Appendix AA - Best Management Practices for the CSNM

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I. Introduction

A. Purpose

Best management practices (BMPs) are required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) to reduce nonpoint source pollution to the maximum extent practicable. BMPs are considered the primary mechanisms to achieve Oregon water quality standards.

Best management practices are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation).

Nonpoint sources of pollution result from natural causes, human actions, and the interactions between natural events and conditions associated with human use of the land and its resources. Nonpoint source pollution is caused by diffuse sources rather than from a discharge at a specific single location. Such pollution results in alteration of the chemical, physical, and biological integrity of water. Erosion from a harvest unit or surface erosion from a road are some examples of nonpoint sources.

The BMPs in this document are a compilation of existing policies and guidelines and commonly employed practices designed to maintain or improve water quality. Objectives identified in this BMP Appendix also include maintenance or improvement of soil productivity and fish habitat since they are closely tied to water quality. Selection of appropriate BMPs will help meet Monument Aquatic Conservation Strategy objectives (Appendix BB) during management action implementation. Practices included in this Appendix supplement the Management Actions/Directions for Riparian Reserves (Appendix BB) and they should be used together.

B. Organization and Use

This document is organized by management activities plus separate sections that address activity planning and design, riparian reserves, wetlands, and fragile soils. Objectives are stated under each management activity followed by a list of practices designed to achieve the objectives.

BMPs are selected and implemented as necessary based on site-specific conditions to meet water quality, soil, or fish objectives for specific management actions. BMPs and Riparian Reserve Management Actions/Direction (Appendix BB) may be modified to meet site specific situations. This Appendix does not provide an exhaustive list of BMPs. Additional nonpoint source control measures may be identified during watershed analysis or during the interdisciplinary process when evaluating site-specific management actions. Implementation and effectiveness of BMPs need to be monitored to determine whether the practices are correctly designed and applied to achieve the objectives. BMPs will be adjusted as necessary to ensure objectives are met.

Review and update of this Appendix will be an ongoing process. Updates will be made as needed to conform with changes in Bureau of Land Management policy, direction, or new information.

II. Project Planning and Design

A. Planning

Objective: To include soil productivity, water quality, aquatic habitat, and hydrologic considerations in project planning.

Practices:

1. Use information from the Cascade-Siskiyou National Monument (CSNM) Resource Management Plan (RMP) and appropriate watershed analyses to prepare project level plans.

2. Use timber production capability classification (TPCC) inventory to identify areas classified as fragile due to slope gradient, mass movement potential, surface erosion potential, and high ground water levels.

3. Use the planning process to identify, evaluate, and map potential problems (e.g., slump-prone areas, saturated areas and slide areas) that were not addressed in the watershed analysis.

4. Analyze watershed cumulative impacts and provide mitigation measures if necessary to meet water quality requirements (see section II. D.).

5. Use the CSNM Resource Management Plan and appropriate watershed analysis information to determine potential for natural and activity-created high intensity wildfires at the project level. Reduce potential for high intensity wildfires through proposed management activities.

B. Design

Objective:To ensure that management activities maintain favorable conditions of soil productivity, water flow, water quality, and aquatic habitat.

Practices:

1. Design proposed management activities to mitigate potential adverse impacts to soil, water, and aquatic habitat. Evaluate factors such as soil characteristics, watershed physiography, current watershed and stream channel conditions, proposed roads, skid trails, logging system design, etc., to determine impacts of proposed management activities.

2. Design mitigation measures if adverse impacts to water quality/quantity, aquatic habitat, or soil productivity may result from the proposed action.

C. Maps/Contract Requirements

Objective: To identify riparian reserves to be protected and to ensure their protection on the ground.

Practices: Include the following on activity maps and/or contracts:

1. Locate all stream channels, lakes, ponds, reservoirs, and wetlands (springs, seeps, bogs, etc.) with appropriate riparian reserves on project map and/or contracts.

2. Include protection required for identified water bodies on project maps and/or contracts.

D. Cumulative Impacts

Objective: To minimize detrimental impacts on water and soil resources resulting from the cumulative impact of land management activities within a watershed.

Practices:

1. Coordinate scheduling of management activities such as timber sales, road construction, and watershed restoration activities with other landowners in the watershed.

2. Use information from the CSNM RMP, appropriate watershed analysis, and water quality management plans to identify areas with a high level of cumulative impacts.

a. Use the following general guidelines to delineate areas for cumulative impact analyses.
    1) Natural drainage boundaries.
    2) Third to fifth order drainages (approximately 500 to 10,000 acres).
    3) Lower boundary location based on a state-designated beneficial use.
b. The extent to which any or all of the following criteria exist would determine which drainage areas have a high risk for water quality degradation due to cumulative impacts. The criteria are not listed in order of priority.
    1) Highly erodible soils (i.e., subject to surface erosion, landslides, or slumps).
    2) Large percent of forest vegetation harvested.
    3) Large area of compacted soil.
    4) Large percent of nonrecovered openings in transient snow zone.
    5) High sedimentation potential.
    6) Poor to fair channel stability or condition.
    7) Poor to fair riparian condition (nonfunctional or functional-at risk with down ward trend).
    8) High impact from catastrophic event (e.g., wildfire).
    9) High road density.
    10) Potential for adverse impact on a beneficial use.
    11) Waterbody included on State water quality limited 303(d) list.
    12) Monitoring data shows that water quality does not meet state water quality standards.

3. For drainage areas identified as having a high risk for water quality degradation, an intensive evaluation should follow the initial analysis and include the nature of the problem, the cause of the problem, and a specific plan with objectives and alternatives for recovery and mitigation. Water monitoring may also be initiated to validate the conclusion of the impact analysis and to establish baseline data.

