APPENDIX D

Watershed and Soil

Characteristics

HYDROLOGY

The effect of roads and trails on hydrologic systems is usually analyzed at the site-scale and at the watershed scale in order to evaluate direct impacts of the road alignment (site-scale) and the indirect and cumulative watershed effects. Alternatives for motorized use designation have been analyzed at the site scale and the 6th field or "subwatershed" scale.

Appendix D presents the 5th and 6th field watersheds that have been analyzed. These subwatersheds are analyzed because they represent those watersheds where actions are being proposed to occur that would potentially affect (either adversely or beneficially) current conditions. Included are watershed characteristics, risks for adverse effects, key watershed and water quality listing status and Riparian Reserve status.

WATERSHED ANALYSES

The following Watershed Analyses were examined for current conditions information and used in effects analysis:

- **1995 North Fork of the Smith River, Chetco RD**
- **1995, Upper Rogue River Watershed, Prospect RD**
- **1995, Squaw/Elliot/Lake Watershed Analysis, Applegate RD**
- **1995, Silver Creek National Watershed #9, Galice RD**
- **1996, Chetco River Watershed Analysis, Chetco RD**
- **1996, Quosatana Creek Watershed Analysis, Gold Beach RD**
- **1997, Draft Grayback/Sucker Pilot Watershed Analysis Results, Illinois Valley RD**
- **1997, Lawson Creek Watershed Analysis, Gold Beach RD**
- **1998, Elk River Watershed Analysis, Gold Beach RD**
- **1998, Hunter Creek Watershed Analysis, Gold Beach RD**
- **1998, Middle Fork Applegate River Watershed Analysis, Applegate RD**
- **1999, Middle Illinois River Watershed Analysis, Illinois Valley RD**
- **2000, East Fork Illinois River Watershed Analysis, Illinois Valley RD**
- **2000, Rogue River below Agness Watershed Analysis, Gold Beach RD**

The following 5th and 6th field watershed were considered based on the Proposed Action and are the basis of effects discussion in the EIS.

Table D-1. TMP Proposed Action Watersheds

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Powers District									
Big Tree Trail #1150	4 & 5	Trail-prohibit motorized use	S.F. Coquille/Elk Ck	Yes	S.F. Coquille	Low	0.1	None	None
Gold Beach District									
Game Lake Trail #1169	3, 4, & 5	Trail-prohibit motorized use	Lawson-Illinois River; Lower Illinois River	Yes	Yes	Low	0.87	7	1
Lawson Creek Trail # 1173	3 & 4	Trail-prohibit motorized use	Lawson-Illinois River; Lower Illinois River	Yes	Yes	Low	0.6	None	1

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Lawson Creek Trail # 1173	4	Trail-prohibit motorized use	Lawson-Illinois River; Lower Illinois River	Yes	Yes	Low	0.38	2	None
Lawson Connector Trail	4	Trail-prohibit motorized use	Lawson-Illinois River; Lower Illinois River	Yes	Yes	Low	0.31	4	None
Shasta Costa Creek Trail	4	Trail-prohibit motorized use	Rogue River, Illahe & Shasta Costa	Shasta Costa	Shasta Costa	Low	0.05	None	None
Nancy Creek & Shasta Costa Creek Trails	4	Trail-prohibit motorized use	Illinois River, Indigo & N.F. Indigo	Yes	Illinois River	Low	2.28	14	5
Road 3680409 (Game Lake)	3	Conversion to Trail	Lawson-Illinois River; Lawson Creek	Yes	Yes	Low	None	None	None

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Roads 3680351, 353 (Lawson/Fairview)	3	Conversion to Trail	Lawson-Illinois River;Lawson Creek	Yes	Yes	Low	None	None	None
Roads 3313103,3680190,195,220 (Signal Buttes)	3 & 5	Conversion to Trail	Hunter Creek, Lower Rogue, Quosatana	Portions of Quosatana	Hunter and Lower Rogue	Low	0.53	5	None
Roads 3313110, 117 (Kimball Hill)	3 & 5	Conversion to Trail	Quosatana	Yes	Rogue River	Low	0.6 for Alt 3 & 0.08 for Alt 5	6 for Alt 3 & None for Alt 5	None
Red Flat Trail	4	Prohibit Motorized Use	Hunter Creek/Upper Hunter	No	Hunter Ck		None	None	None
Trail # 1103	4	Prohibit Motorized Use	Chetco River/Eagle Creek	No	Chetco		None	None	None
Silver Lake Trail #1184	3, 4, & 5	Prohibit Motorized Use	Silver Creek, Upper Silver Creek	Yes	U. Silver Ck	Low	0.68	3	None

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Hobson Horn Trail #1166	4	Prohibit Motorized Use	Illinois River, Lawson, Indigo, N.F. Indigo, Silver, N.F. Silver	Yes	Illinois River, N.F. Silver	Low	0.76	8	None
Fish Hook Peak Trail # 1180	4	Prohibit Motorized Use	Indigo, West Fk. Indigo Ck.	Yes	Illinois River	Low	None	None	None
Taylor Creek Trail #1142, Big Pine Spur Trail #1142A, Trail #1157, Onion Way Trail #1281, Secret Way #1282A	3, 4, & 5	Prohibit Motorized Use	Briggs Creek, Upper Briggs Creek	No	Briggs	Moderate	2.35	6	None
Swede Creek Trail	3, 4, & 5	Prohibit Motorized Use	Briggs Creek, Lower Briggs	No	Briggs	Moderate	0.5	3	1

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Road 2600050	4	Prohibit Motorized Use	Silver Creek, Upper Silver Creek	Yes	Silver Ck	Low	0.22	3	None
Trail #1146,1132, Dutchy/Chance Ck	4	Prohibit Motorized Use	Silver Creek, Upper Silver Creek, Briggs Ck, Upper Briggs Ck	Silver Ck	Silver Ck, Briggs Ck	Moderate	0.89	2	2
Trail 132, 1135, 1143, Red Dog, Orion	4	Prohibit Motorized Use	Briggs Ck, Lower Briggs and Upper Briggs	No	Briggs Ck	Moderate	10	20	10
Wild Rivers District									
Road 4201016 (Eight Dollar Mtn	3, 4,& 5	Prohibit Motorized Use	Deer Ck, Lower Deer Ck, Josephine, & Sixmile	No	Deer Ck, Illinois River	Moderate/Low	2	6	1

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Roads 4300910,920,925,4300011	3, 4, & 5	Prohibit Motorized Use	Josephine Ck	No	Fiddler, Canyon, & Illinois River	Low	0.98	3	1
Roads 4300920, 011 (Botanical Area Rds)	4	Prohibit Motorized Use	Josephine Ck	No	Fiddler, Canyon, & Illinois River	Low	0.83	1	
Roads 421029 (Botanical Area Rds)	4	Prohibit Motorized Use	Josephine Ck	No	Fiddler, Canyon, & Illinois River	Low	1	3	None
Road 4300910 (Wetlands)	3, 4, & 5	Prohibit Motorized Use	Josephine Ck	No	Fiddler, Canyon, & Illinois River	Low	1.56	4	2
Roads 4300920,011 (Wetlands)	3, 4, & 5	Prohibit Mixed Use	Josephine Ck	No	Fiddler, Canyon, & Illinois River	Low	0.83	1	None
Roads 4201029 (Botanical Area)	3, 4, & 5	Prohibit Mixed Use	Josephine Ck	No	Fiddler, Canyon, & Illinois River	Low	1	8	1

