south bank in Sec. 11, T. 26 S., R. 3 W. This is a bench along the river approximately 200 feet deep and 4/10 of a mile long. It is vegetated with hardwoods and hemlocks and is called Myrtle Bench.

Farther east, also on the south bank, is the Swiftwater area in Sec. 1, T. 26 S., R. 3 W. Development of this area is part of the present proposal. There are 3 benches or terraces, the lowest of which was inundated on the margins by the 1964 flood. A second terrace exists with a flat, poorly drained, relatively open area which grades into a wooded hillside. The third terrace rises above the river on the westerly portion of the site and is heavily wooded on the margins, but contains a poorly drained meadow area with scattered hardwoods growing in it. Heavy mortality among conifers included in the meadow indicates that it is of relatively recent vintage, perhaps a product of interrupted drainage.

Vegetation on the site is typical of the planning area. Old growth Douglas-fir predominates in the stand along with western hemlock, grand fir, western redcedar, Pacific yew and sugar pine. Vine and bigleaf maples occur and Oregon ash. Oregon myrtle occurs on the site, but not east of it.

Understory vegetation is typical of the planning area and includes salal, various huckleberries and dogwood. Several fern varieties, grasses, rushes, sedges, cone flowers, skunk cabbage and many other flowering plants are present.

At present, the south abutment of the Swiftwater Bridge stands on the western portion of the first bench and the road extends for several hundred feet south climbing to the second bench and terminating at the section line between Sections 1 and 12. The surface is paved with blacktop 24 feet wide. Both cuts and fills have been hydromulched. Top soil was dressed over some fill areas. Excellent grass cover exists on all disturbed soil areas as a result.

A wooden stairway has been constructed from the south end of the bridge extending down the bank to the rocks in the river channel. This was built to protect the embankment while providing access for fishing.

An 8-inch well has been drilled and cased to supply water for the site. It is 100 feet deep and had a static water level of 15 feet in January 1972. Pump testing at that time drew the level to 30 feet after an hour of pumping at 80 gallons per minute. Maximum capacity was determined to be between 90 and 120 gallons per minute.

Use of the site is fairly intense as fishermen park and cross the first and second benches to reach the river. Overnight use occurs fairly regularly along the road, particularly at its terminus. Litter, sanitation and fire risk from open campfires constitute the greatest current hazard to the site.

Across the river at the north end of the bridge is an area which is proposed to be developed as a visitor information center (VIC) complex. The site is an old gravel bar composed of boulders, cobbles and finer material. Part of the site is stabilized with a developing soil and supporting moderate-sized trees. As it slopes toward the river, flooding frequency increases resulting in scouring and debris accumulation. Flood level in 1964 appears to have reached an elevation of 782' at the site. The water was relatively quiet particularly near the road. High water issuing from Rock Creek, just upstream, tends to push the main channel current away from this site.

Heavy recreational use exists on this area with damage to grass and other vegetation resulting, particularly to the east of the bridge and its approach. Two trash containers constitute the sole management activity here.

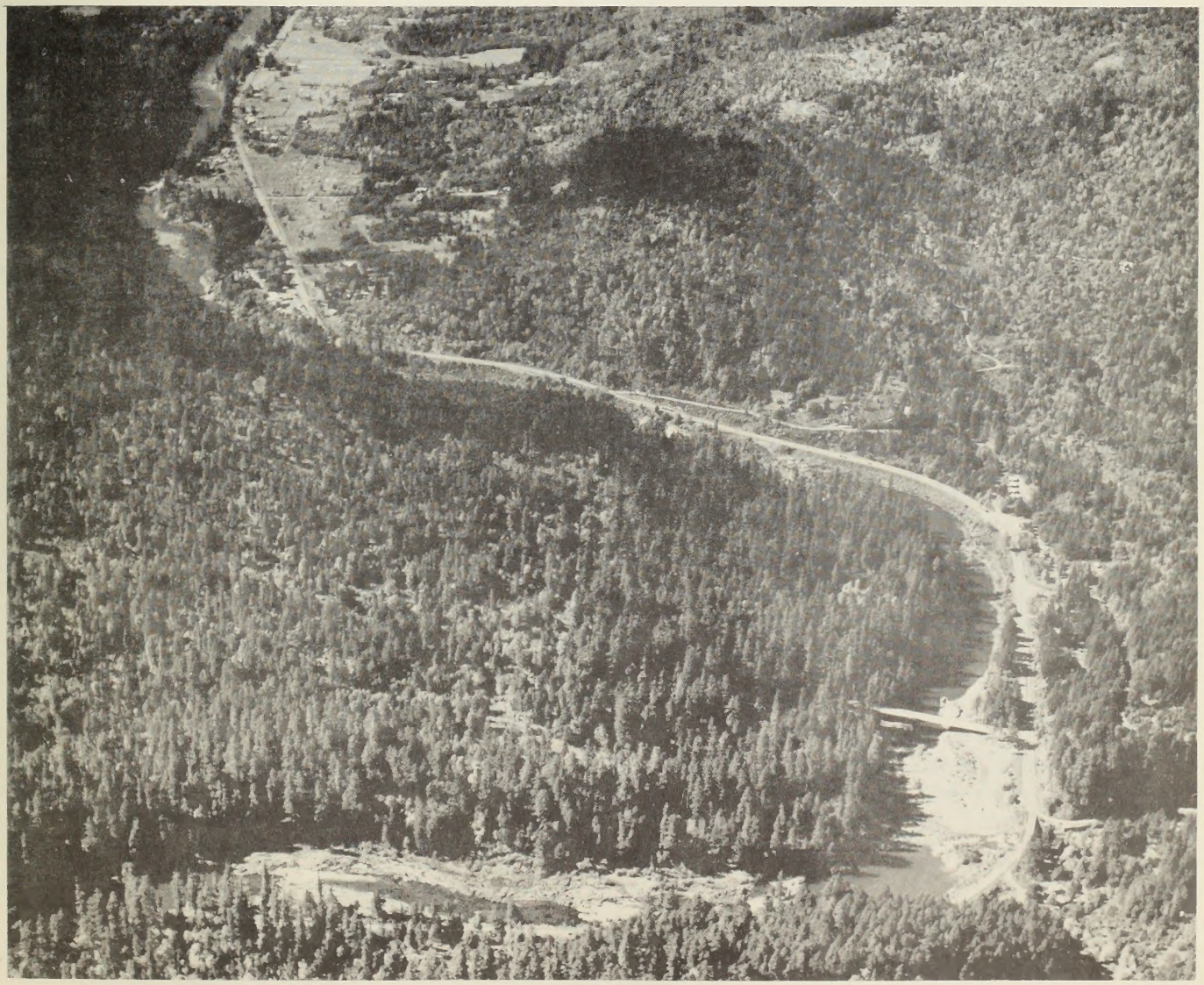
At Hill Creek, a scaling station located on O&C land and formerly used by the Forest Service has been dismantled. This is a small area but flat and thus possesses development potential for a day-use or information site. All that remains of the scaling station is the gravelled access road leading from the highway on an outside curve, through the site and out to the highway again. A thick strand of trees and other vegetation screens all but the entrance and exit from the highway. A natural condition prevails beyond the gravel. Management objectives are to continue to preserve it as is, for future use of its recreation value.

In the northeastern portion of Sec. 22 between the highway on the south and the section line on the east, a flattened area two to three hundred feet deep extends westerly. Vegetation is large old growth conifers and underbrush. By virtue of topography, this area has development potential although it has no points of attraction, is subject to highway noise and is bordered on one side by a private trailer park.

The Rocky Run recreation site potential in Section 17 consists of three benches. The lowest adjoins the river and was flooded with 5 or 6 feet of water in 1964. The 1971 flood crested at bank level without inundating the terrace. Flood frequency is of a level which would permit either placement of low-capital investment or flood proof improvements on this bench. It includes about 2000' of BLM and 600' of Douglas County North Umpqua River frontage. This terrace is 100' to 250' wide and is well vegetated with Douglas-fir, sugar pine, grand fir, Pacific yew, vine maple and brush.

The second bench is the smallest and similar to the first. The third bench is fairly extensive and lies about 80' above the first bench. It supports vegetation similar to that on the others.

Looking westward, the inner portion of the river's horseshoe encloses a heavy stand of timber within which will be the proposed Swiftwater Recreation Site. Rock Creek enters from the lower right.



Rocky Run, a perennial stream, flows through the site, emerging from a deep ravine at the upper portion of the area to flow across the lower benches. Its water quality is very good but it is too small to support anadromous fish. Small trout populations likely exist in holes.

Access to the site may be gained either by a river trail (Tioga Trail) or from a spur of the Bob Butte Road. Total acreage is about 18 acres of O&C and one or two acres of county land.

The South Shores potential recreation site is on a broad bend of the river across from Susan Creek State Park in Sec. 23, T. 26 S., R. 2 W. There are about 40 acres of suitable land within this site. River frontage totals 3400' with a variety ranging from pools to shallow rapids. Swimming and fishing opportunities are abundant. Scenery is very good. Vegetation is very similar to that of Swiftwater and Rocky Run with the exception that some Douglas-fir pole stands occur on this site. Four terraces form the topography with excellent separation of areas thus possible.

A small perennial stream crosses the area which has been subject to sluice-outs in the past. Two small drainages also cross the area. The area is accessible by vehicles through extending the Bob Butte Road through the existing system near Smith's Ford to the site. If this system is developed, it would leave the old road at some point before visibility from the river becomes a problem and remain back on the benches away from the North Umpqua.

Alternatively, the area could be developed for trail oriented recreation; in which case, the Tioga Trail will provide access to the lower portion of the site, while connecting trails could drop down from regions above the area.

There is a great amount of development potential here. The area is large enough and screened enough by changes in vegetation and topography that improvements and activities can be so sited as to be minimally evident outside of the immediate vicinity.

Another series of benches and slopes extends from South Shores to very near the Smith's Ford Bridge. Vegetation is similar to that of South Shores. One stream crosses this area and it has been repeatedly sluiced-out. This area is well screened.

Adjacent to Susan Creek State Park on the north side of the river are 3 areas which can be developed. West of the day-use area is a small section of level land covered with heavy vegetation typical of this region. It is suitable for expansion of the day use section. East of the overnight camp are a few acres of land which may be suitable for expansion of this area.

Across the highway from the day-use area in the north portion of Section 23 and the southwest of Section 14 is an area of 60-80 acres of land primarily suitable for recreation use. Vegetation here consists of the last vestiges of an old Douglas-fir stand with intermingled young and middle-aged trees. Age classes cover a wide range. The site appears to be somewhat xeric as it has a southerly aspect and is within a rain shadow from Thunder - Shivigny Mountain. Even though xeric, it presents concomitant problems of a high water table during wet periods of the year on a portion of the site. Apparently a shallow permeable section overlies an aquaclude which creates a surface water table for a portion of the year. Rapid desiccation later drains this low capacity aquifer with the result that xeric conditions then prevail. As a result of this odd combination, the site supports Douglas-fir and associated species but exhibits a marked propensity for producing poison oak and grasses if the stand is significantly opened. Vegetation management will be challenging in this area.

Trails

Susan Creek Trail - The trail at Susan Creek is not well known or marked and use has been relatively light. With the development of Swiftwater and an interpretive program, this trail can become a valuable adjunct to the North Umpqua's recreation program. The presence of a picnic area at this very beautiful site, as well as the Indian mounds, presents a dual attraction. The trail crosses the powerline right-of-way which has re-vegetated with big leaf maple, brush and a few Douglas-firs. This provides a somewhat interesting change in texture in going from timber to an open area and back into timber again in spite of the innate visual problems of cleared rights-of-way.

Use of Recreation Sites Within or Close to the Canyon

Douglas County Parks - The following table indicates the level of usage occurring during sampling on high-use days. The "percent of usage" indicates what percent of the total installed facilities were occupied and used during the sample period; e.g., a total of ten picnic tables available, five being used on a Sunday afternoon equals 50% usage. These figures are averages and use exceeded 100% when, for example, two different family units shared the same table or when a camper trailer was allowed to use an undeveloped spot in the area under overflow conditions.

NORTH UMPQUA

RECREATION SITE

FACILITIES AND PERCENT OF USAGE

Park Name	Picnic Units 1972	Picnic Units 1970	Tent Camping Units	Percent Usage of Installed Facilities 1972	Percent Usage of Installed Facilities 1970
Whistler's Bend	32	25	18	125	100 during summer
Richard G. Baker Memorial Park	13	25	None	100	100 during summer
V. T. Jackson Wayside	2	3	None	100	80 during summer
Cable Crossing Wayside	--	4	None	--	100 during summer
Lone Rock Wayside	2	2	None	100	80 during summer
The Narrows	2	6	None	150	100 during fishing season
Cavitt Creek	5	5	None	75	80 during summer
Smith Springs	7	12	None	100	100 during summer

North Umpqua Area Use Data - Douglas County Parks - 1970-2

State Parks - State Park usage at Susan Creek State Park has grown steadily. The camp is full to capacity nearly every night during the summer-use season and turn-aways are high. Campers have been permitted to use the day-use parking lot for overnight parking and high nightly turn-aways have still resulted. Day use is less intensive than overnight camping but none-the-less, a significant number of visitors is accommodated and a rising trend continues as shown in the following table:

Susan Creek Park

Day Visitors

1971-72	1970-71	1969-70	1968-69	1967-68	1966-67	1965-66
44,000	45,676	39,924	42,676	27,600	23,128	26,208

Overnight Camping (Camper Nights)

11,900	11,700	9,592	8,244	8,840	9,092	7,671

Turn-aways recorded during July and August 1970 at the park were, respectively 17+ and nearly 19 per day. The park manager reports turn-aways as high as 50 units per day at times.

U. S. Forest Service - Forest Service recreation areas show a similar pattern of use with the exception of picnic facilities. Forest Service day-use (picnic) areas are, in most cases, under utilized. This is attributable to the fact that they are somewhat more remote, are not generally located at destination points and compete with county waysides which are closer to urban centers, thus more accessible. Similarly, BLM recreation areas at Rock Creek and Millpond are more accessible with the latter also having a community recreation development as an attraction.

Campground use has climbed from 20,500 visitor-days in 1965 to 36,800 in 1971 for Forest Service sites. This represents a total increase of 80 percent for the period. In like manner, camping activity has increased 37 percent from CY 1967 to 1971. The Forest Service feels that their present facilities are meeting their demand except for several peak weekends. While camping has shown a steady increase, driving for pleasure has shown the sharpest rise in recreational use of the National Forest here.

ANNUAL RECREATION USAGE FOR U. S. FOREST SERVICE
RECREATION SITES - NORTH UMPQUA COMPOSITE
Visitor Days Use x 1000

Type of Use	CY 1971	1970	1969	1968	1967
Camping, General	13.1	10.8	9.1	8.7	7.8
Camping, Auto	6.5	5.6	3.9	3.7	3.6
Camping, Trailer	11.8	10.4	11.7	10.8	10.2

Continued

ANNUAL RECREATION USAGE FOR U. S. FOREST SERVICE
RECREATION SITES - NORTH UMPQUA COMPOSITE
Visitor Days Use x 1000

Type of Use	CY 1971	1970	1969	1968	1967
Camping, Tent	4.8	4.4	3.9	4.1	3.5
Private Resort	15.8	15.5	14.6	13.3	2.7
Picnicking	2.9	2.7	4.3	2.2	1.7
Total Use	104.0	97.3	69.0*	45.4	29.8
Kind of Site/Activity					
Recreation Roads		34.4	8.2	--	--
Family Picnic Grounds		1.9	2.6	6.7	7.5
Family Campgrounds		31.6	29.7	24.7	19.5

*This figure represents both an increase in use and an increase in sampling base.

Bureau of Land Management - BLM recreation sites have not been sampled in the more distant past by statistically viable methods. However, in the past 3 years, reasonably good data has been collected. Maintenance and fee collection are engaged in daily during the summer season both at Millpond and Rock Creek sites. Personnel engaged in these activities report capacity use during most of the summer with excessive turn-away on peak weekends. Organizations and groups from both the local and the western region make use of the organizational facilities at Millpond. These groups utilize the area both within and out of the high-use season. Many out-of-staters make these two camps their primary destinations, returning year after year. Heavy use of these sites is significant as they are several miles from the North Umpqua Highway and not well marked at the Rock Creek Access Road junction with that highway.

Driving for pleasure, rock hounding and general use of O&C and intermingled lands appear to be the most extensive recreational pursuits in the area.

ANNUAL RECREATION USAGE BLM SITES AT

MILLPOND AND ROCK CREEK - VISITORS

	CY 1972	1971	1970
Overnight	5799*	6258	4253
Day Use	5118*	4504	2178

*Rock Creek closed until 7/29 for repair of water damage.

Projected Needs

Douglas County Parks considered to be pertinent to the planning area have been used to, or beyond, capacity for the past several years.

Susan Creek State Park has experienced an annual growth rate of 9.2% in day-use and 7.5% in overnight use.

Using the Forest Service concept involving the calculation of the level of usage occurring on a site in terms of the percent of its theoretical capacity, Susan Creek Park, in 1971, stands at 38% for overnight use. Forest Service research indicates that at a well managed site, usage stands between 20 and 40% of theoretical capacity. Extremes beyond these termini indicate under-utilization or over use. Susan Creek was calculated on the basis of a 200-day season which includes the slower months which bracket the ordinary high use summer season. Use of the summer high period alone would undoubtedly produce a much higher figure, thus it appears that this park, too, has a considerable amount of unsatisfied demand associated with it.

Day use at Susan Creek is considerably below its capacity, although it is increasing.

Forest Service overnight camping sites within the North Umpqua Composite, have been receiving a 10.2% annual rate of increase. At this level of increase, some sites which are currently under utilized will soon be inadequate.

Currently, developed sites within or near the planning area are providing 33,400 visitor-days* of day use and 86,000 visitor days of overnight use. The total for both dispersed and developed site use is 210,500 for 1972. These figures include the Forest Service North Umpqua Composite area as well as BLM, Douglas County and private lands.

*Based on a 12-hour visitor day.

Projections indicate an overnight demand of 223,000 visitor days by 1982. Total use is expected to reach 1,012,000 visitor days by that year based on a 4-year trend of 17% per year increase.

Figures were collected from several agencies using equally diverse methods of data collection and tabulation. Using the best information available, these data were converted to a common basis, the 12-hour visitor day and projections were based on this.

Many factors can affect the ultimate complexion of processes based on extrapolation from current data, including the effect of the predictions themselves, so specific reliance on such projections should be avoided. However, extrapolations can and do indicate trends fairly accurately in the near future and generally so in the more distant periods. It is evident that a rising demand is occurring within the region for recreation facilities. Use figures and observation demonstrate that the North Umpqua River is a popular and growing region of outdoor recreational pursuits. The major impacts are and will continue to be from metropolitan areas in Oregon and from northern California.

Recreation Summary - Ability to meet future demands for overnight camping is inadequate in the western portion of the canyon. Whistler's Bend is providing 13,700 visitor days and operating at capacity. Only a nominal increase can occur here without expansion. Susan Creek, similarly is at capacity providing 23,800 visitor days. BLM campgrounds in Rock Creek provided 11,600 visitor days last year with one campground closed for part of the season. A small increase can occur at these sites but most likely will not exceed 2,000 visitor days.

Forest Service sites east of the planning area can accommodate an increase from their current level of 36,800 visitor days to about 51,000 visitor days. Some of the smaller sites are heavily used and cannot take more use while the additional use can be absorbed by the two larger sites. The demand is, then, centered to the western portion of the canyon where no additional capacity exists, and the excess capacity lies to the east. An additional complication is that over use is occurring during the high volume summer season and most of the additional capacity is available in the months bracketing the summer months.

In 1972, active demand for overnight camping was satisfied at 86,000 visitor days, drawing against an ultimate capacity of 102,500. Projections indicate that the 1974 demand for this area will equal 104,000 visitor days.

Economically, recreational income is not a significant factor

in the overall economic picture of Douglas County although it assumes a significant role in local areas. Two of the areas are the coastal region and eastern Douglas County from Glide to Diamond Lake. The recreational quality available locally does contribute greatly to the area's general livability and is consequently an important social value to Douglas County residents.

4. Timber Management Activities - Man has been harvesting timber from the North Umpqua Canyon area for decades. During that time approximately 46% of the canyon's old growth timber has been harvested. 67% of the old growth timber on private lands has been harvested while only 21% of BLM's old growth is harvested. Sale of BLM timber within the plan area began in 1944 and had continued until 1972. (See Vegetation Pg. 22)

Douglas County's dependency on the timber resource has been put at 68.7 and 98% depending on which study one chooses. Both agreed, however, that timber and related industries account for the major portion of the export base for the Douglas County economy. For every 1 million bd. ft. decline in Bureau of Land Management timber sales, county sales would decline 0.66% according to a recent study.

An economic profile for the Bureau of Land Management in Oregon determined that an average employment of 6.2753 was required for every 1 million bd. ft. harvested. An additional 2.223 service industry employees would be required for each worker in the timber industry.

K. Esthetics and Human Interest

Esthetic Analysis: The esthetic situation in the North Umpqua Canyon can be characterized as generally high value. Water in the river exhibits low turbidities and pleasant coloration throughout the summer. Heavy fall rains precipitate higher turbidities which generally are of short duration. High water periods throughout the winter result in turbid water with clearing between periods of heavy precipitation. Muddy water will occasionally issue from individual drainages, but is usually generated system wide only under severe weather conditions.

Residential and commercial development in the western portion of the canyon presents a largely pastoral character. Development is fairly continuous to Rock Creek. From Rock Creek east, there are only scattered enclaves of population on the north bank. Parks and waysides are tastefully developed and well screened. Most of the private development is esthetically compatible, with the few exceptions not radically altering the general appearance of the canyon.

A detailed analysis of visual resources is not within the scope of this document but the more prominent features are identified.

The North Umpqua Highway is the most obvious intrusion on the river from an esthetic and environmental viewpoint. Built at a water grade throughout most of its length its right-of-way clearing has denuded the banks to the waterline in many places, particularly where rip-rap extends into the stream. Random camping on turn-outs has created a sanitation and litter problem in some places. In spite of its shortcomings, many beautiful vistas are available along the highway and vegetation forms an effective nearby screen along much of its length.

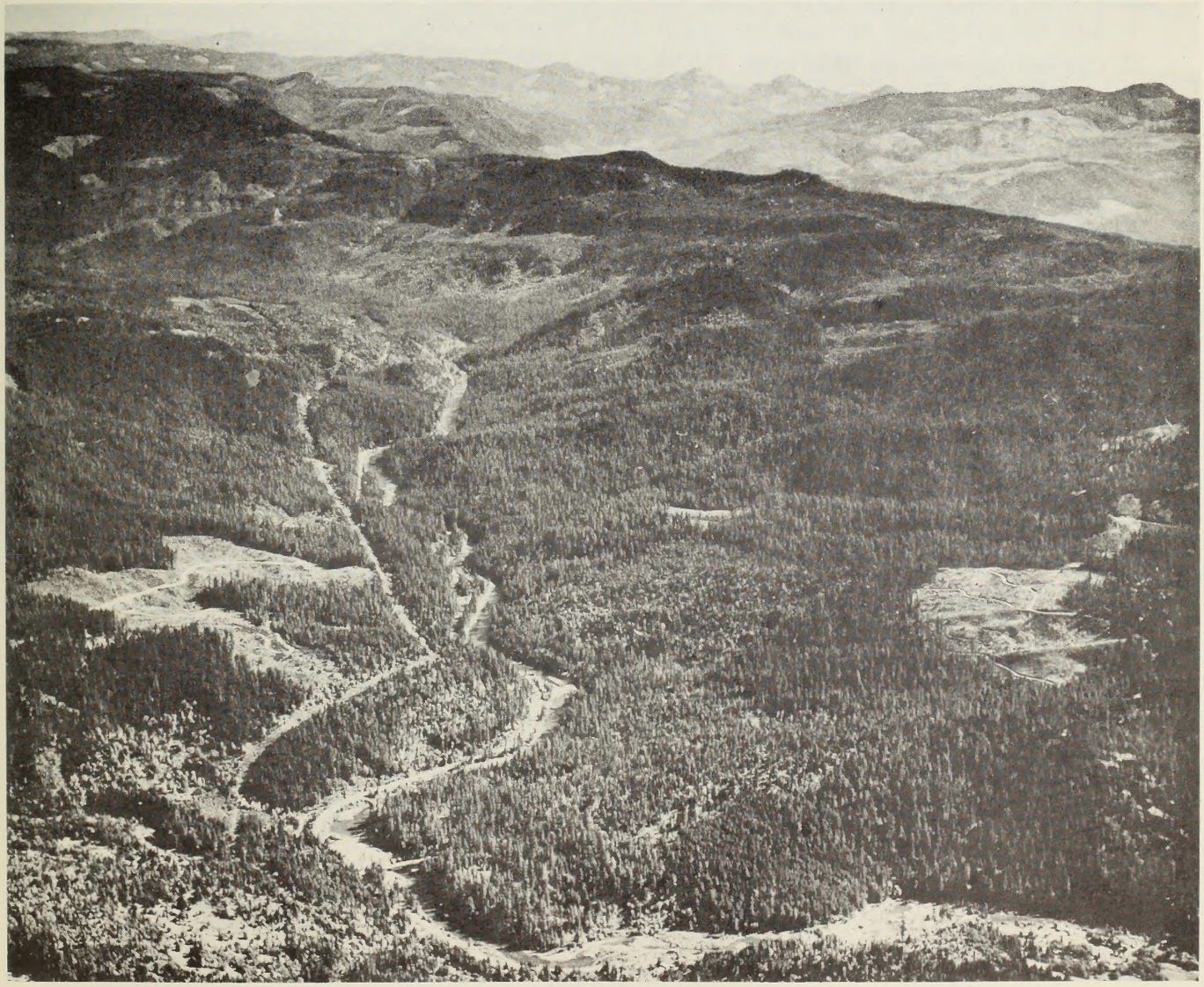
Vistas on the western end of the area include grassland clearings made for pasture, and forest harvests on Scott Mtn. Progressing east, fields and mixed hardwoods blend into logged-over country in the uplands. In the Idleyld vicinity, young stands predominate with some harvest areas visible in the mid-slope area. Color and texture are quite variable in this area due to widely differing vegetation types.

Near Idleyld, the river assumes a greater visual variety than it possesses in its lower reaches. Here it passes through a large cascade to a constricted turbulent pool and channel, then it enters a confined white water channel (the"Narrows") from which it emerges in a broad pool called "Salmon Hole." Rock formations in this location form ledges which are small falls at some water levels. Potholes caused by current rotated pebbles are also interesting features here.

Habitation ends on the south side of the river in the vicinity of Idleyld Park. A little in excess of a mile east of the last home, the Swiftwater Bridge spans the river near Rock Creek. Located near the North Umpqua Highway's Rock Creek Bridge in an area of commercial and residential development, the bridge, which was designed, located and constructed to be compatible with the environment, provides little intrusion in the natural scene.

A deep clear pool at the Swiftwater Bridge provides a good opportunity for viewers on the bridge to observe salmon, steelhead, and trout holding there. Jutting rock masses and two cascades with drops of several feet form focal points at, and upstream from, the day-use portion of Swiftwater. Old-growth forest predominates in this vicinity. High-grade logging is evident both on the north side of the highway and further east on the south side. The texture and color of the landscape are relatively monotonous due to an unbroken old-growth condition of the stand. A lack of striking land forms contributes to the relative lack of visual interest. The river presents good visual variety through this area though it lacks the stronger features it has in other areas.

View south eastward (upstream). Rock Creek and the Swiftwater area are in the lower left while Bob Butte occupies the upper center.



East of the Cable Crossing area, the seen portion of the south side is in old-growth timber until the cutover area on Bob Butte comes into view. The north side is similarily undisturbed, for the most part, until the eastern portion of Section 17 is reached.

From this point through the Hogback in Section 16, extensive cutting appears. Continuing on the north side, a few rock pits, natural meadows and a trailer park appear in the largely unbroken timber. Near the end of the planning area, a slide which is periodically mobile bares fresh soil next to the road.

The hogback is a steep ridge of resistant rock which compels the river to execute a sharp recurved bend. On the south side, the Bob Creek drainage shows extensive logging interspersed with standing timber and a high voltage transmission corridor. Texture and color are stronger here because of vegetation and terrain variety. Bob Butte itself forms a strong part of the view approaching from both the east and west.

Near the river, high-graded areas with many low-valued trees left after logging blend into uncut timber at the site of the Smith Ford Bridge. Here, two piers and both abutments remain of the old bridge. The road leading to the bridge on the south bank is not visible in the summer and scarcely visible for a short distance in the winter when leaf-fall from hardwoods has occurred.

Foreground areas on the south bank are uncut east of Smith Ford with the exception of the blowdown logging in Section 24. Middleground areas, while they appear sparingly due to terrain, are heavily logged over. Grass, brush and tree reproduction has covered most of the cutover area.

Color variety is present in the river water, but only sparingly so, and on a seasonal basis in vegetation. Blooming dogwood creates strong white accents against the darkened old-growth understory in the spring. Vine and bigleaf maple combine with dogwood to provide fall leaf color which occasionally attains some brilliance.

Two commanding rock prominences top ridges in Sections 8 and 10, T. 26 S., R. 2 W., north of the river. They are not visible from the river or highway, but can be seen from locations along the south side of the canyon. Cliffs and fluted walls composed of brownish rock accented by orange highlights make the prominence in Section 8 a spectacular feature even from a distance. The other rock is a gray knob marked by the acuteness of its cliffs.

Noise is prevalent in the canyon. Heavy traffic which includes logging trucks produce a sound level which exceeds 90

decibels, extending perhaps, to 110 decibels. Landforms and heavy vegetation help to screen this sound, so it diminishes rapidly away from the roadway.

Primitive Classification - No areas have been identified in the planning process. A primitive area must meet the following criteria: Code of Federal Regulations 20701, Extensive natural, wild and undeveloped areas and settings essentially removed from the effects of civilization. Essential characteristics are that the natural environment has not been disturbed by commercial utilization and that the areas are without mechanized transportation. Our decision not to classify this area as primitive was made in October 23, 1973 and was based on the past and present activities within the planning area.

Wild and Scenic River Classification

Federal Act - Of the three categories established by the Federal Wild and Scenic Rivers Act, the North Umpqua will qualify easily for the "Recreational River" classification but only marginally or not at all for "Scenic River" category. It will not qualify at all for "Wild Rivers." "Scenic River" classification requires shorelines or watersheds largely primitive and only accessible in places by roads while "Recreational Rivers" allows ready access by roads or railroad and some development along shorelines.

No administrative action or legislative attention has been undertaken to include the North Umpqua under the Federal Act.

State Scenic Waterways - A move has been initiated to request the State Highway Commission to study the feasibility of including the North Umpqua from Soda Springs Dam to slackwater at Winchester under the State Scenic Waterways Act (ORS 390.805 to 390.925). No administrative action has been undertaken as yet. Some portions of the river may qualify under the Act. Substantial public opposition to such a classification has been demonstrated.

L. Ecological Interrelationships - The canyon contains basically two habitats: a coniferous forest and a cold mountain river.

Coniferous Forest Habitat - The coniferous forest in the canyon contains a complex of trees, shrubs, herbs, bacteria, fungi, protozoa, arthropods, other invertebrates of all sizes, vertebrates, oxygen, carbon dioxide, water, minerals, and dead organic matter. The forest supports a variety of species but is dominated by Douglas fir and hemlock.

Physical Factors - The physical factors that affect plant and animal life can be divided into:

Above the surface: These climatic factors include, but are not limited to - slope aspect, solar radiation, air temperature, air humidity, wind, lightning, and carbon dioxide content of the air.

Below the surface: Geologic and soil factors include the nature of the parent material, the soil profile, physical and chemical properties and soil moisture relationships.

Biological Factors - The biological factors can be classified in terms of the basic functions they perform in the community:

Producers: These are green plants that assimilate the nutrient minerals by the use of energy and combine them into living substance. They include flowering plants, gymnosperms, mosses, ferns, and liverworts.

Consumers: These are chiefly animals that eat and digest organic matter, releasing energy in the process. They include mammals, birds, reptiles, insects, roundworms, flatworms, parasitic fungi and bacteria.

Reducers: These are chiefly bacteria and fungi that return complex organic compounds back to the original non-living mineral form. These include micro and macro-organisms such as millipedes, earthworms, mites, fungi, and bacteria.

The interrelationships between and within the physical environment and the biotic community can be described in terms of the nutrient cycle, energy flow, and hydrologic cycle.

Nutrient Cycle: Nutrients are the basic inorganic chemicals which are utilized first by plants, then by animals, to form high energy compounds such as sugars, as well as plant tissues, auxins, and other necessary substances. These chemicals are taken from the soil and incorporated into plant materials. They then cycle throughout the biotic community as plant materials are ingested by animals which are eaten in turn by higher level consumers. Eventually, decomposers return them as inorganic salts and elements to the soil where plants retrieve them to commence the cycle all over again.