4. Based on site-specific conditions, select and apply special management practices such as the following to mitigate water quality impacts in high risk drainage areas.

a. Develop and implement a watershed/riparian restoration plan and encourage coordination with landowners.
b. Require management plans for rights-of-way construction and grazing.
c. Defer the drainage area for approximately five years from management activities that could potentially degrade water quality. Reanalyze the drainage area at the end of five years.

d. Increase widths of riparian reserves.
e. Utilize ecosystem-based concepts for vegetation management.
f. Require helicopter yarding for vegetation management treatments.
g. Require full suspension cable yarding for vegetation management treatments.
h. Require seasonal restrictions with no waivers for timber falling and yarding.
i. Minimize existing and prevent additional road caused impacts:
    1) reduce road density;
    2) minimize road width and clearing limits;
    3) require transport of excavated materials to appropriate disposal site (end hauling);
    4) prohibit new road construction;
    5) no unsurfaced roads;
    6) require seasonal restrictions with no waivers for construction, renovation, and hauling;
    7) require special low impact maintenance and construction techniques;
    8) no roadside brushing/grubbing with excavator;
    9) no blading and ditch pulling in the winter unless essential to provide drain age;
    10) rock ditch lines;
    11) pull back sidecast from road construction and recontour roadway; and
    12) remove culverts and reshape drainageway crossings.
j. Enforce closure for off-highway vehicle use.
k. Implement regular compliance reviews on all activities in the drainage area.
l. Assess trade-offs between wildfire suppression impacts and wildfire damage; plan suppression levels accordingly. Limit use of heavy equipment during wildfire suppression.

III. Riparian Reserves

Objective: To meet the Monument Aquatic Conservation Strategy objectives in Appendix BB.

Practices:

1. Comply with riparian reserve widths described in Appendix BB.

2. Follow the Management Actions/Direction for riparian reserves in Appendix BB.

IV. Wetlands

Objective: To meet the Monument Aquatic Conservation Strategy objectives in Appendix BB.

Practices:

1. Comply with riparian reserve widths described in Appendix BB.

2. Follow the Management Action/Direction for riparian reserves in Appendix BB.

V. Fragile Soils

The BMPs in this section are to be used in addition to those in other sections.

Four categories of fragile soils sensitive to surface-disturbing activities are identified in Medford District's timber production capability classification (TPCC) and shown on map 9 of CSNM DRMP (USDI 2001):

Fragile Slope Gradient (FG)
These sites consist of steep to extremely steep slopes that have a high potential for surface ravel. Gradients commonly range from 60 to greater than 100 percent.

Fragile Mass Movement (FP)
These sites consist of deep seated, slump, or earth flow types of landslides with undulating topography and slope gradients generally less than 60 percent. Soils are derived from volcanic tuffs or breccias.

Fragile Surface Erosion (FM)
These sites have soil surface horizons that are highly erodible. Soils are derived from granite or schist bedrock.

Fragile Groundwater (FW)
These sites have high water tables where water is at or near the soil surface for sufficient periods of time that vegetation survival and growth are affected.

Objective:To minimize surface disturbance on fragile soils.

A. Roads - Fragile Soils

1. Planning

Practice:Avoid fragile soils when planning road systems unless approved by an interdisciplinary team that includes a soil scientist and hydrologist.

2. Design

Practices:

a. Design haul roads with rock surface on FM, FP, and FW soils.

b. Use slotted risers, trash racks, or over-sized culverts to prevent culvert plugging on FM and FP soils.

3. Erosion Control

Practices:

1. Stabilize cutbanks, fillslopes, and ditchlines on FM soils using methods such as vegetation (grass seeding, deep rooted plants, etc.), terracing, rock buttressing, and rock armoring ditchlines.

2. Stabilize cutbanks on FP soils using rock buttressing.

3. Decommission or obliterate temporary spur roads as appropriate for site-specific condition using methods such as scarifying the road bed, planting tree seedlings or grass, restoring the natural ground contour, and water barring.

4. Maintenance

Practice: Minimize ditch cleaning on FM and FP soils to retard slumping of road and cutbanks.

5. Access Restrictions

Practice: Block unsurfaced roads on fragile soils to prohibit motorized vehicle use.

B. Timber Management Activities - Fragile Soils

1. Yarding Methods - Cable

Practices:

a. Use full or partial suspension when yarding on FG, FM, and FW soils.

b. Construct hand waterbars in cable yarding corridors on FM soils where gouging occurs immediately after use according to guidelines in section VIII.B.1.

c. Restrict yarding and hauling to dry season (generally May 15 to October 15) on FM, FP, and FW soils.

2. Yarding Methods - Tractor

Practice: Avoid tractor yarding unless approved by an interdisciplinary team that includes soil scientist and hydrologist.

3. Yarding Methods - Helicopter

Practice: Employ helicopter yarding to avoid or minimize new road construction on fragile soils.

C. Silviculture - Fragile Soils

1. Prescribed Fire - Underburn

Practice: Prescribe cool burns and only burn in the spring on FG and FM soils.

2. Prescribed Fire - Piling

a. Hand - Practices

1. Put slash in yarding corridors on FG and FM soils to control erosion, allowing adequate space to plant trees.

2. Burn handpiles on FG and FM soils only if they prevent planter access.

b. Machine - Practices

1. Avoid machine piling or ripping on FM, FP, and FW soils unless approved by an interdisciplinary team that includes a soil scientist and hydrologist.

D. Wildfire - Fragile Soils

1. Suppression - Practices

a. Apply suppression on fragile soils based on environmental and operational conditions that exist at time of ignition.

b. Limit the use of tractors and other major surface-disturbing activities on all fragile soils.