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Roads 4201844,846,847,4103087,2524048,2524015	4	Prohibit Motorized Use	Illinois, Josephine, Sixmile, Baker, Briggs, Lwr Briggs, Deer, Lwr Deer	No	Illinois	Low	0.05	1	None
Road 4402494 (Biscuit Hill Trail)	3	Conversion to Trail	N.F. Smith River, Baldface Ck	No	Rough & Ready Ck	Low	None	None	None
Roads 4400445, 460, 480, 485 (Botanical Areas)	3, 4, & 5	Prohibit Motorized Use	Illinois, Rough and Ready Ck	No	Rough & Ready Ck	Low/Moderate	0.3	2	None
Roads 4402019, 112,450,172,206,259A,550	4	Prohibit Motorized Use	N.F. Smith River, Baldface Ck, Diamind, W.F. Illinois, Rough&Ready	Baldface Ck	W.F. Illinois River	Low	0.08	None	1

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Bolan Lake Trail #1245	3, 4, & 5	Prohibit Motorized Use	Sucker Creek	No	Sucker Ck	Moderate	None	None	None
Mt. Elijah Trail # 1206	3, 4, & 5	Prohibit Motorized Use	Sucker Creek	Upper Sucker Ck	Sucker Ck	Low/Moderate	0.3	2	None
Elk Creek Trail #1230	4	Prohibit Motorized Use	Sucker Creek, Grayback Ck	Grayback Ck	Grayback Ck	Low	0.8	4	None
Boundary Trail #1207, 903, 907	4	Prohibit Motorized Use	Applegate, Steve & Sturgis, Carberry Ck	Sucker Ck	None	Low	1.59	8	None
Siskiyou Mountains District									
Horse Camp Trail #958	3, 4, & 5	Prohibit Motorized Use	Applegate, Butte and Middle Fork	No	None	Low	1.1	4	0
Cook and Green Trail #959	4	Prohibit Motorized Use	Applegate River	No	None	Low	None	20	3

Road or Trail	Alt(s)	Proposed Activity	Watershed (5th and 6th fields)	Key Water-shed	Listed Streams	CWE risk rating	Miles in Riparian Reserve	Ephemeral Stream Crossings	Perennial Stream Crossings
Penn Sled Trail	3 & 5	Authorize Motorized Use	Applegate, Squaw Ck	No	None	Moderate	None	None	None
Little Grayback Trail #921	4	Prohibit Motorized Use	Applegate, Squaw Ck	No	None	Moderate	0.72	8	None
Mule Mtn Trails #918, 919, 920	4	Prohibit Motorized Use	Applegate, Palmer Ck	Yes	Applegate	Low	4.86	19	2
High Cascades District									
High Cascades Play Area	3	Allow Off-Rd Motorized Use	Big Butte, Clarks Fork-Fourbit Ck	No	None	Moderate	None	None	None

Effects Mechanisms for Fisheries and Aquatic Species

General effects related to roads and motorized trails located within Riparian Reserves are detailed below in Figures 1, 2, and 3. Information displayed in these diagrams is supported by Gucinski et al. 2001, Waters 1995, Furniss et al. 1991, Hausle and Coble 1976, and Cordone and Kelley 1961. It should be noted that none of the alternatives would result in measurable increases from road and motorized trail related impacts to aquatic habitat beyond what is currently occurring.

Figure D-1. Road and Motorized Trail Related Sediment Deposition Effects

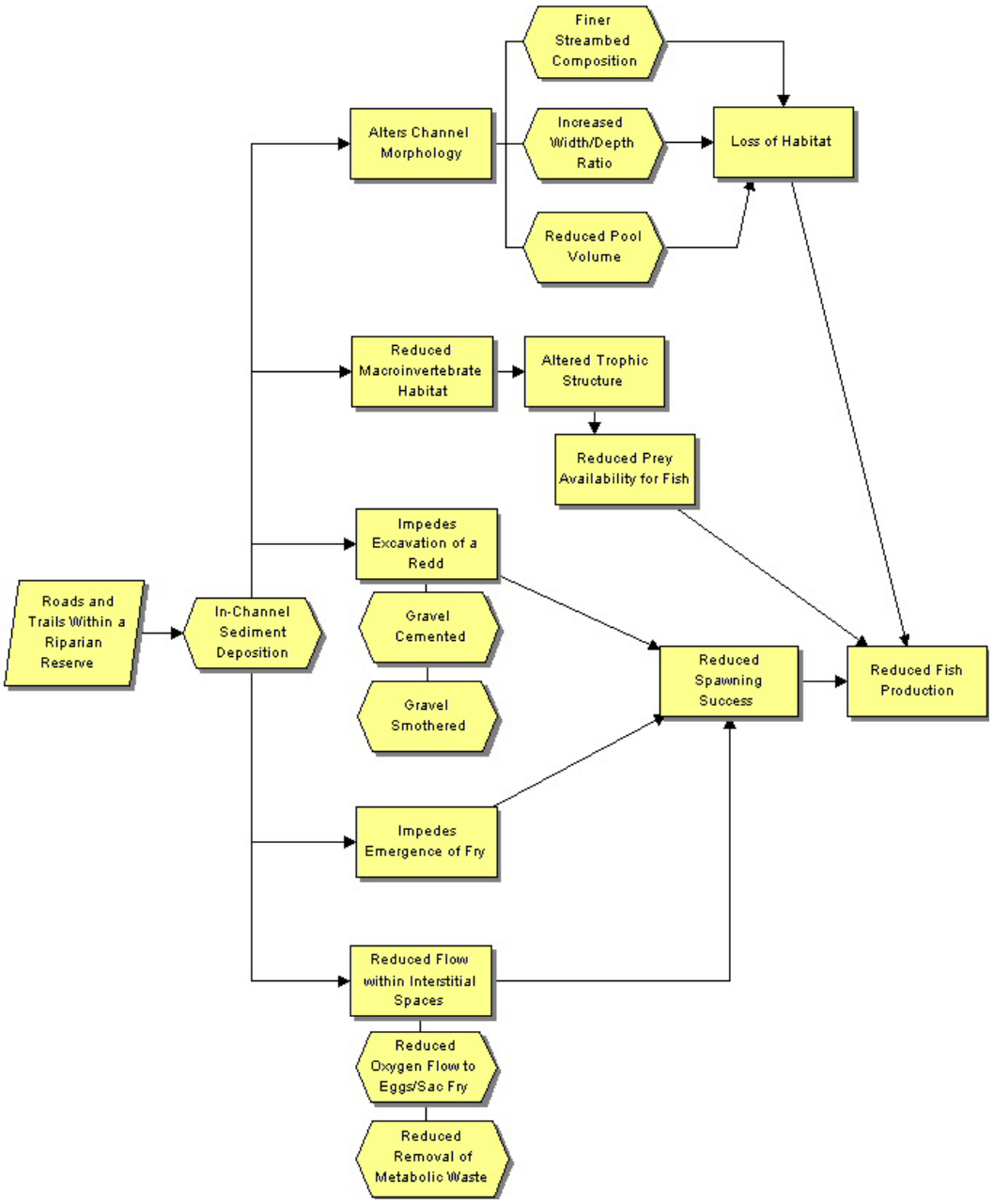
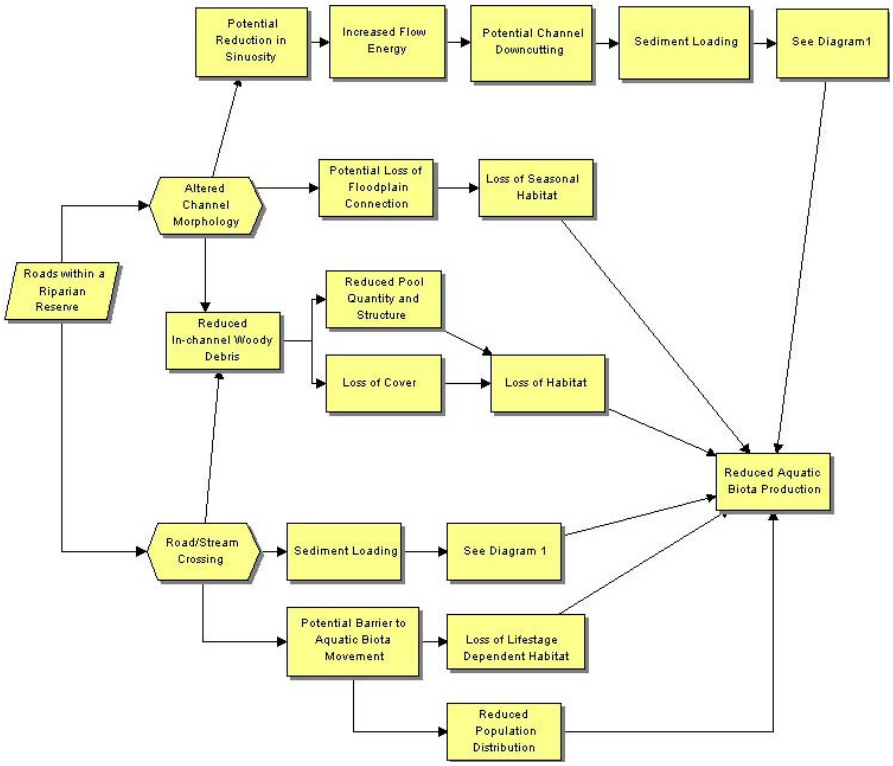