Nutrients remain available to the ecosystem so long as they are not removed from the site by leaching, volatilization, erosion, or removal of biological

material. They are constantly being replenished on most sites by atmospheric processes and breakdown of the parent material in soil formation. Some soils, particularly kaolinite clays, hold phosphorus anions so tightly that this element is nearly unavailable to plant roots.

Energy Flow: Energy in the ecosystem is non-cyclic. That is, it is degraded and dissipates as it passes from the producer level in green plants through each trophic level consisting of consumers.

Energy flow through the forest ecosystem is closely correlated to the nutrient cycle. Virtually all energy enters the biotic community as sun light. But one percent of the light that falls on the forest is transformed by green plants into the chemical energy of food. The remainder is reflected from the leaves, transmitted through them or dissipated as heat through radiation and convection.

The food that is manufactured by green plants is passed through the tissues of the plants, and the tissues of the planteaters, predators, scavengers, parasites, saprophytes, and the other consuming and decomposing forms of animal life. In each group, some of the food is used to build tissue and some as fuel for bodily processes, growth, reproduction, and movement. The chemical energy of the food fuel is converted, through respiration, to heat energy that is lost to the air, to space by radiation, and to chemical bonds through endothermic reactions.

Hydrologic Cycle: The hydrologic cycle in the ecosystem essentially consists of precipitation inputs from the atmosphere, interception, infiltration, and percolation through the soil, evapotranspiration, surface runoff, and groundwater runoff. During this cycle, nutrients are moved to tree roots, nutrients are carried up the tree, and moisture is available for decomposition of litter.

Cold Mountain Stream Habitat - The cold mountain streams in the canyon consist of rapids and pools. They contain many species of fish, bacteria, fungi, protoza, arthropods, invertebrates, oxygen, water, carbon dioxide, nutrients, and dead organic matter. The streams support populations of mainly salmonids. No detailed aquatic ecological studies have been done on the North Umpqua. For

that reason, the general processes in and of the stream will be stated.

The physical factors that affect plant and animal life are temperature, oxygen content, amount of sediment, current, nature of the bottom, nutrients, amount of flow, and land - water interchange.

Temperature - Most species and most activities are restricted to a narrow band of temperatures. Aquatic organisms have a narrower limit of tolerance to temperature than equivalent land animals. Rainbow trout have a temperature range of 32°F to 85°F. Preferred range 54°F to 66°F. Opt. temp. 57°F.

Oxygen - Dissolved oxygen content is an important factor in determining what species live in a stream. The streams in the North Umpqua contain an abundant supply of oxygen to support a large population of salmonids.

Sediment - Has two main effects. It reduces the amount of light penetration, thus reducing photosynthesis and it can cover spawning gravel killing the eggs of salmonids.

Current - Determines the distribution of vital gases and small organisms. Current, in part, determines the nature of the bottom in the North Umpqua. In rapids, frequently, hard bottoms composed of stones are found. Rocks offer favorable surfaces for organisms to cling. In pools, the bottoms are usually soft with shifting sand. This soft bottom limits organisms to burrowing forms. Composition of rapids and pools is often 100 percent different. Nutrients that are most important are nitrates, phosphates, and calcium.

Amount of flow, of course, determines the species composition. Flow indirectly affects the temperature. A low flowing stream exposed to the sun will heat up quicker than a large volume stream.

Land - Water interchange is very important in the North Umpqua Canyon. The streams depend on the land area next to the stream for a large portion of their basic biological energy supply. Streams have energy producers of their own, such as algae, but in cold pure streams these are usually inadequate to support the consumers. Many primary consumers depend in part, on organic materials which are swept or fall in from terrestrial vegetation.

The biological factors can be grouped into three classes like they were for the coniferous forest.

Producers: The algae are the most important producers. Also plant material that falls into the stream has to be included here.

Consumers: Three groups likely comprise the bulk of the biomass; namely, insects, crustacea, and fish. The molluscs, annelids, rotifers, and protozoa rank low in importance.

Decomposers: The aquatic bacteria and fungi are very important in reducing organic matter into inorganic form. The inorganic forms are then cycled through the producers.

The interrelationships between the living and non-living parts is essentially the same process that was described for the coniferous forest. The main difference is that the stream is an open system whereas the forest is more closed. Energy is produced then consumed by production of biological material and usually leaves the streams via the North Umpqua. The main consumers are fish which are either caught or move out of the stream to the ocean. Some energy is replenished by anadromous fish who grow by drawing from the Ocean's energy resources, then return to spawn and die in the upper reaches of the system.

M. Probable Future Environment Without the Proposal - In the event this proposal is not enacted localized pollution and environmental degradation will probably intensify at accessible heavy-use areas. Private timber holdings will undoubtedly be harvested along both sides of the canyon. Access to the south portion by private interests will undoubtedly be via extension of existing road systems.

One of the alternatives outlined in Section VIII will undoubtedly be instituted if the proposal is not. The resulting environment will vary depending on the alternative chosen. (See Section VIII Pg.110).

III. Environmental Impacts of the North Umpqua Canyon Management Plan (Unmitigated)

This section analyzes the impacts which may occur if no mitigating measures are taken. Mitigating measures which have been proposed are discussed in Section IV. The impacts of the plan are categorized by environmental components.

A. Physiography and Geology - Construction of roads and quarries will alter the physical nature of the land where they are located. Slight alterations in terrain will occur as a result of the construction of the Swiftwater Recreation Site and to an even lesser extent with the Tioga Trail.

B. Minerals - There are potential road rock sites within the planning area and adequate alternative sites exist so that development and use of these sites can be highly selective. Approximately 35,000 cubic yards will be used for surfacing on the Bob Butte Road. An area of one acre approximately 25 feet deep would produce this amount. The other roads in the planning area would be rocked at a rate averaging 5 cubic yards/mile. Additional rock will be used as rock blankets for stabilizing slump areas and for building retaining walls. No quarry site would be selected that would be visible from the North Umpqua Highway. No additional roads would have to be built just for the purpose of hauling rock.

Construction materials such as sand and aggregate will be utilized. Petroleum products are to be consumed in paving, roofing and coatings. Fuels to manufacture and transport materials, operate construction equipment, heat structures and water, and maintain the recreation facilities will be expended. Metals used on the recreation site are an equivalent reduction of a non-renewable resource.

C. Soils - The heaviest impact on the soil is road construction. Construction of Bob Butte will disturb 60 acres of soil. Approximately 25 acres will be rendered impermeable by the road surface including the permanent spurs.

Another 75 miles of road will have to be constructed to remove the presently merchantable timber in the planning area. Construction of these additional roads would occur over a period of 40 to 50 years.

Road construction operations create erosion and sedimentation problems mainly during the relatively brief period between land clearing, shaping, and stabilization of the new soil surface. Overall, the Bob Butte road location is on stable soils which were developed from volcanic rocks. There are a few unstable areas.

The two unstable spots at "L" station 231+00 & 235+00 could produce sediment and visual impact to persons traveling the North Umpqua Highway. (See soils reports by the District Soil Scientist, FHWA Geologist, and FHWA highway engineer in Appendix, Pg. 147-150,154-170).

These areas were examined with a seismograph. Basically, interpretation of field data shows that very little slumping will occur at "L" Station 231+00. The slumping that does occur will be loose rock that fills the ditch and a portion of the road. A small amount of sediment is expected from this spot.

At "L" 235+50, there is an area that has about a 40-50% chance of sliding. If it fails, it will not be the type that causes the subgrade to be washed away. Most of the slide will be caught on the road. Should it slide, it will have a visual impact on persons traveling the North Umpqua Highway and sediment will be added to surface runoff in the road ditch. Some of this suspended sediment may reach the North Umpqua River.

Other potential problem areas have either been avoided or actions have been planned that would correct the problem situation.

Erosion will occur from the cut and fill slopes, ditch line, and landslides. Landslides are the greatest source of mass soil movements and their greatest incidence occurs along roads.

Sidecasting and the addition of road fills may overload the surface below the road cut and obstruct upslope soil drainage creating saturated conditions in and above the road fill during periods of high rainfall. Poorly designed culvert systems and deep cross drainages, coupled with plugging of drainages by debris may also create saturated conditions in and above the road fills. Oversteepened backslope cuts remove support for the soils upslope. These conditions frequently result in serious slumps and short but destructive soil flows. Burying right-of-way slash will increase the porosity and permeability of the ground surface exposing it to the effects of moisture during the wet season. Localized wet spots can develop and slumping might occur on over-steepened slopes.

Research has shown that patch cutting with roads produced mean annual soil losses equivalent to 0.11 inches over a 9-year period. Another study found that 64% of the mass movements in a particular study area occurred on green breccia parent material which occupied only 8% of that area. There are some green tuffs and breccia in the North Umpqua area.

Mass soil movement triggered by unplanned road building is by far the greatest producer of sediment in managed timber lands. In

other words, several small landslides along a forest road will produce much more sediment than surface erosion of the sidecast, cut bank, and ditch line. Logging roads have a tendency, however, to heal themselves in time. Vegetation on the cut bank and sidecast prevents further erosion. Unstable areas that are triggered in road building normally fail within the first 2 - 4 years following construction. Spots where landslides have originated do revegetate.

The loosened soil and overburden material from quarry operations will be a ready source of soil erosion. There will be an impact on the soil resource by changing the land use to rock production.

The major impacts on the soils from the Swiftwater Recreation Site will be the construction and use of septic tank drainfields, building a short spur to the overnight area, and draining surface water off part of the overnight area.

Soils on the site are developing from deposits left by ancient floods. There are two prominent terraces. The lower terrace is made of sandy soils over gravel. The upper terrace has 5-7 feet of gray clay over silt.

A soil survey made on the site points out that most of the soils on the lower terrace are well suited for septic tank drainfields. (Appendix Pg. 187-188) The best location is on the south side of that terrace.

The impact of a drainfield on the soil is changing the soil around the tile line from aerobic to anerobic (lack of oxygen). The constant flow of effluent causes a buildup of microorganisms around the tile line. These microoganisms feed on the organic matter in the effluent and remove a large portion of the impurities. The effluent passes through a zone of anerobic organisms into aerated soil. From this point, the water is further purified.

On the upper terrace, there is a very poorly-drained clay soil that is unsuited for use as a drainfield. Three areas on this level need surface drainage. Lowering the water table will allow roots to penetrate the soil in the growing season without being killed when the high water table occurs in the winter.
Tree growth will increase slightly and grass growth will be greatly improved. The draining will be necessary to have vigorous stands of grass for campsites and play areas.

Construction and landscaping of the Visitor Information Center will lay bare a small area of soil. A resulting slight erosion loss could occur to the top soil.

Disposal of vegetative debris resulting from site clearing and cutting of dangerous trees or limbs may be by chipping and scattering, burial, burning, or hauling to a disposal site. Chipping and scattering, burial, or disposal at the county landfill will affect soil resources. Chipping and scattering may increase organic content, decrease available nitrogen and preclude vegetative growth by burial of the soil surface. Burial will produce the obvious effect of disrupting soil structure and profile. Large chunks of buried wood will remain intact for very extensive time periods due to oxygen lack and precluded access of some decay organisms. Burning, if not done in containers, will sterilize patches of soil and alter the structure to varying degrees depending upon the duration of heating and maximum temperature reached. Products of burning wood such as soda ash and phosphates will be released to the soil altering its chemical characteristics.

The construction and use of trails has a very minor impact on the soil. Some compaction will take place.

The use of four-wheel-drive vehicles or motorcycles on unsurfaced roads in the winter causes erosion. The ruts in the roads channelize the water which washes away the soil. When Bob Butte Road is built, some of the off-the-road use may occur despite efforts to control it. The amount of off-the-road use is expected to be small.

A summary of major research on the effects of clear cutting on forest soils compiled by the American Forest Institute showed that there is no drastic or irreversible depletion of forest soil nutrient reserve by timber removal.

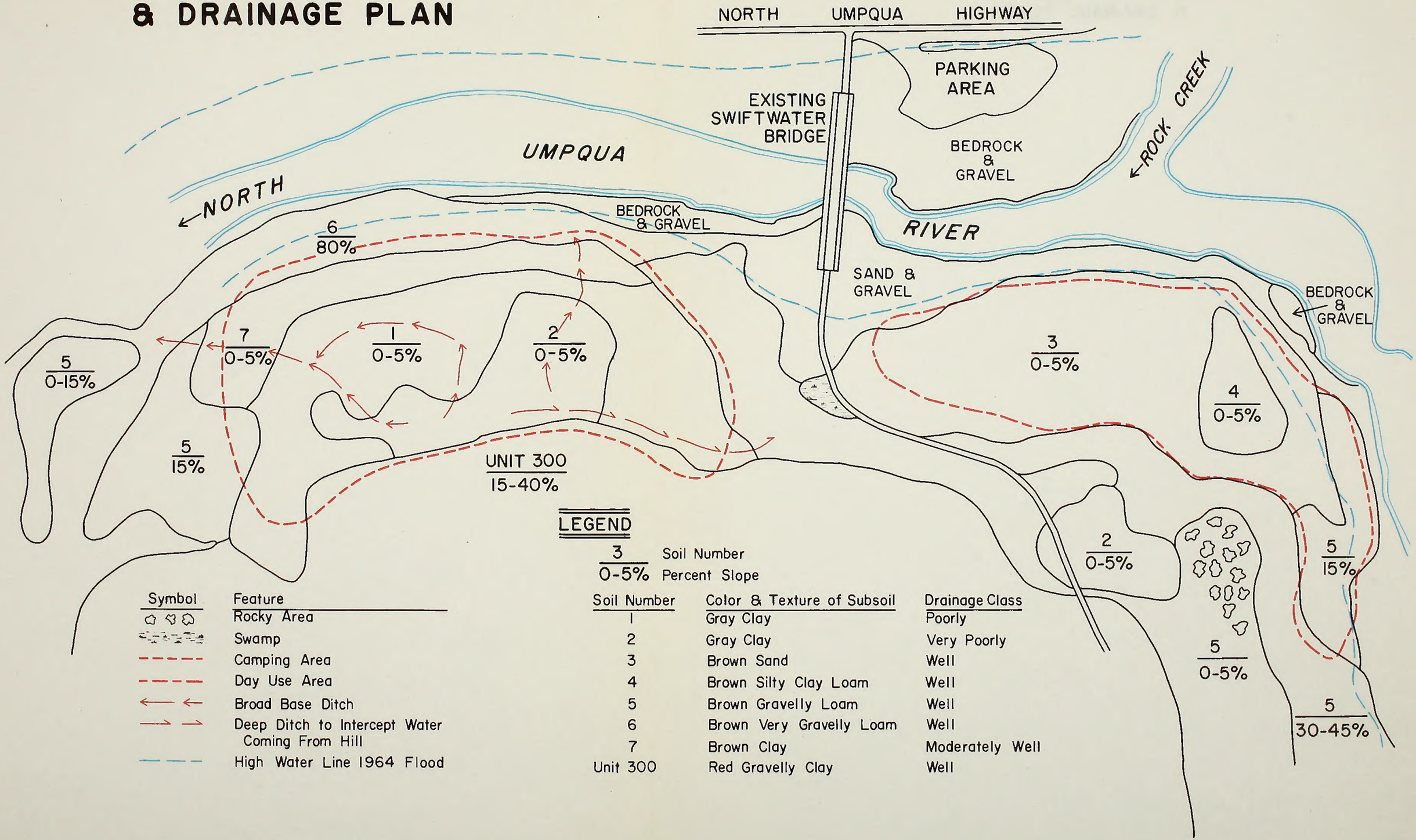
Clearcutting and slash burning together have been shown to cause a 2.25 pound per acre loss of nitrogen. This is equal to the amount of nitrogen added to the soil annually by rainfall. This same practice caused losses of nitrogen. This is equal to the amount of nitrogen added to the soil annually by rainfall. This same practice caused losses of calcium and magnesium that were low and losses of phosphorous that were moderate.

Nutrient losses as a result of clearcutting are not a significant problem, especially where slash burning is not practiced. Quick revegetation further limits nutrient loss.

Soil erosion from clearcutting is minimal. Erosion and the sediment it produces are caused not by felling and hi-lead yarding of trees, but by the road system and slash disposal methods. Debris left in steep draws can trigger massive soil movement.

Slash burning does cause some erosion. The erosion increases the first winter after burning and then tapers off rapidly as vegetation becomes established. Fire can also cause a loss of nitrogen.

SWIFTWATER SOILS MAP & DRAINAGE PLAN



LEGEND

3 — Soil Number
0-5% — Percent Slope

Symbol	Feature
○ ○ ○	Rocky Area
~ ~ ~	Swamp
- - - -	Camping Area
- - - -	Day Use Area
← ←	Broad Base Ditch
→ →	Deep Ditch to Intercept Water Coming From Hill
– – –	High Water Line 1964 Flood

Soil Number	Color & Texture of Subsoil	Drainage Class
1	Gray Clay	Poorly
2	Gray Clay	Very Poorly
3	Brown Sand	Well
4	Brown Silty Clay Loam	Well
5	Brown Gravelly Loam	Well
6	Brown Very Gravelly Loam	Well
7	Brown Clay	Moderately Well
Unit 300	Red Gravelly Clay	Well

Dry ravel is the source of soil movement in clearcuts and is particularly prevalent on steep south slopes on bare areas. Raveling generally stops by the second growing season after burning.

The effects of logging methods upon the soil are interrelated functions of types of soils, equipment, weather, and topography. For example, a soil may be severely damaged by crawler tractor logging during times of soil wetness. But, the same soils may not be harmed if the same operation is conducted when the soil is frozen and protected by snow cover.

The hazard of soil sterilization in small areas from fuel or oil dumping and spills is always present when motorized equipment is employed. Those logging methods with the slightest impact upon the soil are standing skyline, running skyline, slackline, balloon, and helicopter yarding. These methods require the least amount of roads and trails and cause the least amount of litter and surface soil disturbance.

Logging methods with a moderate impact upon the soil are horse skidding, high-lead yarding, and mobile yarder-loader operations. These methods require more roads and landings than methods listed under slight impact. They also disturb a larger percentage of the litter layer and topsoil. Trails where the logs are skidded become scraped and compacted. These two conditions concentrate water and provide areas for overland flow which may cause rill and gully erosion under certain conditions.

Logging methods which can have a severe impact upon the soil are the crawler tractor and rubber-tired skidder. Tractor logging disturbs and can compact as much as 40 percent of the area. The main skid roads receive the severest damage and occupy about 20 percent of the area. Soil structure is usually destroyed on frequently traversed areas and is more easily destroyed if the soils are wet. Some surface runoff on the affected area is the rule under these conditions. Tractor logging causes deep soil disturbance over 15 percent of the area while moving cable logging causes 1.9 percent. Tractor logging causes 5.9 percent shallow soil disturbance over the area while cable logging causes 13.3 percent.

Planting trees has a favorable impact on soils. The young trees reduce soil temperatures by their shape, increase the amount of organic matter, and protect the soil surface from the impact of rain drops as they gain size.

Thinning has a very minor impact on the soil. Thinning does increase the organic matter in the soil. It does not have much effect on soil temperature or soil moisture. The soil does not contain more water after a thinning has taken place.

Landings are generally a quarter of an acre in size. The top soil and frequently the subsoil is scraped off. Compaction is heavy and the area made unproductive. Stunted yellowish trees will grow on some of the landings indicating that the nutrients are very low. Landings represent a very small percent of the area taken out of production.

Erosion can result from landings and can either be small rills and/or slumps. The material pushed over the edge around the landing may cause slumps.

D. Water - Road construction rather than logging itself, is the factor that causes greatest surface erosion and mass soil movement, with resulting degradation of water quality. The first winter after construction, the sediment load in the tributaries to the North Umpqua and the North Umpqua itself will increase. The sediment yield will be above normal levels for a short period when the first large rain storms hit in the fall. After this initial increase, sediment loads are expected to return to normal within a few years.

All streams where they are crossed by the Bob Butte road are water-source only streams; i.e., do not support a fish population, and thus the main importance is for their potential effect on downstream water quality. Siltation of these streams due to road construction is the most likely water-quality problem which will occur and will result in some sediment being flushed into the main stem.

Herbicides applied for roadside brush control at recommended dosages and properly handled will not contaminate surface water. However, the possibility of an accident occuring is present even though the chance is remote.

Maintenance of roads and structures will cause additional sedimentation in streams if clearance of landslides from the road are sidecast into streams.

No degradation of summer water quality is expected except for temporary local effects due to culvert installation and similar activity. Road surfacing inhibits or ends infiltration and hastens runoff.

Construction of the Visitor Information Center and Swiftwater Recreation Site will decrease infiltration of water into the soil. Also, the trails and roads on the site will decrease water entering the soil. The presence of more people along the bank of the river or fishermen littering the river could cause some water degradation.

The well will remove ground water thus lowering the water table. While no such problem is indicated for this well, in some instances overdrafting a well can impair the capacity of the well and may reduce the potential storage capacity of the aquifer.

Use of water from the river would represent a consumptive use partially offset by return through ground water inflow both through subsurface sewage disposal and through soil drainage after irrigation.

Trails could affect water quality through improper location and maintenance.

Some competition for water could occur where a government well was placed near a private well within the same aquifer.

Four-wheel drives and other ATV's could cause isolated instances of water-quality degradation attributable to stream crossings and use of steep slopes for trails.

Clearcut logging has been found to result in increases in stream flow. Most of the increase is attributable to lack of vegetative interception and to vastly reduced evapotranspiration. This results in higher soil moistures at the end of the summer precipitation deficit season. Although 80% of the increase comes in the October through March period, stream flow increases are detectable during all months. Flow augmentation is particularly beneficial during the summer when small increases constitute a large percentage rise. Detectable increase may last as long as 30 years by some indications but other evidence indicates that rapid revegetation may reduce the increase over a very short time period.

Flood peaks have not been perceptively affected by clear cutting because flood-producing precipitation occurs during the mid-winter when ground water recharge has been completed for all soils. The greatest increase in stream flow vis-a-vis clearcuts and green timber occurs during the October through December period when precipitation is refilling the soil reservoir depleted by vegetation in uncut stands and contributing inflow to stream channels from moister soils in cut-over areas.

Increases in water yield have been shown to be directly proportional to the percent of the area cleared, thus partial cutting or patch cutting on a sustained-yield basis in larger watersheds produces flow increases so small as to fall within the margin of error attributable to other causes and sources.

Forest harvest methods such as clear cuttings, and to a lesser extent some partial or shelterwood systems remove forest cover which exposes natural water surfaces to continuous, direct solar radiation. Under a continuous forest canopy, sunlight reaching stream channels is largely diffuse and intermittent, and changes in water temperature vary primarily with air temperature. When the forest cover is removed, direct solar radiation provides much of the energy required to raise water temperature.

The effect on water temperature is most pronounced when harvest is followed by the common practice of slash burning. Slash and brush remaining after removal of timber may provide shade which may maintain water temperatures at relatively low levels. Elimination of this shade by burning exposes the water surface to direct solar radiation. Increases in water temperature favor the growth of pathogens and reduce the supply of dissolved oxygen, with adverse effects on aquatic life. Water temperature increases can also cause fish mortality.

Considerable logging debris may be deposited in natural waters as a result of forest harvest. This organic material contains simple sugars which are released by leaching and used as food by aquatic microorganisms. In the process, these organisms extract much oxygen, thus reducing the dissolved oxygen content of the water to levels which may be lethal to aquatic life. Slash and other logging debris may dam streams, slowing velocity and reducing turbulence. As a result, the inadequate supply of dissolved oxygen may not be replenished. The direct evidence of such water-quality degradation is the growth of bacterial slimes and algae which thrive on the nutrients released by organic decomposition.

Timber harvesting methods can be beneficial in increasing the supply of water available for human use. Much research documents the potential of various properly-applied cutting practices to significantly increase water yields from forested watersheds.

Man-made openings in the forest canopy can cause the following effects:

- increased accumulation of snow in openings
- reduction of precipitation losses due to interception by the forest canopy and evaporation therefrom
- reduction of soil moisture losses caused by transpiration of vegetative cover

all of which result in increased runoff and more available water.

Falling and bucking of timber causes no degradation of water quality unless trees are felled into or across surface waters. Then, the lopping of limbs and sawing incidental to log making may deposit

slash and organic debris in the water. This can cause the reduction of dissolved oxygen and impact on aquatic life described in the preceding subsection. All of the ground skidding and yarding methods have some potential for significant adverse impacts on water quality, since all cause some degree of soil disturbance. The effect is more pronounced when clearcuttings are logged by tractor, particularly on slopes of 15% or more and on saturated soils. The resulting disturbance exposes mineral soil to surface erosion, with consequent sedimentation and turbidity of surface waters caused by materials carried downslope in runoff.

E. Climate and Air - Climate on the macro scale will not be affected detectable by the projects. Micro-climates will be affected, in some cases, rather markedly.

Some air degradation will result from emissions of internal combustion engines during construction and logging, and by vehicles using roads after construction.

Dust from construction operations will occur. Most dust will be the result of vehicles traveling over the new subgrade before it has been surfaced. Dust will not be a significant environmental impact.

Smoke from slash burning debris will cause some air-quality degradation. The smoke from campfires will temporarily lower air quality.

Because of their obvious use, restrooms may be a source of noxious odors.

F. Vegetation - The clearing and grubbing operation will remove 60 acres of vegetation in the road right-of-way of the Bob Butte Road. Young trees along the right-of-way will benefit from increased room and light. Their crowns will increase in size and their annual increment of growth will also increase.

Road cut and fill slopes are often much slower to revegetate than adjacent land due to sterility of material. Sterile material impedes revegetation by pioneering plant species. The land covered by the road surface is permanently a non-producer of vegetation. Brush vegetation growing on cut and fill slopes will eventually reduce the visibility of vehicle operators. A program of mechanical and chemical brush control will be accomplished by maintenance crews. This will result in some destruction of roadside vegetation.

The Visitor Information Center will do little damage to the vegetation since it will be located on an open site essentially free of vegetation. Only one commercial tree will have to be removed.

The vegetation will be affected in the high-use portions of the Swiftwater Recreation Site. Shrubs such as Salal, oceanspray and hardwoods such as bigleaf maple, vine maple, dogwood, and chinquapin are generally located throughout the site. Some commercial

timber species such as Douglas-fir, white-fir, grand-fir, sugar pine and incense cedar will have to be removed from the site. As a result, timber production will be reduced on the 55-acre area.

All vegetation will be denuded in those areas where trails, roads, and campsites are to be located. However, the vegetation will increase in growth on the edge of the new openings. Vegetation may increase growth rates where subirrigated and fertilized by leach line effluent.

Maintenance will also require removal of dangerous trees and limbs.

The degree of disturbance and the manner of log removal exert a major influence on vegetation succession and recovery for several years after logging. Chronological succession differs slightly on burned and non-burned areas. Regardless of treatment, there is a large increase of plant species immediately after timber removal. Vegetation analysis after clearcutting a Douglas-fir forest that contained 30 different plant species showed an increase to 36 species the first year, 49 the second, and 75 the third year after logging on a non-burned area. On a slash-burned area, the number of species was 79, 93, and 107 during the same period of time. The slash-burned clearcutting, however, was 3 years older.

Some shrubs that can compete successfully for light in the forest are able to remain competitive after logging. Other plants - fireweeds (Erchtites sp.), groundels (Senecio sp.), willow-herbs (Epilobium sp.), and thistles (Circium sp.), for example - are rapid airborne invaders of disturbed soil surfaces. Other herbs come and disappear in a more gradual and orderly manner. The overall result is a sharp continued increase in plant density and species for several years, and then a gradual decrease because of plant competition.

Burning has a deleterious effect upon shrubby plants; they tend to become more compact and less spreading as they develop from exposed root collars and exposed vegetative parts. Herbaceous species, however, are much more numerous on burned-over areas and some remain common for a longer period than on unburned areas.

Many vascular and lower order plants of the old-growth Douglas fir community require varying degrees of undisturbed habitat for their existance. Some exhibit considerable environmental tolerance but others will undoubtedly decline when forest management procedures are applied to their habitat. This will result from actual destruction of the plant or from micro-climatic alteration. Rotation ages for some stands under intensive management may not be of sufficient length to re-establish some climax or near climax understory species.

Institution of forest management practices on untouched areas will increase the total number of species but may result in the decline or loss of some species over wide areas.

The short-term impact of clear cutting is the complete removal, through tree harvesting, of the upper vegetal layer and the partial damage to the lower vegetal layers in the course of falling operations. Clearcutting produces miles of cutting edge where standing trees are exposed to wind. Subsequent windthrown trees may endanger adjacent vegetation by providing a breeding ground for insects or fuel for wildfire. Clear cutting may also increase fire danger on cut-over area by exposing it to the drying effects of sun and wind until the new forest develops a closed canopy. From the long-term point of view, clear cutting tends to develop a forest that contains trees of approximately the same age and of species that grow well in full sunlight. Douglas-fir will be the dominant tree species since it will be the species most often planted and it has the ability to grow well in full sunlight. Other species which would probably occur in minor amounts are western hemlock, grand fir, and incense cedar.

Assuming no reforestation efforts are taken, the natural rate and degree of recovery will vary by the conditions that characterize warm dry sites. Clearcutting on relatively cool-moist sites within this vegetative zone normally results in the natural regeneration of trees and other vegetation in less than 20 years. Clearcutting on cool-moist sites does not, however, normally produce tree regeneration so fast that herbaceous and other woody vegetation are excluded. There is usually a period during which this vegetation is dominant or thrives in association with tree regeneration.

Clearcutting on relatively warm-dry sites may result in the regeneration of herbaceous and non-coniferous woody vegetation to the virtual exclusion of many coniferous species over extended periods of time, sometimes as long as 25 years or more.

Conversion of existing stands to clear cuts will occur at a rate of 180 acres per year for the next 10 year period. As these units are being harvested the clear cuts of previous years will be reforesting so the immediate effects of clear cutting are temporary.

The short-term impacts of shelterwood cutting are much less than those of clearcutting; since only a proportion of the total vegetation, usually 50% or less, is destroyed or removed. Shelterwood cutting may expose large areas to wind and any resulting windthrown trees may endanger vegetation by providing a breeding ground for insects and fuel for wildfire. Shelterwood cutting also opens the forest to drying effects of wind and sun thereby increasing fire danger, although to a lesser extent than clearcutting.

With regard to long-term impacts, shelterwood cutting normally results in the natural establishment of tree regeneration, thereby avoiding a long period of exclusive dominance by herbaceous and non-coniferous woody vegetation. Like clearcutting, it usually results in an even-aged forest but favors species better adapted to shade. This practice opens the forest canopy and allows increased growth of herbaceous and shrub layers although not to the extent of clearcutting.

Seed tree cutting usually impacts vegetation much the same as clearcutting. The number of trees left standing after logging are generally few in number but provide a better chance for natural regeneration and recovery than clearcutting.

Short-term impacts of selection cutting are the least of any of the final harvest cutting practices since only a small amount of vegetation is destroyed or removed. Selection cutting does not normally increase danger to forest vegetation from wind, fire or insects due to the absence of large openings or heavy concentration of slash over large areas.

Long-term impacts of selection cutting result in an uneven aged forest composed of species adapted to shade - trees of all ages, from seedlings to mature trees. Tree regeneration almost always occurs in small openings soon after mature trees are removed; herb or shrub-dominated areas of any significant size rarely occur.

The short and long-term impacts of commercial thinning and mortality salvage are relatively insignificant due to the minimal amounts of vegetation removed.

The short-term impact of ground systems such as tractor skidding and high-lead yarding is to partially destroy or damage the lower vegetal layers. Logging can cause damage to residual trees resulting in disease, particularly in such species as western hemlock and white fir. Unless extensive soil compaction or loss of soil by erosion occurs, the long-term impact is to contribute to a relatively early natural regeneration of tree species. Logging methods such as horse skidding, aerial systems, balloons and helicopters do not impact the herbaceous and shrub layers. Consequently, the early development of a new forest is only enhanced where tree species already capable of continued growth are present in the understory following falling operations. The lack of disturbance to soil surface and low vegetation causes a serious impediment to reforestation in many cases.

G. Animals

Terrestrial Wildlife - The Bob Butte Road right-of-way will permanently remove 60 acres of wildlife habitat and encourage harassment of wildlife through ease of vehicular access. The steep cutbank and fill slopes will interfere and restrict the movement of animals. Some disturbance of animals will be caused by the noise of construction equipment. Access to the area south of the river will increase the harvest of available wildlife resources by hunters. In addition to hunting, poaching and some road kill will affect animal populations.

An increase in disturbance and displacement of terrestrial wildlife will occur at the proposed Swiftwater complex.

Trails will allow human penetration of relatively isolated areas thus causing some potential disruption to shy creatures. Also, use of trails by motorcycles in violation of restrictions on their use could result in poaching and harassment.