2.Rehabilitation - Practice

a. Assure prompt rehabilitation on fragile soils through seeding or planting of native species.

E. Rights-of-Way - Fragile Soils

Practices:

1. Avoid facility construction on FM and FP soils unless approved by an interdisciplinary team that includes a soil scientist and hydrologist.

2. Design rights-of-ways to minimize surface disturbance on FM and FP soils.

VI. Roads and Landings

A. Planning

Objective: To plan road systems that meet resource objectives and minimize detrimental impacts on water and soil resources and aquatic habitat.

Practices:

1. Follow the transportation management plan in Appendix CC.

2. Implement transportation management objectives that minimize adverse environmental impacts.

3. Use an interdisciplinary team to perform a project level, site-specific analysis for any proposed road construction.

4. Avoid fragile and unstable areas unless approved by an interdisciplinary team that includes an engineer, soil scientist, and hydrologist.

5. Avoid new road construction or landings within riparian reserves and wetlands unless approved by an interdisciplinary team that includes an engineer, fisheries biologist, hydrologist, and soil scientist.

6. Obtain necessary fill/removal permits from Division of State Lands and/or U.S. Corp of Engineers.

7. Plan in-stream work to coincide with the Oregon Department of Fish and Wildlife (ODFW) work period:

Bear Creek Watershed June 15 - September 15
Jenny Creek Watershed July 1 - January 31
Klamath River-Iron Gate Watershed July 1 - March 31
Cottonwood Creek Watershed June 15 - September 15

8. Encourage use of BMPs where not specifically required in reciprocal right-of-way agreements.

B. Location

Objective: To minimize soil erosion, water quality degradation, and disturbance of riparian vegetation or aquatic habitat.

Practices:

1. Locate roads on stable positions (e.g., ridges, natural benches, and flatter transitional slopes near ridges and valley bottoms). Implement extra mitigation measures when crossing unstable areas is necessary.

2. Avoid headwalls, midslope locations on steep unstable slopes, seeps, old landslides, slopes in excess of 70 percent, and areas where the geologic bedding planes or weathering surfaces are inclined with the slope.

3. Locate roads to minimize heights of cutbanks. Avoid high, steeply sloping cutbanks in highly fractured bedrock.

4. Locate roads on well-drained soil types. Roll the grade to avoid wet areas.

5. Locate stream crossing sites where channels are well defined, unobstructed and straight.

C. Design

1. General

Objective: To design the lowest standard of road consistent with use objectives and resource protection needs.

Practices:

1. Base road design standards and design criteria on road management objectives such as traffic requirements of the proposed activity and the overall transportation plan, an economic analysis, safety requirements, resource objectives, and the minimization of damage to the environment.

2. Consider future maintenance concerns and needs when designing roads.

3. Preferred road gradients are 2 to 10 percent with a maximum grade of 15 percent. Consider steeper grades only in those situations where they will result in less environmental impact. Avoid grades less than 2 percent.

4. Road Surface Configurations

a. Outsloping - sloping the road prism to the outside edge for surface drainage is normally recommended for local spurs or minor collector roads where low volume traffic and lower traffic speeds are anticipated. It is also recommended in situations where long intervals between maintenance will occur and where minimum excavation is desired. Outsloping is not recommended on gradients greater than 8 to 10 percent.

b. Insloping - sloping the road prism to the inside edge is an acceptable practice on roads with gradients more than 10 percent and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure.

c. Crown and Ditch - this configuration is recommended for arterial and collector roads where traffic volume, speed, intensity and user comfort are a consideration. Gradients may range from 2 to 15 percent as long as adequate drainage away from the road surface and ditchlines is maintained.

5. Minimize excavation through the following actions: use of balanced earthwork, narrow road width, and endhauling where slopes are greater than 60 percent.

6. Locate waste areas suitable for depositing excess excavated material.

7. Consider slope rounding on tops of cut slopes in clayey soils to reduce sloughing and surface ravel. Avoid this practice in erosion classes I, II, VII and VIII.

8. Surface roads if they will be subject to traffic during wet weather. The depth and gradation of surfacing will be determined by traffic type, frequency, weight, maintenance objectives, and the stability and strength of the road foundation and surface materials.

9. Provide vegetative or artificial stabilization of cut and fill slopes in the design process. Avoid establishment of vegetation where it inhibits drainage from the road surface or where it restricts safety or maintenance.

10. Prior to completion of design drawings, field check the design to assure that it fits the terrain, drainage needs have been satisfied, and all critical slope conditions have been identified and adequate design solutions applied.

2. Surface Cross Drain Design

Objective: To design road drainage systems that minimize concentrated water volume and velocity and therefore to reduce soil movement and maintain water quality.

Practices:

1. Design cross drains in ephemeral or intermittent channels to lay on solid ground rather than on fill material to avoid road failures.

2. Design placement of all surface cross drains to avoid discharge onto erodible (unprotected) slopes or directly into stream channels. Provide a buffer or sediment basin between the cross drain outlet and the stream channel.

3. Locate culverts or drainage dips in such a manner to avoid discharge onto unstable terrain such as headwalls, slumps, or block failure zones. Provide adequate spacing to avoid accumulation of water in ditches or surfaces through these areas.

4. Provide energy dissipators (e.g., rock material) at cross drain outlets or drain dips where water is discharged onto loose material or erodible soil or steep slopes.

5. Place protective rock at culvert entrance to streamline water flow and reduce erosion.

6. Use the guide for drainage spacing by soil erosion classes and road grade shown in Tables AA-1.

7. Use drainage dips in place of culverts on roads that have gradients less than 10 percent or where transportation management objectives result in blocking roads. Avoid drainage dips on road gradients greater than 10 percent.