Figure D-2. Road and Motorized Trail Related Suspended Sediment Effects

Figure D-3. Potential Effects from Roads and Motorized Trails Located Within a Riparian Reserve



Incorporated Best Management Practices (BMPs, USDA Forest Service, 1988)

ROAD SYSTEM BMPS

R-1. Title: General Guidelines for the Location and Design of Roads

Objective: To locate and design roads with minimal resource damage.

Explanation: There are several general considerations which must be incorporated into the planning of road locations and designs. These measures are preventive and indirectly protect water quality and associated aquatic resources. The following apply to all transportation activities:

a. A basic requirement for transportation facility development and operation is the formulation and evaluation of alternatives, and the selection of an alternative that best meets resource management objectives with the least adverse effect on environmental values.

b. In the location, design, and construction of roads, an interdisciplinary team is used to evaluate the effects of transportation development and operations and minimize adverse economic, environmental, and social impacts.

c. All resource-coordinating instructions for the protection and prevention of damage to National Forest resources shall apply to the planning, development, and operation of transportation facilities. The following instructions apply to system roads:

(1) Roads should be located to facilitate completion of the area transportation system, fit the terrain, and minimize damage to improvements and resources. Fragile and special areas that cannot be mitigated to an acceptable level of resource damage should be avoided.

When possible, roads use non-geometric horizontal and vertical alignment conforming as much as possible to natural ground contours. This allows a survey to be taken on or near the actual location of the road to be constructed, instead of on a preliminary line from which the final location would be offset. This type of location and survey, and the following design and construction, results in smaller cuts and fills with less total material moved and narrower clearing widths. The final road has a much lower impact than one located, surveyed and designed by more conventional methods.

(2) Road design standards and design criteria are based on a transportation plan for the area, an economic analysis, road management objectives which identify traffic requirements during and following the sale, safety requirements, resource objectives to be met or mitigated, and specific resource concerns.

(3) Stream crossing structures shall be designed to provide the most efficient drainage facility consistent with resource protection and costs. The design may involve a hydrologic analysis to determine runoff volumes, flood conditions, velocities, scour, and open channel shapes.

Implementation and Responsibility: An interdisciplinary team aids the responsible official in defining resource objectives which are used to locate the road and in developing mitigative measures.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with project plan requirements and the operating plan determined with tests, measurements, and observations by the Forest Service Contracting Officers Representative (COR) or Engineering Representative (ER).

Monitoring: EA review process, tagline reviews, plan-in-hand reviews, progress reviews during construction, and final inspection. Also see monitoring for other Road System BMPs and the Forest Plan monitoring plan.

R-2. Title: Erosion Control Plan

Objective: To limit and mitigate erosion and sedimentation through effective planning prior to initiation of road construction activities and through effective contract administration during construction.

Explanation: Land disturbing activities, such as road construction, usually result in short term erosion. By effectively planning for erosion control, sedimentation can be minimized. Prior to starting work, the Contractor submits a general plan which sets forth erosion control measures to be used. Operations cannot begin until the Forest Service has given written approval of the plan. The plan recognizes the mitigation measures required in the contract. All contracts specify that operations be scheduled and conducted to minimize erosion.

Implementation and Responsibility: Mitigative measures are developed by design engineers, using an interdisciplinary approach; the measures are reflected in the contract's specifications and provisions.

Erosion control is required by contract provisions common to road construction. The Erosion Control Plan is implemented by the Purchaser on timber sale contracts or Contractor on Public Works Projects.

This practice is commonly applied to road construction or timber sales, but should be extended to apply to road construction for mining, recreation, special uses, and other roadwork on the Forest.

Monitoring: Contract packet review, prework meetings, and operating plans along with tests, measurements, and observations by the COR or ER and watershed specialists. Also see Forest Plan monitoring plan.

R-4. Title: Road Slope Stabilization (Planning)

Objective: To reduce sedimentation by minimizing erosion from road slopes and minimizing the chances for slope failures along roads.

Explanation: Road stabilization considerations begin in the reconnaissance and location of the road. The first planning requirement is for an adequate engineering, hydrology, soils, and geology investigation to provide data for:

a. Cut and fill slope design.

b. Controlling surface and subsurface drainage.

c. Determining compaction standards and surfacing needs.

A prerequisite of stabilization is to provide basic mechanical stability of the soil, using data from the site investigations to develop requirements for proper slope angles, compaction, and adequate drainage.

Implementation and Responsibility: Erosion prevention must be included in planning for all road construction contracts.

Most, if not all, of the stabilization measures should be planned for completion on all disturbed ground prior to the winter season, when erosion is most severe.

At especially critical locations, with a high erosion or sedimentation potential, expensive remedies may be necessary.