Management of the forest will change the environment of the terrestrial wildlife inhabitating the forest. Both positive and negative impacts will occur varying with time and the variety of species present.

Grazing of elk on cutover land is light the year after timber removal. Six to eight years after logging it reaches a peak, then drops rapidly and becomes light in 11 or 12-year-old units. The plant species growing in these harvested areas are greater in number and nutritionally superior to plant species growing under a closed canopy. The harvested areas that have the most soil disturbance produce a higher percentage of browse favorable to elk.

The size of clearcuts and their shape influences the grazing of elk. Grazing decreases as the distance from the timber increases.

Each species has its own habitat requirements and reactions to change. Forest management practices duplicate the natural vegetation succession patterns that have taken place in the past - the only difference being a smaller scale and shorter time cycle. Unmitigated management action and resulting impacts are listed below:

Proposed Action	Impact
Tree Improvement	Increased tree growth rate - reducing time of clearcut use by wildlife
Brush and grass control (Scarification, mechanical burning, chemical)	Remove brush and grass that provides cover and forage
Burning or burying of slash	Loss of cover for small mammals and birds
Seeding and planting	Reduces time interval of natural regeneration
Baiting or treating seed (Endrin or Strychnine)	Remove target animal. Has secondary effects on animals in the food chain.
Fencing and screening	Restricts animal movement and animal becomes entrapped
Snag falling	Loss of snags used for denning, nesting, perching, food, and food storage.
Fertilization (Superphosphates)	Increased palatability and volume of vegetation growth
Precommercial (Thinning & Pruning)	Open up canopy, increase quantity and quality of forage
Protection (Chemical Insecticides)	Reduction of food supplies. Can kill animal in contact with chemical or disrupt reproduction.
Cutting practices Clearcutting Seedtree Cutting Selective Cutting Shelterwood Cutting	Removal of, or destruction of nesting, fawning, calving, wintering, or escape cover. The degree of change varies by method.
Logging methods Tractor Skidding High-lead Yarding Horse Skidding Skyline Balloon Helicopter	Same as for cutting practices. The degree of destruction varies with method used
Transportation	Remove land from production. Encourage harassment and direct loss due to "road kills."

No crucial habitats for terrestrial species have been identified within the North Umpqua Canyon Management Plan area.

Aquatic Wildlife - Improper clearing, grubbing, grading and disposal of waste and slide material from road construction may cause erosion that adds sediment to streams and impair some of the habitat requirements. Culverts may concentrate water to flow on erosive fill areas causing sedimentation of streams. Sedimentation may smother aquatic organisms and destroy spawning ground of some salmonids.

Clean, stable gravel 1/2 to 6 inches in diameter is required for the successful reproduction of salmonids. This permits an intragravel flow of water adequate to provide each embryo and alevin with a high concentration of dissolved oxygen and to remove metabolic wastes such as carbon dioxide and ammonia. The introduction of logging debris, particularly leaves, small branches and bark into a stream can result in a serious reduction of the dissolved oxygen content of the water through both biochemical (BOD) and chemical (COD) oxygen demands. Minimum values of dissolved oxygen for salmonids is about 5 - 7 mg/1.

Harvest of summer steelhead and trout will probably increase as a result of more anglers being able to fish on the south side of the river.

No change in salmon harvest is expected under current regulations as the river and tributaries are closed to salmon angling above the established deadline at Rock Creek.

Present fish populations can support an increased harvest as long as current hatchery production is maintained. Increased number of anglers and effort is more a function of fish population than access and facilities.

A special report, "Analysis of the Angler Use of the North Umpqua River Salmon and Steelhead Fisheries" states that 44% of summer steelhead and 19% of winter steelhead are harvested, Appendix, p.p. 172-186. This is for the entire river. Less than 21% of the total harvest of summer steelhead occurs within the planning area. The report concludes that the present steelhead population is not over harvested and that it can stand more fishing pressure without damaging the fishery.

Increased disturbance will occur to those fishes inhabiting that portion of the river adjoining the recreation site.

The primary impacts on aquatic animals from various forest cutting practices occur as a result of the removal of protective vegetation along streams and the deposit of debris and sediment in streams. Logging activities that increase water temperatures have their greatest influence on juvenile salmonids rearing in small streams and on embryonic stages developing in streambed gravels.

Elimination of the forest canopy and riparian vegetation can increase water temperatures over optimum limits. Any erosion originating on the clearcut area can result in the degradation of water quality in adjacent water bodies through sedimentation and siltation. Changes in annual water flow by this cutting practice could produce either positive or negative impacts depending on the biotic requirements of the animal.

Large amounts of debris left on stream bottoms following the logging operation can be destructive to aquatic animals, especially fish, clams and mussels, aquatic insects, and crustaceans. Habitat degradation comes from lowered dissolved oxygen through addition of organic material, increased water temperatures, and physical damage to the stream bottom and banks. Large logs and heavy debris left in steep draws and along streambanks may cause long-term drainage problems which result in destruction of fish populations and stream habitat. Sluice-outs, during periods of heavy precipitation, cause complete destruction of the aquatic habitat from physical changes in the environment.

Accidental spills of oil, gasoline, and other materials used with logging equipment may add undesirable ingredients to small tributary streams and be toxic to aquatic organisms.

The impact of some forest development practices such as seeding and planting tend to benefit aquatic animals by improving the basic water quality over a period of time.

However, actions such as mechanical brush cutting, trenching and furrowing, scarification, burying slash and precommercial thinning may cause short-term water-quality problems associated with siltation and stream-bank degradation. Debris could also be deposited in the streams from such operations resulting in a reduction of the oxygen content of the water and blockage of fish passage.

Weed control, precommercial thinning and baiting when conducted with chemicals could cause direct kills to fish, clams mussels, crustaceans and aquatic insects and drastically harm aquatic communities. Fencing and screening could have a positive impact through protection of overhanging streamside vegetation that provides a habitat for terrestrial insects that fall into the water and become food for fish. Snag felling directly into streams may cause blockages to fish migration and add to organic load in the water.

Most research shows very little increase in stream nutrients due to forest fertilization projects; however, the physical operation of moving fertilizer and a chance of accident near streams conceivably could result in a detrimental impact on aquatic resources.

Forest protection actions concerned with control of insects and disease through predators and viruses would have little direct effect on larger aquatic organisms such as fish. A drastic reduction in the amount of terrestrial and aquatic insects could, however, have an adverse impact on fish and crustaceans through the reduction of the insect population used as a food supply by fish.

Activities during fire suppression work may have impacts on aquatic animals and organisms. Recent studies show that the most commonly-used retardants, both powder and liquid, are toxic to fish and aquatic organisms. Concentrations of around 150 to 200 parts per million in water may be fatal to fish. Direct drops of retardant on small ponds, streams and slow-moving portions of the river may cause concentrations that will produce fish kills. Spills of retardants near assembly areas and air fields with subsequent drainage into streams systems may be lethal to aquatic animals.

H. Microorganisms - Sediment from construction will temporarily reduce the algae production in the streams, thus decreasing food for aquatic animals. The deposit of sediment will reduce the variety and population of bottom-dwelling microorganisms, some of which are important sources of food for fish.

Construction will destroy the microorganism population in the surface of the soil as the top soil is buried under fill material. The impact will be minor after the first rains because microbial populations will build up quickly on the soil surface. The new microbes will begin to increase organic matter in the fill material.

There will be a reduction of soil microorganisms due to the roads, trails, and permanent buildings at the Swiftwater Recreation Area. There may be an increase in coliform bacteria and harmful microorganisms due to the presence of people using the trails, roads and campsites. A small amount of soil sterilant may be used to retard vegetation from growing through gravel and mulch that will be used for landscaping. The impact will be very slight overall. It will kill some soil microorganisms.

While some timber management practices will have a beneficial impact on the organisms that are found on or below the soil surface, others will be detrimental to the extent that populations will be decreased or imbalances created. In general, those practices that reduce soil moisture, diminish carbon supplies, or affect soil aeration through compaction will have an adverse impact on soil organisms. However, this impact will usually be of a very short duration because of the dynamic reproductive characteristics of these organisms.

Research findings suggest that burning has the greatest effect on microbiological activity in the uppermost part of the surface soil. Intensity of burning was shown to be important in determining whether or not microbiological properties of the soil were altered. In most cases, unburned and lightly burned soils were not greatly different in numbers of organisms or ratio of bacteria to actinomycetos. After an initial reduction, marked increases were noted in the microbiological populations of severely-burned soil two years later.

Fertilization, chipping, seeding and planting will have a beneficial impact for both the short-term and long-term, on soil organism populations.

Clearcutting and seed-tree practices will temporarily reduce populations due to decreased soil moisture content on disturbed soil portions of the area.

Any of the timber management practices that affect water quality could have a direct effect on populations of microorganisms in aquatic ecosystems. Increased sedimentation is one of the most serious possible impacts because all aquatic environments are affected and many aquatic microorganisms cannot tolerate substantial increases above the natural geologic rate of sedimentation.

Practices that may cause short-term negative impacts on water quality and hence microorganisms include chemical weed or brush control, area and spot burning if adjacent to streams, scarification and mechanical brush cutting if beside streams, snag falling if in waterways, and hand clearing and cleaning if along streams.

Activities that have a positive impact on aquatic microorganisms include seeding, planting, mulching and fencing and screening. Fertilization could be beneficial by stimulating growth of phytoplankton, especially in some neutral waters.

Use of insecticides could kill zooplankton and fungicides may be directly toxic to phytoplankton for the life of the chemicals used. Loss of these basic food items would indirectly effect all aquatic animals. Fires have an adverse short-term effect on water quality and minute plants and animals. Fire suppression activities could also cause adverse effects on aquatic microorganisms if retardants are dropped directly into water or vegetation along streams is destroyed.

Short-term vegetative impacts on aquatic microorganisms occur when trees are felled into the aquatic habitat. The increased water temperature and presence of organic matter reduces the amount of dissolved oxygen available for consumption.

Another negative impact of excessive siltation not previously discussed occurs when high levels of suspended material prevent photosynthesis by phytoplankton for prolonged periods of time. This causes a reduction in the basic productivity of the aquatic ecosystem.

I. Human Settlement & Land Use - Although the Bob Butte Road will be open to public use, it is not considered a public road within the meaning of the Douglas County subdivision ordinance. Therefore, subdivision of private lands for which the Bob Butte Road is the sole access, will be precluded. Douglas County and BLM intentions are to maintain the open-space forested character presently prevailing in this area.

Statewide planning goals adopted by the Oregon Land Conservation and Development Commission on December 27, 1974, state that forest land shall be retained for the production of wood fibre and other forest uses. These goals further stipulate that existing forest land uses shall be protected unless proposed changes are in conformance with the comprehensive plan.

There is a potential for five residences accessible via the Bob Butte Road provided the sites meet approval of the County Sanitarian for subsurface sewage disposal. The large ownerships cannot be divided without access to a public road, thus it is conceivable that these parcels could be sold at their present size of 1/4, 1/2, or full sections and each tract occupied by a residence. These would be prohibitively large acreages to be used for merely residential purposes. Full development of this nature would add possibly five more residences. The total number of residences which could be occasioned by the Bob Butte Road, assuming approval of subsurface sewage disposal and the finding of adequate water supplies, would be about ten. More specifically, these residences could be located in the W½NW¼ and SE¼ of Section 12 which is the Gardner property. The Weyerhaeuser land is located in SW¼ section of Section 12, T. 26 S., R. 3 W. Weyerhaeuser also owns Section 18, T. 26 S., R. 3 W. The Reynolds property is located south of the North Umpqua river in Section 16 and has been divided into three parcels. The remaining residences could be located on the Champion International land in the SE¼, Section 20, and SE¼, Section 22. Winchester Plywood has property in the SW¼, Section 22. All of these lands are in T. 26 S., R. 2 W., W.M. With the exception of the Reynolds' property, no residences could be constructed within an approximate distance of 1,000 feet south of the North Umpqua River. The Reynolds' property could have residences 200 to 300 feet from the river bank.

The land adjoining the river on the north side is mostly in public ownership including Douglas County, state of Oregon and BLM. Private ownership is generally confined to that area in Section 16, commonly referred to as the hogback. This private land does have year-round residences now on the north side of the river.

Existing logging roads have some residential use in many cases. These are scattered homes, not generally fitting the common concept of a "subdivision" consisting of numerous small adjoining lots. Piecemeal settlement by residents on small acreages will likely continue, especially on the north side. The same public road status problems will arise for subdividers planning on using these roads as would confront similar potential users of the Bob Butte Road.

Natural processes have been the dominant land use on O&C lands and some private lands while much of the remaining private land has been harvested and is now in various stages of coniferous reproduction. Re-establishment of access will result in the resumption of forest management practices on much of the land, both private and Federal, with those portions within and adjacent to recreation sites being managed for their recreation resource values. The existing labor market is adequate to handle any increase in timber harvest that may occur as a result of re-opening access to these lands.

Within the planning area, stimulation of small businesses and expansion of existing ones by the market provided by users of the Swiftwater Recreation Site and Visitor's Information Center could cause some change in land use.

Development of Swiftwater will help to control random camping and picnicking which continues to grow along the North Umpqua Highway and logging roads. Also, the growing problems of litter and sanitation can be reduced by the addition of this site.

The construction of a few residences as may be possible with current zoning will result in a change in land use from either undisturbed or forest production land to single-family homes.

Forest management practices, particularly such practices as precommercial thinning and harvesting activity may be a depressant on building incentive or enjoyment by existing residents.

J. Esthetics and Human Interest - Some visual deterioration will occur for those who prefer seeing no people, vehicles or structures on the south bank. Approximately one-eighth up to one-quarter of a mile of the Bob Butte Road will be visible in two locations for several years from the North Umpqua Highway.

Disturbance will affect residents near the Swiftwater complex during the construction period. Operation of the site will provide a continuing source of some congestion, noise, and people activity in the neighborhood. Traffic through the Swiftwater site on the Bob Butte Road will subject users to vehicle noise. Log trucks and other heavy equipment may generate as much as 110 decibels through application of the engine brake.

Timber management impacts of greatest magnitude are visual, but sound, odor and mood are also involved. Any action that produces a visible change in the natural forest environment can cause human reaction. Among development actions with highly visible effects are prescribed burning of slash (atmospheric smoke, charred forest floor); scarification (dust during the operation, disturbance of surface vegetation and soil); chemical weed and brush control (dead vegetation); and pre-commercial thinning (slash). Commercial thinning and salvage logging when carefully done, create an open park like appearance to a stand which some people find pleasant. Noticeable evidence of protection actions includes fire lines and, if identified as such, the burned areas resulting from burning out.

Clearcutting produces the greatest alteration of the forest environment. Clearcut design which does not include esthetic considerations can and has created poor visual impacts. Some logging operations, and particularly subsidiary road construction, create visible soil disturbance and atmospheric dust. The soil disturbance alone may be visually objectionable; it can also be the source of sediment which, carried in surface runoff, spoils the clarity and color of natural waters. Heavy log truck traffic over dirt or gravel roads may create clouds of dust which seriously impair visibility, and the usefulness of roadside areas.

Any of the timber management activities may leave such residual litter as discarded tools or equipment accessories, e.g., broken shovels, axes, wire-rope chokers and worn-out truck tires, empty fuel or herbicide containers, lunch wrappers, etc., as evidence of human presence on the land.

Consciously or subconsciously, most people have some appreciation of natural beauty. Reaction to the poorer visual effects of timber management actions will vary in intensity with the individual viewer.

The combination of sound and odor of a noisy logging operation or mechanized forest development project could shatter the mood of those seeking relative solitude.

The adverse visual impacts of timber production are partially offset by some incidental visual benefits. Logging road construction may open up an impressive scenic vista which otherwise would be unappreciated. Severely damaged or decadent stands are sometimes poorer visually than a recently-logged area. Certainly when reforested, they are a distinct improvement. Clearcuttings and vegetative erosion-control measures produce forage which attaacts wildlife for easy viewing by amateur naturalists.

Severe alteration of the vegetative cover, such as by timber harvest and brush removal, can also create ill effects on visually important geologic features. Road construction and the opening of vista points will generally enhance these features by making them visible and in some cases, accessible.

Construction of the Bob Butte Road and establishment of the Swiftwater Recreation Complex and Tioga Trail will draw people into areas that are now infrequently visited. This will tend to lower the quality of "fishing experience" for those anglers that prefer to pursue their sport in solitude.

Most of the on-the-ground practices associated with the proposal can destroy or disrupt any archeological and historical sites that are on or are eligible for the National Register of Historic Places and also those that are of non-National Register significance but have recreational and other cultural values.

K. Ecological Interrelationships - Road construction will alter the plant environment adjacent to the road surface. Surface disturbance will set succession back to pioneering species and the communities where the level will likely remain due to the improverished substrate extant on road shoulders. The area within the road surface area will be totally devoid of aerial portions of vegetation. Roots may be expected to penetrate beneath the paved area, however, thus retaining at least a portion of the subsurface environment.

Vegetation adjacent to the road will be subjected to a changed environment because of altered physical factors. Solar insolation will be increased, relative humidity will be decreased and wind velocity will be increased. The environment will become more severe thus occasioning a minor change in plant composition. Small streams tributary to the North Umpqua will carry more suspended sediment during winter peak flow periods during the construction phase and for a few years thereafter until vegetation becomes established on bare soil areas. This increased sediment load will result in temporary reductions in stream productivity.

The imposing presence of man in a local ecosystem as a result of recreation site or trail development will affect nearby ecological processes as man competes for space, sun, water, and various other factors, while at the same time producing his own effluents. This will result in some changes. These effects would be vegetational changes due to roads, buildings, and campsites and animal disturbances due to the presence of humans.

IV. Mitigating Measures Included in the North Umpqua Canyon Management Plan

A. Physiography and Geology - The Bob Butte Road has been designed to conform as much as possible with the land. This will result in less excavation and lower fills. The road will take advantage of natural slope breaks. Structures and trails associated with the Swiftwater complex are designed to blend with the terrain. Quarry development and use will be engineered to blend as harmoniously as possible with the landscape and located out of sight from high-use areas.

Through exposure to the interpretive program, at the Visitor's Information Center, people will learn about, see and enjoy the physiographic and geologic features present in the area.

Areas containing natural arches and caves in the canyon will be avoided during road construction to insure no irreparable damage is done.

B. Minerals - A detailed mining and reclamation plan will be made for the quarry that is selected as a rock source for surfacing of the Bob Butte Road. The District Mining Engineer, BLM State Office Geologist, FHWA Geologist, with the assistance of the FHWA core drilling crew, will investigate the quarry or quarries before mining begins and determine what cautions need to be followed in removing the rock. The quarry will be developed with regard to its maximum capacity as a material source for road surfacing material. The quarry will be located so it is not visible from the Bob Butte Road. The quarry site may be used to dispose of material end hauled from portions of the road construction site if the sequence of construction activities permits this.

The quarry operation will be conducted so as to not change the character of, or cause pollution of streams nor cause adverse effects to fish and wildlife. Every effort will be made to strip and stockpile topsoil from the proposed quarry site to be used in quarry reclamation. All stockpiles will be seeded and mulched to prevent soil erosion. The disposal site will be reclaimed by grading, spreading the stockpiled topsoil and fertilizing and mulching.

Aggregate stockpiles, culverts, and equipment storage will be located out of view from the Bob Butte Road.

The State Department of Environmental Quality regulates aggregate production and gravel mining as they pertain to both air and water-quality effects.

C. Soils - The preliminary location of Bob Butte Road was examined by the district Soil Scientist for soil stability. The unstable spots were pointed out in reports of 1971. (See Appendix, pp 147-150, p.p. 154-160) From these reports, examinations were made to see if the unstable spots could be missed. The Federal Highway Administration, in 1972, also made a soil investigation, Appendix, p.p. 168-170). Their report recommended ways of stabilizing problem areas that cannot be avoided. Since these soil reports, most of the trouble spots have been either avoided or plans have been made to stabilize them when the road is built.

Efforts were made to avoid those sites at L-231+00 and L-235+50 with a relatively high potential for slumping. (Appendix, p.p. 168 to 170 for a discussion of alternatives.) From a soils point of view, the present location is more stable than any of the alternative routes. The remaining portion of the road is on stable soils.

The road is designed to the minimum width which will safely accommodate the anticipated traffic. Alignment and grades will follow the topography to take advantage of benches as much as possible. Rolling of the grade will be used to minimize the amount of soil that is moved. Clearing and grubbing will be conducted to minimize the area of soil disturbance.

End hauling will be used so excavation and embankment will be balanced. Excavated material unsuitable for embankment will be spread along fill slopes and used as a seed bed for vegetation.

Approximately 10,000 cubic yards of excavated material will be wasted. If the sequence of construction activities permits, the waste material will be deposited into the quarry site before reclamation. If the quarry is still active when end hauling begins, the material will be hauled to a disposal site selected in advance of construction. The site will be on stable ground, adequately drained, shaped to the contour of the ground, fertilized, and revegetated.

Full compaction will be required on all fills. Rock blankets will be placed on unstable cut banks. Cut banks and fills will be mulched, seeded, and fertilized. This work will be done prior to the winter rains.

Temporary erosion-control measures will be used to correct conditions that develop during construction and are needed prior to installation of permanent pollution control. The work shall consist of temporary measures to control soil erosion or water pollution through the use of berms, dams, sediment basins, fiber mat, netting,

gravel, mulches, grasses, watering of seeded areas, slope drains, diverting live streams during installation of culverts, and other erosion-control devices or methods.

Perforated underdrains will be installed in wet areas to make the subgrade more stable. To reduce degradation of water quality all drainage work will be completed before winter rains begin.

Care will be required in blasting so rock is broken up but not excavated by the charge. Excavation will be done by equipment and techniques which will lessen the chance of rock-scarred and broken topped trees.

Pioneering of more road than can be completed to final grade prior to the wet season will not be allowed. Surfacing will be applied to new roads before winter rains. The road will be surfaced with 9 inches of base rock and 1½ inches of bituminous plant mix. This surfacing will give a dust-free, smooth, nonskid road that will not erode during wet weather.

Maintenance will be prompt as possible. In the case of removing slide material, backslopes will be reshaped to make them stable. The slide material will be hauled to disposal sites. Ditches will not be scraped except when adequate drainage is impeded. Otherwise, ditch line vegetation will not be disturbed.

Stipulations will be written in the Swiftwater Recreation Site contract that require the contractor to meet both the county's and the DEQ's regulations on the installation of drainfields. The district Soil Scientist has examined the soils for a drainfield. His examination showed that there is over one acre of suitable soil. Part of the county's regulations state that a water table cannot be within 24 inches of the surface. Test holes drilled to a depth of 5 feet showed no evidence of a seasonal water table.

We anticipate a 9,000 gallon daily loading of the drainfield. This is well within the field's capacity to absorb effluent.

The site will not be open in the winter months. Therefore, the drainfield will have a 3 - 4 month resting period each year. This will prolong the life of the system.

Soil that is disturbed on the spur road to the upper level will be covered with straw mulch, grass seed, and fertilizer. It will be placed on the soil before the winter rains begin. This will

protect the soil from the energy of raindrops and also soften the visual impact of freshly-cut soil. Culvert outlets will not be placed on sidecast. This will prevent some erosion from sidecast. The road will be surfaced to prevent erosion and allow for all weather access.

Paths and landscaping will be designed to control pedestrian traffic so that soil compaction and erosion does not occur. Surfacing of paths and heavy-use areas with gravel or pavement will stabilize soils. Where gravel is used, the infiltration capacity of the soil will remain near a normal level. Compaction can and will be alleviated where it is problematic by scarification and tilling.

Soil that is exposed during construction and landscaping of the Visitor Information Center will be mulched, seeded, and fertilized before winter rains begin. The shaping of the land around the octagon building and subsequent lawn will enhance the area on the north end of the Swiftwater Bridge. At the same time, the lawn will prevent erosion.

Small trenches will be placed across trails to prevent water from eroding the soil. Initial location and design will result in trails with lower water accumulation and thus erosion potential. Surfacing of trails in problem areas will also solve soils problems. No motorized vehicles will be permitted to use trails. This will help prevent ruts from forming in the trails.

Careful assessments will be made of each logging area to determine the most appropriate equipment, method, and timing to minimize the impact on the environment. Tractor skidding may be limited to slopes with gradients of less than 35%. Some circumstances permit the use of tractors on steeper slopes with less damage than other skidding methods. This is particularly true of broken or benchy ground. Tractor skidding will also be limited to those seasons and conditions when excessive soil compaction will not occur. This usually occurs between mid-April to mid-October.

Hi-lead systems will generally be used on slopes over 35% in cases where soils are stable. In areas that are less stable, but still operable, yarding systems which suitably protect the soil and surface vegetation will be used. This will likely include some aerial systems. Logging debris in steep, unstable draws will be removed and placed in a stable area.

Landings will be kept small (generally under 1/4 acre). Logging debris will be pulled off the edge where it may cause slope failure.

In many cases, landings will be ripped and treated to hasten their revegetation. Mulching and seeding of landings will be done in all cases. Dressing with top soil may be required in some circumstances.

An intensive forest operations inventory is now being conducted which will identify fragile areas in place. These areas will be restricted to a logging system compatible with the site. A high lead system or aerial system may be employed.

D. Water - Adequate drainage on the Bob Butte Road system will be provided by installing culverts properly spaced and adequate in size. All culverts will be designed to handle 25-year floods. Selection of this standard was based on data that showed that this design will amply fulfill the culvert's function according to BLM road criteria. Spacing of cross-drain culverts will be governed by road alignment, grade and by soil type. The culverts will be spaced close enough to prevent ditch-line erosion. Aprons will be installed on the outlet end of culverts where erosion of fill material may occur. Riser pipes will be installed on culverts over 60 inches in diameter. These vertical pipes are attached to the culvert 6 feet downstream from the inlet to provide a second entrance for water in the event the inlet is clogged with debris. Concrete headwalls will be placed at the inlet end of culverts over 66 inches in diameter to protect the fills from erosion. In areas where springs or underground water will undermine the stability of fills or cut slopes, perforated pipes, horizontal drains or rock blankets will be installed. Stabilizing and establishing vegetation on cuts and fills will reduce erosion.

The bituminous plant mix surfacing will prevent entrance of excessive quantities of surface water into the base and subgrade. The surfacing operations will be controlled to prevent pollution of streams by petroleum products.

Environmental analysis are written for all actions which can restrict the location or use of petroleum products, industrial chemicals and similar toxic or volatile materials used on federal lands. All timber sale contracts provide a stipulation for the storage and handling of hazardous materials.

Equipment, logs, and debris will be kept out of streams except where totally unavoidable. Any debris entering the stream shall be removed as soon as possible. Activities in streambeds will be kept to a minimum and performed during the low water period of June 15 to September 30. Road construction will be limited to the dry season. Care will be taken to minimize destruction of stream banks by equipment.

Contamination of stream flow by pesticides or herbicides will be prevented by strictly adhering to guidelines approved by the Federal Working Group on Pest Management including establishing untreated buffer areas along streams.

No channel changes will be made in live streams. Gravel mining of streams will not be allowed.

Snow will be removed the full width of the road bed, thus preventing the concentration of water in the wheel track that may cause erosion.

Sewage systems will be designed to exceed special water-quality standards for the North Umpqua. Only soils with proven subsurface sewage disposal capabilities will be used for leach fields. When and if public sewerage facilities become available, the Swiftwater system will be connected to it. If subsurface disposal should become a source of damage, alternative methods of treatment and disposal will be utilized. Proper maintenance such as annual pumping of septic tanks will help to assure the continued functioning of leach fields.

Symptoms of leach field failure would be growth of algae along the river's gravel bar near the site and a strong odor emiting from the field itself. Maintenance personnel at the site will be alerted to these signs. Corrective action which may include a temporary closing of the site would then be taken.

Traffic control on the river bank will prevent random paths from becoming sources of erosion and sediment. Regular patrol and maintenance combined with an interpretive sign program will minimize littering along the river banks and in the water. Trails will be located so that equine offal will not contaminate the river.

Lowering of the groundwater through pumped withdrawal is not expected to produce adverse impacts. If problems did develop, pumping rates could be adjusted accordingly and water storage constructed.

Streamside buffer strips of adequate width to protect the stream from sediment-laden overflow and mechanical logging damage will be left along all perennial streams. The width of the buffer will be governed by slope of ground, tree height, density, and species; stream characteristics (width, depth, flow velocity, and the erodibility of the bed and bank material).

Several different methods will be used to prevent trees from falling into streams through streamside buffer strips. These methods include: directional falling parallel to or away from streams, tree pulling, jacking, and leaving high stumps to prevent logs from rolling downhill.

Tractor skidding will not be permitted up or down any stream channel. Channels may be crossed only at designated, approved points. Temporary crossing structures such as corrugated metal pipes or log culverts are required where necessary. In unusual cases, rocky stream bottoms and banks can be crossed without the installation of temporary structures while still maintaining adequate water quality. All tractor stream crossings are limited to the absolute minimum necessary to adequately operate the area. The use of temporary stream crossings can frequently save many stations of additional road construction with a subsequent savings in environment insult.

Side cast skid roads will be kept to a minimum. Those that are needed will be promptly waterbarred. Some may be seeded also. The use of ridgetops and long lines on winches reduces the need for sidecast roads.

Logging slash, cull trees, stumps and other logging debris which might inadvertently fall into a stream will be removed concurrent with logging operations or in any event, prior to the onset of high water.

E. Climate and Air - No overall significant effect is foreseen for air quality. If dust from construction becomes annoying watering will be required.

All slash burning of right-of-way debris shall utilize methods which produce intense heat with no visible smoke emissions except that minimal emissions of smoke associated with starting and stopping the operation will be tolerated.

The Bob Butte Road will be bituminous surfaced and major spurs will be rocked. Minor temporary spurs may have natural surfacing. As a result, road dust will be local and minimal with no abatement program planned unless campgrounds or people-use areas are involved. In these instances, dust palliatives such as watering or oiling will be used.

If concentrations of smoke or other effluents reached noxious levels, controls on the producing agents will be instituted such as prohibiting campfires or restricting them to cooking fires using charcoal only. The canyon is normally well ventilated, thus effluent dispersion will usually be good. Proper restroom ventilation and maintenance will remove them as a source of noxious odor.

Adverse micro-climate can be manupulated to re-establish vegetation. For example, watering, shading, wind-screening, tilling, and addition of soil amendments are some ways of managing micro-climates to achieve desired results.

When logging slash must be burned, it will be done in accordance with the state of Oregon smoke management guidelines, i.e., wind must prevail away from populated areas, weather conditions must be such that smoke can rise and disperse without being trapped by an inversion or will dissipate in a cloud system.

F. Vegetation - Wherever possible, the Bob Butte Road is located on benches and moderately sloping ground to keep the right-of-way to a minimum and avoid excessive destruction of vegetation. The loss of site productivity by erosion will be mitigated by appropriate erosion control measures and by practices that insure optimum drainage. These measures and practices have been outlined under Soils, p.p. 83-86.

The use of mechanical and chemical brush-control measures will be limited to sections of road where vegetation causes inadequate sight distance and unsafe driving conditions. Chemicals will be used to control grass growth on asphalt roadway shoulders to prevent sod buildup which breaks up surfacing. Only chemicals that comply with Federal and state pesticide laws and Executive Orders will be used. In implementing the use of chemicals, directions on the label and any special provisions will be complied with, and all necessary safety precautions will be taken during application.

The vegetation cut from mechanical brush cutting will add to the soil cover and return nutrients to the soil.

Wherever possible, cut and fill slopes will be serrated to enhance the opportunity for native tree and shrub regeneration and establishment.

The adverse impact of windthrown trees along the edge of the right-of-way will be mitigated by early removal of hazardous concentrations.

Landscaping utilizing native shrubs and hard woods will occupy the site of the Visitor Information Center.

In the Swiftwater Recreation Site, site design, location, construction methods, and chosen landscaping will blend developments into the natural scene. Landscaping will be done with indigenous species. No vegetation will be removed unless it absolutely cannot be incorporated into the site design.

Tree planting will be done promptly following logging. This practice will aid in replacing ground cover destroyed during logging. The BLM currently has a tree improvement program affecting this area which will eventually provide seedlings having increased growth rates and resistance to disease. This may provide a means to rapidly achieve reforestation.

Mitigation of adverse impacts as a result of forest development treatments that destroy existing vegetation will be achieved by confining practices to small areas; e.g., application of herbicides, mechanical scarifications. Unusual, interesting or rare specimens will be protected wherever possible. Foreground zone management practices will tend to preserve climax-type species and old-growth understory vegetation. Patch cutting and partial cutting in other areas will tend to conserve some old-growth habitat characteristics.

Widely scattered cutting units will provide readily available gene pools in the adjacent uncut stands, from which re-introduction of species can occur as conditions in the cut-over area become favorable to them.