8. Locate drainage dips where water might accumulate or where there is an outside berm that prevents drainage from the roadway.

9. When sediment is a problem, design cross drainage culverts or drainage dips immediately upgrade of stream crossings to prevent ditch sediment from entering the stream.

10. Rolling the gradient is recommended in erodible and unstable soils to reduce surface water volume and velocities and culvert requirements.

3. Stream Crossing Design

Objective: To prevent stream crossings from being a direct source of sediment to streams thus minimizing water quality degradation; to provide unobstructed access to spawning and rearing areas for anadromous and resident fish.

Practices:

1. Design stream crossing structures to ensure passage of juvenile and adult fish and other aquatic species.

2. Design stream crossing approach to be as near a right angle to the stream as possible to minimize streambank and riparian habitat disturbances.

3. Minimize the number of crossings on any particular stream.

4. Where feasible, design culvert placement on a straight reach of stream to minimize erosion at both ends of the culvert. Design adequate stream bank protection (e.g., rip-rap) where scouring would occur. Avoid locations that require a stream channel to be straightened beyond the length of a culvert to facilitate installation of a road crossing.

5. Design stream crossings for fish-bearing streams to maintain natural streambed substrate and site gradient where feasible.

6. Design stream crossing structure width to be at least as wide as the bankfull width of the crossing site.

7. Consider lining the bottom of the crossing structure with boulders sized to withstand a 100- year flood event to restore streambed habitat complexity.

8. Consider designing a control weir or rock apron for a culvert outlet if needed to prevent downcutting below the culvert.

9. Evaluate on a case-by-case basis the need to maintain aquatic connectivity on nonfish-bearing streams to ensure upstream movement of other aquatic species.

4. Temporary Stream Crossing Design

Objective: To design temporary stream crossings that minimize disturbance of the stream and riparian environment.

Practices:

1. Evaluate the advantages and disadvantages of a temporary versus permanent crossing structure for access to the area during all seasons over the long term in terms of economics, maintenance, and resource requirements.

2. Design temporary structures such as prefabricated temporary timber bridges, multiple culverts with minimum fill height, cattleguard crossings, or log cribs to keep vehicles out of the stream.

3. Consider using 1 to 3 inch diameter washed, uncrushed river rock as culvert fill material to provide good spawning substrate after the culvert is removed. Place geotextile fabric over the rock.

4. Minimize the number of temporary crossings on a particular stream.

5. Avoid temporary stream crossings on fishery streams unless approved by an interdisciplinary team that includes a fisheries biologist.

5. Low Water Ford Stream Crossing Design

Objective: To design low water fords that minimize disturbance of the stream and riparian environment.

Practice: Use only when site conditions make it impractical or uneconomical to utilize a permanent or temporary crossing structure.

D. Construction

Objective: To create a stable roadway while minimizing soil erosion and potential degradation of water quality or aquatic habitat.

1. Roadway Construction

Practices:

1. Limit road construction to the dry season (generally between May 15 and October 15). When conditions permit operations outside of the dry season, keep erosion control measures current with ground disturbance to the extent that the affected area can be rapidly closed/blocked and weatherized if weather conditions warrant.

2. Manage road construction so that any construction can be completed and bare soil can be protected and stabilized prior to fall rains.

3. Confine preliminary equipment access (pioneer road) to within the roadway construction limits.

4. Construct pioneer road so as to prevent undercutting of the designated final cutslope and prevent avoidable deposition of materials outside the designated roadway limits.

Conduct slope rounding, if required, at the first opportunity during construction to avoid excess amounts of soil being moved after excavation and embankment operations are completed.

5. Use controlled blasting techniques that minimize amount of material displaced from road location.

6. Locate waste stockpile and borrow sites outside of riparian reserves.

7. Construct embankments, including waste disposal sites, of appropriate materials (no slash or other organic matter) using one or more of the following methods:

a. layer placement (tractor compaction),
b. layer placement (roller compaction), and
c. controlled compaction (85 to 95 percent maximum density).

Slash and organic material may remain under waste embankment areas outside the road prism and outside units planned for broadcast burning.

8. Avoid sidecasting where it will adversely effect water quality or weaken stabilized slopes.

9. Provide surface drainage prior to fall rains.

10. Clear drainage ditches and natural watercourses of woody material deposited by construction or logging above culverts prior to fall rains.

2. Stream Crossing Construction

Practices:

1. Confine culvert installation to the low flow period in accordance with Oregon Department of Fish and Wildlife guidelines for timing of in-stream work (VI.A.7.) to minimize sedimentation and the adverse effects of sediment on aquatic life.

2. Divert the stream around the work area to minimize downstream sedimentation. Require the contractor to submit an approved plan for water diversion before in-stream work begins. Maintain diversion until all in-stream work has been completed.

3. Use material such as straw bales, geotextile fabric, or coconut fiber logs/bales immediately downstream from the work area to reduce sediment movement downstream.

4. Prevent wet or green cement and new or old asphalt from entering a stream.

5. Place culverts in the streambed at the existing slope gradient on larger nonfish-bearing streams. Place energy dissipators (e.g., large rock) at the outfall of culverts on small nonfish-bearing streams to reduce water velocity and minimize scour at the outlet end.

6. Countersink culvert at least 6 to 8 inches below the streambed to minimize scouring at the outlet. Increase culvert diameters accordingly.