Project location and mitigative measures are determined during the environmental analysis and road design process, and included in the project plan using an interdisciplinary approach.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with project plan requirements and the operating plan is determined with tests, measurements, and observations by the COR or ER through inspection.

Monitoring: NEPA field review process, tagline review, plan-in-hand review, design review, road construction review process, and final inspection. Also see Forest Plan monitoring plan.

R-5. Title: Road Slope and Waste Area Stabilization (Preventive)

Objective: To minimize soil erosion from cut slopes, fill slopes, and waste areas.

Explanation: Depending on various factors such as slope angle, soil type, climate, and proximity to waterways, many fill slopes, some cut slopes, and waste areas will require vegetative and/or physical restraint measures to provide for adequate surface soil stability. The level of stabilization effort needed must be determined on a case-by-case basis by appropriate personnel.

Vegetation measures include the seeding of herbaceous species (grass, legumes, or browse species), or the planting of brush and trees. Vegetative measures may include fertilization and mulching to ensure success.

Physical restraint measures may include, but are not limited to grading, ditches, scattering vegetative debris, erosion nets, terraces, side drains, blankets, mats, riprapping, mulch, tackifiers, pavement, and soil seals.

Implementation and Responsibility: Vegetative measures can improve the effectiveness of physical restraint measures, but may not be effective and complete by themselves for the first several seasons.

Physical restraint and vegetative surface stabilization measures will be periodically inspected, as necessary, to determine effectiveness. In some cases, additional work may be needed to ensure that the vegetative or mechanical surface stabilization measures continue to function as intended.

Initial project location, mitigative measures, and management requirements and needs are normally developed during the environmental analysis process, using an interdisciplinary approach. These requirements and needs are translated into contract provisions and specifications.

Monitoring: Forest Service work leaders, road inspectors, and their supervisors monitor work accomplishment and effectiveness, to help ensure that design standards, project plan constraints, and mitigative measures are met. Watershed specialists assist in implementation and effectiveness evaluations. Also see Forest Plan monitoring plan.

R-6. Title: Dispersion of Subsurface Drainage Associated with Roads

Objective: To minimize the possibilities of roadbed and cut or fill slope failure and the subsequent production of sediment.

Explanation: Roadways may change the subsurface drainage characteristics of a hillside. Since changes to normal areas and interruption of subsurface flows increase the risk of instability, it is sometimes necessary to provide special drainage (subsurface) to avoid saturation of the subgrade and slopes to reduce subsequent slope failure. The following are some dispersion methods which can be used:

a. pipe underdrains
b. horizontal drains
c. stabilization trenches
d. drainage blankets or rock drains
e. ditches

Dispersal of collected water should be accomplished in an area capable of withstanding increased flows. On most soils, energy dissipators need to be placed at pipe outlets. This is a preventive practice.

Implementation and Responsibility: Locatable wet areas and areas with underground flows are designed with appropriate mitigative measures to provide subsurface drainage. Locating such areas may involve geologists, engineers, soil scientists, and hydrologists.

Contracted projects are implemented by the Contractor or timber sale Purchaser. Compliance with project plan and specifications requirements, and operating plans is determined with tests, measurements, and observations by the COR or ER. Additional sites found during construction, or necessary changes to known sites, are designed in the same manner as the original sites.

Monitoring: Plan-in-hand review, design review, and road construction review process. Also see Forest Plan monitoring plan.

R-7. Title: Control of Surface Road Drainage Associated with Roads

Objective: (1) To minimize the erosive effects of water concentrated by road drainage features, (2) to disperse runoff from or through the road, and (3) to minimize the sediment generated from the road.

Explanation: A number of measures can be used, alone or in combination, to minimize possible detrimental effects of surface drainage. Culverts or bridges are normally placed at all natural drainages crossed by roads. Ditches, cross drains, water bars, dips, and grade sags are used to take water off the roadbed surface.

Methods used to reduce erosion may include such things as energy dissipators, aprons, downspouts, gabions, debris racks, and armoring ditches and drain inlets and outlets. Soil stabilization can help reduce sedimentation by reducing the effects of erosion on borrow and waste areas, on fill slopes, and on roadbeds.

Dispersal of runoff from roads can be accomplished by rolling the grade, insloping with cross drains, outsloping, crowning, installation of water spreading ditches, contour trenching, etc. Dispersal of runoff can reduce peak downstream flows and keep water in its natural drainage area.

Sediment travel can be reduced by installing measures such as sediment filters, settling ponds, and contour trenches.

Implementation and Responsibility: Soil erosion classification, parent rock, steepness of side slopes, soil type, and road grades are used to assist in project location, design criteria, and mitigative measures used by designers for surface drainage. The data is determined using an interdisciplinary approach during the environmental analysis and road design process, and then placed in contracts.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with plans, specifications, and operating plans is determined with tests, measurements, and observations by the Forest Service COR or ER.

Monitoring: Tag-line review, design review, and road construction review process. Watershed specialists assist with implementation and effectiveness evaluations. Also see Forest Plan monitoring plan.

R-9. Title: Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects

Objective: To minimize erosion of and sedimentation from disturbed ground on incomplete projects.

Explanation: The best drainage design can be ineffective if projects are incomplete at the end of the dry season. Affected areas can include roads, waste areas, tractor trails, skid trails, landings, fills, streamcrossings, and bridge excavations. Preventive measures include:

a. Removal of temporary culverts, culvert plugs, diversion dams or elevated streamcrossing causeways;

b. Installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipators, dips, sediment basins, berms, debris racks or other facilities needed to control erosion;

c. Removal of debris, obstructions, and spoil material from channels and floodplains;

d. Grass seeding, placement of hay bales, and mulching.

Implementation and Responsibility: Protective measures must be applied to all areas of disturbed, erosion-prone, unprotected ground. When conditions permit operations outside of the dry season, erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed," if weather conditions deteriorate. Areas should not be abandoned for the winter with remedial measures incomplete.

Project mitigative measures and location are developed and documented during the environmental analysis process using an interdisciplinary approach.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with project plan criteria, contract specifications, and operating plans is determined with tests, measurements, and observations by the COR or ER.

Monitoring: Road construction review process and observation during and after project completion. Also see Forest Plan monitoring plan.

R-10. Title: Construction of Stable Embankments (Fills)

Objective: To construct embankments with materials and methods which minimize the possibility of failure and subsequent water quality degradation.

Explanation: The failure of road embankments and the subsequent deposition of material into waterways may result from the incorporation of slash or other organic matter into fills, from a lack of necessary compaction during the construction of the embankment, from unsuitable soils, and from the use of inappropriate placement methods.

To minimize this occurrence, the roadway should be designed and constructed as a stable and durable earthwork structure with adequate strength to support the pavement structure, shoulders, and traffic. Proper slope ratio design, moisture content of soils, and compaction will normally promote stable embankments, as long as the soil is suitable. Embankments will be constructed of appropriate material and may be placed by one or more of the following methods:

a. Controlled compaction using density controlled strips
b. Controlled compaction (with normal testing procedures)
c. Special project controlled compaction
d. Layer placement (roller compaction)
e. Layer placement (hauling and spreading equipment operated uniformally over the entire width)
f. Sidecasting and end dumping

Method "f" is rarely specified for road construction, except on the lowest construction tolerance and to obtain adequate width for equipment to operate, and only in conformance with BMP R-11.