G. Animals

Terrestrial Wildlife - To avoid impacts to the greatest number of wildlife species, clearcutting will be confined to small scattered tracts ranging from 5 to 15 acres to produce the greatest edge effect. Where larger clearcuts are warranted to implement landscape management techniques, varied unit boundaries, feathered edges and islands of timber will provide a maximum "edge effect" combined with readily-available shelter. Snags will be left where they do not present a safety hazard to loggers and others or create an increased fire danger. These snags will mitigate the impact on cavity-nesting birds and other animals using the snag habitat. If endangered wildlife not presently known to exist in the area are observed, measures will be taken to protect them as prescribed in BLM Manuals.

Patrolling will help to control unauthorized use of trails by motor vehicles. If animal harassment or poaching reached unsuitable levels, state and local police can be recruited to help control it.

Aquatic Wildlife - Many of the same mitigating measures discussed under soils, water, and vegetation will also ameliorate the impacts on aquatic wildlife. For example, any action that will reduce or eliminate sedimentation or erosion will minimize those impacts on aquatic life. The same holds true for such measures as streamside buffer strips, proper logging practices, cleaning of stream channels, adequate sewage systems at recreation sites, and a host of other mitigating measures.

H. Microorganisms - The proper installation of an adequate septic tank and drainfield in the Swiftwater Recreation area will prevent coliform bacteria from entering the North Umpqua River from

the site. An adequate number of well-maintained refuse disposal cans will minimize an increase in other harmful microorganisms.

Mitigation of the major adverse impact on microorganisms associated with timber harvest will be achieved by eliminating slash burning. If this measure is not practical due to large amounts of slash, gross yarding and burning the slash in a small area will be the mitigating measure.

Many of the adverse impacts on microorganisms will be mitigated by the same measures that will be used in connection with reductions in sedimentation and soil compaction.

I. Human Settlement and Land Use - Safety hazards associated with log trucks and the motoring public will be mitigated by proper road design, use of warning signs, and by providing adequate turnouts for passing.

Since the Bob Butte Road would traverse private land, the BLM will cooperate with the state and Douglas County regarding land use zoning and planning. The character of land use on the private lands is controlled by Douglas County zoning, subdivision, and sanitary regulations.

Computation of the seen area as it relates to individual homesites and inclusion of it under landscape management techniques will mitigate adverse visual impacts in this regard. Restrictions placed on nearby forest management operations such as requiring disposal of slash where it is visible to residents will help. Watering or oiling roads used in timber hauling will solve the dust problem. Restricting hauling hours to "normal" working hours will solve disturbance problems.

J. Esthetics and Human Interest - Recognizing that roads are probably the most disruptive elements in a visual composition, great care and consideration must go into their planning, design and construction. The Bob Butte Road is designed to conform to the various landforms. This will result in sharper turns, shorter tangents, sharper grade breaks and steeper grades. The result of this will be lower fills, less excavation and a slightly slower road, but one which is significantly more pleasant visually because it fits the land.

Long views along adjoining road alignments will be avoided by

keeping junctions close to right angles and designing curves into the intersecting roads a safe distance back from the junction.

Informational signs will be wood, rustic routed, concise, sparingly located and easily read.

Mechanical cutting of roadside vegetation will be used where herbicides cause unsightly results.

Trees along the toe of the fill that provide a screen of the Bob Butte Road from the North Umpqua Highway will be identified. Whenever possible, they will be preserved and, if necessary, rock retaining walls will be built around them to prevent damage to the trunk and root system through burial by fill material.

Although the primary emphasis on visual management pertains to the view from the river, highway and associated recreation sites, the view of a traveller on the Bob Butte Road will not necessarily be neglected. Activities in seen-area portions of foreground, middleground and background zones will be designed and promulgated in strict accordance with scenery preservation principles.

Landscape design will be done by a landscape architect or someone trained in design principles and sensitive to esthetic considerations. Detailed planning for areas critical from an esthetic standpoint will be done under the direction of a qualified landscape architect.

The design and construction of the Swiftwater Recreation Site and Visitor Information Center will be done with environmental compatibility foremost in mind. Personal health and social benefits will accrue by virtue of people being exposed to leisure in a pleasant natural environment. Screening will reduce visual impact.

The problem of noise is dealt with by locating the most sensitive area, the overnight camp, on the highest level. Vegetative screening and proper location of facilities in the site design process will further ameliorate sound intrusion. Bob Butte Road will have a restriction on hours of commercial hauling during the recreation season. Use of engine brakes through and near the site will be prohibited. Speed restrictions will also reduce noise.

Careful siting of recreation areas themselves and the structures therein will result in low or no visibility off the site. Designing circulation and structures to be compatible with the site will reduce adverse impacts and enhances the visual qualities inherent in the scene. The use of native or blending materials and suitable paint and stain colors will maintain structures within the limits of visual compatibility.

The placing of camping spurs where they are screened by vegetation and land forms will help to retain the natural characteristics of the site by lowering the visibility component of normally garish campers, trailers, and motor homes.

Separation of use areas and the accommodation of only those uses for which the site is best suited will result in better site utilization and development which is compatible with nature.

Trail construction to areas away from the river and other primary viewing points, may result in modification of timber management practices that are esthetically displeasing on lands adjacent to or viewed from the trail.

Mitigation of adverse impacts on esthetic values associated with timber management will be achieved by utilizing landscape management techniques, extending rotation lengths, mulching and grass seeding all road banks, and reforesting all harvested areas. Visual impacts from a timber management point of view are to be determined primarily as they relate to the viewer on the North Umpqua Highway, the river, and designated or developed recreation sites.

To manage the visual resource and to mitigate some of the more radical changes which occur during timber harvest, the seen area has been divided into three zones: Foreground, Middleground and Background. (See Appendix 140-141.) The intensive silviculture used in managing Douglas-fir forest will be modified in the three landscaped management zones to meet the further management objectives extant there. (See p.p. 7-11)

In areas containing possible archeological or historical values, surveys are to be conducted and any findings are to be investigated and evaluated in accordance with Section 106(2b) of the Historic Preservation Act of 1966. When present, no actions that would disturb or otherwise affect them are to be allowed in the vicinity until such a time that their significance has been evaluated and a determination made for their continued protection or salvage and destruction. No actions will be taken that will adversely affect the Indian Mounds Site or Indian built rock piles in the Susan Creek area.

K. Ecological Interrelationships - The mitigative measures individually described for each component of the environment in this section represent collectively, the actions to be taken in mitigating the impact of the plan on the ecosystem. Consequently, they will not be restated in this part.

V. Adverse Impacts That Can Not be Avoided Despite Mitigation

A. Physiography and Geology - In spite of all the mitigating measures taken in the course of carrying out construction activities proposed in this plan, a slight alteration in terrain will occur. This will occur on no more than 250 acres.

B. Minerals - Some non-renewable mineral resources will be used in construction projects. Approximately 335,000 cubic yards of rock will be used on the Bob Butte Road and the other roads which would need to be built over the next 40 to 50 years.

C. Soils - Despite all erosion-control measures there will be some erosion from constructing the Bob Butte Road. The erosion is expected to be slight and will last one to three years. After this time, vegetation will probably cover bare soil areas and prevent further erosion.

The construction of the Bob Butte Road will take 60 acres out of production. This area, the road cut and fill slope and the road bed, will be unproductive for many years to come.

Waste material from end hauling will be placed on productive soils. By placing the material on the soil, the productivity is greatly reduced. This is an impact that will not be mitigated within the next 2 to 5 years. After this time, the waste areas will again be productive. Trees will likely begin to grow. Approximately 2 acres will be covered up with waste material.

Unmitigated impacts at the Swiftwater Recreation Site and Visitor's Information Center include a loss of infiltration capacity and productivity due to soil being covered by roofs, roads and trails. Some soil compaction will occur unavoidably in the utilization of most recreation sites.

Approximately five acres of soil will be covered. This is 10 percent of the recreation site. Water is expected to run off faster, which reduces the amount of ground water recharge.

Small amounts of off-the-road vehicle use from roads and trails will cause minor amounts of damage such as ruts but this constitutes more of an esthetic infringement than a soil damage.

Logging practices, such as yarding, slash burning, and fire line construction will result in some localized erosion due to vegetal destruction. Accidental spills of chemicals, oil, etc. will occur, but their impact can be expected to be minimal, since the contracts under which activities will occur will contain a stipulation for the storage and handling of hazardous materials.

The overall net impact of the proposal on soils will be minor. Activities that have a detrimental effect on the soil resource,will be limited each year so that the natural healing processes can occur.

D. Water - Some sediment will appear in small streams tributary to the North Umpqua due to road development; however, there will be no significant additional system-wide impact. Unusually severe rainstorms may cause drainage structures to fail due to blockage or overloading. Soil movement and loss will occur.

Landslides may occur and cause severe local degradation of water quality in some small tributaries. Some stream channels may be scoured to bedrock.

Some temporary, local degradation of water quality will occur at the time culverts are installed.

People in the recreation site will have some effect on water quality. Some soil compaction will occur because of people and the construction of foot trails and roads in the recreation area. This will inhibit the infiltration and hasten water run-off. Vandalism could occur at the facilities and possibly be a cause of water pollution. Consumptive use could be considered an adverse impact, although of minor consequence.

Driving on unsurfaced roads in wet weather as well as ATV's use of unimproved stream crossing and off-the-road use could cause some turbidity in nearby streams despite efforts to close roads in the winter.

Felled trees may unavoidably slide down steep slopes and into or through streamside buffer strips, causing localized soil erosion or distrubance of the vegetation along the streambank, Some soil compaction is inevitable on any area that is tractor logged unless done over snow deep enough to keep logs and equipment above the soil surface. Some localized soil distrubance and erosion can be expected in most logged areas regardless of the method employed. All of these soil impacts will adversely affect water quality.

No significant impact on the water quality of the North Umpqua River system is anticipated from implementation of this plan. Any degradation that does occur will be minor, temporary, and localized.

E. Climate & Air - The unavoidable adverse impacts of road construction and log hauling on local climate are relatively minor. Air quality will be temporarily degraded by engine emissions and dust will sometimes be a nuisance in the vicinity of road construction operations and along logging roads. Local temporary degradation at Swiftwater is possible due to aggregations of motor vehicles or to wildfire caused by recreationists.

Some local impact at the Swiftwater Recreation Site will be caused by campfire smoke.

Despite improved smoke-management technology, there will continue to be occasions when smoke from burning forest fuels will find its way into the lower atmosphere over population centers. These occurrences will be significant only as a temporary nuisance. Inevitably, as long as prescribed fire is used, there will be misapplications due to human error and accidents of nature. Some brush fields will be created and some forest sites made temporarily unproductive by micro-climatic changes.

Any lowering of air quality that may result from this proposal will be insignificant in terms of the canyon.

F. Vegetation - Sixty acres of land will be bared for the Bob Butte Road construction. The pavement portion and shoulders will remain bare while cuts and fills plus the 5-foot-wide area adjacent to the top of cuts and the toes of fills will be re-vegetated with grass and brush.

The stability of plant communities will be affected by recreationists on concentrated user areas. Reproduction of some species will be retarded and vigor of older individuals could be affected.

Vegetation will be removed to provide room for structures and clearance for trails. Maintenance activities will result in vegetation pruning and removal. Construction of drainfields will have a deleterious affect on the vegetation involved.

In clearcut units significant short-term adverse impacts (e.g., immediate and extensive destruction of existing vegetation) will frequently be accepted as a cost of avoiding long-term adverse impacts (e.g., excessive delay in regenerating and developing a new forest similar to the one removed). For example, clearcutting, scarification, aerial spraying of herbicides and burning of an area may be used to insure timely replacement of a well-stocked Douglas-fir forest as opposed to a vegetative cover of shrubs, hardwood trees and scattered hemlock or cedar which would exist if no action were taken.

Implementation of the North Umpqua Canyon Management Plan will result in a gradual change in vegetation from an old growth forest to a second growth forest. This change will occur gradually over a period of many decades.

G. Animals

Terrestrial Wildlife - The implementation of many mitigation measures will serve only to reduce, and cannot avoid, some short-term

adverse impacts on terrestrial wildlife. Mainline roads will cause a long-term impact due to the presence of people. Some associated disruption and destruction of wildlife may occur. Mortality, especially among larger animals is rare because speeds are generally low and most operations generally occur during daylight or within an hour of sunrise. Steep cutbanks may impede animal movement. The Bob Butte Road will make animals migrating to and from the river more vulnerable.

Development of extensive public access will probably reduce the elk use in the area. Elk use is low and confined to the higher elevations of the eastern part of the area south of the river.

The presence of humans will cause disturbance and/or displacement to the wildlife which may now occupy the Swiftwater Complex.

Individual animals will be killed or displaced by timber management activities such as scarification, mechanical brush cutting, area burning, falling and bucking, yarding, and road construction.

Because the various activities in the plan will be carried out over a long period of time the net effect on terrestrial wildlife will be minimal. Some species will benefit while others will be adversely affected.

Aquatic Wildlife - Despite implementation of recommended mitigative measures, some short-term disruptions of the aquatic habitats and subsequent damage to aquatic wildlife will occur.

Short-term sedimentation during construction will occur despite mitigative measures during road construction.

Harassment caused to the fish in that portion of the river adjoining the Swiftwater Site cannot be entirely mitigated. Some mortality is to be expected.

During forest management activities some short-term adverse impacts could occur to aquatic wildlife as a result of accidental stream blockages, soil erosion, etc.

The overall net effect of the North Umpqua Canyon Management Plan on the fisheries will be insignificant. Basically, the most obvious result will be that fishing pressure will be increased but redistributed to both sides of the river.

H. Microorganisms - Regardless of the mitigative measures taken, some short-term impacts will occur in the form of reductions and imbalances in organism populations. This will result from those practices which compact the soil, reduce soil moisture and decrease carbon supplies. Usually, the impact will be short lived because of the dynamic reproductive characteristics of these organisms.

People not using sanitation facilities and not disposing of refuse in the proper container, could cause an increase of the coliform bacteria and other harmful microorganisms; however, the incidences are expected to be minimal.

In the case of continuing erosion and permanent roads, the adverse effect will continue until the sites are stablized or the roads reclaimed. Localized mass soil movements that result in the exposure of bare rock or parent material will be impacted far into the future.

No consequential impacts to microorganisms is expected from implementation of this proposal.

I. Human Settlement and Land Use - As is the case on most roads, there will probably be motor-vehicle accidents on the Bob Butte Road.

Despite all the mitigation measures which are taken, there will probably be some vandalism in the recreation complex. Some people will object to seeing a new recreation development constructed on the North Umpqua River.

Visual impacts will be ameliorated by adjusting management practices within the viewed zones but the change in character from native scenery to an altered form of managed woodland is objectionable to some people. This will reduce the value of the land to people so affected. Such an environmental change could reduce the pressure for change in land use caused by people seeking a homesite in the forest primeval.

Initiation of management activity on untouched portions of the land will preclude further use of the land for its primitive values until the restoration powers of nature could undo the evidence of man.

The restrictions placed on timber harvesting due to recreation sites, landscape management zones, streamside buffer strips, and fragile areas will reduce annual timber production by almost 1 million board feet.

The major net result of this proposal will be that land not currently managed for timber production or recreational use will be made accessible for these pursuits. No significant changes in human settlement patterns is expected.

J. Esthetics and Human Interest - Small portions of the Bob Butte Road may be visible for a few years from the North Umpqua Highway during and after the road construction. Even after reclamation, the cut and fill slopes in some areas still may be seen from the main highway.

From the standpoint of human interest, the Bob Butte Road and Swiftwater will attract more people into the area south of the

river where their very presence constitutes a visual infraction to some; particularly fishermen. Lines of brightly painted shiny aluminum campers and trailers do constitute a visual intrusion. Also, permanent artificial objects will be constructed in natural settings. Some noise originating on site will affect some persons.

The timber management program will continue to cause some impairment of esthetic values, even when all feasible mitigating measures are carefully applied. Atmospheric smoke from prescribed burning will be visible at times, as will dust from logging and road construction operations, and from truck hauling of logs. Clear-cuttings and heavy partial cuttings will change the natural appearance of the forest. So will unsightly road cuts and fills, and the occasional massive soil movements which will occur as results of some accidental or ill-advised construction and logging operations. The smells and sound of timber management operations will also continue to affect the moods of forest visitors in various ways.

To some, the implementation of this proposal will result in lowering of the esthetic value inherent in the canyon while others will feel that the increase in access and recreation facilities will inhance the canyon's esthetic appeal.

Due to the nature of archeological sites (difficult to locate) there may be an occasional site destroyed inadvertenly during the execution of a particular action.

K. Ecological Interrelationships - Most practices will alter the appearance of the ecosystem and temporarily disrupt the balanced relationships between its components, particularly those practices that involve soil movement and destruction or removal of vegetation. In these instances, the nutrient cycle, hydrologic cycle, and energy flow will be interrupted until the impacted area is revegetated and the ground is stabilized. In the case of the roads, the original relationships will never be restored during the life of the facility. However, with the proper application of mitigating measures, the impact will be minimal in terms of the basic processes of the ecosystem and will be of relatively short duration.

The presence of man and his works in the natural environment will create changes, which will benefit some species and individuals and adversely affect others.

VI. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Productivity

A. & B. Physiography, Geology, and Minerals - In general, the proposals outlined in this plan will not affect the long-term productivity of the area as it relates to the physiography, geology, or mineral resource.

C. Soils - The long-term productivity of the area will be reduced by 60 acres in constructing the Bob Butte Road. Other permanent spurs will reduce productivity by approximately 5 acres per mile of single-lane road constructed.

The road is considered a long-term use. The land in the road prism is considered to be taken out of production. There will be some loss of soil on the cut banks and fills until the vegetation becomes established. This will be kept to a relatively short period of 6 months by mulching. Productivity in these areas will be reduced. The area in the fills will come back into trees after two to five years.

The construction of the road system will expose the surface to potential erosion. Movement of the top soil layer will decrease future productivity upon which new growth is dependent. Natural disasters may cause road failures and loss of soil.

The possible reclamation of permanent roads along with temporary roads, can be expected to result in reduced productivity where extensive cuts and fills were made. In all probability, the full productivity of quarry sites will not be restored despite the mitigative measure taken.

Soils on the recreation site and visitor information center will be used for absorbing water, growing a fixed number of trees, growing forbs and grasses, and supporting roads and buildings. Approximately five acres will be covered with roofs, roads, parking lots and trails. Most of this will be in roads and parking area. The soil will be covered by gravel in narrow strips that go between trees. Should the recreation site be removed, the roads can be ripped and the buildings removed. Most of the five acres would return to grass and shrubs within a short period of time.

Long-term productivity will be reduced by the amount of tree growth that is lost by covering five acres of soil. Soil lost

during construction is lost forever.

No reduction in long-term productivity will occur from managing potential recreation sites for that resource value.

Trails and extensive recreation will not reduce the long-term productivity.

While some forest management practices may have a short-term impact on localized areas, most practices will either increase or not effect long-term productivity. The removal of material (trees) in the course of logging could lead to slight reductions in soil nutrition over time.

D. Water - Minor changes in runoff are possible due to compaction and interception and concentration of flow brought about by the construction of the Bob Butte Road and other logging roads. Long term watershed productivity and characteristics will remain unaltered.

Due to some compaction in the recreation areas, there will be a temporary degradation of water quality during periods of heavy precipitation.

In high elevations of the area where snow melt forms a significant portion of the season runoff, the increased snow pack-which occurs after cutting, particularly clearcutting, has a definite short term benefit by increasing water productivity. Periodic erosion along roadways resulting from seasonal rain and storms will have a minimal impact on water quality.

E. Climate and Air - Activities proposed in this plan will not effect the climate or air as they relate to the long-term productivity of the area.

There will be some temporary degradation due to emissions by automobiles and logging trucks. Some increase of particulate matter will come from campfires. Due to good mixing conditions which prevail, the effects will be of short duration.

F. Vegetation - Within one year of road construction, the cuts and fills will be revegetated with grass and brush by natural and artificial means. Trees will begin to grow in two to five years. Eventually the trees on the fill slopes will grow to maturity. Generally, trees on the cut slope will not reach maturity because of the steepness of the slope. The pavement portion of the road will remain

bare for the life of the road.

Some hardwoods and shrubs will be disturbed during the period of time when the Swiftwater Site is in operation. Indigenous species can be introduced to replace those lost to recreational use. The same is true with the coniferous species. A certain amount of over-mature and mature danger trees will have to be removed in the site. Proper site planning will leave as much vegetation as possible to maintain the productivity of the area.

The vegetation can be replanted if the recreation structures were to be removed. It would take the coniferous species 40 to 50 years to attain a size of commercial use.

The short-term use of the land for timber production will generally have little, if any, impact on long-term vegetation productivity. Vegetation is a renewable resource, capable of re-establishment on most areas that are denuded during timber harvest and forest development actions. Through natural revegetation and man-controlled forest development actions, the former productivity of the site can usually be both restored and increased over time. Timber productivity, especially, can be increased through timber management practices; i.e., development, protection, commercial thinnings, mortality salvage and the timber harvest of the crop prior to the period of natural declining growth and general stand deterioration.

Timber management practices generally have a minor detrimental effect on the long-term productivity of aquatic plants. In fact, the productivity of plants in standing water habitat may be initially increased for a period of years because of favorable habitat changes. However, long-term productivity can conceivably be diminished because the natural life of the habitat is being reduced by continual sedimentation.

G. Animals -

Terrestrial Wildlife - Wildlife within the plan area will be displaced from the habitat area tied up in roads, trails and buildings. This will constitute a long-term loss. Species not tolerant of human contact will suffer a long-term loss during the use season.

Short-term use of the land for timber production will not, as a rule, impair long-term productivity for terrestrial wildlife. Removal of dense old-growth forest and restoration of new forests

with more open conditions will even enhance long-term productivity in many cases. An exception to the rule involves endangered species, where normally short-term impacts such as the accidental disturbance or destruction of habitat could exterminate the only remaining population.

Aquatic Wildlife - Siltation of the tributary streams will cause a short-term degradation of stream productivity. Channels that have been scoured to bedrock by landslides will suffer a long-term loss of productivity.

Recreation activity will not have a long-term effect on aquatic wildlife productivity.

Short-term use of land for timber production will not endanger long-term productivity of aquatic wildlife if recommended mitigative measures are implemented. Although serious accidents can damage portions of the aquatic habitat, extensive or widespread damage of entire river systems as a direct or indirect result of timber management is extremely unlikely.

H. Microorganisms - Any soil that is used for permanent structures such as roads and buildings will effect the long-term productivity of soil microorganisms.

No long-term effect is anticipated for coliform bacteria and other harmful microorganisms.

The effect on long-term productivity of micro and macroorganisms is not known.

I. Human Settlement and Use - Since there is no access currently for large portions of the area, settlement may exist in the future due to removal of this hurdle. Active management of the lands opened by this project will constitute a change from custodial land use.

Recreation sites will be removed from the timber allowable-cut base and their production of wood products other than firewood will drop to very low levels. Trails will penetrate other areas forcing some modification in timber management practices. Use of the region by a recreating public will probably increase pressures on land managers to restrict timber harvest levels.

J. Esthetics and Human Interest - Some short-term reduction in

esthetic values may develop during project construction, but in the long-term, no damage will occur except for those people who prefer not to see other people or their vehicles injected into a natural setting. On the other hand, societal esthetic values will increase because a greater number of people are enabled to view and commingle with the environment due to site development.

Long-term productivity remains high in properly designed and managed recreation areas. Natural features and their attendant esthetic values will continue to attract and satisfy people throughout the life of the project.

Landscape management to ensure a pleasant environment will not appreciably reduce the long-term productivity of the visual resource but will probably enhance it to some degree.

Any inadvertent destruction of archeological sites would represent a permanent loss of productivity.

K. Ecological Interrlationships - The productivity of the impacted area will be reduced where permanent structures such as buildings and roads are constructed. Since this includes such a small area, its effect on the ecosystem would be minor.

The practices associated with the growing and harvesting of a timber crop increase the yield of vegetal material and some other environmental components beyond what nature alone can produce. The continual removal of this nutrient-containing resource over successive rotations and the practices to which the land is subjected may have a dampening effect on soil productivity over time. Such reduction of productivity will be off-set by artifically introduced nutrients through fertilization.

L. Cumulative Impacts - Implementation of this proposal will result in re-opening a portion of the canyon to resource management activities that are short-term uses. These activities, though they restrict a small area to certain uses, have been designed to insure the maintenance and enhancement of the canyon's long-term productivity.

VII. Irreversible and Irretrievable Commitments of Resources

This section is focused on identifying the long-term impacts of the proposed management plan from the perspective of irrevocable uses of resources due to such causes as resource extraction, massive erosion, destruction of human-interest values, elimination of endangered species and their habitat, and irreversible changes in land use. The consideration of any of these consequences is based only upon the existence of risks residual after the fullest possible mitigation efforts, previously discussed have been employed.

A. Physiography and Geology - Once roads and quarries have been constructed the physical nature of the land has been permanently altered even though this alteration is very localized.

Erosive process induced by removal of the vegetative cover and the construction of roads produce an indeterminable amount of localized mass wasting or mass movements which cannot be reversed or retrieved, no matter what mitigating measures are taken. When the vegetal cover is removed from an area where steep slopes occur and there is an abundant supply of moisture; i.e., in humid climates, the erosional process will sustain itself and in those situations where rock types and structure are conducive to weathering the erosional cycle will increase. This is a natural process which tends toward an equilibrium over geologic time but in terms of man's life time it results in a disequilibrium because of the time required for the area to stabilize.

B. Minerals - Mineral resources are irrevocably commited in the construction of rock surfacing. Rock used in strengthening the subgrade and for rip-rap is not available for other purposes. Tars and other heavy distillate oils are not readily reusable once they have been incorporated in road surfacing. Energy resources expended in constructing the road are irretrievable.

Mineral resources will be committed at Swiftwater and the Visitor Information Center to the extent that metals, plastics, paints, tars, aggregates and other materials are used in construction. Heating of water and restrooms will most likely be electric which could involve fossil or nuclear fuel sources for generations. Fuel for construction equipment is, likewise, an irretrivable commitment of energy resources.

C. Soils - The irreversible impact and commitment of the soil resource is closely correlated to the physiographic and geologic factors described in the previous part. There are additional impacts, however, if the assumption is made that permanent roads will remain in perpetuity. In this case, approximately 2 to 5 percent of the soil surface will be committed to a relatively irreversible use, although the trend towards logging systems which require less roads would reduce these percentages in the future.

A small amount of soil will be eroded away by road construction. Any soil deposition into bodies of water represents a permanent loss of the resource. The amount that will be lost will be insignificant in terms of tree growth and its effect on other vegetation.

Soils will also be irretrievably committed where there are permanent facilities at the Swiftwater Recreation Site and the Visitor's Information Center.

In a theoretical sense, however, roads and recreation facilities could be "dismantled," and the areas returned to a productive state if society's values so deemed necessary.

D. Water - The construction of roads provides a means of intercepting and concentrating overland flow. This could affect the timing and peak magnitudes during high-water periods. Roads are also a source of gasoline, oil, and whatever other contaminants are introduced by vehicles. This could become a minor source of water-quality degradation during periods of high precipitation.

If any springs are encountered during excavation, the groundwater hydrology for the area near the uncovered discharge could be altered permanently.

Watershed values of a drainage are irretrievably committed, to a degree, in those instances where bare rock has been exposed or enlarged as a result of massive soil movements. Landslides can also cause the destruction of a natural stream channel, resulting in its rechannelization, and the accompanying permanent loss of soil and other materials.

E. Climate and Air - Under extreme conditions, natural restoration of the original microclimate may take a long time, but there is no irretrievable commitment to any fixed microclimate.

Under Federal Clean Air Regulations, the amount of degradation

allowable past a dated baseline is limited. The construction and use of many campgrounds could result in cumulative air-quality impact, which, though negligible in and of itself, could in combination with numerous other low-level sources be significant. Thus, it can be inferred that these sources which by their existence establish a prior right, constitute an inflexible, or perhaps, irretrievable commitment of a portion of the regional airshed's "pollutability."

F. Vegetation - No vegetation will grow on the running surface of roads or on solid rock cutbanks. Tolerant vegetation adjacent to the cleared area may be damaged by exposure to direct sunlight. Some vegetation will be kept out of ditches and culverts. Modified harvest practices will forgo added production which would accrue under intensive management.

Vegetation within the developed recreation sites will be commited to non-consumptive use as long as the site exists. This will preclude nearly all timber production and collection of commercial products such as ferns, huckleberry, and boughs. Some logs and firewood may be produced from down or danger trees, but only limited quantities.

Wood and other construction materials derived from plant sources represent an irretrievable commitment of these particular resources.

Timber management practices do not result in any irreversible or irretrievable impacts on vegetation. Even where drastic misapplications may occur and result in extensive delays in tree regeneration, natural plant succession and technical progress can be expected to restore the site to a forest condition. Only where landslides expose rock surfaces can the forest condition be considered irretrievable.

G. Animals

Terrestrial Wildlife - Any loss of an endangered species constitutes a potential irreversible and irretrievable commitment. Small, non-mobile species with limited habitats and local distributions; e.g., the Northwest Salamander, are especially vulverable, other

mobile species with widespread distribution; e.g., the spotted owl, could possibly be eliminated from a specific area for a long period of time.

Animals needing solitude may be disrupted from habitat areas near the Bob Butte Road. Road kill is generally minor along roads of this type, but some may occur.

As long as people and the buildings remain on the Swiftwater Recreation site, it will reduce the habitat available for terrestrial wildlife.

Aquatic Wildlife - The most vulnerable aquatic animals, if they exist, are the rare fishes, local populations of which could be severely damaged as a result of a timber management related accident.

There will also be harassment to aquatic wildlife while recreation areas are in operation.

Fishing pressure will be re-distributed to both sides of the river. Previously inaccessible stretches of water will be fishable with improved access to the south bank.

H. Microorganisms - Based on the extent of current knowledge, irretrievable commitments will be limited to localized areas where the soil matter has been removed as a result of massive soil movements or construction activity.

Disruption of the soil surface or profile will affect soil organisms. Those areas overlain by road rock and pavement will lose much of their microbiological complement. Occasional maintenance activities such as ditch or culvert cleaning or herbicide application to control ditchline vegetation may have an effect on the soil biota.

The alteration of habitat conditions could favor the existence of one species of aquatic microorganism at the expense of another; however, no irreversible or irretrievable commitments are known with present knowledge.

I. Human Settlement and Land Use - People may be injured or killed in automobile accidents on the Bob Butte Road. If, in the future, either private or government land is developed, this development must necessarily conform to the location chosen for this road.

Land involved with recreation sites is largely an irretrievable commitment which removes it from timber production. Trails impose a certain inflexibility in changing land use although trails can be relocated to maintain the integrity of the trail experience while still allowing some timber management.

The forest management program would have no irretrievable effect on human settlement or land use.

J. Esthetic and Human Interest - A corridor of forested land will be changed to a roadway by the construction of the Bob Butte Road. If timber were cut or damaged, some visibility could ensue from viewing positions along the North Umpqua River and Highway.

A scenic drive will be created by this road project with the result that timber management in the area next to the road will be severely restricted as to intensity, type, and method of harvest, use of precommercial and commercial thinnings and other such activity. Many more acres of the area north of the river will become visible from this road, thus necessitating some change in management prescriptions there also. Some private homes built on the heights west of Rock Creek may have a view of portions of this road. Where the grade crosses Bob Butte, some areas may remain visible both to private residences in the hogback area and to motorists who are west bound on the North Umpqua Highway.

A permanent esthetic loss may occur to those people who oppose having the south side of the river occupied by recreation sites and accompanying recreationists.

The timber management program makes no irrevocable commitment of esthetic values. Even old-growth forests could be re-established, although it would take several centuries in time.

Any inadvertent damage or destruction of archeological sites will be irreversible and irretrievable. If the sites were not completely destroyed, however, enough salvage might be possible to retain their value.

K. Ecological Interrelationships - As stated previously, the ecology of localized areas may be permanently impacted because those areas are covered by buildings, trails, roads or landslides. The ecological processes in the other portions of the management plan area will continue.

Much remains unknown regarding the ecological interrelationships that exist throughout the Coniferous Forest Biome, so absolute certainty cannot be ascribed to the general apparent lack of irreversible or irretrievable impacts.

VIII. Alternatives to the Proposal

This section contains a discussion of several alternatives to the proposed action. In many cases, the impacts on the environment are similar to those described in the previous section. The discussion centers around those actions and impacts which differ from the proposed Management Plan. Obviously, there could be developed an almost infinite variety of programs combining portions of all alternatives. These discussions are aimed at the major significant alternatives.

1. Alternative No. 1 - No action

A. Description of the Alternative Action - This alternative would compel the BLM to stop at the present situation by building no more roads, harvesting no more timber, planting no more trees, developing no more recreation sites or engaging in any action which would noticeably alter the current scene.