7. Limit activities of mechanized equipment in the stream channel to the area necessary for installation.

8. Notify contractors that they are responsible for meeting all state and federal requirements for maintaining water quality including the following:

a .Inspect and clean heavy equipment as necessary before moving onto the project site in order to remove oil and grease, noxious weeds and excessive soil.
b. Ensure that hydraulic fluid and fuel lines on heavy mechanized equipment are in proper working condition in order to prevent leakage into streams.
c. Remove from the site and dispose any waste diesel, oil, hydraulic fluid and DEQ regulations. Excavate areas that have been saturated with toxic materials to a depth of 12 inches beyond the contaminated material or as required by DEQ.
d. Conduct equipment refueling within a confined, secured area outside the stream channel such that there is minimal chance that toxic materials could enter a stream.
e. Use spill containment booms or as required by DEQ.
f. Bar storage of equipment containing toxic fluids in a stream channel anytime.

9. Place permanent stream crossing structures in fishery streams before heavy equipment moves beyond the crossing area. Where this is not feasible, install temporary crossings to minimize stream disturbance.

10. Place rip-rap on fills around culvert inlets and outlets.

11. Stabilize fill material over a stream crossing structure as soon as possible after construction is completed.

12. Cover bare soil areas with appropriate material (e.g. hydro-seeding, native seed, weed-free straw, bark chips, etc.) prior to fall rain or when moisture conditions are adequate.

3. Temporary Stream Crossing Construction

Practices:

1. Where possible, limit the installation and removal of temporary crossing structures to only one time during the same year and within the prescribed work period. Installation and removal should occur in accordance with Oregon Department of Fish and Wildlife guidelines for timing of in-stream work (VI.A.7.).

2. Use backfill material that is as soil-free as practicable over temporary culverts. Whenever possible use washed river rock covered by pit run or one inch minus as a compacted running surface.

3. Spread and reshape clean fill material to the original lines of the streambed after a crossing is removed to ensure the stream remains in its channel during high flow.

4. Use log cribbing in tractor logging units when it is impractical to use a culvert and rock backfill material. Remove upon completion of logging the unit.

5. Limit activities of mechanized equipment in the stream channel to the area that is necessary for installation and removal operations.

6. Remove stream crossing drainage structures and in-channel fill material during low flow and prior to fall rains. Reestablish natural drainage configuration, including the bankfull width.

4. Low Water Ford Stream Crossing Construction

Practices:

1. Restrict construction and use to low flow period in accordance with Oregon Department of Fish and Wildlife guidelines for timing of in-stream work.

2. Use washed rock/gravel or concrete slab in the crossing.

3. Apply rock on road approaches (normally within 150 feet of each side of the ford) to prevent washing and softening of the road surface.

E. Landings

Objective: To minimize soil disturbance, soil erosion, soil productivity losses, and water quality degradation.

Practices:

1. Locate landings at sites approved by an interdisciplinary team that includes a soil scientist, hydrologist, and fisheries biologist.

2. Avoid placing landings adjacent to or in meadows or wetland areas.

3. Clear or excavate landings to minimum size needed for safe and efficient opertions.

4. Select landing locations considering the least amount of excavation, erosion potential, and where sidecast will not enter drainages or damage other sensitive areas.

5. Deposit excess excavated material on stable sites where there is no erosion potential. Construct waste disposal sites according to guidelines in VI.D.1.7.

6. Restore landings to the natural configuration or shape to direct the runoff to preselected spots where water can be dispersed to natural, well-vegetated, gentle ground.

F. Road Erosion Control

Objective: To limit and mitigate soil erosion and sedimentation.

Practices:

1. Apply protective measures to all areas of disturbed, erosion-prone, unprotected ground, including waste disposal sites, prior to fall rains. Protective measures may include water bars, water dips, grass seeding, planting deep rooted vegetation, and/or mulching. Armor or buttress fill slopes and unstable areas with rock which meets construction specifications. See section VII.B.1. for water bar (water dip) spacing and construction guidelines.

2. Surface roads that are to be left open to traffic from October 15 through May 15.

3. Close roads that are not adequately surfaced from October 15 through May 15.

G. Road Renovation/Improvement

Objective: To restore or improve a road to a desired standard in a manner that minimizes sediment production and water quality degradation.

Practices:

1. Improve flat gradients to a minimum of two (2) percent or provide raised subgrade sections (turnpike) to avoid saturation of the road prism.

2. Reconstruct culvert catchbasins to specifications. Catchbasins in solid rock need not be reconstructed provided water flow is not restricted by soil, rock, or other debris.

3. Identify potential water problems caused by off-site disturbance and add necessary drainage facilities.

4. Identify ditchline and outlet erosion caused by excessive flows and add necessary drainage facilities and armoring.

5. Replace undersized culverts and repair damaged culverts and downspouts.

6. Add additional full-rounds, half-rounds, and energy dissipators as needed.

7. Correct special drainage problems (e.g., high water table, seeps) that effect stability of subgrade through the use of perforated drains, geotextiles, or drainage bays.

8. Eliminate undesirable berms that retard normal surface runoff.

9. Restore outslope or crown sections.

10. Avoid disturbing backslope while reconstructing ditches.

11. Surface inadequately surfaced roads that are to be left open to traffic during wet weather.

12. Require roadside brushing be done in a manner that prevents disturbance to root systems (i.e., avoid using excavators for brushing).

H. Road Maintenance

Objective: To maintain roads in a manner that protects water quality and minimizes erosion and sedimentation.

Practices:

1. Provide basic custodial care to protect the road investment and to ensure minimal damage to adjacent land and resources.

2. Perform blading and shaping to conserve existing surface material, retain the original crowned or outsloped self-draining cross section, prevent or remove rutting berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid wasting loose ditch or surface material over the shoulder where it can cause stream sedimentation or weaken slump prone areas. Avoid undercutting backslopes.