Implementation and Responsibility: Project constraints and mitigative measures are developed through the environmental analysis and road design process, using an interdisciplinary approach. The appropriate method of embankment placement is chosen during the design process.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with project plan specifications and the operating plan is determined with tests, measurements, and observations by the COR or ER through inspection.

Monitoring: Design review, progress reviews during construction, and road construction review process. Also see Forest Plan monitoring plan.

R-11. Title: Control of Sidecast Material

Objective: To minimize sediment production originating from sidecast material during road construction or maintenance.

Explanation: Unconsolidated sidecast material can be difficult to stabilize and is susceptible to erosion, settling, and mass instability. Site-specific limits or controls for sidecasting uncompacted material should be developed through interdisciplinary input. Sidecasting is not an acceptable embankment placement alternative in areas where it will adversely affect water quality. Road widths on full bench ground should not include any width on side cast material without prior approval of the COR or ER.

Waste areas should be located where excess material can be deposited and stabilized. The location and provisions for disposal of waste materials are included in construction contracts. During road maintenance operations, the deposition of sidecast material shall be done where it will not weaken stabilized slopes. Disposal of slide debris shall be done only at designated waste areas where deposited material can be stabilized or approved for sidecast placement, which may include the road surface and fill slopes.

Implementation and Responsibility: Mitigative measures are developed through the environmental analysis and road design process, using an interdisciplinary approach, and are included in the project specifications, drawings, or guidelines.

Contracted projects are implemented by the Contractor or timber sale operator. Compliance with project criteria, contract specifications, and operating plans is determined with tests, measurements, and observations by the COR, ER, or maintenance engineer.

Contracts and guidelines address slide and slump repair, surface blading, and the placement of waste road material to reduce sidecasting.

Monitoring: Road design review, progress review during construction, and maintenance activity reviews. Also see Forest Plan monitoring plan.

R-12. Title: Control of Construction in Streamside Management Units

Objective: To reduce the adverse effects of sediment from nearby roads on slope stability, vegetation, and aquatic resources along a designated stream zone by:

a. Acting as an effective filter for sediment generated by erosion from road fills, dust drift, and oil traces;

b. Maintaining shade, riparian habitat (aquatic and terrestrial), and channel stabilizing effects;

c. Maintaining the floodplain in an undisturbed condition.

Explanation: Except at designated stream crossings, road fills, waste areas and other embankments must be kept at a distance from nearby streams. Factors such as stream class, channel stability, sideslope, ground cover, and soil stability are taken into account in developing riparian and streamside management unit widths. It is vital to stabilize fill slopes and control water runoff to minimize the movement of sediment into streamside management units.

Stream classes and streamside management unit widths are determined by an interdisciplinary process involving hydrologists, fisheries biologists, and other specialists as required.

Implementation and Responsibility: Project location and mitigative measures are developed by the interdisciplinary team. Specifications are inserted into the contract by design engineers.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with environmental criteria, contract specifications, and operating plans is determined with tests, measurements, and observations by the COR or ER.

Monitoring: NEPA field review process, tag line review, design review, and progress review during construction. Also see Forest Plan monitoring plan.

R-13. Title: Diversion of Flows Around Construction Sites

Objective: (1) To ensure that all stream diversions are carefully planned, (2) to minimize downstream sedimentation, and (3) to restore stream channels to their natural grade, condition and alignment as soon as possible.

Explanation: Flow must sometimes be guided or piped around streamside project sites. Typical examples are bridge and dam construction, or large culvert installation. Flow in stream courses will be diverted if the Forest Service deems it necessary due to expected sediment production during construction. Such a diverted flow shall be restored to the natural streamcourse as soon as practicable and, in any event, prior to normal periods of precipitation runoff.

Implementation and Responsibility: This practice is required by contract provisions. The planning and design process will identify where diversions are required, and the design will include mitigative measures to protect fishery values and other downstream uses. The planning process may include consultation with other Federal, State, or local agencies and private parties to ensure that all factors are considered.

Project location, bypass design, and mitigative measures are identified in the design and planning process to meet project criteria.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with project criteria, contract specifications and operating plans is determined with tests, measurements, and observations by the COR or ER.

Monitoring: Progress review during construction and road construction review process. Also see Forest Plan monitoring plan.

R-14. Title: Bridge and Culvert Installation and Protection of Fisheries

Objective: To minimize sedimentation and turbidity resulting from excavation for in-channel structures.

Explanation: Excavation is a common requirement for the installation of bridges, culverts and minor streamside structures such as weirs, check dams, or riprapping. Waste material developed in such operations should neither obstruct the streamcourse (including natural floodplains) nor the efficiency of the associated structures. Some preventive and corrective measures are:

a. Excavated materials shall be kept out of live streams unless they are designed to be placed there. (i.e. riprap, etc.)

b. Sediment producing materials will not be left within reach of anticipated flood flows.

c. It is sometimes necessary to divert flowing water around work sites to minimize erosion and downstream sedimentation.

d. When needed, bypass and access roads shall be suitably located with plans made for their subsequent obliteration and stabilization.

For streams designated as important fisheries by Forest Service fisheries biologists, culverts will be installed only during flow periods specified in the project plan. Normally, this work would occur during minimum flow periods when water could be more easily diverted; work would not be allowed during salmonid fish spawning periods or before eggs have hatched and fingerlings have emerged from the gravel. Downstream sediment basins may be necessary to mitigate impacts on low flows.

Implementation and Responsibility: Project location and mitigative measures are developed during the road design process to meet the project criteria, using an interdisciplinary approach when deamed necessary.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with project criteria and the operating plan is determined with tests, measurements, and observations by the Forest Service COR or ER through inspection.

Monitoring: NEPA field review process, plan in hand review, design review, progress review during construction and road construction review process. Also see Forest Plan monitoring plan.

R-18. Title: Maintenance of Roads

Objective: To maintain roads in a manner which provides for water quality protection by controlling the placement of waste material, keeping drainage facilities open, and by repairing ruts and failures to reduce sedimentation and erosion.

Explanation: Roads normally deteriorate because of use and weather impacts. This deterioration can be reduced through adequate maintenance or restriction of use. All system roads will be maintained to at least the basic custodial care required to maintain drainage, protect the road investment, and minimize damage to adjacent land and resources. This level is the normal prescription for roads that are closed to traffic. Higher levels of maintenance may be chosen to reflect greater use or resource protection. Additional maintenance measures could include resurfacing, outsloping, clearing debris from ditches and cross drains, restoration of ditches, and spot rocking.

Annually, the Forest Service determines the maintenance needs of each road. Roads to be maintained by commercial users are considered. The process to accomplish maintenance activities are budgeted and contracted or scheduled for force account work. The Forest Service may collect deposits for commercial use to facilitate road maintenance and to equitably assess maintenance cost of each user.

Implementation and Responsibility: The work is controlled by maintenance engineers who prioritize work to fit the budget and develop a road maintenance plan. Maintenance levels for each road are documented in road management objectives. Maintenance on timber sale roads is a Contractor responsibility commensurate with their use. On roads not maintained by active timber sales, the work is accomplished with Forest Service crews or by contract. Compliance with the contract provisions is determined with tests, measurements, and observations by the COR or ER.