Management policy for the canyon area would have to be re-evaluated under the existing laws governing management of O&C lands to restrict utilization to a more singular purpose. This alternative would not be in compliance with the approved Management Framework Plan for the North Umpqua Planning Unit.

Development will occur on intermingled private lands regardless of Government actions.

B. Environmental Impacts of the Alternative Action - This alternative would have the least noticeable impact on the environment of those identified.

Some soil erosion will probably still take place both from natural processes and from road and culvert failure caused by lack of maintenance on BLM roads that might have been abandoned. The eroded soil might eventually become deposited in waterways, thus resulting in an adverse impact on both water quality and aquatic life.

The quality of recreational experience within the planning area will continue to deteriorate, particularly along the north bank of the river. Localized pollution and environmental degradation will intensify at accessible heavy-use areas. People impacts on the currently available areas will become more evident through damage to stream banks, vegetation and some esthetics. Randomized uncontrolled recreational use of areas undeveloped for overnight

camping will continue to cause fire risk, litter, and sanitation problems. Turn-aways at existing recreation sites will continue to grow as the predicted increase in recreationists materializes. Visual deterioration will continue along the north bank of the river due to the expected increase in concentrations of people.

The effect on terrestrial wildlife will be variable depending on the habitat requirements of the individual species. Those requiring a climax stand or stand that is deteriorating, will benefit from cessation of activities. Other wildlife such as deer and raptors which benefit from an open or subclimax stand will be adversely affected by this alternative. Game harassment will remain low.

Fishing pressure will continue to grow steadily at the popular accessible reaches and holes. Only minor deterioration of the aquatic environment would be expected. This would result from natural slides or road failures brought on by lack of maintenance.

A minimal impact on air quality could be expected. Somewhat lower oxygen production would occur from timber stands in a decadent condition than from vigorously-growing stands maintained by intensive forest management practices. Slash smoke wouldn't be produced from O&C land within the plan area.

A gradual change to climax vegetation would occur under this proposal. Plant communities dependent upon old-growth timber stands will flourish relatively undisturbed. The number of species would be reduced over a period of time. Some acreage now in roads would revegetate.

Implementation of this alternative would reduce the Roseburg District's allowable cut by seven million board feet annually. Locally, this would result in a loss of approximately 44 jobs in the wood products industry and a loss of 98 jobs in the timber-industry supported services jobs.* Adverse effects from this reduction in harvest would also occur outside of the local area.

The excluding of management activities from the canyon area may increase the esthetic pleasure derived by some existing residents and may serve as a stimulation to settlement in available areas to others.

No new sources of noise will be introduced in the canyon. In fact, some reduction may occur due to the cessation of logging activity on O&C lands.

*Economic Profile for BLM in Oregon, Table 48, April 1972.

There have been no problems with wild fires in the plan area since the lands were revested to the United States. However, the potential exists for forest fires to periodically cause severe damage to the area due to impeded access, particularly south of the river.

Insect and disease damage would be difficult or impossible to control. Widespread forest destruction could result.

No new unnatural disruption of the eco-system would result from implementation of this alternative.

2. Alternative No. 2 - Timber-Oriented Management Using a South Bank Road System.

A. Description of the Alternative Action - Activities under this alternative would be similar to those carried out with the present level of management in the district. These include timber harvesting, road building, reforestation, thinning, fertilization, environmental protection, etc.

The primary differences between this alternative and the proposal involve a lack of emphasis on recreation and esthetics. Neither the Swiftwater Recreation Site nor the Visitor's Information Center would be constructed. No trails would be built nor would areas be set aside for future recreation potential. The Bob Butte Road would be constructed at the approximate location of the proposal, but it would be the standard 12-foot wide, gravel-surfaced logging road. Landscape management zones would not be incorporated into this alternative with the exception that a screen or buffer of minimal width would be left along the river and along the North Umpqua Highway.

This alternative would not be in compliance with the approved Management Framework Plan for the North Umpqua Planning Unit.

B. Environmental Impacts of the Alternative Action - The effect on the physiography and mineral resources will be similar to the proposal though on a reduced scale. A slight alteration in terrain will occur from road construction and quarry development. Use of non-renewable mineral resources will be significantly less than with the proposal.

Construction of a 12-foot-wide Bob Butte Road would reduce the soil disturbance to approximately 40 acres and would render 15 acres totally unproductive because of road surfacing. The same 75 miles

of additional road construction would be necessary to remove timber. This will take 400 acres out of production. Some erosion will occur in the construction of this road system. Waste material placed on productive soils will greatly reduce the soil productive capacity. Logging practices will also result in some soil loss or degradation.

Some sedimentation will occur in tributary streams due to road construction and logging activities. This should occur to about the same degree as the proposal and in fact may be slightly higher since more land will be disturbed with an increased timber harvest.

A slight reduction in air quality will occur from road construction and timber hauling. Some smoke will occur as a result of slash burning. Since this alternative allows for more timber harvesting than the proposal, more slash will be burned.

Vegetation will be removed in road rights-of-way and harvest areas. Only those areas in the prism of the road will be permanently devegetated. The remaining areas will be revegetated by natural or artificial means. Approximately 800,000 bd. ft. more timber will be harvested annually under this alternative than under the proposal.

Terrestrial wildlife will be affected in various degrees depending on the particular habitat requirements of the individual species. Those that require an open or subclimax stand will benefit from increased harvest while those needing an old-growth forest will be adversely affected. Some disruption and displacement of wildlife will occur through road construction and timber harvesting.

The main effect on aquatic wildlife will come about as a result of disruption of habitats. Some sedimentation caused by management activities will temporarily lower water quality and thus the aquatic habitat will be altered.

Harassment of wildlife will be lower under this alternative than under the proposal because less people will be attracted to an area without recreation facilities.

Although this alternative will provide access along the south bank to fishermen, the drawing effect of established recreation areas will not be present. This would probably result in less angling pressure than the proposal and thus would keep the quality of

"fishing experience" at a higher level.

Microorganisms will be affected by any practice that compacts soil, reduces moisture or decreases carbon supplies. The extent of these activities will determine the extent to which microorganisms are affected.

Increased timber harvest with minimal regard for visual impact will adversely affect those permanent residents in the canyon who view timber management activities as degrading to a natural scene. Visitors to the area with the same regard for management activities may be discouraged from settling in the canyon.

Providing access to the private lands on the south side of the river could allow about ten residences to be established provided all legal requirements could be met.

Increases in use of developed recreation sites in the canyon predicted for the future, will lower the quality of recreation experience for the users. Localized degradation of esthetic qualities will continue to increase at currently accessible heavy-use areas. Use of undeveloped areas for recreation activities and overnight camping will result in fire risk, litter, and sanitation problems. People will tend to congregate near accessible areas on the river, thus causing a visual deterioration to those who prefer not to see people along the river banks.

Recreationists driving on a minimum-width Bob Butte Road, as would occur with this alternative, could conflict with logging traffic. The chances of a serious accident occuring on a road of this width is much greater than on a 20-foot paved road as outlined in the proposal.

Management practices advanced under this alternative will cause disruptions to the natural ecosystem which will be temporary in some instances and permanent in others. These changes will benefit some species and adversely affect others. The overall effect on the ecosystem will be similar to the proposal.

The option exists for locking up the alternative Bob Butte Road. This would allow timber management activities to take place, but would restrict greatly the use of the road network by recreationists. Anglers and other recreationists could hike into the area to pursue their leisure activities, but their numbers and the accompanying impact on the environment would be minimal.

3. Alternative No. 3 - Intensive Management Using Alternative Road System.

A. Description of the Alternative Action - This alternative would entail building the Swiftwater Recreation Site and Tioga Trail as outlined in the proposal. Landscape Management Zones as described in the proposal would also be established. The Visitor's Information Center, however, would not be constructed.

Access to the area south of the river for timber management activities would be routes other than a south bank system. These, as shown on the North Umpqua Canyon Management Plan Map on page 2, would include the Lone Rock and Thunder Mountain System. Some road development on the south bank by private land owners may take place.

This alternative would not be consistent with the approved Management Framework Plan for the North Umpqua Planning Unit.

B. Environmental Impacts of the Alternative Action - This alternative would be similar to the proposal in its impact on the physiography and mineral resources involved.

The same amount of road will have to be constructed under this alternative as under the proposal, but 4.5 miles more road will have to be relocated and improved. Erosion will occur during road construction and logging activities. Soil will be rendered unproductive by road and recreational site construction. These losses will be similar to the proposal and may even exceed it because of the increased road improvement necessary.

Sedimentation of streams and disturbance of the aquatic ecosystem will occur to about the same degree as the proposal. Reconstruction of the Thunder Mountain System on steep terrain will increase sedimentation.

This alternative would harvest the same volume of timber as the proposal, thus the impact on vegetation would also be similar.

Disturbance of wildlife habitats by logging and construction activities should nearly equal that of the proposal. Human disturbance will be less than the proposal due to the restricted access available to the public.

By restricting access to the south bank of the river, the esthetic quality of that area may be maintained for those who regard the addition of recreationist as being degrading to the south bank.

Access to the south bank of the river to anglers, although available under this alternative, would be difficult. This would tend to minimize any increase in angling pressure and would keep the level of "fishing experience" high.

Risk of fire damage under this alternative would be greater than the proposal because of the increased distance into the area via the Thunder Mountain or Lone Rock Road systems.

Those 15 to 18 families living along the Lone Rock Road, which is presently a quiet scenic road, little used except by the residents, would find their quiet family living patterns disrupted by the greatly increased timber hauling and recreational traffic. At a meeting in February 1973, residents amply expressed themselves against routing any increased logging or recreational traffic over the Lone Rock Road.

This alternative would require a greater expenditure of energy resources to remove the timber. Based on mid-points of volumes, this alternative has an 11.8 mile greater cumulative hauling distance than the proposal.

The road systems into the area could be locked up under this alternative either by private land owners or the BLM. This would greatly restrict use of the area by recreationists with the resultant effect being a minimal disturbance to the environment from leisure-related activities.

IX. Routes Considered

Eight access routes were initially considered as a means of renewing access to the area south of the river. Of these, the proposal was judged to be the least damaging to the environment while best meeting the BLM's multiple-use management goals.

Two of the access possibilities did not require a bridge construction while the other six did.

A. Land Access

A. There are two land access routes to the area.

Common Factors

a. No new bridge would be necessary.

b. Traffic would not enter the area until it reached (1) the Lone Rock Road intersection, or (2) the Little River Road intersection (avoiding Glide).

c. Fire access via Thunder Mtn. would be slowed by a minimum of 20 to 25 minutes.

d. Would not eliminate need for mainline road within area south of the river.

1. Lone Rock Road System

a. High costs would accrue to the BLM and Douglas County to bring this route up to standards for heavy hauling, particularly if it were also made into two lanes for recreation use.

b. Recreation use would be hampered due to poorer access and the bad intersection for right turns at the Lone Rock Bridge.

c. Heavy traffic would be brought to what is now a fairly dense residential area.

2. Thunder Mtn. Road System

a. An increase in tributary volume would finance more road improvement for this segment and a better road may result.

b. Higher hauling costs due to adverse haul.

c. Little recreational use would occur.

d. Potential for road closure due to snowfall or landslides is greater due to the increased length and elevation reached by this route.

e. Much difficult reconstruction in steep country would be necessary to get necessary grades and alignment, resulting in high construction costs, soil disturbance, and degradation of water quality.

B. Bridge Access

Several bridge crossing alternatives were singled out initially, for study.

1. Wright Creek

This alternative would connect the road system into an existing U.S. Forest Service Road net which crosses the river at the Wright Creek Bridge approximately 4 miles east of the planning area.

a. No new bridge required.

b. Excessive amount of backhaul.

c. Extensive road construction required in steep country to effect a link-up between the Wright Cr. System and the existing lower elevation system in planning area.

d. Extremely rough terrain would be crossed if the lower level extension were to be constructed to link up the existing systems.

e. The bridge serving this system is very prone to flood damage.

f. Fire access would continue to be poor.

g. Heavier traffic would utilize a greater length of the North Umpqua Highway.

h. Recreation use would be minimal.

i. Would not eliminate the need for a mainline road system within the area south of the river.

2. Smith Ford

A bridge deck washed out in 1964 at this location but its piers and one abutment remain standing.

a. An old bridge would be reconstructed.

b. Structure here cannot economically be made floodproof.

c. Some backhaul would be involved.

3. Swiftwater Bridge

Swiftwater Bridge (the option chosen) connecting into the system via Bob Butte Road.

A road will have to be built on this approximate location to manage the lower lands along the river, regardless of entry to the area. The proposal is to make this road available for safe recreational use as well as for commercial hauling. Specific road design information is available for review at the Roseburg District Office.

a. Recreation values and opportunities will be enhanced.

b. Fire access from the DFPA station at Rock Creek or Roseburg will be the most rapid of any alternative.

		c. The bulk of the timber on the south side is most economically hauled west over this route. d. This route requires the least heavy mainline road construction to develop access. e. New bridge needed (now built). f. Small portions of this road may be visible for a few years from the North Umpqua Highway. g. Additional noise and smoke will be introduced to the river canyon.
4.	T. 26 S., R. 2 W., Section 7	This alternative was abondoned when engineering tests showed that the north abutment would be located in an active slide area.
5.	Idleyld	Two locations were considered here. One at the "Narrows", would have infringed upon a very popular fishing area and been visually unacceptable; the other, located further upstream shared the visual problem and would have required a highly-visible approach road on the left bank.

X. Consultation and Coordination With Others

A. Consultation and Coordination in the development of the proposal and in preparation of the draft statement - The first public input started back in 1968. The chairman of Roseburg District BLM Advisory Board appointed a Multiple-Use Planning committee to study and make recommendations concerning future management proposals for the O&C lands from Rock Creek east to the Forest Service boundary.

The general outline of the plan has been presented to many groups and individuals prior to completion of the finalized version. Visitor Information Center plans as they relate to a cooperative project have also been presented.

The following have been presented with either one or both of the preceding:

Larry Williams
Oregon Environmental Council

Society of American Foresters
Umpqua Chapter

Sutherlin Chamber of Commerce

Roseburg Area Chamber of Commerce

Douglas Forest Protective Association

Umpqua Valley Timber Cruisers
(4-wheel Drive Club)

Izaak Walton League of America
Umpqua Chapter

Umpqua Mineral Club, Inc.

Douglas Timber Operators

Weyerhaeuser Company
Springfield, Oregon

State of Oregon
Gov. Tom McCall

Kessler Cannon - Executive Ass't to the Governor for Natural Resources

Robert Davis - Executive Ass't. to the Governor

Oregon State Game Commission

Robert Stults - State Representative

William Markham - State Representative

Glide Community Club

Glide Kiwanis Club

Winston-Dillard Kiwanis Club

Roseburg Lions Club

South Umpqua Gem and Mineral Club

Roseburg Kiwanis Club

USFS (UNF Supervisor's Office & Job Corps)

Douglas County Commission

Douglas County Land Department

Douglas County Park Department

North Umpqua Planning Committee (Frank Moore, Lea Riley, Mr. Rogers, Alan Knudtson, Ray Miller, Helen Glenn, Mrs. Hallock, Jack Price).

Steamboaters

Individuals

Mr. and Mrs. Reynolds
Helen Glenn
Forest Kennaday
Dorothy Terry
Stanley Knouse

In the spring of 1972, with staking substantially completed on the

proposed Bob Butte Road location, many individuals who had earlier expressed an interest were invited to walk the road location to get a first-hand view. Those who accepted are listed:

Everett Johnson, Chairman, Roseburg Dist. Advisory Board, C&D Lumber Co.

Tom Worden, Roseburg Dist. Advisory Board Member, Broadcaster, KRSB

Fred Sohn, Roseburg District Advisory Board Member, Sun Studs, Inc.

Charles S. Collins, Roseburg District Adivsory Bd. Member, Pacific West Representative Izaak Walton League of America (IWLA)

Robert Sherman, Chairman, Umpqua Chapter IWLA

Richard Gilman, IWLA

Stanley Knouse, President, Steamboaters

Ralph U. Grenfell, Assistant Supervisor, S.W. Region Oregon State Wildlife Commission (OSWC)

Jerry Bauer, Biologist, OSWC

Jim Fosback, Dillard Lumber Co.

Alan Knudtson, Roseburg Jeweler

George Webster, D.R. Johnson Lumber Co. Forester

Frank Moore, Proprietor, Steamboat Inn

Dorothy Terry, Resident, North Umpqua Highway

Paul Nolte, Roseburg Attorney

Larry Williams of the Oregon Environmental Council (a private organization) was shown the planning area and briefed on the plan's content on an earlier field trip.

In February of 1972, the chairman of the Roseburg District BLM Advisory Board reappointed the North Umpqua Multiple-Use Subcommittee

to review the draft of the North Umpqua Canyon Management Plan. Their report is on file.

In January 1973, the North Umpqua Canyon Management Plan and Environmental Analysis Record were sent to all individuals and organizations previously expressing an interest in them. Additional copies were sent to other commercial, conservation and environmentalist organizations who might be interested in the proposal. Review and comments were solicited from all and many were received. This mailing list appears on pages 126-133.

The State O&C Advisory Board toured the North Umpqua Plan area and went on record commending the staff of the Roseburg District for a wide-ranging, thoughtful, and comprehensive job in the preparation of the plan. (O&C Advisory Board - Report of meeting July 10-11, 1973, Roseburg, Oregon.)

The BLM met on several occasions with personnel of the Umpqua National Forest to discuss the proposal. Standards of management utilized by both agencies within the canyon are similar. The same landscape management principles are favored by both the BLM and the USFS. The USFS chose not to tie their road system into the proposed Bob Butte Road.

Goals of the Oregon Wildlife Commission for the North Umpqua River Canyon are alligned closely with the proposal. A major objective of the Commission is to provide more access to both the river and the surrounding area. They feel that this will provide a better distribution of sportsmen.

The statement was developed by a multi-disciplinary team of BLM employees with professional backgrounds in forestry, recreation, engineering, wildlife, soils, watershed management, hydrology and landscape architecture.

B. Co-ordination in the review of the draft statement - comments on the draft environmental impact statement will be requested from the following agencies:

Department of Agriculture

Department of the Interior
- Fish and Wildlife Service
- Bureau of Outdoor Recreation
- Bureau of Reclamation
- National Park Service
- Geological Survey
- Bureau of Indian Affairs

Department of Health, Education and Welfare

Department of Transportation

Environmental Protection Agency

Advisory Council on Historic Preservation

State of Oregon Clearing House

Umpqua Regional Council of Governments (Roseburg, Oregon)

Comments Were Solicited From People and Organizations on:
MAILING LIST FOR THE NORTH UMPQUA CANYON MANAGEMENT PLAN
AND ENVIRONMENTAL ANALYSIS

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Idleyld Park, OR 97447

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Council of Trout Unlimited
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Portland, OR 97203

3. Mr. Bart Garrison
First National Bank of Oregon
Roseburg Branch
P.O. Box 1247
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4. A. T. King, M.D.
The Doctors Clinic
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Salem, OR 97301

5. Mr. Albert G. Flegel
Chairman, Douglas County
Board of Commissioners
Douglas County Courthouse
Roseburg, OR 97470

6. Mr. Anthony Netboy
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Eugene, OR 97405

17. Mr. Stanley Knouse
President, Steamboaters
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Portland, OR 97204

20. Sierra Club
Conservation Center
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Seattle, WA 98105

21. Frank J. Barry
Wilderness Society
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Eugene, OR 97403

22. Wildlife Management Institute
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3. Citizens For a Clean Environment
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4. Governor's Committee For
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5. Oregon Parks and Recreation Society
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7. Oregon State Federation of Garden Clubs
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9. Roseburg Chamber of Commerce
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3. The Honorable John D. Dellenback
United States Representative
Longworth House Office Building
Room 1020
Washington, DC 20515

34. The Honorable Mark Hatfield
United States Senate
Old Senate Office Building
Room 463
Washington, DC 20510

35. The Honorable William Markham
House of Representatives
Salem, OR 97310

36. The Honorable Robert Stults
House of Representatives
Salem, OR 97310

37. The Honorable Jason Boe
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of the State of Oregon
Salem, OR 97310

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42. KRNR Radio
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54. Ken Cochrun
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78. Champion - International
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79. Little River Box Co.
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80. Mr. Milton Herbert
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XI. References

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XII. Glossary of Terms

Allowable cut -	predetermined level of timber harvest - usually annual allowable cut
Anadromous (fish)	going from the sea to rivers to spawn
Aquifer	water bearing layer of soil, sand, gravel or rock
Aspect	directional orientation of sloped land
Backslope	refers to the cut slope above a road
Balanced roads	road so designed that excavation volume approximately equals embankments or fill volume. i.e. no soil material is allowed to "waste" or run over the hillside
Berm	the raised dirt shoulder alongside a road
Biome	a life zone of the earth. A zone characterized by certain climatic conditions, inhabited by certain kinds of plants and animals
Biota	the animal and plant life of a region
Blister rust	i.e. White Pine blister rust - Cronartium ribicola - a fungal disease which attacks 5-needle pines including Western White Pine and Sugar Pine
Clearcut	a silvicultural system wherein all trees are cut or an area where all trees have been cut
Daylighting	constructing a road section through a narrow ridge so that the outside road shoulder coincides with the original ground line
Decibel	a unit for measuring the relative loudness of sounds detectable by human ear ranging from 1 to 130
Ecosystem	energy - driven complex of a community of organisms and its controlling environment
End-hauling	road construction practice wherein excess earth is hauled to waste areas or to fill areas rather than disposed of by sidecasting

Esthetics	pertaining to the sense of the beautiful
Estuarine	pertaining to estuaries or bays
Grubbing	the digging-up of tree stumps and roots
High lead	a logging method whereby logs are pulled or yarded by cable to a spar or tower
High-grade cutting	practice of cutting only high value trees on an area
Hydromulch	a homogeneous slurry of grass seed, fertilizer and wood fiber placed on exposed soils by hydraulic mulching equipment. Application of the foregoing
"L" station	the designed center line of a proposed road
Layout	process of locating and marking cutting boundaries including roads and rights-of-way, on the ground
Microorganism	a microscopic animal or vegetable, organism
Partial cutting	removal of individual or small groups of trees scattered throughout a stand
Patch-cutting	removal of timber by clearcutting areas generally ranging in size from 15 to 40 acres and spaced at fairly regular intervals across the landscape
Pathogens	a specific cause of disease
Phyto-plankton	the plants of the plankton. Unattached microscopic plants subject to movement by wave or current action
Perched water table	a water bearing strata intercepted by an impermeable layer, usually clay, that results in a wet, bog area at a higher elevation than the water table in surrounding areas
Pioneer road	a preliminary construction following the location of the final road for the principal purpose of getting construction equipment to and from the job
Riprap	material, usually large rock, but also log or metal cribbing, or gabions, emplaced to protect shoreline from water action

Sapling	small trees usually 4" to 11" in diameter
Saprophyte	a plant living on dead or decaying organic matter
Scarification	plowing or ripping of soil to remove compaction, destroy brush or roots, etc.
Seed tree cut	removal in one cut of the mature timber from an area, except for a small number of seedbearers per acre left singly or in small groups
Shelterwood system	an even-aged system in which a new stand is established under the protection of a partial canopy of trees. The old stand is removed in a series of two or more harvest cuts, the last of which removes the shelterwood when the new even-aged stand is well established
Silviculture	the Art and Science of growing forest trees
Skidder	machine used for pulling logs to a landing
Skid road	path or trail made by pulling logs to a landing
Skyline	in this context a logging method which enables logs to be lifted clear of the ground
Slash	limbs, tops, and cull trees left from logging
Toxicant	a toxic agent: especially one for insect control
Turbidity	the characteristic in water of being opaque or muddy from particles of extraneous matter
Zoo-plankton	the animals of the plankton. Unattached microscopic animals subject to movement by wave or current action

XIII APPENDIX

Relationship to Management Framework Plan

Land-use planning is accomplished in the BLM through a process called Bureau Planning System, a stage of which is called the Management Framework Plan. "The Management Framework Plan" (MFP) for a specific area describes the various resource uses which are permissible after consideration of the governing guidance, such as law and Bureau policy, the facts about the resources and uses, the views of the public, and other inputs to the decision-making process. In addition, it describes the constraints on the planning for the realization of those uses which are necessary to insure compatibility of uses, protection, and enhancement of the environment, stability of dependent communities, and other objectives of management. Step 2 of the MFP (Multiple Use Recommendations) were presented to the public in April of 1972. As a result of four public meetings, certain changes were incorporated into the MFP and subsequently approved by the District Manager on June 8, 1972. The area involved in this statement was included in the North Umpqua Planning Unit Management Framework Plan. The subject MFP is available for inspection at the Bureau of Land Management office in Roseburg, Oregon.

SCENIC MANAGEMENT ZONES

Foreground - The Foreground zone is the immediate environment of the viewer. It is the area in which he perceives individual plants, bushes, limbs, and leaves. The texture of the foreground is determined by individual leaves, fronds, branch patterns, bark, and so on. It varies in depth from a few feet where the dense forest and topography close in to several hundred feet. Even where vision is limited, sensations such as smoke, dust, smell, and noise can extend the effective foreground a considerable distance beyond his visual limit.

In the case of the North Umpqua, the foreground on gentle land consists of the roadside and riparian vegetation to a minimum distance of 200' to 300' depending on understory vegetation.

On steeper ground, the foreground zone extends from roadside or river bank to the nearest break in topography usually not more than several hundred feet, but occasionally more.

Bob Butte Road foreground zone extends from road edge to a few hundred feet for the flat or benchy ground over which much of the road lies. Topography governs in most cases. The road crosses steep ground in the vicinity of Bob Butte which causes the effective foreground to constrict in extent in timbered slopes. On the same steep ground in old clearcut areas, the brush and reproduction restrict the foreground to the immediate roadside. Here, as in other areas along both the Bob Butte and North Umpqua Roads, vegetation next to the road forms an effective close screen. In some instances, this screen is critical in maintaining a good visual aspect and its protection is imperative.

Middleground - The middleground extends away from the foreground zone and lies between it and the background zone. This is the zone in which trees and objects form the patterns and textures of the landscape. Land forms begin to dominate as ridgelines and drainages become evident. Individual trees are still recognizable on skylines. Overall forms and parts begin to draw together to form patterns.

The middleground generally encompasses the area beginning a 1/4 to 1/2 mile from the observer and extending to the near edge of the background at 3-5 miles distance. This includes the greatest acreage of the planning area. The middleground is consequently very critical because it dominates the view and harbors the preponderant forest resources within the study zone.

Background - The background lies from the outer border of the middleground at 3-5 miles to the limit of sight. This is the region where textures soften, colors are muted and grayed. Ridgelines and sky dominate form and only the grosser patterns such as canyons and drastic vegetation changes are discernible. Very little land lies within the background in the planning area and that which does, lies at the transition from middleground to background. Scott Mountain, as viewed from Glide, is an example of the background.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of River Basin Studies
Portland Area Office
919 N.E. 19th Avenue
Portland, Oregon 97232

Reference: RBS

February 24, 1975

District Manager
Bureau of Land Management
1928 N.E. Airport Road
Roseburg, Oregon 97470

Dear Sir:

As requested in your January 27, 1975, letter, we have reviewed your preliminary draft environmental impact statement concerning a multiple-use resource management plan for the North Umpqua River Canyon near Glide. Our comments are for your consideration during preparation of the draft statement and do not constitute the comments of the Department of the Interior under provisions of the National Environmental Policy Act (Public Law 91-190).

The statement, in general, presents an excellent description of the environmental effects which could result from implementation of the proposed multiple-use management plan. Specifically, major fish and wildlife species and human uses of these species are thoroughly identified, and impacts of the proposed action on natural resources are satisfactorily outlined. Consequently, we have only minor comments to provide.

II. L. Ecological Interrelationships, pages 45-49. The discussion of the basic concepts involving interrelationships between physical environment and biotic communities (nutrient cycle, hydrologic cycle, etc.) is interesting; however, it does not include enough data to sufficiently aid in understanding the proposed management plan's environmental impact. Most of the information concerning the canyon habitats could be more satisfactorily handled in other existing categories. As a result, we suggest that this section be deleted from the statement.

VIII. Alternatives to the Proposal, pages 104-110. An additional alternative which could be included is development of the area for recreational purposes only. This might not be an economically acceptable alternative; however, it does merit consideration.

We appreciate the opportunity to review the preliminary draft and hope that our comments aid in preparation of your final statement.

Sincerely yours,

for John W. Kincheloe
Field Supervisor

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
NORTHWEST REGION
~~1002 SECOND AVENUE~~
~~SEATTLE, WASHINGTON 98104~~
915 SECOND AVENUE, RM. 908
SEATTLE, WASHINGTON 98174

IN REPLY REFER TO:

E3035

FEB 21 1975

Memorandum

To: District Manager, Bureau of Land Management, Roseburg

From: Regional Director, Northwest Region, Bureau of Outdoor Recreation

Subject: Preliminary Draft Environmental Statement for the North Umpqua River Canyon East of Roseburg, Oregon

Pursuant to the January 27, 1975, letter from your office, we have reviewed the subject statement and we offer the following comments.

General Comments

The document is thorough and from the standpoint of recreation, primary and secondary impacts are evaluated with sufficient detail for public review.

Cooperation with the Forest Service in recreation planning is evident; i.e., integration of the new Tioga Trail with the existing Forest Service Mott Trail. For further recreation planning information, we recommend the Bureau of Land Management contact the State Liaison Officer and incorporate information contained in the Oregon Statewide Comprehensive Outdoor Recreation Plan. The State Liaison Officer is: David G. Talbot, State Parks Superintendent, 300 State Highway Building, Salem, Oregon 97310.

Specific Comments

Pages 56 and 89 - Since the new Tioga Trail will provide equestrian access along the south shore of the river, the potential for isolated instances of water quality degradation due to horse use should be considered.

Maurice H. Lundy
for Regional Director

United States Department of the Interior

NATIONAL PARK SERVICE

Pacific Northwest Region
Fourth and Pike Building
Seattle, Washington 98101

IN REPLY REFER TO:

L7619
(PNR)GAE

February 25, 1975

Mr. George C. Francis
District Manager
Bureau of Land Management
1928 Northeast Airport Road
Roseburg, Oregon 97470

Dear Mr. Francis:

We have reviewed the preliminary statement for the North Umpqua Canyon Management Plan and offer the following comments to assist the preparation of the draft environmental impact statement.

Although useful background information is included, archeological and historical resources have not received adequate discussion. These resources should receive the same treatment as other aspects of the environment--i.e., they should be inventoried, their significance evaluated, impacts upon them assessed, and mitigating measures proposed.

We suggest you consult the "National Register of Historic Places" and the Oregon State Historic Preservation Officer to learn if sites on, or eligible for, the National Register will be affected. To determine if known archeological sites will be affected and if further measures to inventory the area are required, we suggest you consult Mr. David Cole, Museum of Natural History, University of Oregon, Eugene, Oregon 97403.

The environmental statement should document efforts to comply with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593. Compliance procedures are contained in 36 CFR Part 800.

We are enclosing a copy of Preparation of Environmental Statements: Guidelines for Discussion of Cultural (Historic, Archeological, Architectural) Resources. You may find the information in this booklet helpful in preparation of the draft statement.

Sincerely yours,

Glenn D. Gallison
Associate Regional Director,
Cooperative Activities

UNIVERSITY OF OREGON

Museum of
Natural History

EUGENE, OREGON 97403
telephone (code 503) 686-3033

May 7, 1974

Mr. Frank Maxwell
U. S. Department of the Interior
Bureau of Land Management
District Office
P.O. Box 1045
Roseburg, Oregon 97470

Dear Mr. Maxwell:

David L. Cole has given me the copy of the "North Umpqua Canyon Management Plan" for review. I would like to take this opportunity to eongratulate you for doing a partieularly good job on non-renewable archaeologic resources.

I was partieularly impressed with your eoncern for proteeting the Susan Creek rock cairns. Since arehaeologic resourees are so fragile, the careless actions of a few vandals can deprive the rest of the populaee from being able to examine, study, and enjoy such resources.

I corresponded with Mr. Brigham of your office earlier this year regarding the Susan Creek Indian Mounds. I was happy to hear that this area has been protected and that an interpretive sign describing the signifieance of the site has been prepared.

I apologize for the lateness of this reply to your environmental analysis, particularly since it did consider archaeologic resources and did result in some positive action.

Best regards,

John L. Fagan

Dr. John L. Fagan
Asst. curator of Anthropology

JLF:rb

IN REPLY REFER TO:

UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
District Office
P. O. Box 1045
Roseburg, Oregon 97470

9110
6120

DATE: Oct. 1, 1971

TO : District Manager

FROM : Soil Scientist

SUBJECT: Bob Butte

Soils along roads and on two recreation sites were examined in the North Umpqua Corridor. A steep segment of Bob Butte Road was investigated for stability of the soils. From P-121 + 00 to P-135 + 00 (old P-stake numbers) slopes are 60-90%. Besides having the steepest sideslopes on the Bob Butte Road, this segment also is the only long stretch that can be seen from the North Umpqua Highway.