3. Keep road inlet and outlet ditches, catchbasins, and culverts free of obstructions, particularly before and during winter rainfall. However, keep routine machine cleaning of ditches to a minimum during wet weather.

4. Promptly remove slide material when it is obstructing road surface and ditchline drainage. Save all soil or material useable for quarry reclamation and stockpile for future reclamation projects. Utilize remaining slide material for needed road improvement or place in a stable waste area (outside of riparian reserves). Avoid sidecasting of slide material where it can damage, overload, saturate embankments, or flow into downslope drainage courses. Reestablish vegetation in areas where more than 50 percent of vegetation has been destroyed due to sidecasting.

5. Retain vegetation on cut slopes unless it poses a safety hazard or restricts maintenance activities. Cut roadside vegetation rather than pulling it out and disturbing the soil.

6. Minimize disturbance of existing vegetation in ditches and at stream crossings to the greatest extent possible.

7. Minimize soil disturbance and displacement, but where sediment risks warrant, prevent off-site soil movement through the use of filter materials (such as weed-free straw bales or silt fencing) if vegetation strips are not available.

8. Replace stream crossing structures needing to be upgraded with structures designed to accommodate at least the 100-year flood, including associated bedload and debris.

9. Refuel power equipment (or use absorbent pads for immobile equipment) and prepare concrete at least 100 feet away from water bodies to prevent direct delivery of contaminants into a water body.

10. Remove snow on haul roads in a manner that will protect roads and adjacent resources. Remove or place snow berms to prevent water concentration on the roadway or on erodible sideslopes or soils.

11. Patrol areas subject to road or watershed damage during periods of high runoff.

I. Dust Abatement

Objective: To minimize movement of fine sediment from roads; to prevent introduction into waterways of chemicals applied for dust abatement.

Practices:

1. Use dust palliatives or surface stabilizers to reduce surfacing material loss and buildup of fine sediment that may wash off into water courses.

2. Closely control application of dust palliatives and surface stabilizers, equipment cleanup, and disposal of excess material to prevent contamination or damage to water resources.

3. Avoid application of dust abatement materials (such as lignon or mag-chloride) during or just before wet weather and at stream crossings or other locations that could result in direct delivery to a water body.

J. Road Access Restrictions

Objective: To reduce road surface damage and therefore minimize erosion and sedimentation.

Practices:

1. Barricade or block roads using gates, guard rails, earth/log barricades, boulders, logging debris, or a combination of these methods. Avoid blocking roads that will need future maintenance (i.e., culvert cleaning, slide removal, etc.) with unremovable barricades. Use guardrails, gates, or other barricades capable of being opened for roads needing future maintenance.

2. Provide maintenance of blocked roads in accordance with design criteria.

3. Install waterbars, cross drains, cross sloping, or drainage dips if not already on road to assure drainage.

4. Scarify, mulch, and/or seed for erosion control.

K. Road and Landing Decommissioning

Objective: To reduce soil compaction, minimize or reduce sedimentation, and improve site productivity by decommissioning roads and landings and rehabilitating the land.

Practices:

1. Use an interdisciplinary team to identify and prioritize roads, skid roads, and landings for decommissioning. Assign highest priorities to roads in unstable areas and riparian reserves.

2. Conduct activities during dry conditions. Maximize activities during late summer and early fall to best avoid wet conditions.

3. Rip roads and landings by an approved method to remove ruts, berms, and ditches while leaving or replacing surface cross drain structures.

4. Minimize disturbance of existing vegetation in ditches and at stream crossings to the extent necessary to restore the hydrologic function of the subject road.

5. Minimize soil disturbance and displacement, but where sediment risks warrant, prevent off-site soil movement through use of filter materials (such as weed-free straw bales or silt fencing) if vegetation strips are not available.

6. Revegetate decommissioned areas with native species.

L. Water Source Development

Objective: To supply water for various resource programs while protecting water quality and riparian vegetation.

Practices:

1. Design and construct durable, long-term water sources.

2. Avoid reduction of downstream flow which would detrimentally effect aquatic resources, fish passage, or other uses.

3. Direct overflow from water-holding developments back into the stream.

4. Locate road approaches to in-stream water source developments to minimize potential impacts in the riparian zone. Apply rock to surface of these approaches to reduce the effects of sediment washing into the stream.

5. Avoid use of road fills for water impoundment dams unless specifically designed for that purpose. Remove any blocking device prior to fall rains.

6. Construct water sources during the dry season in accordance with the Oregon Department of Fish and Wildlife guidelines for timing of in-stream work (VI.A.7.).

M. Rock Quarry Reclamation

Objective: To minimize sediment production from quarries and associated crusher pad developments susceptible to erosion due to steep sideslopes, lack of vegetation, or their proximity to water courses.

Practices:

1. Prior to excavation, remove topsoil and place at a site with minimal erosion potential. Stockpile topsoil for surface dressing during the post-operation rehabilitation.

2. Use culverts and rip-rap for crusher pad drainage when necessary.

3. Stabilize quarry cutbanks and general quarry area.

4. Revegetate with native species, apply mulch, and provide adequate drainage to minimize erosion.

5. Rip, waterbar, block, fertilize, and revegetate access roads to quarries where no future entry is planned.

VII. Timber Management Activities

A. Yarding Methods

1. Cable

Objective: To minimize soil damage and erosion caused by displacement or compaction.

Practices:

a. Use full or partial suspension when yarding on erodible or ravel prone areas where practical.

b. Use full or partial suspension with seasonal restrictions on areas of high water tables.

c. Use seasonal restriction if required suspension cannot be achieved by yarding equipment.

d. Avoid downhill yarding.

2. Tractor

Objective: To minimize loss of soil productivity and reduce potential for surface runoff and subsequent water quality degradation.