Monitoring: Timber Sale road package or Public Works Contract review and on the ground review of road maintenance practices on the Forest. Also see Forest Plan monitoring plan.

R-19. Title: Road Surface Treatment to Prevent Loss of Materials

Objective: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.

Explanation: Unconsolidated road surface material is susceptible to erosion during periods of precipitation. Likewise, dust derived from road use may settle onto adjacent water bodies.

Road surface treatments include grading, watering, dust oiling, penetration oiling, sealing, aggregate surfacing, chip-sealing, or paving, depending on traffic, soils, geology, road design standards, the road objectives,and available funding.

Implementation and Responsibility: Project location and mitigative measures are developed by the design or maintenance engineer to meet project criteria.

Contracted projects are implemented by the Contractor or Purchaser. Compliance with project criteria, contract specifications, and operating plans is determined with tests, measurements, and observations by the COR or ER.

Monitoring: Road construction review process. Also see Forest Plan monitoring plan.

R-20. Title: Traffic Control During Wet Periods

Objective: (1) To reduce road surface damage and rutting of roads, and (2) to lessen sediment washing from damaged road surfaces.

Explanation: The unrestricted use of roads during wet weather can result in rutting and churning of the road surfaces. Runoff from such damaged road surfaces carries a high sediment load. The damage and maintenance cycle for roads that are frequently used in winter can create a disturbed road surface that is a continuing sediment source.

Roads involving more than casual use during wet periods shall have a stable surface and sufficient drainage to allow such use with a minimum of resource impact. Rocking, oiling, paving, and armoring are measures that may be necessary to protect the road surface and reduce material degradation. In many cases, use can be discouraged, but not eliminated. Where winter field operations are planned, roads may need to be upgraded, use restricted to low ground pressure vehicles, or maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surfaces.

Implementation and Responsibility: Project-associated implementation procedures can be enforced by Forest Service personnel. Hauling activity can be controlled by the Sale Administrator or maintenance ER within active timber sales. The decision for restricted use is based on local weather, soil moisture conditions, and road damage criteria.

Mitigative measures are developed by engineers using an interdisciplinary approach as necessary. Contracted projects are implemented by the Contractor or Purchaser. Compliance with plans, specifications, and operating plans is determined with tests, measurements, and observations by the Forest Service COR or ER.

Monitoring: Timber Sale road package or Public Works Contract review, and forest road management inspection trips. Also see Forest Plan monitoring plan.

REC-6. Title: Management of Off-Road Vehicle (ORV) Use

Objective: To provide a systematic process to aid in determining when and to what extent ORV use will cause, or is causing adverse effects on water quality.

Explanation: The Forest ORV plan should:

a. Identify areas or trails where ORV use could cause degradation of water quality.

b. Establish baseline water quality data for normal conditions as a basis from which to measure change.

c. Identify water quality standards and the amount of change acceptable.

d. Establish monitoring methods and frequency.

e. Identify Best Management Practices appropriate in management of ORV's.

Implementation and responsibility: Monitoring results will be evaluated against the ORV plan objectives for water quality and the land management plan objectives for the area. These results will be documented along with the actions necessary to correct any problems.

If considerable adverse effects are occurring or are likely to occur, immediate corrective action will be taken. Corrective actions may include, but are not limited to, reduction in the amount of ORV use, signing or barriers to redistribute use, partial closing of areas, rotation of use on areas, closure to causative vehicle type(s) or total closure, and structural solutions, such as culverts and bridges.

Closure is done by authority of the Forest Supervisor (See BMP W-8).

Monitoring: Watershed and Recreation specialists will evaluate selected ORV use areas to measure the effectiveness of site-specific BMPs for ORV use. Also see Forest Plan monitoring plan.

REC-8. Title: Protection of Water Quality Within Developed and Dispersed Recreation Areas

Objective: To protect water quality by regulating the discharge and disposal of potential pollutants.

Explanation: This practice prohibits placing in or near a stream, lake or other waterbody, substances which may degrade water quality. This includes, but is not limited to, human and animal waste, petroleum products, and other hazardous substances. Areas may be closed in order to restrict use in problem areas.

Implementation and responsibility: The public will be encouraged through signs, pamphlets, and public contact to conduct their activities in ways that will not degrade water quality. Pamphlets, brochures, and other material will be used to encourage public coorperation in protecting water quality in dispersed areas. Forest Officers can issue citations to violators.

Monitoring: Forest Officers in both developed and dispersed recreation areas evaluate the implementation and effectiveness of this BMP during visits to various sites.

SOILS

The geographic scope for the assessment of the soil resource conditions and potential effects is the entire Rogue River-Siskiyou National Forest. The Rogue River-Siskiyou National Forest is divided into five districts: the analysis for the soil resource is organized, analyzed, and discussed for each of the districts.

The following tables present the soils potentially affected by each of the proposed activities associated with the Proposed Action (Alternative 3)

Table 1. Gold Beach RD. Soils affected by each proposed activity that would result in a change in impact to soils.

Proposed Activity	Soil Types[1]	Soil Characteristics
Convert maintenance level 1 roads to motorized trails	55F 56F 73F 78G 79G 87F 91F 103D,E 124E 135F 141G 180F 207E 225E 228F 240E 241E 255E 262F,G 263G	**55F:** Cedarcamp-Snowcamp-Rock outcrop complex, 30-60% north slopes. Very bouldery loams and cobbly clay loams, well drained, formed from serpentinitic peridotite or meta-igneous rock. Hazard of water erosion moderate or severe. Associated with backslopes, ridge crests, shoulders. **56F:** Cedarcamp-Snowcamp-Rock outcrop complex, 30-60% south slopes. Similar to 55F. **73F:** Deadline-Barkshanty-Nailkeg complex, 30-60% south slopes. Channery loams, well drained, formed from schist or phyllite, depth to bedrock 20-60+ inches. Hazard of water erosion moderate or severe. Associated with backslopes, stable benches, narrow summits, shoulders. **78G:** Deadline-Nailkeg complex, 60-90% north slopes. Similar to 73F, with hazard of water erosion very severe. **79G:** Deadline-Nailkeg complex, 60-90% south slopes. Similar to 78G. **87F:** Digger-Remote-Rock outcrop complex, warm, 30-60% south slopes. Similar to 88F, with 25% rock outcrop. **91F:** Digger-Umpcoos-Dystrochrepts complex, warm, 30-60% south slopes. Described above. **103D, 103E:** Edson-Barkshanty complex, 0-15%, 15-30% slopes. Channery loams and clay loams, well drained, formed in schist or phyllite, depth to bedrock 60+ inches. Hazard of water erosion slight. Associated with concave and convex areas of summits. **124E:** Gamelake-Tincup complex, 0-30% slopes. Very gravelly and very cobbly loams, well drained, formed in metasedimentary or metavolcanic rock, depth to bedrock 20-60+ inches. Hazard of water erosion moderate. Associated with concave and convex areas of summits. **135F:** Greggo-Mislatnah-Rock outcrop complex, 30-60% south slopes. Cobbly clay loams, well drained, formed from serpentinitic peridotite or other serpentinitic rock, depth to bedrock 10-40 inches. Hazard of water erosion severe. Associated with backslopes, narrow summits, shoulders and ridge crests. **141G:** Haplumbrepts-Rock outcrop-Rubble land complex, 60-100% north slopes. Extremely gravelly sandy loams, well drained or somewhat excessively drained, formed from intrusive igneous rock, depth to bedrock 20-70 inches. Hazard of water erosion very severe. Associated with backslopes, ridge crests, shoulders. **180F:** Described above.