Two spots in this segment are unstable. One spot is located at old P-121 + 00 and the other at P-125 + 50. At P-121 + 00 several young trees have been sliding downhill. Sideslopes are 70% and the soils are 90% rock.* To check the depth of soil at this spot, a seismograph was used. The soil was tested about where the top of the cutbank will be . The test showed there were 22 feet of loose rock.

A road built in SE¼ of Section 30, T. 24 S., R. 1 W., passes through a similar soil and the same slope. The type of failure that has occurred since the road was built in 1967 has caused very little sediment or damage to the road. The failure has partially filled the road.

The other unstable spot (P-125 + 50) has slopes over 70%. Soils have a light gravelly clay loam texture. There is a pocket of this soil that runs from about P-124 + 50 to P-126 + 00. It runs from 150 feet above the road to 100 feet below the road. Seismograph tests were made 60 feet uphill from the P-line. The tests showed 8 feet of soil at P-124 + 90 and 12 feet at P-125 + 50.

A similar situation to the one at P-125 + 50 was found in Section 24, T. 24 S., R. 2 W. A shallow (8-10 feet) pocket of gravelly clay loam material has slid off the cutbank. The slide is not a serious one in terms of losing a road. However, it will have a visual impact on the North Umpqua Highway.

*L-231+00 and L-235+00

The remaining portion (P-121 + 00 - P-135 + 00) of the road should have stable cutbanks. Soils similar to those found on the remaining portion are like those found on part of Rock Creek "C" access road.

If the potential slide at P-125 + 50 does fail, it can be seen from the highway. There is about a 40-50% chance of the slide failing.

An alternate route was investigated to see if it is possible to avoid this section. Shown on the accompanying map is an alternative route that takes advantage of gentle slopes on the south side of Bob Butte. The route takes off from Weyerhaeuser's proposed road in Section 18 and climbs to the existing Bob Creek Road. It stays on the existing road until it crosses Bob Creek. Then new construction would have to begin and connect to an existing road in Section 21. (Road 26-2-22.0)

This route has several severe limitations:

1. Soils in the NE¼ of Section 19 are unstable. Deep soils on tuff and breccia bedrock on slopes over 50% slide off cutbanks. Road 26-2-21.0 in Section 19 passes through these unstable soils. On a segment of this road the subgrade and cutbank have both failed.

2. Approximately 1.5 miles of extra road would have to be built.

3. The alternate route has steep adverse grades. From where the road enters the west side of Section 20 down to Bob Creek, adverse grades of 12 to 14% are common. Also, new construction in Section 28 would have some steep grades.

4. Parts of the road in Section 29 and Section 28 could be seen from the highway.

The alternate route does not appear to be a feasible one. It does not avoid unstable soils and it can still be seen from the highway.

The present proposed location will disturb less soil and will give favorable hauling grades. The proposed location should be used.

Certain precautions are needed in building the proposed road through old P-122 + 00 - P-135 + 00.

A. End hauling should be used.

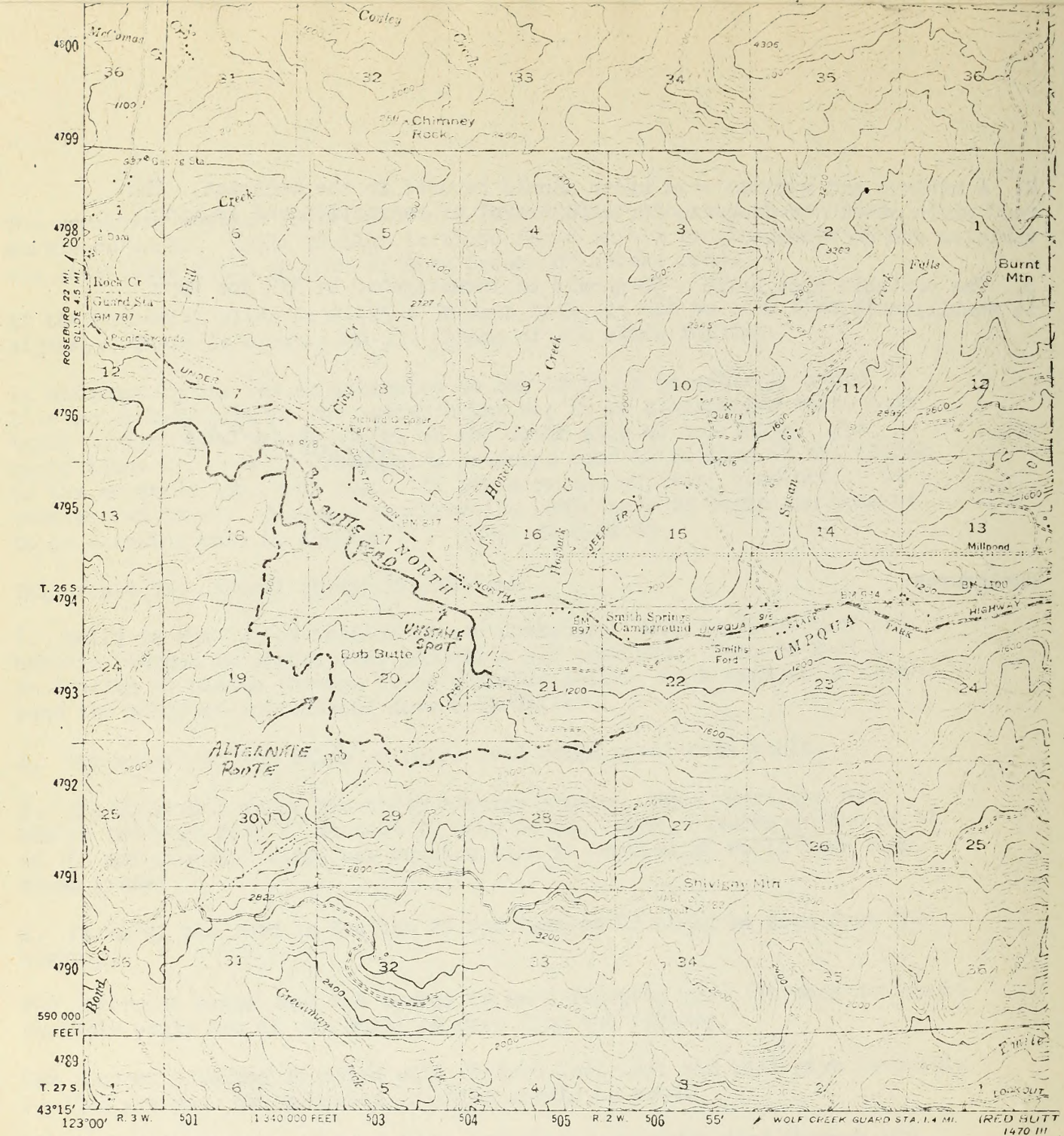
B. In constructing the pioneer road, a small cat (D-7 or less) should be used with a U-shaped blade. This will prevent a lot of sidecast from running down through the timber and getting into the river.

C. A minimum and maximum road width should be used in the contract. The road width should be adequate for safe travel of recreation and logging vehicles and no wider.

D. The unstable spot P-125 + 50 should be investigated by BPR for ways to stabilize it.

Steve Wert

Enclosures



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods
Aerial photograpns taken 1952. Field check 1955

Polyconic projection. 1927 North American datum
10,000-foot grid based on Oregon coordinate system, south zone

Dashed land lines indicate approximate iccations
Certain land lines are omitted because of insufficient data

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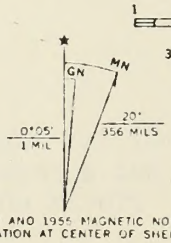


UTM GRID AND 1955 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND

PLANNING AREA STREAMS

The following streams have been tabulated from USGS quadrangle maps:

Stream Name	Total Livewater*	Anadromous Fish Use	Resident Fish Use**
North Bank			
Bradley Cr.[1]	20,000[1]	6,000[1]	17,600
French Creek[2]	19,800	10,600	15,500
	7,750	0	0
Hill Creek	11,200	0	0
Clay Creek	6,100	0	0
Honey Creek	41,500	6,400	19,000
Hogback Cr.[3]	6,500	0	0
Susan Cr.	56,950	4,200	15,100
Cedar Creek	3,000	0	0
South Bank			
Britt Creek	16,500	0	13,500
	4,500	0	0
	16,500	0	0
Rocky Run	15,000	0	0
Bob Creek	19,400	0	2,700
	8,000	0	0
	6,000	0	0
	4,500	0	0

1. Watershed all private
2. Watershed all private but upper portion
3. Intermittent stream

*Lineal feet

**Generally small cutthroat trout

October 25, 1973

NORTH UMPQUA RIVER ABOVE COPELAND CREEK

Mean daily low flow - 640 c.f.s.
Minimum daily flow of record - 565 c.f.s. September 13, 1959

Mean Maximum flow - 10,860 c.f.s.
Maximum discharge of record - 40,700 c.f.s. December 22, 1964

Mean daily flows: (by month)

October	903 c.f.s.
November	1312 c.f.s.
December	1763 c.f.s.
January	1880 c.f.s.
February	1736 c.f.s.
March	1546 c.f.s.
April	1625 c.f.s.
May	1983 c.f.s.
June	1575 c.f.s.
July	1010 c.f.s.
August	840 c.f.s.
September	784 c.f.s.

Source: 1961 - 1971 Water Years - U.S.G.S. Gage # 14-3165 published records.

October 25, 1973

NORTH UMPQUA RIVER AT WINCHESTER, OREGON

Mean daily low flow - 707 c.f.s.
Minimum daily flow of record - 578 c.f.s. September 14, 1959

Mean maximum flow - 57,545 c.f.s.
Maximum discharge of record - 119,000 c.f.s. December 22, 1964

Mean daily flows: (by month)

October	1410 c.f.s
November	4285 c.f.s.
December	6972 c.f.s.
January	7945 c.f.s.
February	5793 c.f.s.
March	5634 c.f.s.
April	4534 c.f.s.
May	3987 c.f.s.
June	2313 c.f.s.
July	1302 c.f.s.
August	971 c.f.s.
September	940 c.f.s.

Source: 1961 - 1971 Water Years - U.S.G.S. gage #14-3195 published records.

District Office
P. O. Box 1045
Roseburg, Oregon 97470

JUN 17 1974

District Manager

Soil Scientist

Bob Butte Access Road

Bob Butte road will pass through soils that range from black clay to gravelly loams derived from volcanic rocks. It will cut across several ancient river terraces and old slumps. The road will produce sediment that is high in clay for two to three years after construction. Most of the sediment will come from small cut banks sloughing and erosion from ditches.

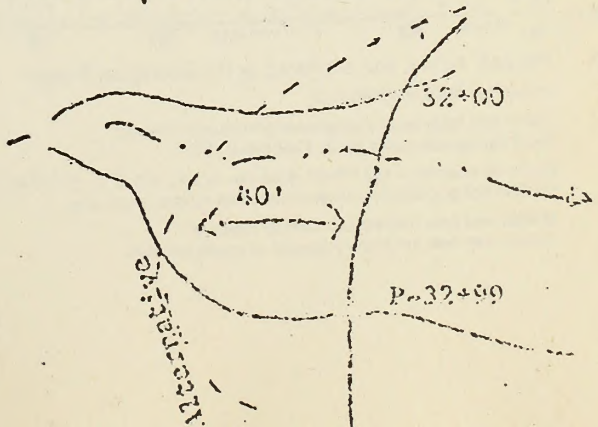
Side cast material will be stable except for those areas shown on the map below. It will rest on gentle slopes and should respond well to seeding and hay mulch. New road construction should have cut banks and fills mulched and subgrade rocked before October 1. We might also try rocking ditches. This should reduce the heavy sediment that comes after the first winter rains.

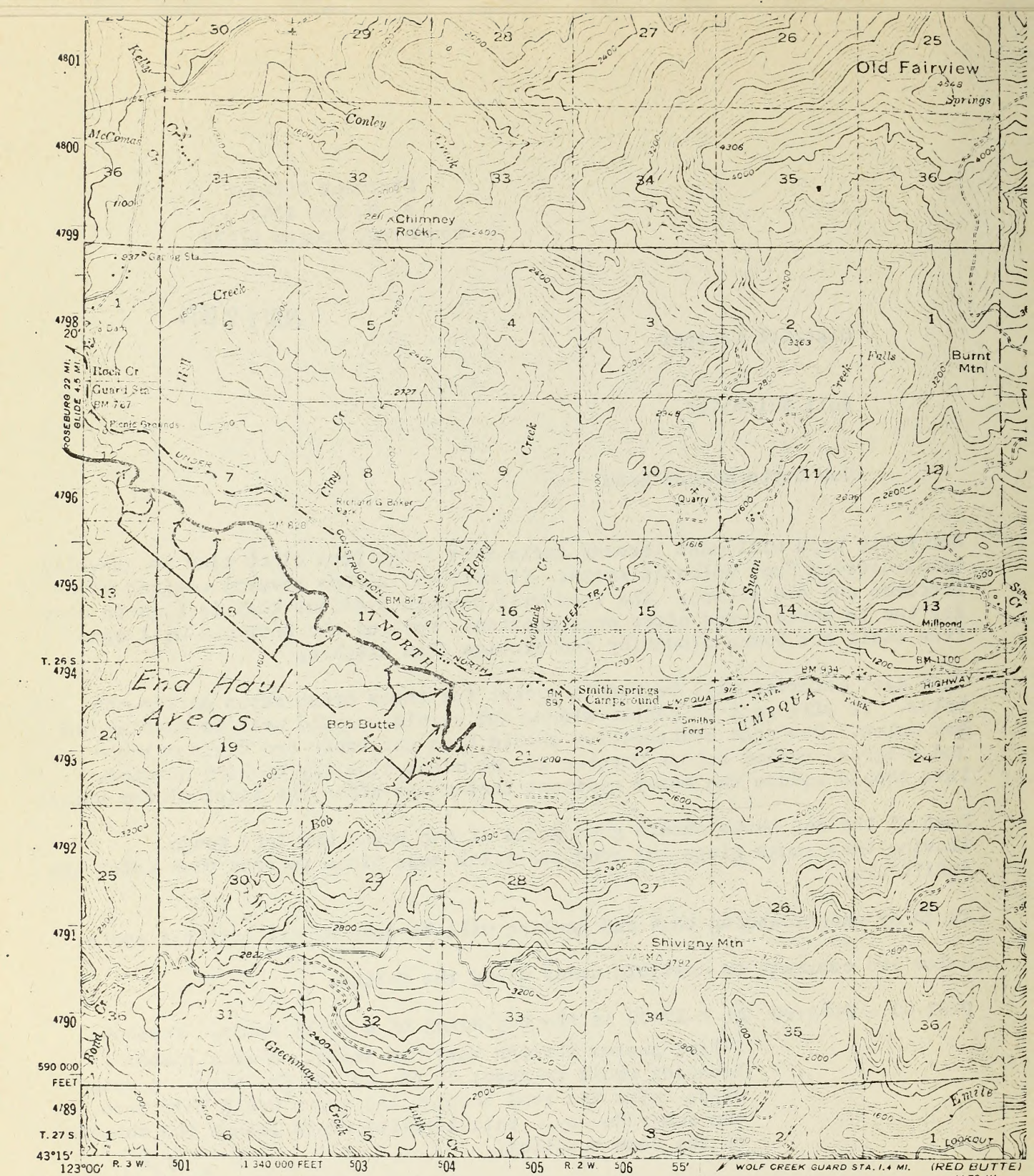
Most of the cut banks should grow grass if the banks are left rough. Leaving them rough gives the seed and mulch some place to rest plus water can infiltrate.

It is my understanding that end hauling will be done on all critical spots.

Below are comments on unstable areas along the P-line.

P-32+00 - P-43+00 At P-32+00 is the beginning of a small swamp. Present P-line passes through very wet soils. A more stable location would be about 40 ft. up the drainage. A deep ditch below the road through the swamp would help keep the subgrade dry. This location would lessen the chances of the road settling.





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Aerial photographs taken 1952. Field check 1955

Polyconic projection. 1927 North American datum
10,000-foot grid based on Oregon coordinate system, south zone

Dashed land lines indicate approximate locations
Certain land lines are omitted because of insufficient data

SCALE 1:62500

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UTM GRID AND 1955 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 2
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SY

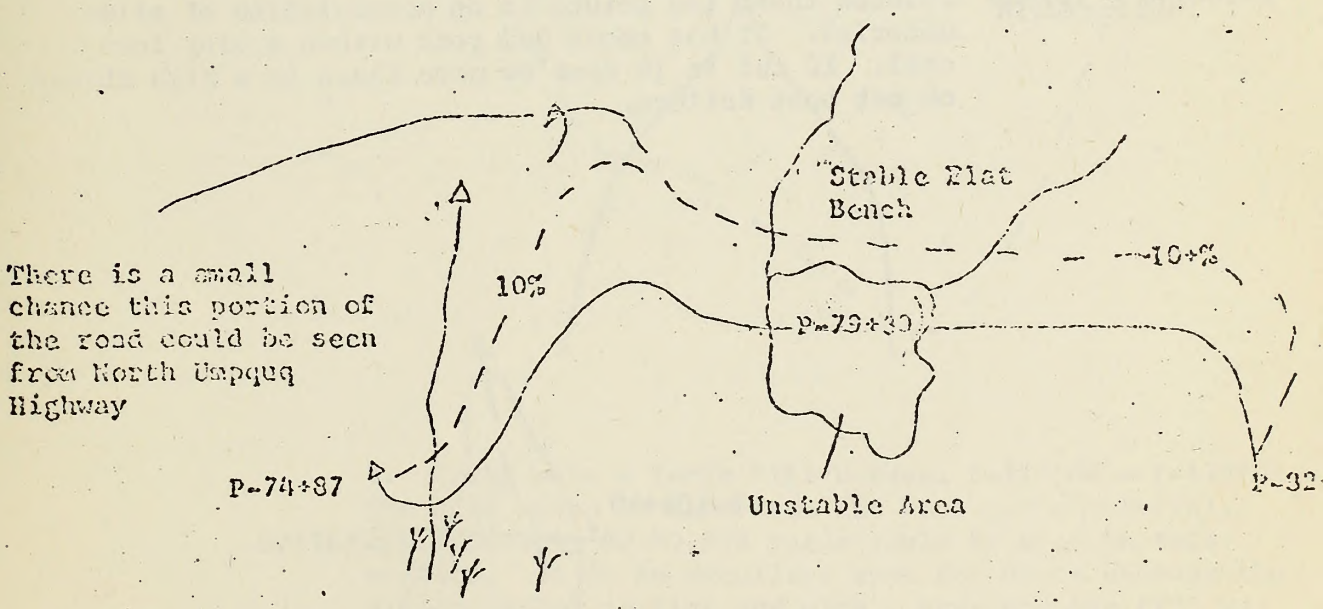
From 39+00 - 43+00 the road goes through a poorly drained clayey. Ditches along both sides of the road should keep subgrade dry.

Extra rock will be needed from 32+00 - 43+00.

P-66+23 — Several springs break out of a gentle slope at this point. If cuts are less than five feet there should be no problem. If they are deeper, this spot should be looked at carefully to see if there are deeper springs. Riprap should be used if more springs are found.

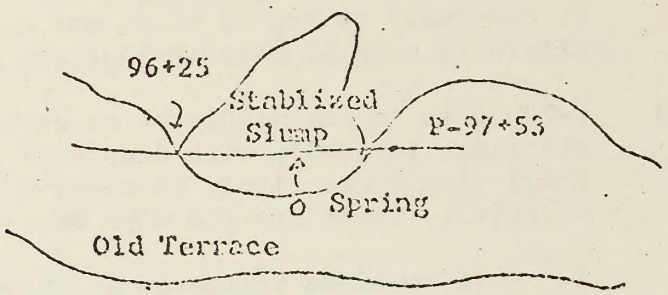
P-74+87 - 82+50 — P-79+30 is in the middle of an unstable sideslope. The sideslope is 50-55% with deep soil on it. Three to four small slumps are likely to occur with the present location. There are two ways of avoiding them.

1. Road could be relocated as shown in diagram.

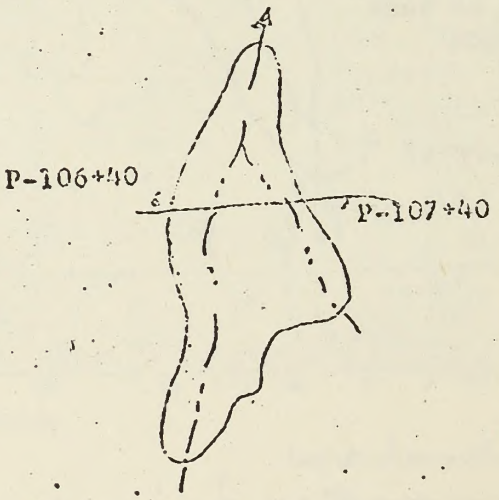


2. Could riprap unstable area.

P-96+25 - 97+53 Road cuts into an unstable old river terrace. Avoid cutting into terrace from 96+25 - 97+53. At 97+30 is a spring that has skunk cabbage growing in it which indicates that the spring does not dry up.

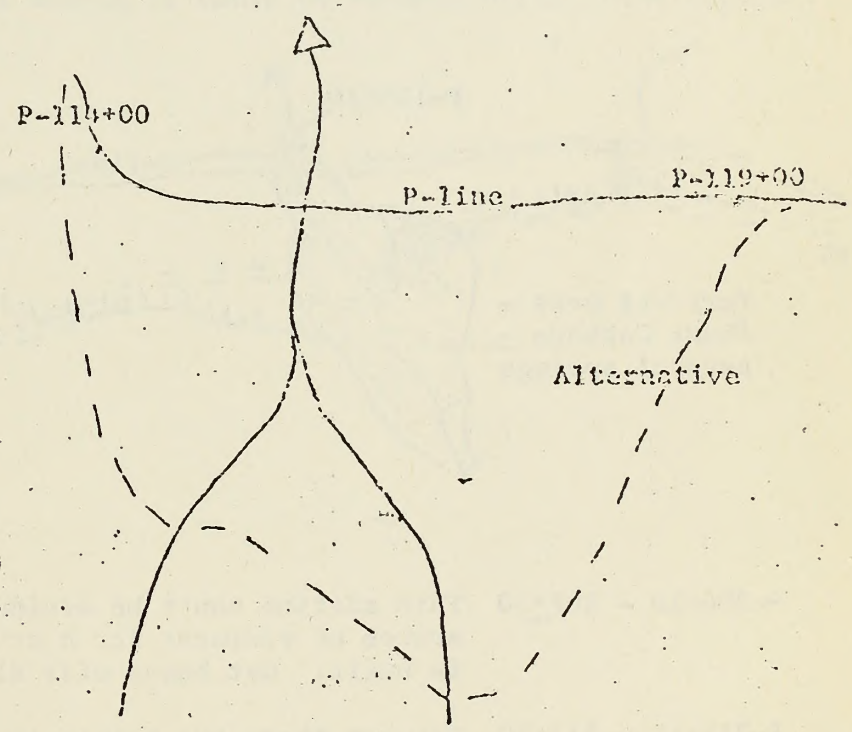


P-106+40 - 107+40 Between these two points is an accumulation of slide material. It has about 30% rock within a clay loam soil. If cut is 15 feet or more there is a high chance of cut bank failure.



P-114+00 - 119+00 Present location calls for a 40-50 foot cut at P-119+00 into a deep soil derived from tuff. I do not know how deep the soil material is. A possible cut bank failure from a large cut could be avoided in two ways:

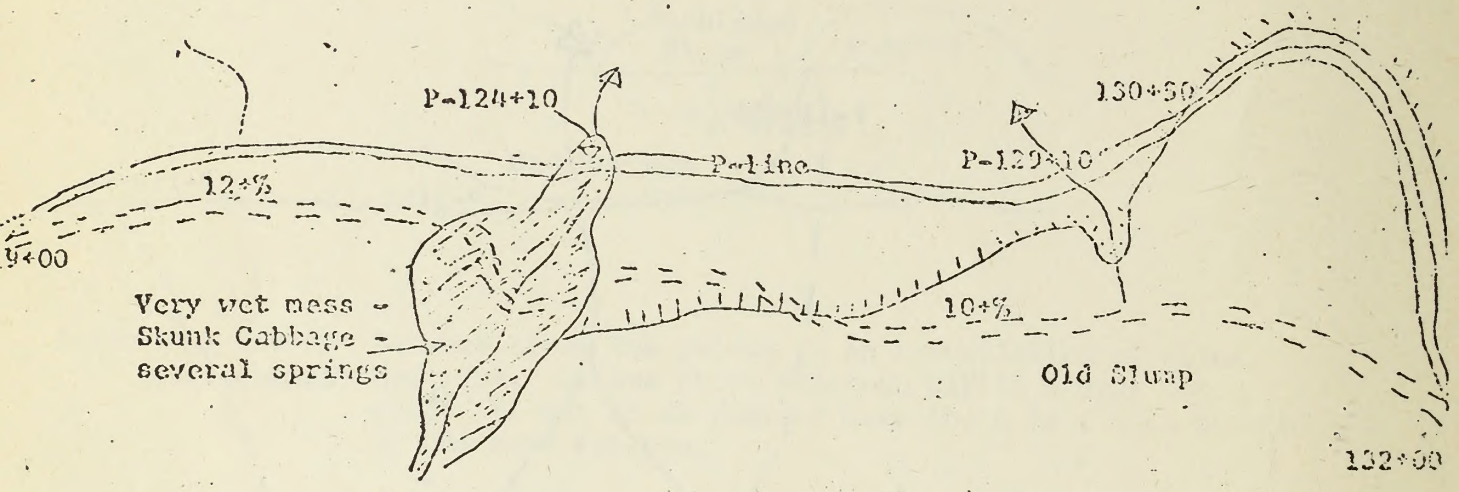
1. Could curve road up stream at 119+00 and side hill to cross two small streams.



2. Could make a large fill between P-114+00 - P-119+00. The fill could be made from end haul waste material. Approximately 30-40,000 yards could be used in this section. It is an excellent spot for waste because the stream bottom is flat and wide. Provided the fill was compacted there should be no problem holding the fill.

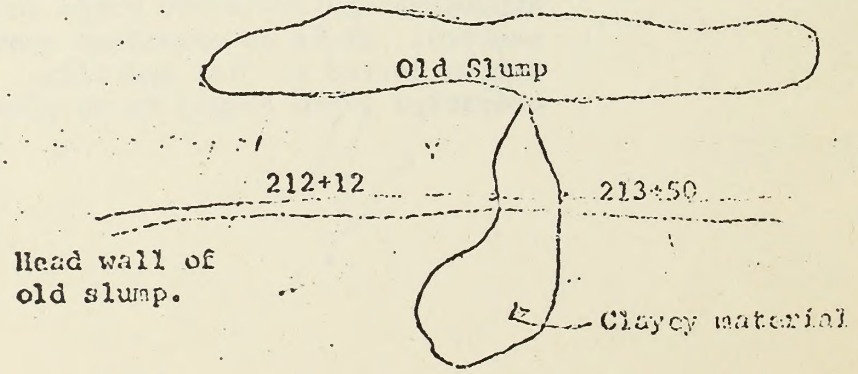
P-119+00 - 132+00 At 124+10 and 129+09 to 130+50 are unstable areas. P-124+10 is the center of a continuously wet slumpy area. At P-129+90 - 130+50 the road will be cutting into the edge of an old slump. Sloughing of the cut banks will be a problem in this section.

Shown below is an alternative route. It does not get away from the unstable area at P-124+10. Riprap will stabilize this spot.



P-206+18 - 207+50 This section can't be avoided easily. It will be a source of sediment for a couple of years after the road is built. Cut banks will slough.

P-212+12 - 213+50 Between these two points is a pocket of clayey material that has a high chance of slumping. It is doubtful whether this spot can be stabilized because the slope is getting too steep (50%) for riprap to work.



P-216+52 - Old P Stake 109+00 Road is located along the edge of an old slump. Chances are high that the road will fail. Road should be moved 40 feet up the hill.

Old P-122+00 - 125+00* Unstable area. There will be small slump from cut bank for a couple of years after construction. Slopes are too steep for riprap.

Old P-176+50 - 177+00 A small pocket of clay lays between these points. It is small enough it could be removed during construction.

SWMT/vm
06-16-71

Steve West

*L - stations 231+00 and 235+50

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
BUREAU OF PUBLIC ROADS
REGION 8
FEDERAL HIGHWAY PROJECTS OFFICE
MATERIALS BRANCH

PRELIMINARY SOIL SURVEY

OREGON BLM 444.2
BOB BUTTE ROAD
ROSEBURG BLM DISTRICT

DOUGLAS COUNTY
OREGON

By: Craig A. Sparks,
Geologist

Date: March 1970

I. INTRODUCTION

The Bob Butte project, Oregon BLM 444, is located near Idleyld Park, Oregon. It extends southeasterly along the south side of the North Umpqua River to the vicinity of Bob Butte where it joins a BLM access road. See the area sketch.

Line changes have added about 3-1/2 miles to the beginning of the project. A report by Wayne Hiatt, dated January, 1966, covers the original survey. The recent survey, P 0+00 to P 216+52.88, is covered in this report. P Station 216+52.88 (recent survey) = 106+95.97 (survey by B. Rice, 1965).

Topography, geology, vegetation, climate, and access are covered in the January, 1966 report by Wayne Hiatt.

II. FOUNDATION CONDITIONS

A. Bedrock Outcrops

Rock crops out along the banks of the North Umpqua River and in some streams through the project. Hard rock can be expected in some cuts but the majority of the cuts will be in highly weathered rock. This rock has been weathered in place to rock fragments and compact silt and clay. It is rippable material. A vertical backslope is recommended in the hard rock and a 1/2:1 backslope in the highly weathered rock. Exposed outcrops in the area show 5' to 15' of soft highly weathered rock grading into hard non-rippable rock. Similar conditions can be expected throughout the project.

B. Soil Types

The soils along the project are derived from andesitic rock. They are mainly sandy clay or sandy silt and rock fragments; A-4, A-7-5, and A-2-4 soils.

C. Foundation Exploration

The following list of foundation conditions was made from visual observations and shallow test pits dug with hand tools.

(All Stations are P1 Stations unless otherwise noted)

Station	to	Station	Remarks
0+00	to	2+90	Line leaves the South Umpqua Road and crosses the gravel terrace to the river edge. Hard rock crops out along the river.

Station	to	Station	Remarks
2+90	to	3+50	South Umpqua River
3+50	to	4+75	Hard rock
4+75	to	8+00	Line crosses valley floor. Minor cutting in silty gravel.
8+00	to	10+00	5' to 8' silty clay over hard rock.
10+00	to	18+00	Minor cutting expected in silty clay.
18+00	to	27+50	Line follows old logging road. Minor cutting expected in silty clay and rock fragments.
18+50			Spring (provide adequate
21+00			Spring cross drainage)
27+50	to	32+00	Line along hill slope. 10' to 15' clay and rock fragments.
32+00			Stream
32+00	to	34+20	Low area. Can expect water to stand during the rainy season. Clay soil.
34+20	to	34+60	Line climbs slope. 10' to 15' silty clay.
34+60	to	44+00	Line along a flat bench. Minor cutting in silty clay.
44+00	to	48+90	Low area. Presently boggy. Can expect water to stand in rainy seasons.
44+40 & 47+00.			Test Holes: 0 to 1' Wet duff
			1' to 3' Wet blue clay
			3' Dry brown clay
48+90	to	49+75	Clay soil. Small springs in hill slope.
49+75	to	50+30	Line follows old logging road. 3' to 5' clay and rock fragments in cut slope.
50+30	to	51+00	Low area. Silty clay.

Station	to	Station	Remarks
51+00	to	55+35	Minor cutting expected in silty clay.
	51+70		Small stream
55+35	to	59+60	Steep hill slope. 5' to 10' silty clay and rock fragments over hard rock.
59+60	to	60+00	Line along old logging road. Minor cutting in clay and rock fragments.
60+00	to	66+00	3' to 10' silty clay over hard rock.
66+00	to	68+50	Clay and rock fragments. Minor cutting expected.
	66+50		Springs
	68+40		Stream - silty gravel and boulders in stream bottom.
68+50	to	75+20	5' to 10' clay and rock fragments over hard rock.
75+20	to	75+50	Small stream through low bog area.
	75+25		0 to 2' Wet blue clay 2' to 3' Damp firm silty clay
75+50	to	84+58	5' to 15' clay and highly weathered rock over hard rock.
84+58	to	86+00	Line crosses gully.
	85+25		Stream. Hard rock crops out 50' downstream.
86+00	to	96+90	5' to 10' clay and highly weathered rock over hard rock.
96+90	to	97+50	Bog area on gentle slope. 0 to 2-1/2' Wet blue clay 2-1/2' to 3-1/2' Damp brown silty clay
97+50	to	106+40	5' clayey silt over hard rock.
106+40	to	107+00	Line crosses gully
	106+80		Stream
107+00	to	P_2 4+25	3' to 10' gravelly clayey silt and compact highly weathered rock over bedrock.