Practices:

a. In previously unentered stands, use designated skid roads to limit soil disturbance to less than 12 percent of the harvest area.

b. Minimize width of skid roads.

c. For stands previously logged with tractors, utilize existing skid roads. Rip all skid roads used in final entry harvest.

d. Rip skid roads discontinuously, preferably with winged ripper teeth when the soil is dry. Rips should be spaced no more than 36 inches apart and from 12 to 18 inches deep or to bedrock, whichever is shallower. Designated skid roads should be ripped if they will not be used again until the next rotation.

e. Avoid placement of skid roads through areas with high water tables.

d. Use appropriate seasonal restrictions that would result in no off-site damage for designated skid roads.

e. Allow logging on snow when snow depth is 18 inches or greater and negligible ground surface exposure occurs during the operation.

f. Restrict tractor operations to slopes less than 35 percent.

g. Construct waterbars on skid roads according to guidelines in section VII.B.1.

3. Helicopter

Objective: To minimize surface disturbance on high risk watersheds.

Practice: Employ helicopter yarding to avoid or minimize new road construction in high risk watersheds.

4. Horse

Objective: To minimize soil disturbance, soil compaction, and soil erosion.

Practices:

a. Limit horse logging to slopes less than 20 percent.

b. Construct hand waterbars on horse skid trails according to guidelines in section VII.B.1.

c. Limit harvest activity to times when soil moisture content at a six-inch depth is less than 25 percent by weight.

B. Erosion Control for Timber Management Activities

1. Waterbars

Objective: To minimize soil erosion.

Practices:

1. Construct adequate waterbars on skid roads, yarding corridors, and fire lines prior to fall rains.

2. Use the following table for waterbar spacing, based on gradient and erosion class.

Table AA-1. Water Bar Spacing by Gradient and Erosion Class

Gradient (%)	Water Bar Spacing[1] (feet) by Erosion Class[2]		
	High	Moderate	Low[3]
2-5	200	300	400
6-10	150	200	300
11-15	100	150	200
16-20	75	100	150
21-35	50	75	100
36+	50	50	50

1/Spacing is determined by slope distance and is the maximum allowed for the grade.
2/ The following guide lists rock types according to erosion class:
High: granite, sandstone, andesite porphyry, glacial or alluvial deposits, soft matrix conglomerate, volcanic ash, pyroclastics;
Moderate: basalt, andesite, quartzite, hard matrix, conglomerate, rhyolite;
Low: metasediments, metavolcanics, hard shale.

3. Use the following techniques to construct waterbars:

a. Open the downslope end of the waterbar to allow free passage of water.

b. Construct the waterbar so that it will not deposit water where it will cause erosion.

c. Compact the waterbar berm to prevent water from breaching the berm.

d. Skew waterbars no more than 30 degrees from perpendicular to the centerline of the trail or road.

2. Revegetation of Disturbed Areas

Objective: To establish an adequate vegetative cover on disturbed sites to prevent erosion.

Practice: Use native vegetation that allows natural succession to occur. Avoid interference with reforestation operations. Include application of seed, mulch, and fertilizer as necessary. Complete prior to fall rains.

VIII. Silviculture

A. Site Preparation

1. Gross Yarding

Objective: To achieve cool burn on sensitive soils and maintain protective duff layer.

Practice:

1. Consider the following in writing a prescription for gross yarding to reduce burn intensities: long-term site productivity, ecosystem dynamics, regeneration success, prescribed fire intensities, and smoke emissions.

2. Prescribed Fire - Underburn and Concentration Burn

a. General Guidelines

Objective: To maintain long-term site productivity of soil.

Practice: Evaluate need for burning based on soils, plant community, and site preparation criteria. Burn under conditions when a light burn can be achieved (see guidelines below) to protect soil productivity.

1. Category 1 Soils (highly sensitive): burn only in spring-like conditions when soil and duff are moist. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in Appendix JJ.

2. Category 2 Soils (moderately sensitive): burn only in spring-like conditions when soil and duff are moist. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in Appendix JJ. Write fire prescriptions that reduce disturbance and duration and achieve low fire intensity.

3. Category 3 Soils (least sensitive): burn to avoid high intensity (severe) burns to protect a large percentage of the nutrient capital. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in Appendix JJ.

Table AA-2. Guidelines for Levels of Prescribed Burn Intensity

Visual Characterization	Site-Specific Results	Proportional Area
Light burn	The surface duff layer is often charred by fire but not removed. Duff, crumbled wood or other woody debris is partly burned, logs not deeply charred.	Less than 2 percent is severely burned. Less than 15 percent is moderately burned.
Moderate burn	Duff, rotten wood, or other woody debris partially consumed; logs may be deeply charred but mineral soil under the ash not appreciably changed in color.	Less than 10 percent is severely burned. More than 15 percent is moderately burned.
Severe burn	Top layer of mineral soil significantly changed in color, usually to reddish color; next 1/2 inch blackened from organic matter charring by heat conducted through top layer.	More than 10 percent is severely burned. More than 80 percent is moderately burned. Remainder is lightly burned.

b. Firelines

Objective: To minimize soil disturbance, soil compaction, soil erosion, and disturbance to riparian reserves.

Practices:

1. Construct firelines by hand on all slopes greater than 35 percent.

2. Utilize one-pass construction with a brush blade for tractor firelines.

3. Construct waterbars on tractor and hand firelines according to guidelines in section VII.B.1.

4. No machine constructed firelines in riparian reserves.

3. Prescribed Fire - Piling

a. Hand Piling

Objective: To prevent soil damage due to high burn intensity.