		207E: Remote-Digger-Rock outcrop complex, warm, 3-30% slopes. Similar to 87F, with 20% rock outcrop. **225E:** Saddlepeak-Threetrees complex, 15-30% slopes. Very channery loams, well drained, formed from schist or phyllite, depth to bedrock 20-60+ inches. Hazard of water erosion moderate. Associated with concave and convex areas of summits. **228F:** Saddlepeak-Threetrees-Scalerock complex, 30-60% north slopes. Very channery loams, well drained, formed in schist or phyllite, depth to bedrock 10-60+ inches. Hazard of water erosion moderate or severe. Associated with backslopes, narrow summits and shoulders. **240E:** Snowcamp-Cedarcamp-Flycatcher complex, 0-30% slopes. Very gravelly and very cobbly loams, well drained, formed in serpentinitic peridotite or meta-igneous rock, depth to bedrock 10-60+ inches. Hazard of water erosion moderate or severe. Associated with concave and convex areas of summits, shoulders and knobs. **241E:** Snowcamp-Cedarcamp-Rock outcrop complex, 0-30% slopes. Very bouldery loams, well drained, formed in sepentinitic peridotite or meta-igneous rock, depth to bedrock 20-60+ inches. Hazard of water erosion moderate. Associated with concave and convex areas of summits, ridge crests and shoulders. **255E:** Swedeheaven-Quailprairie-Sankey complex, 0-30% slopes. Gravelly loams and very gravelly sandy clay loams, well drained, formed in metasedimentary or metavolcanic rock, depth to bedrock 10-60+ inches. Hazard of water erosion moderate or severe. Associated with concave and convex areas of summits, shoulders and knobs. **262F, 262G:** Threetrees-Saddlepeak-Scalerock complex, 30-60%, 60-90% slopes. Very channery loams, well drained, formed in schist or phyllite, depth to bedrock 10-60+ inches. Hazard of water erosion moderate or severe, very severe. Associated with backslopes, narrow summits and shoulders. **263G:** Threetrees-Saddlepeak-Scalerock complex, 60-90% north slopes. Similar to 262G, with very severe water erosion hazard.
New motorized trail construction	17E 87F 103E	**17E:** Barkshanty-Nailkeg-Rock outcrop complex, 0-30% slopes. Channery loams, well drained, formed in schist or phyllite, depth to bedrock 20-60+ inches. Hazard of water erosion moderate. Associated with concave and convex areas of summits, ridge crests, shoulders. **87F:** Described above. **103E:** Described above.
Close trails to motorized use	9F,G 13G 54F 90E 91F 104E 112A 132F 158F 180F 182F 204E 214 241E	**9F, 9G:** Atring-Kanid-Vermisa complex, 30-60%, 60-90% south slopes. Very gravelly loams, well drained and somewhat excessively drained, formed in metasedimentary rock, depth to bedrock 10-60 inches. Hazard of water erosion moderate or severe, very severe. Associated with backslopes, narrow summits and shoulders. **13G:** Atring-Vermisa complex, 60-90% north slopes. Very gravelly loams, well drained and somewhat excessively drained, formed in metasedimentary rock, depth to bedrock 10-40 inches. Hazard of water erosion very severe. Associated with backslopes, narrow summits and shoulders. **54F:** Cedarcamp-Snowcamp-Flycatcher complex, 30-60% south slopes. Very gravelly and very cobbly loams, well drained, formed in serpentinitic peridotite or meta-igneous rock , depth to bedrock 10-60+ inches. Hazard of water erosion moderate or severe. Associated with backslopes, narrow summits and shoulders.

		90E: Digger-Remote complex, warm, 3-30% slopes. Gravelly loams, well drained, formed in metasedimentary or metvolcanic rock, depth to bedrock 20-60+ inches. Hazard of water erosion moderate. Associated with convex and gently sloping areas of summits. **91F:** Described above. **104E:** Eightlar-Gravecreek-Pearsoll complex, 3-30% slopes. Very stony clay loam, very cobbly loam, very cobbly clay loam, well drained, formed in serpentinitic peridotite or other serpentinitic rock, depth to bedrock 10-60+ inches. Hazard of water erosion moderate or severe. Associated with concave and convex areas of summits, shoulders, knobs. **112A:** Evans silt loam, 0-3% slopes. Silt loam, well drained, formed in alluvium, depth to bedrock 60+ inches. Hazard of water erosion slight except during flooding. Associated with floodplains. **132F:** Gravecreek-Eightlar-Pearsoll complex, 30-60% south slopes. Similar to 104E, with hazard for water erosion moderate to very severe. **158F:** Kanid-Acker-Atring complex, 30-60% north slopes. Gravelly and very gravelly loams, well drained, formed in metasedimentary rock, depth to bedrock 20-60+ inches. Hazard of water erosion moderate or severe. Associated with backslopes and footslopes. **180F:** Described above. **182F:** Mislatnah-Redflat-Greggo complex, 30-60% north slopes. Cobbly clay loams, gravelly loam, well drained, formed in serpentinitic peridotite or other serpentinitic rock, depth to bedrock 10-60+ inches. Hazard of water erosion moderate or severe. Associated with backslopes, footslopes, narrow summits, shoulders. **204E:** Redflat-Mislatna-Greggo complex, 0-30% slopes. Similar to 182F, but associated with concave and convex areas of summits, shoulders, knobs. **214:** Riverwash. Associated with areas adjacent to rivers and streams that consist of sand and gravel and do not support vegetation. Frequently flooded, with very severe hazard of water erosion. **241E:** Described above.

[1]Curry County Soil Survey (USDA NRCS, 2005)

Table 2. Wild Rivers RD. Soils affected by each proposed activity that would result in a change in impact to soils.

Proposed Activity	Soil Types	Soil Characteristics
Convert maintenance level 1 roads to motorized trails	58F,G[2] 193E[1]	**58F, 58G:** Pearsoll-Rock outcrop complex, 20-60%, 60-90% slopes. Extremely stony clay loam and rock outcrop, shallow, well drained, formed in colluvium derived dominantly from serpentinite and peridotite. Depth to serpentine bedrock 10-20 inches. Hazard of water erosion is high to very high. Associated with mountainsides and highly dissected mountainsides. **193E:** Perdin-Rock outcrop complex, 5-30% slopes. Cobbly loams, gravelly clay loams, and rock outcrop, well drained, formed from serpentinitic peridotite. Depth to bedrock 20-40 inches. Hazard of water erosion is moderate or severe. Associated with convex areas of summits.
Close trails to motorized use	4[2] 7F[2] 8G[2] 9G[2] 10F[2] 23G[2] 24G[2]	**4:** Banning loam, 0-3% slopes. Loams and clay loams, deep, somewhat poorly drained, formed in alluvium derived from metamorphic, granitic, and ultramafic rock. Depth to bedrock 60+ inches, seasonal high water table, hazard of water erosion is slight. Associated with alluvial fans and drainageways.