P 113+75.48 = P_2 0+00

Station to Station	Remarks
P_2 4+25 to P_2 4+75	Springs in hill slope. 0 - 1' Wet Clay and organic material. 1'- 3' Soft wet blue clay. 3'- 4' Firm damp brown clayey silt.
P_2 4+75 to P_2 9+40	5' to 10' gravelly clayey silt over hard rock.
P_2 9+40 to P_2 10+20	Line crosses gully
P_2 9+75	Stream - gravel in stream bed.
P_2 10+20 to P_2 15+62.06	5' to 10' clayey silt and highly weathered rock over hard rock.
P_2 15+62.06 = 120+63.30	
120+63.30 to 124+00	5' to 10' clayey silt.
124+00 to 125+20	Wet area in gully floor. Toe of old mud flow upstream. Small streams at 124+00, 124+70, and 125+10.
125+20 to 129+00	10' to 20' highly weathered rock over hard rock.
129+00 to 130+20	Line crosses a gully.
129+50	Stream. Gravel in stream bed.
130+20 to 143+20	Line on a bench. Minor cutting in compact clayey silt.
143+20 to 158+50	10' to 15' silty clay and rock fragments and highly weathered rock over hard rock.
145+25 to 146+70	Line at head of slide scarp, 12" to 16" diameter trees growing within the slide.
158+50 to 160+00	Line crosses gully.
159+25	Stream. Gravel in stream bed.
160+00 to 168+20	10' to 20' compact clay and highly weathered rock over hard rock.
168+20 to 169+30	Line crosses gully.

Station	to	Station	Remarks
169+30	to	177+30	10' to 15' highly weathered rock over hard non-rippable rock.
177+30	to	178+30	Wet clay.
178+30	to	189+00	5' to 10' silty gravelly clay and highly weathered rock over hard rock.
189+00	to	192+00	Line crosses gully. Hard rock from 191+15 to 192+00.
191+40			Stream
192+00	to	204+00	5' to 15' silt and rock fragments over hard bedrock.
204+00	to	209+00	5' to 10' silt and highly weathered rock (rippable) over bedrock (non-rippable).
204+25			Stream

D. Landslide Considerations

From 145+00 to 146+70 the line crosses the head of an old slide. 12" to 16" diameter fir trees are presently growing within the slide. A full bench cut will be into the slope above the scarp. Material should not be side-casted into the slide and adequate drainage provided to prevent water from accumulating in the slide head.

In areas where the line is along steep hill slopes the soil overburden is susceptible to sliding.

Springs were present from 48+90 to 49+25, 66+10 to 67+00, and 96+90 to 97+50. As minor cutting is expected in these areas the slide potential should be low if adequate drainage is provided.

E. Subsidence due to Loading

Several low areas exist where water will stand during wet seasons. The survey was completed during a dry season and actual bog areas were small. Test holes dug in the bogs show an average of 2 to 3 feet of wet soft bluish brown silty clay over firm dry silty clay or highly weathered rock. Either the soft wet silty clay should be excavated or a 5 foot minimum fill of suitable material sould be considered. Locations of low areas are: 32+25 to 34+25, 35+00 to 48+90, and 50+00 to 53+00.

III. SUBBASE AND SURFACING

A. Depths from "R" Values

Eight soil samples were taken along the P line. As many of the cuts will be into highly weathered rock or hard rock, a complete subgrade survey is recommended before crushed surfacing is placed.

Soil Sample SO 69-09-233 represents the highly weathered rock.

From the soil samples taken the following gravel equivalent depths are recommended:

Station	to	Station	Gravel Equivalent Depth (inches)
0+00	to	86+00	13
86+00	to	216+00	9

B. Aggregate Source

No source of aggregate has been found for this project.

610 East Fifth Street
Vancouver, Washington 98661

November 13, 1972

Mr. A. R. Westby, Chief
Design Section
Vancouver, Washington

10-72.2-54

E. S. Richardson, Chief
Materials Section

By: Wayne H. Hiatt,
Highway Engineer

Preliminary Examination of some Questionable Areas
Oregon BLM 444-B, Bob Butte Road

On November 1, 1972 a preliminary examination on the ground was made of several areas along this route to evaluate the various conditions that are of concern to the Design Section.

Among these are some reported unstable slumping and wet zones between the following Stations: L 43+40 - L 44+05; L 47+25 - 48+75; P 93+00 - 96+50; P 123+50 - 124+50; P 150+00 - P 153+00; P 158+00 - 159+00; P 215+00 - 109 (Eq.); and another slumping area was noted between Station P 176+50 - P 179+75.

In addition to this, backslope recommendations were desired between P Stations 115 - 138; 209 - 215; and 230 - 244.

Soft swampy areas: L 43+40 - L 44+05 and L 47+25 - L 48+75

The above areas were investigated by probe and the following are the results: The area between L Stations 43+40 and 44+05 consists of a wet clayey silt material to a depth of 5 feet in the center, tapering out on each side. It would be advisable to subexcavate most of this material to prevent subsidence. In conjunction with this, the wet marshy area right and adjacent to the line should be ditched across the road so that the water will not remain ponded.

The area between L Stations 47+25 and 48+75 consists of a very thin layer 1-1/2 to 2 ft. thick lying on granular material. Most of this will be removed in the process of clearing the vegetation prior to placing embankment materials. Here too, a swampy area right and adjacent to the line should be ditched and drained across the road.

- more -

Slump - P 93+00 to P 97+00

An old slump area exists right and above the alignment with some spring activity in the vicinity of P 96+50.

It is recommended that the line be so located that as little disturbance as possible be made to the existing terrain. This could be done by shifting the L-line to position very near that of the P-line. This would shift line left a maximum distance of 50 feet. This shift would result in the embankment being a fill rather than a partial cut at the toe of this slump and tend to add stability to the area.

Some subexcavation of wet unstable material between P 95 and P 96 would be advisable so that the fill material could be placed on firmer foundation.

It appears that rock will be encountered in the excavation Back Station which could be used in the lower part of this fill to provide some lateral drainage.

Adequate drainage in this area should be done to prevent accumulation of water in the embankment. This may require some perforated pipe in the ditch line.

Wet Slump Area - P 123+50 to P 124+50

The plans show a low 0 to 3' fill crossing this area. It would be advisable to subexcavate the soft wet material and provide good cross and lateral drainage. The topography is quite low through this area, 3-4:1, so it is not likely that this slump will cause any problem in the future.

Slump Area - P 127 to P 128

The area which the P-line crosses does not appear to be unstable. It appears that most of the activity has been below or down hill from the P line. Since the topography is relatively gentle here, 2-4:1, it is recommended that the curve Back Station from this area be lengthened and the line shifted up hill 30-40' through this area.

Reported Slump Areas - P 150 to 153 and 158 to 159

An inspection of these areas did not reveal any significant problem. The topography through this area is relatively gentle ranging from 3-5:1, consisting of deep 20'+ volcanic derived soils. Some of these flatter areas along this canyon are ancient river terraces. Rounded stream gravels can be found in various places. It cannot be said unequivocally that some movement will not take place but it appears that the chances are relatively low.

- more -

Wet Slumping Condition - P 176+50 to P 179+75

It appears that the slumping material is a rocky soil mixture 10-15' thick and probably moving on rock a distance of 200'+ above the P-line.

A rock blanket against the backslope plus good drainage for the roadway would probably be the best way to handle it. Some perforated drain in the ditch line would also be advisable to insure that the roadway be kept dry.

Selected removal of some of the wet material before embankment material is placed would be advisable also.

Wet Slump Area - P 215 to 109 (equation)

The plans show a +10% grade coming into this area with an approximate 15 ft. cut through this slump. It would be best if this area could be crossed with little or no cut or fill, however, this does not seem feasible because of the topography. In lieu of this the backslope should be blanketed with shot rock to prevent slumping and provide subsurface drainage. In conjunction with this, perforated intercepter drains should be installed in the ditch line with good cross drains.

Slope Recommendations - P 115 to 138

The maximum cut through this area is approximately 20 ft. Natural topography here is flat enough to allow 1-1/2:1 backslope throughout this area. This would be the best angle for this material since it is a deeply weathered volcanics. However, this would generate much material that would have to be end hauled and wasted. Based on this situation a 1:1 slope is recommended but some slumping and ravel will have to be expected.

Slope Recommendations - P 209 to P 215

The natural topography through this area ranges 2-3:1. It appears that there is a 5-8' rocky soil mantle over a weathered rock. For this reason, a 1/2:1 slope is recommended for the rock with some slope rounding for the rocky soil overburden.

cc: Mr. H. L. Adkins

WHiatt:ce

ANALYSIS OF THE ANGLER USE OF THE NORTH UMPQUA RIVER SALMON AND STEELHEAD FISHERIES

By
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July 23, 1974

ANALYSIS OF THE ANGLER USE OF THE NORTH UMPQUA RIVER SALMON AND STEELHEAD FISHERIES

The North Umpqua has long been known for its steelhead and salmon fisheries. Since 1960, the angler effort on the North Umpqua has shown a steady increase. The primary cause for this increase has been the significant improvement of the spring chinook and summer steelhead runs. In addition, increased publicity, improved access, increased population and increased leisure time have added to the angling pressure.

The increasing angler demand on the North Umpqua and the growing demand for the other resources in this watershed have resulted in a growing concern over how much more harvest and environmental change the salmon and steelhead population can withstand.

The following analysis of the North Umpqua Fishery is based on data taken from Oregon Wildlife Commission's Annual Reports, fish counts, and salmon-steelhead punch card data.

A summary of the data used is attached in appendices.

North Umpqua Steelhead Fishery

Steelhead in the North Umpqua are arbitrarily separated into two groups, those returning primarily through the summer and those returning primarily in the winter.

The summer steelhead's presence in the North Umpqua during the summer has received the most angling pressure. Until recent years, (1969) summer steelhead were the fish in lowest supply.

Between 1950 and 1958, the summer steelhead run averaged 3,025 fish and the winter steelhead run averaged 7,365 fish. Supplemented by hatchery-reared smolts, the average summer steelhead run from 1959 through 1965 increased to 3,450 fish. The winter steelhead, although receiving some hatchery-reared smolts, remained nearly the same but declined to an average of 6,925 fish.

The average summer and winter steelhead runs between 1966 and 1973 have increased. For this period, the summer steelhead run has averaged 10,714 fish. Winter steelhead runs for the same period averaged 9,446 fish.

Since 1969, over 68 percent of the summer steelhead run has consisted

of adults from hatchery-reared smolts. Adult steelhead from hatchery reared smolts have averaged 17 percent of the winter steelhead run since 1969.

From 1967 through 1973, the summer steelhead have comprised 55 percent of all steelhead entering the North Umpqua and 74 percent of the harvest.

An average of 44 percent of the summer steelhead and 19 percent of the winter steelhead entering the North Umpqua are harvested. 1/

North Umpqua Salmon Fishery

The North Umpqua supports two species of salmon of which the spring chinook is the most significant to the sport fishery in the North Umpqua. Spring chinook have made up 90 percent of the salmon passing the Winchester counting station since 1965. The remaining 10 percent is composed of 8 percent coho salmon and 2 percent fall chinook.

The total number of salmon passing the Winchester counting station has increased from an average of 8,858 salmon for 1960 through 1965, to an average of 13,167 salmon for 1966 through 1973.

The spring chinook run has averaged 61 percent wild fish since 1965.

Total salmon harvest has increased from 296 salmon in 1960 to 4,512 salmon in 1972. Spring chinook made up 98 percent of all salmon harvested in the North Umpqua since 1967. Since 1967, an average of 21 percent of the adult spring chinook passing the Winchester Counting Station are harvested.

Angler Demand on the North Umpqua Fishery

Two methods were used to analyze angler pressure on the salmon and steelhead of the North Umpqua. The first approach was to use the data available from the Salmon-steelhead punch card program to project angler trips and the second approach was to use past creel census data and current harvest to project angler trip.

The punch card data shows that salmon angler trips increased from 2,033 in 1957 to 12,933 in 1971. Steelhead angler trips increased from 2,157 to 89,848 during the same period. (Appendix 7)

1/The percent harvest figure is considered high as steelhead caught in the first seven miles of the North Umpqua have not been counted at the Winchester counting station.

Creel census data on the spring chinook fishery from 1958 through 1964 indicated an increase of 2,492 angler trips. Assuming the same average angler success, the total angler trips for the 1971 spring chinook season was 20,234. (Appendix 8)

Using summer steelhead creel census data available for the period 1958 through 1963, the projected angler trips for 1971 was 36,475 angler trips. (Appendix 8) Based on winter steelhead creel census data for 1963 and 1964, the projected angler trips in 1971 was 11,246. (Appendix 8)

The two methods show a wide separation, and it cannot be said one method is more realistic than the other. Both methods do show an increasing angler pressure on the North Umpqua.

Forty-nine percent of the summer steelhead and trout anglers fishing the North Umpqua between 1968 and 1972 fished in the "Fly Area." 2/ During this same period, the distribution of summer steelhead anglers was 39 percent in the "Fly Area" and 61 percent below the Rock Creek deadline. Figure 1.

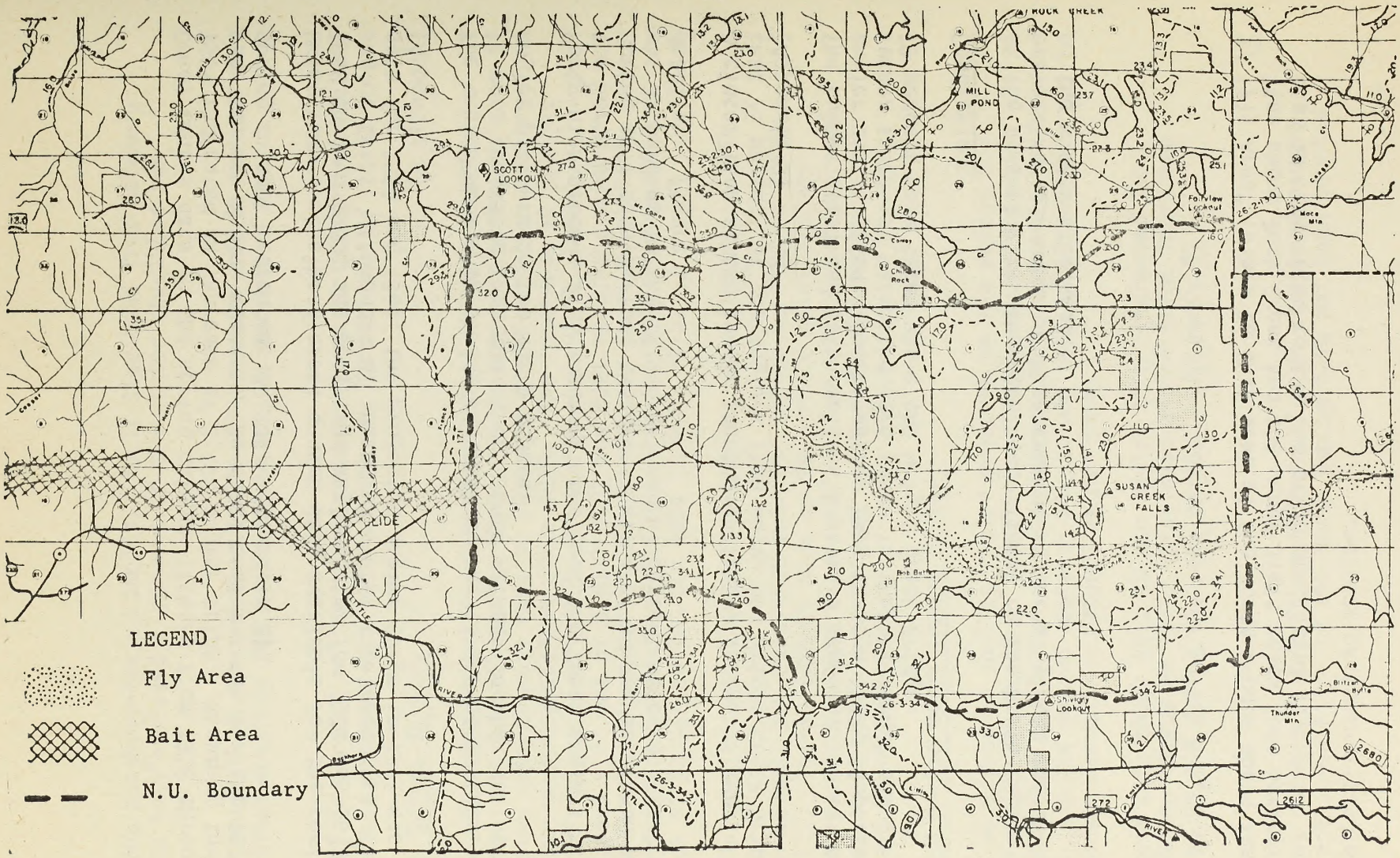
A closer look at the summer steelhead fishery in the "Fly Area" shows that 75 percent of the anglers fish above the Wright Creek Bridge. (Appendix 9)

The summer steelhead catch follows a pattern somewhat similar to the angler distribution. In the period 1968 through 1972, 46 percent of summer steelhead harvested were taken in the "Fly Area" and of that, 79 percent were taken above the Wright Creek Bridge.

Conclusions

At the present time, the steelhead fishery on the North Umpqua is harvesting an average of 44 percent of summer steelhead and 19 percent of the winter steelhead.

2/ "Fly Area" refers to that area of the North Umpqua above the deadline above Rock Creek and the upper limit below Soda Springs Dam that is restricted to the use of an artificial fly.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SUSAN
CREEK
FALLS
Shivigny
Lookout
Thunder
Mtn
LITTLE
RIVER
LEGEND
Fly Area
Bait Area
N.U. Boundary

The spring chinook fishery is currently harvesting an estimated 21 percent of the adults entering the North Umpqua.

In reference to the proposed North Umpqua Canyon Management Plan, the following conclusions were made:

The proposed plan covers approximately 13 river miles of the North Umpqua within which is located the upper limit for salmon angling and the beginning of the "Fly Area." Of the 13 miles within the planning area, eight miles are in the "Fly Area" beginning at the deadline above the mouth of Rock Creek.

Summer steelhead harvested between the deadline at Rock Creek and the mouth of Wright Creek 12 miles upstream represent 21 percent of the summer steelhead harvested in the "Fly Area." Summer steelhead harvested in the "Fly Area" but within the eight miles in the planning area compose something less than 21 percent of the harvest.

It is generally thought that a fish population can sustain at least a 50 percent harvest. Based on the current estimated harvest, an increase in harvest up to 50 percent of the run can be sustained without damage to the fishery.

The fact that the average wild summer steelhead run has increased even in the face of increased angling pressure and disturbance of the stream environment, does not show we are over-harvesting the wild summer steelhead.

The greatest opportunity for an increased fishery is in the spring chinook and winter steelhead runs.

APPENDIX 1
NORTH UMPQUA SPRING CHINOOK AND STEELHEAD COUNTS
AT WINCHESTER COUNTING STATION

Year	Summer Steelhead	Winter Steelhead	Spring Chinook
1946	3,361	6,563	2,507
47	5,113	11,220	3,811
48	2,762	9,700	2,493
49	1,672	9,225	2,593
1950	2,835	7,008	2,321
51	3,361	4,188	3,617
52	4,443	10,635	5,288
53	2,844	5,094	4,831
54	3,117	9,124	8,189
55	3,430	4,755	7,644
56	2,927	10,211	9,314
57	2,228	8,923	5,228
58	2,041	6,350	4,398
59	2,049	6,372	3,787
1960	2,732	6,138	4,050
61	3,141	5,192	5,253
62	3,072	7,734	6,550
63	4,827	5,847	11,020
64	2,900	7,726	8,803
65	5,428	9,472	11,750
66	6,185	9,935	7,269
67	4,818	8,589	9,036
68	5,178	9,863	9,262
69	14,931	8,122	20,777
1970	15,580	12,115	12,970
71	16,185	10,330	9,930
72	13,732	8,266	16,423
73	9,104	8,348	19,674

Source: Oregon State Game Commission Annual Reports

APPENDIX 2
HATCHERY PRODUCED FISH

Year	Spring Chinook	Summer Steelhead	Winter Steelhead
1952	87	-	-
53	900	-	-
54	1,687	-	-
55	995	-	-
56	1,276	-	-
57	1,249	-	-
58	259	-	-
59	660	693	-
1960	664	950	323
61	883	704	286
62	1,398	1,317	46
63	2,336	1,920	198
64	2,238	560	56
65	2,702	1,983	482
66	601	3,046	836
67	2,554	2,658	930
68	3,066	3,748	3,605
69	9,358	10,847	1,257
1970	6,910	12,856	1,778
71	3,907	13,671	2,247
72	8,467	10,570	1,914
73	8,243	6,175	933

Source: Oregon State Game Commission Annual Reports

APPENDIX 3
STEELHEAD HARVEST FROM THE NORTH UMPQUA
1960 - 1972

Year	Total Summer Steelhead Run	Total Winter Steelhead Run	Total all Steelhead	Total Harvest
1960	2,732	6,138	8,870	478
61	3,141	5,192	8,330	688
62	3,072	7,734	10,806	945
63	4,827	5,847	10,674	1,799
64	2,900	7,726	10,626	1,140
65	5,428	9,472	14,900	2,235
66	6,185	9,935	16,120	4,069
67	4,818	8,589	13,407	3,297
68	5,178	9,863	15,041	4,335
69	14,931	8,122	23,053	6,986
1970	15,580	12,115	27,695	8,905
71	16,185	10,330	26,515	8,396
72	13,732	8,266	21,998	10,707

Source: Oregon State Game Commission Salmon-Steelhead Punch Card Reports

APPENDIX 4
NORTH UMPQUA ESTIMATED STEELHEAD CATCH BY MONTH
1967 - 1972

Year	Month												Total	Total 1/ St. S.	Total 2/ St. W.
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
1967	234	398	194	114	25	45	254	384	563	329	354	403	3,297	1,929	1,368
1968	575	344	408	131	59	145	168	507	906	444	349	299	4,335	2,519	1,816
1969	401	576	351	96	113	125	697	1,365	1,340	655	643	534	6,896	4,825	2,071
1970	315	461	423	146	38	155	889	2,543	2,059	865	536	475	8,905	7,047	1,858
1971	254	549	332	198	184	143	1,342	1,139	1,959	1,194	530	572	8,396	6,307	2,089
1972	653	415	366	202	177	475	1,519	1,812	2,245	1,299	1,019	525	10,707	8,369	2,338

1/ Summer steelhead caught from June through November of the same year

2/ Winter steelhead caught from December through May of the following year

Source: Oregon State Game Commission Salmon Steelhead Punch Card Reports

APPENDIX 5
SALMON HARVEST FROM THE NORTH UMPQUA
1960 - 1972

ar	Spring Chinook			Fall Chinook			Coho			Total all Salmon	Total Salmon Harvest
	Adults	Jacks	Total	Adults	Jacks	Total	Adults	Jacks	Total		
60	3,594	456	4,050	70	1	71	768	50	818	4,939	296
61	4,711	542	5,253	72	18	90	215	131	346	5,689	508
62	5,626	924	6,550	99	5	104	389	142	531	7,185	306
63	9,222	1,798	11,020	121	64	185	419	129	548	11,753	759
64	5,792	3,011	8,803	279	93	372	569	658	1,227	10,402	575
65	8,631	3,099	11,730	85	97	182	841	325	1,166	13,078	699
66	5,967	1,302	7,269	268	36	304	1,979	283	2,262	9,835	745
67	4,146	4,890	9,036	401	318	719	649	268	917	10,672	802
68	4,992	4,720	9,712	108	16	124	622	673	1,295	11,131	1,083
69	17,753	3,024	20,777	250	13	263	1,414	233	1,647	22,687	5,714
70	10,603	2,367	12,970	149	50	199	464	99	563	13,732	2,318
71	7,548	2,382	9,930	67	19	86	123	81	204	10,220	2,481
72	9,081	7,342	16,423	120	40	160	242	93	335	16,918	4,512

APPENDIX 6
NORTH UMPQUA ESTIMATED SALMON CATCH BY MONTH
1967 - 1972

Year	Month												Total	Total 1/ Ch.S	Total 2/ Ch. F & Co.
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
1967	15	15	10	90	383	134	40	25	35	40	0	15	802	787	15
1968	2	0	18	82	408	235	45	68	145	41	9	5	1,083	1,069	14
1969	25	33	100	217	1,607	960	1,089	718	739	159	38	29	5,714	5,647	67
1970	9	24	24	207	1,081	376	103	141	174	85	56	38	2,318	2,224	94
1971	0	18	0	83	1,033	816	212	111	111	78	5	14	2,481	2,462	19
1972	11	65	76	357	1,798	1,032	420	190	318	70	98	77	4,512	4,337	175

1/Salmon caught from January through October

2/Coho and fall chinook salmon caught in November and December

Source: Oregon State Game Commission Salmon-Steelhead Punch Card Reports

APPENDIX 7
NORTH UMPQUA STEELHEAD AND SPRING CHINOOK
ANGLER USE STATISTICS

Year	Angler Trips Steelhead	Steelhead Harvest	% of Run	Angler Trips Salmon	Spring Chinook Harvest	% of Run
1957	2,157	410		2,033	183	4.0
1958	2,410	458		1,390	153	3.0
1959	1,347	256		3,290	362	10.0
1960	2,515	478	5.3	3,700	296	0.7
1961	3,621	688	8.2	5,080	508	10.0
1962	4,974	945	8.7	1,700	306	5.0
1963	9,468	1,799	16.8	3,994	759	7.0
1964	6,000	1,140	10.7	3,594	575	7.0
1965	22,350	2,235	15.0	4,112	699	6.0
1966	29,064	4,069	25.2	4,382	745	10.0
1967	23,550	3,297	24.5	4,717	802	9.0
1968	30,964	4,335	28.8	3,495	1,083	12.0
1969	42,113	6,896	29.9	12,986	5,714	28.0
1970	51,665	8,905	32.2	7,506	2,318	18.0
1971	89,848	8,396	31.7	12,933	2,481	25.0
1972*		10,707	48.7		4,512	27.0

Source: Oregon State Game Commission Salmon-Steelhead Punch Card Reports

*Angler trip projections not available for 1972 at the time of printing.

APPENDIX 8
UMPQUA SPRING CHINOOK FISHERY
1958 - 1964

Year	Angler Trips	Chinook Adults	Chinook Jacks	Fish per Angler	Hours per Fish	Percent of Run Harvested
1958	6,060	487	28	0.08	71.4	11
1959	6,991	675	83	0.11	52.6	18
1960	4,883	352	56	0.08	58.8	10
1961	5,463	492	55	0.10	45.5	10
1962	6,684	1,134	93	0.18	26.2	17
1963	6,018	1,014	127	0.19	21.3	10
1964	8,552	1,321	86	0.16	28.0	16

Source: Oregon State Game Commission Annual Reports

SUMMER STEELHEAD FISHERY
1958 - 1963

Year	Angler Trips	Harvest
1958	2,210	872
59	2,715	682
60	3,366	590
1961	3,831	916
62	3,347	561
63	2,860	638

Source: Oregon State Game Commission Annual Reports

WINTER STEELHEAD FISHERY
1963 - 1964

Year	Angler Trips	Harvest
1963	3,908	813
1964	5,110	862

Source: Oregon State Game Commission Annual Reports

APPENDIX 9
Creel Sampling Results
North Umpqua Summer Trout and Steelhead Fishery

1968-72

Item	1968	1969	1970	1971	1972	5-Year Average
Total no. of Anglers	1,386	1,431	1,826	2,617	2,117	1,867
% of total anglers in "Fly" area	49	49	54	50	48	49
% of total anglers in "Bait" area	51	51	46	50	52	51
SUMMER STEELHEAD FISHERY						
% of StS ang. in "Fly" area	31	32	47	41	42	39
% of StS ang. in "Bait" area	69	68	53	59	58	61
% of StS anglers within "Fly" area above Wright Cr. Br.	71	84	71	66	83	75
% StS taken in "Fly" area	52	49	49	32	43	46
% StS taken in "Bait" area	48	51	51	68	57	54
% StS taken within "Fly" area ab. Wright Cr. Br.	67	92	74	80	88	79
StS per ang. in "Fly" area	0.22	0.20	0.19	0.06	0.08	0.13
StS per ang. in "Bait" area	0.56	1.01	0.98	1.25	1.99	1.20
StS per ang. above Wright Cr. Br.	0.21	0.22	0.19	0.07	0.08	0.14
StS per ang. below Wright Cr. Br.	0.26	0.10	0.17	0.04	0.05	0.11
Hrs. per StS in "Fly" area	12.0	13.5	17.3	44.7	42.6	22.3
Hrs. per StS in "Bait" area	21.7	19.5	19.0	25.0	38.9	24.0
Hrs. per StS about Wright Cr. Br.	12.7	12.6	17.3	36.9	39.9	21.4
Hrs. per StS below Wright Cr. Br.	10.7	24.0	17.3	75.5	63.0	25.9

(Continued next page)

APPENDIX 9 - CONTINUED

TROUT FISHERY (SUMMER)

Item	1968	1969	1970	1971	1972	5-Yr Averag
% of trout anglers in "Fly" area	59	49	58	54	52	54
% of trout ang. in "Bait" area	41	51	42	46	48	46
% trout anglers w/i "Fly" area above Wright Cr. Br.	65	65	70	65	80	69
% trout taken in "Fly" area	79	55	62	45	40	53
% trout taken in "Bait" area	21	45	48	55	60	47
% trout taken w/i "Fly" area above Wright Cr. Br.	73	69	72	59	86	72
Trout per ang. in "Fly" area	1.47	1.27	1.16	0.87	1.22	1.1
Trout per ang. in "Bait" area	0.56	1.01	0.98	1.25	1.99	1.2
Trout per ang. above Wright Cr. Br.	1.66	1.36	1.21	0.79	1.30	1.2
Trout per ang. below Wright Cr. Br.	1.13	1.09	1.06	1.01	0.87	1.0
Trout per hr. in "Fly" area	0.77	0.57	0.45	0.39	0.50	0.5
Trout per hr. in "Bait" area	0.37	0.57	0.32	0.68	0.99	0.5
Trout per hr. above Wright Cr. Br.	0.86	0.60	0.48	0.36	0.51	0.5
Trout per hr. below Wright Cr. Br.	0.60	0.51	0.38	0.44	0.41	0.4

District Office
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APR 26 1972

District Manager

Soil Scientist

Swiftwater Recreation Soil Report

Soils on the Swiftwater Recreation site are developing from deposits left by ancient floods. There are two prominent terraces that were formed during the last 5-10,000 years by the North Umpqua River. The lower terrace is made of sandy soils over gravel. The upper terrace has 5-7 feet of gray clay over silts.

Most of the soils on the first terrace are well suited for septic tank drainfields. They typically have two feet of sandy loam on the surface and three to four feet of fine and medium statified sand. They are well drained. The best location for drainfields is along the south side of the terrace. The texture is coarser there than on the north side. By placing the drainfields near the south side, effluent will have a longer distance to travel before getting to the river.

On the east end of the terrace, there is a small area of a soil (Soil 4) that has a silty clay loam subsoil. Drainfields in this area should not be expected to handle large quantities of effluent. South of Soil 4 is a spring that "sub-out" when it hits the flat.

Most of the first terrace did not flood in '64.

The second terrace has very poorly drained clay soils (Soil 1 and 2). They are unsuited for use as drain fields. Three areas on this level need surface drainage. Surface water needs to be removed to make these areas suitable as campsites or play grounds. It can be removed by means of a shallow broad ditch.

These ditches can be seeded and should present no safety hazard. Areas

eeding drainage are shown on the accompanying map.

A suggested road location to serve the west side of site is also shown on the accompanying map. Soils are stable along this route.

Attached are interpretations of the soil for various land uses in the park.

Stephen R. Wert

SHERT:CH
4/25/72

INTERPRETATION OF PHYSICAL PROPERTIES

Symbol	Degree of Limitation and Soil Features Affecting							Soil Limitations for Sewage Disposal
	Road Location	Shallow Excavations	Building Sites	Camp Areas	Picnic Areas	Play Areas	Paths and Trails	Septic Tank Absorption Field
1	Moderate poor drainage	Severe. Seasonal water table between 6-12"	Severe poorly drained	Severe poorly drained	Severe poorly drained	Severe very slow permeability	Moderate water table	Severe slow permeability water table
2	Severe very poor drainage	Severe seasonal water table at surface	Severe very poorly drained	Severe very poorly drained	Severe poorly drained	Severe water table	Severe water table	Severe slow permeability
3	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
4	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Moderate Permeability
5/0-5%	Moderate Stoniness	Severe very gravelly & stoney	Severe Stoniness	Severe Stoniness	Moderate Stoniness	Severe Stoniness	Severe Stoniness	Severe depth to rock
5/15%	Slight	Severe very gravelly & stoney	Moderate stoniness	Moderate stoniness	Slight stoniness	Severe stoniness	Moderate stoniness	Moderate Steepness
5/45%	Moderate stoniness rockiness	Severe very gravelly, stoney, steepness	Severe stoniness steepness	Severe stoniness steepness	Severe steepness	Severe steepness	Severe steepness	Severe steepness
6/20%	Severe steepness	Severe very gravelly stoney, steepness	Severe Steepness, stoniness	Severe steepness stoniness	Severe steepness	Severe steepness	Severe steepness	Severe steepness

INTERPRETATION OF PHYSICAL PROPERTIES

Symbol	Degree of Limitation and Soil Features Affecting							Soil Limitations for Sewage Disposal
	Road Location	Shallow 1/ Excavations	Building Sites	Camp Areas	Picnic Areas	Play Areas	Paths and Trails	Septic Tank Absorption Field
7	Slight	Moderate seasonal high water table between 30-60"	Moderate seasonal water table, shrink-swell	Moderate seasonal water table	Moderate Moderately well drained	Slight	Slight	Severe low permeability
Unit 300	Moderate steepness	Moderate steepness stoniness	Severe steepness	Severe steepness	Severe steepness	Severe steepness	Moderate steepness	Severe steepness

1/Shallow excavations include trenches for pipe lines, water lines, foundations, etc.

Soil 1

This soil is deep, reddish brown, and poorly drained. It has 6 inches of silt loam over clay.

A	0-6"	Brown (7.5 yr 4/4) silt loam; moderately fine granular structure; slightly sticky; slightly plastic.
B1	6-12"	Light brown (7.5 yr 5/6) silty clay loam; moderately fine subangular blocky structure; sticky; plastic; clear, distinct 10 yr 6/1 mottles.
$B21_t$	12-28"	Brown (7.5 yr 4/4) clay; weak medium subangular blocky structure; very sticky; very plastic; many clear, distinct 10 yr 6/1 mottles; gray clay skins in pores.
$B22_t$	28-60"	Yellow-brownish gray (10 yr 4/2) clay, massive; very sticky; very plastic; abundant clear distinct 10 yr 6/1 mottles; few gray clay skins in pores.

In December the water table was within 6 inches of the surface. In April it was at 18 inches.

Soil 2

This soil is deep, dark gray, and very poorly drained. It has 6 inches of silt loam over clay.

A	0-6"	Black brown (10 yr 3/2) silt loam; weak fine granular structure; slightly sticky; slightly plastic.
B1	6-10"	Dark brown (10 yr 3/3) clay; weak, medium, subangular blocky structure; very sticky; very plastic; many distinct 10 yr 5/1 mottles.
B2	10-60"+	Gray (6/0) clay; massive; very sticky; very plastic.

Water table is at surface in December. In April, it is 6 inches below surface.

Soil 3

This soil is deep, brown, and well drained. It has 24 inches of sandy loam over medium and fine sand.

A	0-4"	Dark Brown (10 yr 3/3) sandy loam; weak fine grandular structure; non-sticky; non-plastic.
B	4-24"	Gray brown (7.5 yr 5/3) sandy loam; weak, fine, grandular structure; non-stick, non-plastic.
C	24-60"+	Gray brown (7.5 yr 5/3) sand; single grain; stratified fine and medium sand.

Soil 4

This soil is deep, brown, and well drained. It has 24 inches of silt loam over silty clay loam.

A	0-6"	Dark brown (10 yr 3/3) silt loam; moderate, fine grandular structure; non-sticky; non-plastic
B1	6-24"	Brown (7.5 yr 4/3) silt loam; moderate, fine subangular blocky structure; slightly sticky; slightly plastic.
B2	24-60"+	Brown (7.5 yr 4/3) silty clay loam; moderate, fine, subangular structure; slightly sticky; slightly plastic.

Soil 5

This soil is moderately deep brown, and well drained. It has 12 inches of very gravelly loam over gravelly clay loam.

01	2-0"	Black organic matter
A	0-12"	Yellow brownish gray (10 yr 4/2) very gravelly loam, 40% rocks 2-16" in diameter on the surface. 60% in the horizon.
B	12-30"	Brown (7.5 yr 4/3) gravelly loam; slightly sticky; slightly plastic. 50% gravel.
C	30-40"+	Gravel, sand, and some clay loam pockets.

Soil 6

This soil is shallow, brown, and well drained. It has 12-20 inches of very gravelly loam over gravel and sometimes bedrock.

A	0-14"	Yellow brownish gray (10 yr 4/2) very gravelly loam. 50% river gravels.
C	14-20"	Gravel

Soil 7

This soil is deep, reddish brown, and moderately well drained.

A	0-14"	Dark reddish brown (5 yr 3/3) silt loam; moderately fine grandular structure; slightly sticky; slightly plastic.
B1	6-12"	Gray reddish brown (5 yr 4/3) silty clay loam; moderately fine subangular blocky structure; sticky; plastic.
$B21_t$	12-30"	Gray reddish brown (5 yr 4/3) clay; moderate, medium subangular blocky structure; very sticky; very plastic, thin clay skins in pores.
$B22_t$	30-60+	Light brown (7.5 yr 5/6) clay; massive, very sticky; very plastic; abundant 10 yr 6/1 mottles

UNIT 300

A	0-4"	Dark reddish brown (5 yr 3/3) silt loam; moderate medium grandular structure; slightly plastic; slightly sticky 15% pebbles.
B1	4-14"	Dark reddish brown (5 yr 3/6) silty clay loam, moderate medium grandular structure; sticky; plastic, 20% pebbles
$B2_t$	14-40"+	Reddish brown (5 yr 4/6) gravelly silty clay, moderate medium subangular blocky structure; sticky, 40% rocks.

Known or Suspected Wildlife in the Plan Area.

	Common Name	Scientific Name
	Mammals	
	Trowbridge's Shrew	Sorex trowbridgii
	Vagrant Shrew	Sorex vagrans
	Shrew-mole	Neurotrichus gibbsii
	Townsend's Mole	Scapanus townsendii
	Coast Mole	Scapanus orarius
	Lump-nosed Bat	Plecotus townsendii
	Pallid Bat	Antrozous pallidus
	Silver-haired Bat	Lasionycteris noctivagans
	Hoary Bat	Lasiurus cinereus
	Big Brown Bat	Eptesicus fuscus
	Fringed Myotis	Myotis thysanodes
	Long-eared Myotis	Myotis evotis
	Hairy-winged Myotis	Myotis volans
	California Myotis	Myotis californicus
	Yuma Myotis	Myotis yumanensis
	Little Brown Bat	Myotis Lucifugus
	Brush Rabbit	Sylvilagus bachmani
	Snowshoe Hare	Lepus americanus
	Mountain Beaver	Aplodontia rufa
	Porcupine	Erethizon dorsatum
	Beaver	Castor canadensis
	Nutria	Myocastor coypus
	Townsends Chipmunk	Eutanis townsendii
	Northern Flying Squirrel	Glaucomys sabrinus
	Chickaree	Tamiasciurus douglasii
	Western Gray Squirrel	Sciurus griseus
	California Ground Squirrel	Spermophilus beechevi
	Botta Pocket Gopher	Thomomys bottae
	Mazama Pocket Gopher	Thomomys mazama
	Heermann's Kangaroo Rat	Dipodomys heermanni
	Brushy-tailed Wood Rat	Neotoma cinerea
	Dusky-footed Wood Rat	Neotoma fuscipes
	Deer Mouse	Peromyscus maniculatus
	Muskrat	Ondatra zibethica
	Creeping Vole	Microtus oregoni
ST	White-footed Vole	Phenacomys albipes
	Red Tree Vole	Phenacomys longicaudus
	Western Red-backed Vole	Clethrionomys occidentalis
	Long-tailed Vole	Microtus longicaudus
	Townsend's Vole	Microtus townsendii
	House Mouse	Mus musculus

	Pacific Jumping Mouse	Zapus trinotatus
	Mountain Lion	Felis concolor
	Bobcat	Lynx rufus
	Black Bear	Ursus americanus
	Coyote	Canis latrans
	Gray Fox	Urocyon cinereoargenteus
	Red Fox	Vulpes fulva
	Raccoon	Procyon lotor
ST	Ringtail	Bassariscus astutus
	Marten	Martes americana
ST	Fisher	Martes pennanti
	Striped Skunk	Mephitis mephitis
	Spotted Skunk	Spilogale putorius
	Mink	Mustela vison
	Short-tailed Weasel	Mustela erminea
	Long-tailed Weasel	Mustela frenata
	River Otter	Lutra canadensis
	Roosevelt Elk	Cervus canadensis roosevelti
	Black-tailed Deer	Odocoileus hemionus columbianus

Fishes

Pacific lamprey	Lampetra tridentata
Western brook lamprey	Lampetra richardsoni
Brook trout	Salvelinus fontinalis
Cutthroat trout	Salmo clarki
Coastal cutthroat trout	Salmo c. clarki
Brown Trout	Salmo trutta
Rainbow trout-resident	Salmo gairdneri
Steelhead	Salmo g. gairdneri
Coho salmon	Oncorhynchus kisutch
Spring & Fall Chinook Salmon	Oncorhynchus tshawytscha
Largescale scucker	Catostomus macrochailus
Carp	Cyprinus carpio
Oregon chub	Hybopsis crameri
Umpqua squawfish	Ptychochailus umpquae
Redside shiner	Richardsonius balteatus balteatus
Umpqua dace	Rhinichthy's evermanni
Speckled dace	Rhinichyhys osculus subsp
Blackside dace	Rhinichthys o. nubilus
Coastrange sculpin	Cottus aleuticus
Prickly sculpin	Cottus asper
Riffle sculpin	Cottus gulosus
Reticulate sculpin	Cottus perplexus
Three-spined stickleback	Gasterosteus aculeatus

Birds

	Red-necked Grebe	Podiceps grisegena
	Horned Grebe	Podiceps auritus
	Eared Grebe	Podiceps caspicus
	Western Grebe	Aechmophorus accidentalis
	Pied-billed Grebe	Podilymbus podiceps
	Great Blue Heron	Ardea herodias
	Green Heron	Butorides virescens
	Common Egret	Casmerodius albus
	Black-crowned Night Heron	Nycticorax nycticorax
	Least Bittern	Txobrychus exilis
	American Bittern	Botaurus lentiginosus
	Whistling Swan	Olor columbianus
	White-fronted Goose	Anser albitrons
	Mallard	Anas platyrhynchos
	Gadwall	Anas strepera
	Pintail	Anas acuta
	Green-winged Teal	Anas crecca canolinensis
	American Widgeon	Anas americana
	Shoveler	Anas clypeata
	Wood Duck	Aix sponsa
	Common Goldeneye	Bucephala clangula
	Barrow's Goldeneye	Bucephala islandica
	Bufflehead	Bucephala albeola
	Horlequin Duck	Histrionicus histrionicus
	Hooded Merganser	Lophodytes cucullatus
	Common Merganser	Mergus merganser
	Red-brested Merganser	Mergus serrator
	Turkey Vulture	Cathartes aura
	Gashawk	Accipiter gentilis
	Sharp-shinned Hawk	Accipiter striatus
	Cooper's Hawk	Accipiter cooperii
	Red-tailed Hawk	Buteo jamaicensis
	Swainson's Hawk	Buteo swaininsoni
	Rough-legged Hawk	Buteo lagopus
	Golden Eagle	Aquila chrysaetos
SE	Bald Eagle	Haliaeetus lencocephalus
	Marsh Hawk	Circus cyaneus
	Osprey	Pandion haliaetus
	Pigeon Hawk	Falco columbarius
	Sparrow Hawk	Falco sparverius
	Blue Grouse	Dendragapus obscurus
	Ruffed Grouse	Bonasa umbellus
	California Quail	Lophortyx californicus
	Mountain Quail	Oreortyx pictus
	Ring-necked Pheasant	Phasianus colchicus
	American Coot	Fulica americana

	Killdeer	Charadrius vociferus
	Common Snipe	Capella gallinago
	Spotted Sandpiper	Actitus macularia
	Solitary Sandpiper	Tringa solitaria
	California Gull	Larus californicus
	Band-tailed Pigeon	Columba fasciata
	Mourning Dove	Zenada macroura
	Barn Owl	Tyto alba
	Screech Owl	Otus asio
	Great Horned Owl	Bubo virginianus
	Snowy Owl	Nyctea scandiaca
	Pygmy Owl	Glaucidium gnoma
	Burrowing Owl	Speotyto cunicularia
FT &	Spotted Owl	Strix occidentalis
ST	Long-eared Owl	Asio otus
	Short-eared Owl	Asio flammeus
	Saw-whet Owl	Aegolius acadicus
	Common Nighthawk	Chordeiles minor
	Black Swift	Cypseloides niger
	Vaux's Swift	Chaetura vauxi
	Anna's Hummingbird	Calypte anna
	Broad-tailed Hummingbird	Selasphorus platycercus
	Rofous Hummingbird	Selasphorus rufus
	Calliope Hummingbird	Stellula calliope
	Belted Kingfisher	Megaceryle alcyon
	Yellow-shafted Flicker	Colaptes auratus
	Red-shafted Flicker	Colaptes cafer
	Pileated Woodpecker	Dryocopus pileatus
	Acorn Woodpecker	Melanerpes formicivorus
	Lewis Woodpecker	Asyndesmus Lewis
	Yellow-bellied Sapsucker	Syphrapicus varius
	Hairy Woodpecker	Dendrocopos villosus
	Downy Woodpecker	Dendrocopos pubescens
	Eastern Kingbird	Tyrannus tyrannus
	Western Kingbird	Tyrannus verticalis
	Fraill's Flycatcher	Empidonax traillii
	Hammond's Flycatcher	Empidonax hammondi
	Dusky Flycatcher	Empidonax oberhalseri
	Western Flycatcher	Empidonax difficilis
	Western Wood Peewee	Contopus sordidulus
	Olive-sided Flycatcher	Nuttallornis borealis
	Horned Lark	Eremophila alpestris
	Violet-green Swallow	Tachycineta thalassina
	Tree Swallow	Iridoprocne bicolor
	Bank Swallow	Riparia riparia
	Rough-winged Swallow	Stelgidopteryx ruficollis
	Barn Swallow	Hirundo rustica
	Cliff Swallow	Petrochelidon pyrrhonota
	Purple Martin	Progne subis

Gray Jay	Perisoreus canadensis
Steller's Jay	Cyonocitta stelleri
Scrub Jay	Aphelocoma Coerulescens
Common Raven	Corvus corax
Common Crow	Corvus branchyrhynchos
Northwestern Crow	Corvus caurinus
Black-capped Chickadee	Parus atricapillus
Mountain Chickadee	Parus gambeli
Chestnut-backed Chickadee	Parus rufescens
White-breasted Nuthatch	Sitta carolinensis
Red-breasted Nuthatch	Sitta canadensis
Brown Creeper	Certhia familiaris
Wrentit	Chamaea fasciata
Dipper	Cinclus mexicanus
House Wren	Troglodytes aedon
Winter Wren	Troglodytes troglodytes
Bewick's Wren	Thryomanes bewickii
Long-billed Marsh Wren	Telmatodytes palustris
Rock Wren	Salpinctes obsoletus
Robin	Turdus migratorius
Varied Thrush	Ixoreus naevius
Hermit Thrush	Hylocichla guttata
Swainson's Thrush	Hylocichla ustulata
Western Bluebird	Sialia mexicana
Mountain Bluebird	Sialia currucoides
Golden-crowned Kinglet	Regulus satrapa
Ruby-crowned Kinglet	Regulus calendula
Water Pipit	Anthus spinoleta
Cedar Waxwing	Bombycilla cedrorum
Starling	Sturnus vulgaris
Hutton's Vireo	Vireo huttoni
Solitary Vireo	Vireo solitarius
Red-eyed Vireo	Vireo olivaceus
Warbling Vireo	Vireo gilvus
Orange-crowned Warbler	Vermivora celata
Nashville Warbler	Vermivora ruficapilla
Yellow Warbler	Dendroica petechia
Myrtle Warbler	Dendroica coronata
Audubon's Warbler	Dendroica auduboni
Townsend's Warbler	Dendroica townsendi
Hermit Warbler	Dendroica occidentalis
MacGillivray's Warbler	Oporornis tolmiei
Yellowthroat	Geothlypis trichas
Yellow-breasted Chat	Icteria virens
Wilson's Warbler	Wilsonia pusilla
American Redstart	Setophaga ruticilla
House Sparrow	Passer domesticus
Western Meadowlark	Sturnella neglecta
Red-winged Blackbird	Agelaius phoeniceus
Brewer's Blackbird	Euphagus cyanecephalus

	Brown-headed Cowbird	Molothrus ater
	Western Tanager	Piranga ludoviciana
	Black-headed Grosbeak	Pheucticus melanocephalus
	Lazuli Bunting	Passerina amoena
	Evening Grosbeak	Hesperiphona vespertina
	Purple Finch	Carpodacus purpureus
	House Finch	Carpodacus mexicanus
	Pine Siskin	Spinus pinus
	Red Crossbill	Loxia curvirostra
	White-winged Crossbill	Loxia leucoptera
	Oregon Junco	Junco oreganus
	Chipping Sparrow	Spizella passerina
	White-crowned Sparrow	Zonotrichia leucophrys
	Golden-crowned Sparrow	Zonotrichia atricapilla
	White-throated Sparrow	Zonotrichia albicollis
	Fox Sparrow	Passerella iliaca
	Lincoln's Sparrow	Melospiza lincolnii
	Song Sparrow	Melospiza melodia
FE & SE	Peregrine falcon	Falco Peregrinus

Amphibians and Reptiles

	Northwestern salamander	Ambystoma gracile
	Western long-toed salamander	Ambystoma m. macrodactylum
	Pacific giant salamander	Dicamptodon ensatus
	Southern Olympic salamander	Rhyacotriton olympicus variegatus
	Northern rought-skinned newt	Taricha g. granulosa
	Dunn's salamander	Plethodon dunni
	Western red-backed salamander	Plethodon vehiculum
	Painted salamander	Ensatina e. picta
	Clouded salamander	Aneides ferreus
	Speckled black salamander	Aneides f. flavipunctatus
ST	Tailed frog	Ascaphus truei
	Western toad	Bufo boreas
	Pacific treefrog	Hyla regilla
	Red-legged frog	Rana aurora
	Foothill yellow-legged frog	Rana boylei
	Bullfrog	Rana catesbeiana
ST	Spotted frog	Rana pretiosa
	Western Pond turtle	Clemmys marmorata
	Western fence lizard	Sceloporus occidentalis
	Western Skink	Eumeces s. skiltonianus
	Northern alligator lizard	Gerrhonotus coeruleus
	Southern alligator lizard	Gerrhonotus multicarinatus
	Pacific rubber boa	Charina b. bottae
	Pacific ringneck snake	Diadophis p. amabilis

Sharp-tailed snake	Contia tenuis
Western Yellow-bellied racer	Coluber c. mormon
Pacific gopher snake	Pituophis m. catenifer
California kingsnake	Lampropellis g. californiae
Saint Helena X Sierramountain kingsnake	Lampropeltis z. zonata X multicincta
Red-spotted garter snake	Thamnophis sirtalis concinnus
Western terrestrial garter snake	Thamnophis elegans
Western aquatic garter snake	Thamnophis couchi
Northwestern garter snake	Thamnophis ordinoirdes
Northern Pacific rattlesnake	Crotalus v. oreganus

FT - Listed as threatened in Threatened Wildlife in the United States, 1973 edition, U.S. Department of Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife.

ST - Listed as threatened
SE - Listed as endangered
} in Rare and Endangered Animals of Oregon, Oregon State Wildlife Commission Bulletin, January 1973.

ANALYSIS OF COMMENTS RECEIVED
On The
North Umpqua Canyon Management Plan

1. BLM should not develop multiple-use management on the south side of the canyon. The area should be kept in a wilderness state.

Analysis: The plan considered this alternative and rejected it as contrary to the intent of the O&C Act and not responsive to the public interest because:

1. It would cause a substantial reduction in forest products useful to man (and would not provide enough positive benefits to offset the ensuing loss). It would not meet Wilderness Act Criteria because:
   (a) Intermingled ownership (not contiguous area - greater than 5,000 acres.)
   (b) Area is largely developed
   (c) Proximity to a heavily travelled highway - no solitude
   (d) Hand of man is very evident nearly everywhere

2. BLM should utilize and extend existing road systems at their current single-use standard (logging) rather than extend the Bob Butte Road at a multiple-use standard.

Analysis: Alternate means of access have been discussed in the Management Plan. Topography and the capability of logging equipment determine the location and density of the road net necessary to manage any particular area of steep terrain. Some latitude is to be had in locating access or mainline roads, but existing physiographic conditions are the major alignment determinants. This is the case in the North Umpqua Canyon. The interior net is the same for all options with minor exceptions and the choice involves only where the access point to the interior net will be.

Six different access alternatives were initially considered:

1. Rebuilding the Smith Ford Bridge
2. Construction of a bridge in Section 7
3. Wright Creek Bridge and Road
4. Extension of the Lone Rock Road
5. Construction and reconstruction over Thunder Mountain
6. Construct bridge and road beginning near Rock Creek (Swiftwater Bridge and Bob Butte Road)

1. Rebuild Smith Ford - Hydrologic problems would require highway relocation, high cost.

2. Bridge in Section 7 - Core drilling indicates north abutment would be in an active slide.

3. Wright Creek Road and Bridge - Low level road would traverse very steep, sparsely vegetated land and towering rock cliffs. High level road could be connected but involves substantial adverse grades. This alternative would have high potential for adverse environmental impacts. The previous three alternatives were rejected without further analysis as being untenable. The following alternatives received an economic analysis.

4. Extension of Lone Rock Road - Poor recreation access, bad junction with highway, high cost to county to bring road to standards for heavy hauling, imposition of a major haul road on a quiet residential area, most costly alternative, and possesses potential of being closed to public by a private landowner.

5. Thunder Mountain Alternative - This route would require much construction and reconstruction to obtain suitable grades, most of which would be highly visible; would involve substantial adverse grades over a 2,000' climb; provide little or no public recreation access; will require the lengthiest road system of the three alternatives analyzed.

6. Swiftwater Bridge and Bob Butte Road - The point of access chosen. Will provide the greatest return in public recreation benefits; provide the greatest opportunity for environmental protection and the most viable management access route.

3. The river and its environment is extremely fragile and more people introduced to the south bank would do irreparable harm.

Analysis: Survey of the north bank of the river indicates no perceptible damage in river bank environment except:

(a) Where highway was imposed
(b) Immediately adjacent to campgrounds and waysides developed to permit sanitation at popular fishing access points.

Since Bob Butte Road will not reach river bank and no spur roads will reach river, the impact of foot travel will be negligible. Trail will be above bank on first bench most of the way and spurs will extend to the river only where gravel bars and rocky points will permit traffic without damage. Natural conditions - rock, deep holes, and very steep banks inhibit travel along banks thus trails are the only means of travel. Potential campgrounds adjacent to river bank include only 9,200 (of 140,000) feet of shore line of which approximately 5,250 feet will be available to foot traffic. The remainder is too precipitous. Even these facilities will be back a minimum of 50 feet or more; i.e., over-night area at Swiftwater has a minimum separation of 100 feet horizontal difference with traffic control designed in.

4. Introducing more people and fishing opportunities by management of the south side of the canyon will impair fishing and cause damage to the steelhead run.

Analysis: The attached "Analysis of the Angler Use of the North Umpqua River Salmon and Steelhead Fisheries" report gives details and data concerning utilization of the fishery resource. The following information is extracted from that report:

A. There has been a steady increase in angler effort since 1960. Summer steelhead receive most of this pressure.

B. In the 1950-58 period, summer and winter steelhead runs averaged, respectively, 3,025 and 7,365 fish.

C. With hatchery planting, the 1959-65 period, summer and winter runs averaged, respectively, 3,450 and 6,925 fish.

D. The 1966-71 period, summer and winter runs averaged, respectively, 10,479 and 9,825 fish. Summer runs exceeded 13,000 fish since 1969.

E. Since 1969, 77% of summers and 20% of winters are from hatchery smolts.

F. In the 1967-71 period, summer fish comprised 53% of the total steelhead run and 71% of the total harvest.

G. An average of 39%* of summer fish and 18%* of the winter fish entering the North Umpqua are harvested.

H. Spring chinook comprise 89% of the salmon run in the North Umpqua.

I. In the 1960-65 period, salmon runs averaged 8,858 fish rising to 11,274 for 1966-71, of which 68% were wild fish.

J. Harvest of chinook rose from 296 fish in 1960 to 2,481 in 1971.

K. Since 1967, harvest of adult spring chinook passing Winchester has averaged 27%.

L. Two methods are available to estimate angler demand; punch cards collected from salmon-steelhead anglers and creel census data. Punch card data indicate a rise in salmon angler trips from 1957 of 2,033 to 12,933 in 1971. Steelhead angler trips rose from 2,157 to 89,848 during this period. Creel census data projected

to 1971, indicate salmon-angler trips to be 20,234 with summer and winter steelhead angler trips pegged at 36,475 and 11,246, respectively. Use of either method produces widely varying figures, but one common factor - rapid increase.

M. The "Fly Area" attracted 49% of the North Umpqua's summer steelhead and trout anglers during 1968-72. During this period, 39% of summer steelhead anglers fished in the fly area and 61% below the Rock Creek deadline. In the fly area, 75% of the pressure occurs above Wright Creek.

N. Current harvest of summer steelhead population is 39%, while 18% of the winter steelhead run is harvested. Twenty-seven percent of the returning adult spring chinook are harvested. Fish populations are believed to be capable of supporting a harvest of 50% of the population; at least, without harm.

O. The plan area involves 13 miles of river of which 8 miles are fly water only. Twenty-one percent of the summer steelhead harvest is taken from the 12 miles of river extending from the deadline at Rock Creek to Wright Creek; therefore, less than 21 percent of the harvest comes from within the planning area.

*This figure is considered high as the fish caught in the 7 miles below Winchester dam have not been counted.

5. Management of canyon should be coordinated with U.S. Forest Service upstream.

Analysis: We have coordinated on both an informal and a formal basis with the U.S. Forest Service, Douglas County Parks Department, Champion International Corporation, (U.S. Plywood) and Weyerhaeuser Corp. Land management criteria is essentially the same as that used by the Forest Service. We have even tried to use the same terminology as the Forest Service in landscape management so as to facilitate cooperation in management.

Quarterly inter-agency meetings with the Forest Service always involved some discussion of the North Umpqua Plan. Some initial meetings involved possible use by the Forest Service of Bob Butte Road for their main timber access. They decided against this, however. Other later official meetings and correspondence with Forest Service were:

1. USFS - Job Corps - BLM January 26, 1971
2. Richard Woody March 19, 1971
3. USFS/BLM Interagency May 20, 1971
4. John Philbrick March 9, 1972

6. Keep campground facilities 150 feet away from river bank

Analysis: Our design premise begins with the need to keep our recreation installations as much out of view of the river perspective as possible. In accomplishing this, no roads will come this close and the likelihood of any other portion of the construction being within this zone is low. We do, however, wish to maintain flexibility and rather than tie ourselves to an arbitrary distance which may or may not be sufficient in all cases, and would rather govern our design by the criteria stated in the Plan. They are: environmental compatibility, minimal intrusion on the site, little or no visibility from the opposite river bank, and the installation of such structures or plantings as may be necessary to protect the banks, themselves, from traffic.

7. Wait for S.B. 100 (State Land-use Planning Legislation Proposed) and/or State Scenic Waterway action

Analysis: S.B. 100 would not impact federal lands. We will recognize zoning regardless of source (State or County). No subdivisions of the existing acreage is allowed under present county zoning ordinances unless access is to a public road. BLM roads are not considered "Public" by County Zoning Ordinance. The following are excerpts from letters regarding this issue:

Letter from Richard Reynolds to George Francis, November 1972, (R. Reynolds of Douglas County Planning Commission). "The definition of a public road for purposes of the Douglas County Subdivision Ordinance is any roadway which conforms to one or a combination of the following:

1. Any right-of-way dedicated to the public for roadway purpose and accepted for public use by the County Board of Commissioners (page 3, Subdivision Ordinance).

2. Any county or state owned and maintained right-of-way.

3. BLM, Forest Service, or Oregon State Forestry owned right-of-ways when established as public road for subdivision purposes. Concurrence of the subject agency is necessary under this aspect of public road definition.

It should be noted that supplementary to this definition, no subdivision or partitioning, under Douglas County Subdivision Ordinance, is allowed on an easement roadway (page 6, Subdivision Ordinance). No subdivision will be approved without fulfilling that qualification."

Letter dated October 6, 1972, to Archie Craft from Ray E. Doerner, chairman, Douglas County Commissioners. "Some concern has been expressed

that the proposed location of the Bob Butte Road will open the small amount of private land to development and that such a happening would detract from the basic public value. That private land is soon scheduled for county zoning under a classification of Forest Recreation which is compatible with the BLM proposal. Also, our subdivision ordinance does not allow subdivisions on other than county or state roads.

You may be sure that Douglas County is concerned, and we care much about the appearance of the North Umpqua streamside. To that end we pledge with you our full cooperation in planning and protecting the use of the area in question."

Present zoning and sanitation rules in Douglas County are becoming effective through updating and enforcement. We feel the best course is to encourage intelligent zoning of private lands at the local level. Current and future prospects appear good in this regard.

The North Umpqua Canyon Management Plan is not in conflict with the State Scenic Waterways Act.

The attached clippings from the "News Review" adequately explain the current status of plans to study the North Umpqua River under the state act. Briefly, the idea was proposed that the State Highway Commission study the river for possible inclusion under the act. Opposition appeared to be widespread and spontaneous. One public gathering was held to discuss the proposal and a raucous outcry against it ensued. No discernible activity has transpired since that meeting November 10, 1971.

There is no discord between the provisions of our plan and those of the State Scenic Waterways Act if the act should ever be implemented on the North Umpqua.

8. Develop recreation sites in side streams away from river

Analysis: Some expansion possible in Rock Creek area but not much.

The aesthetics attendant to sites on main river give them a value of the highest order. These are major values which would go unutilized and unappreciated if the sites are not installed. It is not in the public interest to have so great a resource remain unused.

The river is the prime attraction; its scenery; its unusual rock formations; the color of its water; its sound and frenzy; its forested hills; its trout and anadromous fishery. This is what people come to see and utilize and no amount of development in Rock Creek is going to substitute for the attraction of the main river. Over-night facilities in Rock Creek will accommodate people up to a point but day use by these Rock Creek over-nighters of the river environs will still be heavy and damage to the river will occur in areas of heavy use. It is easier to manage people if they are concentrated in planned areas.

9. Use multidiscipline team approach to planning

Analysis: We did - list of participants and contributions:

Don Kobelin, Forester, Area Manager - Overall direction and guidance.
Richard Popp, Assistant Area Manager, Assists Area Manager on overall direction and guidance.
Bruce Ottenfeld, Forester, Timber Manager - Transportation system, inventory, silvicultural methods.
Bruce Chambers, Engineer, Construction Program Manager - Route analysis, transportation analysis, engineering feasibility.
Steve Wert, Soils Scientist - Area soil surveys, road location, soil survey hydrogolic data.
Frank Oliver, Fisheries Biologist - Fisheries report analysis of use data, stream mapping and management, fishery protection.
Robert Mitchell, District Cruiser/Appraiser - Appraisal of logging methods, timber valuation.
Tom Watts, Timber Management Specialist, Seen area mapping, road location, forest management planning, landscape classification.
Frank Maxwell, Forester, Outdoor Recreation Planner - Recreation site analysis planning and layout, use data analysis and projection, landscape classification and management criteria.
Jack O'Brien, Project Engineer - Road route location, route analysis.
Bernie Mayer, Resource Management Specialist - Plan review, allowable cut data input, silvicultural methods.
W. Hiatt, FHWA Geologist - Bob Butte Road Route geological investigation.
D. H. Potter, Assistant Regional Environmental Coordinator, BPR- Analysis of visual impact and suggested ameliorating techniques for Bob Butte Road.
A. R. Westby, Chief Design Section, FHWA - Bob Butte Road traffic analysis
Ron Russell, Landscape Architect - Preliminary recreation site mapping and design, visual impact analysis visitor information cneter site design.
Clay Greenleaf, DSC Architect - visitor information center design.

In summary we do not recommend any major substantive change in this plan. It is an amplification of basic plans and policies identified in the Management Framework Plan. Based on the Environmental Analysis Record no major environmental changes will accrue due to this plan's implementation, however, considerable public controversy is apparent, therefore, we recommend that a formal Environmental Impact Statement be prepared at the earliest opportunity.