	25E[2] 26F[2] 47E[2] 48F[2] 61B,D[2] 72F[2] 80G[2] 81G[2] 82G[2]	**7F:** Beekman-Colestine complex, 50-75% south slopes. Gravelly loam, moderately deep, well drained, formed in colluvium derived from altered sedimentary and extrusive igneous rock. Depth to bedrock 20-40 inches, hazard of water erosion is high. Associated with mountainsides. **8G:** Beekman-Vermisa complex, 60-100% north slopes. Gravelly loam and extremely gravelly loam, moderately deep to shallow, well drained to somewhat excessively well drained, formed in colluvium derived from altered sedimentary and extrusive igneous rock. Depth to bedrock 10-40 inches, hazard of water erosion is high. Associated with mountains. **9G:** Beekman-Vermisa complex, 60-100% south slopes. Similar to 8G. **10F:** Bigelow very gravelly sandy loam, 35-65% slopes. Deep, well drained, formed in colluvium from granitic rock. Depth to compacted glacial till approx. 39 inches, hazard of water erosion is high. Associated with concave areas on mountainsides and glacial basins. **23G:** Crannler very stony sandy loam, 50-90% slopes. Moderately deep, somewhat excessively drained, formed in colluvium and residuum from granitic roak. Depth to bedrock 20-40 inches, hazard of water erosion is high. Associated with convex slopes of mountains. **24G:** Crannler-Rock outcrop complex, 50-100% slopes. Similar to 23G, but with 30% rock outcrop. **25E:** Cryaquepts, 0-30% slopes. Silt loam, moderately deep or deep, somewhat poorly drained or poorly drained, formed in alluvium and colluvium from granitic rock. Depth to bedrock 20-60+ inches. Associated with depressional areas, drainage basins, and mountainsides. **26F:** Cryumbrepts, very steep, 20-75% slopes. Gravelly sandy loam, very shallow to moderately deep, well drained and somewhat excessively drained, formed in colluvium from granitic rock. Depth to bedrock 7-40 inches. Associated with mountainsides. **47E:** Josephine gravelly loam, 20-35% slopes. Similar to 48F, with hazard of water erosion moderate. Associated with mountainsides and ridges. **48F:** Josephine gravelly loam, 35-55% north slopes. Deep, well drained, formed in colluvium and residuum from altered sedimentary and extrusive igneous rock. Hazard of water erosion is high. Depth to bedrock 40-60 inches. Associated with mountainsides. **61B, 61D:** Pollard loam, 2-7%, 12-20% slopes. Deep, well drained, formed in colluvium and alluvium from altered sedimentary and extrusive igneous rock. Hazard of water erosion slight, moderate, depth to bedrock 60+ inches. Associated with terraces, saddles, and hills, mountains. **72F:** Speaker-Josephine gravelly loams, 35-55% south slopes. Moderately deep to deep, well drained, formed in colluvium, residuum from altered sedimentary and extrusive igneous rock. Hazard of water erosion high, depth to bedrock 20-60 inches. Associated with mountains. **80G:** Vermisa-Beekman complex, 60-100% north slopes. Similar to 8G. **81G:** Vermisa-Beekman complex, 60-100% south slopes. Similar to 8G. **82G:** Vermisa-Rock outcrop complex, 60-100% south slopes. Similar to 8G but with 30% rock outcrop., shallow, somewhat excessively drained.

[1]Curry County Soil Survey (USDA NRCS, 2005)
[2]Josephine County Soil Survey (USDA NRCS, 1983)

Table 3. Siskiyou Mountains RD. Soils affected by each proposed activity that would result in a change in impact to soils.

Proposed Activity	Soil Landtypes[3]	Soil Characteristics
New motorized trail construction	69 619 (65% 61 / 35% 69) 689 (60% 68 / 40% 69)	**69:** Soils are sandy loams, loams and silty clay loams containing 50-80% gravel, cobble and stone, forming in unconsolidated, non-cohesive, landslide debris, somewhat poorly to well drained, Stability Class V (very unstable). Depth to bedrock from 6 to 12+ feet. Associated with steep and uneven landslide toe slope positions with 45-80% slopes. **68:** Soils are similar to 69 soils, with Stability Class III (moderately stable). Associated with gently rolling to moderately steep, hummocky landslide mid-slopes with 15-45% slopes. **61:** Soils are loams and fine sandy loams containing 50-85% platy gravels and cobbles, forming in colluvium, somewhat excessively drained, Stability Class III (moderately stable). Depth to bedrock from 1-3 feet. Associated with slightly to moderately dissected, long, straight, very steep side slopes with 60-90% slopes.
Close trails to motorized use	57 93 99 542 (65% 54 / 35% 92) 593 (60% 59 / 40% 93) 793 (35% 70 / 35% 59 / 30% 93)	**54:** Soils are sandy loams and loams containing 35-65% gravel, cobble and stone, forming in glacial till deposits, well drained, Stability Class III and IV (moderately stable to unstable). Depth to bedrock 6-12 feet. Associated with moderately to highly dissected very steep slopes associated with glacial trough walls with 60-90% slopes. **57:** Soils are loams and clay loams containing 50-90% gravel, cobble and stone, forming in residuum and colluvium, well drained, Stability Class II (stable). Depth to bedrock from 2-4 feet. Associated with side slopes and ridges associated with ultramafic, serpentinized igneous intrusions with 20-70% slopes. **59:** Soils are loams, clay loams and clays containing 50+/-% cobble and stone, forming in colluvium (high percentage mafic coarse fragments), well drained, Stability Class IV and V (unstable to very unstable). Depth to bedrock 6-12+ feet. Associated with moderately steep to steep, somewhat rounded and dissected slopes occurring along fault zones or in association with mafic or ultra mafic intrusions with 45-75% slopes. **70:** Soils are mostly loams and clay loams containing 45-60% gravel and cobble, forming in colluvium, well drained, Stability Class III and IV (moderately unstable to unstable). Depth to bedrock 2-4 feet. Associated with highly dissected, long, steep to very steep, straight side slopes with 55-80% slopes. **92:** Perennially wet alder glades with wet soils of variable composition and slope, commonly in draws and basins. **93:** Large rock outcrops and associated talus fields, various kinds of rock represented, commonly occur along ridge tops and southern exposures.

		99: Old landflows and landslide deposits consisting of interconnected steep slopes and benches, formed by mass movement processes, result in churned soil deposits with poor to excessive drainage. Highly variable site-to-site.

[3]SRI for the Rogue River National Forest (Badura and Jahn, 1977)

Table 4. High Cascades RD. Soils affected by each proposed activity that would result in a change in impact to soils.

Proposed Activity	Soil Landtypes[3]	Soil Characteristics
Develop motorized play area	24	Soils are sandy loams forming in cindery glaciofluvial deposits, excessively drained, Stability Class I (very stable). Depth to bedrock generally greater than 12 feet. Associated with sandy flats of glaciofluvial origin.

[3]SRI for the Rogue River National Forest (Badura and Jahn, 1977)

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