Practice: Burn piles when soil and duff moisture are high.

b. Tractor Piling

Objective: To protect soil productivity and to prevent soil damage due to compaction, displacement, and high burn intensity.

Practices:

1. Restrict tractor operations to dry conditions with less than 25 percent soil moisture content in the upper six inches of soil.

2. Restrict tractors to slopes less than 20 percent.

3. Construct small diameter piles or pile in windrows using brush blades.

4. Avoid piling concentrations of large logs and stumps.

5. Pile small material (3 to 8 inches diameter size).

6. Burn piles when soil and duff moisture are high.

7. Rip entire area to maintain soil productivity except that occupied by piles. Use winged ripper teeth and rip on contour to minimum depth of 12 inches. No ripping on clayey soils (i.e., soil series 706, 708, 840, 850).

8. Avoid displacement of duff and topsoil into piles or windrows.

9. Make only two machine passes (one round trip) over the same area wherever practical.

10. Use the lowest ground pressure machine capable of meeting objectives.

B. Fertilization

Objective: To protect water quality and to avoid impacts that retard or prevent attainment of the Monument Aquatic Conservation Strategy objectives.

Practices:

1. Avoid aerial application when wind speeds would cause drift.

2. Locate heliports and storage areas away from riparian reserves.

3. No application within riparian reserves.

4. Avoid direct application to ephemeral stream channels.

IX. Special Forest Products

A. Roads

Objective: To prevent erosion and water quality degradation.

Practices:

1. Utilize seasonal restriction on harvesting if access is by an unsurfaced road.

2. Clean all road surfaces, ditches, and catchbasins of debris from harvesting.

B. Harvest

Objective: To minimize soil damage, soil erosion, and aquatic and riparian habitat degradation.

Practices:

1. Follow practices listed in section VII. A.

2. Use an interdisciplinary team that includes a soil scientist, hydrologist, and fisheries biologist to review proposed special forest product collection/harvest activities within a riparian reserve.

X. Livestock Grazing

Objective: To protect, maintain, or improve water quality, aquatic habitat, riparian-wetland areas and upland plant communities; to achieve properly functioning riparian ecosystems.

Practices:

1. Consider fencing springs, seeps, and water developments to protect water quality, aquatic habitat, and riparian ecosystems.

2. Ensure rest for plant growth and vigor during the critical growing period.

3. Monitor, evaluate, and adjust livestock management practices to meet resource objectives.

4. Resolve management conflicts through the development of grazing management plans.

5. Promote ecological recovery through appropriate forage utilization levels.

6. Develop and implement recovery plans for riparian areas.

XI. Wildfire

A. Prevention

Objective: To minimize occurrence of severe intensity wildfires in riparian reserves, on category 1 soils, and high risk drainage areas.

Practice: Utilize prescribed burning to reduce both natural and management related slash (fuel) adjacent and/or within these areas.

B. Suppression

Objective: To minimize water quality degradation while achieving rapid and safe suppression of a wildfire.

Practices:

1. Apply the appropriate level of wildfire suppression which considers impacts of the wildfire as well as the suppression action.

2. Construct firelines by hand within riparian reserves.

3. Apply aerial retardant adjacent to riparian reserves by making passes parallel to riparian reserves.

C. Rehabilitation

Objective: To protect water quality and soil productivity with consideration for other resources.

Practices:

1. Utilize vegetation classification information as the framework for prescribing rehabilitation activities.

2. Develop a fire rehabilitation plan through an interdisciplinary process.

3. Select treatments on the basis of on-site values, downstream values, probability of successful implementation, social and environmental considerations (including protection of native plant community), and cost as compared to benefits.

4. Erosion control seeding should attempt to meet the intent of ecosystem based management objectives. Use seed availability information to prioritize erosion control seeding. First priority should be native seed sources for grasses and forbs, followed by annual grasses and forbs, and the lowest priority should be the use of perennial grasses.

5. Examples of emergency fire rehabilitation treatments include:

   a. Seeding or planting native species or other nitrogen fixing vegetation that accomplishes necessary erosion control and meets site restoration objectives.

   b. Mulch with straw or other suitable material.

   c. Fertilize.

   d. Place channel stabilization structures.

   e. Place trash racks above road drainage structures.

   f. Construct waterbars on firelines.

   g. Install stream channel structures to trap sediment in intermittent streams or dry draws.

XII. Watershed Restoration

Watershed restoration is a key component of the Monument Aquatic Conservation Strategy and is based on watershed analysis.

A. Roads

See sections VI. F., VI. G., and VI. K.

B. Riparian Vegetation

Objective: To restore the species composition and structural diversity of plant communities in riparian areas and wetlands that will provide adequate vegetative cover for shade and erosion control.

Practices:

1. Consider riparian treatments such as planting unstable areas along streams and flood terraces, planting riparian areas lacking vegetation due to past management activities, fencing to exclude livestock, and thinning densely-stocked young stands to encourage development of large conifers.

2. Assign high priority for restoration to riparian areas adjacent to water quality limited streams.

C. In-Stream Habitat Structures

Objective: To minimize damage to streambanks and riparian habitat during construction of in-stream habitat improvement projects.

Practices:
1. Carefully plan access needs for individual work sites within a project area to minimize exposure of bare soil, compaction, and possible damage to tree roots. Utilize existing trails to the extent practical.

2. Base design of habitat improvement structures on state-of-the-art techniques and local stream hydraulics.

3. Follow ODFW guidelines for timing of in-stream work (section VI.A.6.).

4. Follow applicable practices in section VI.D.2.

5. Keep equipment out of streams to extent possible. Inspect all mechanized equipment daily to help ensure toxic materials such as fuel and hydraulic fluid do not enter the stream.

6. Minimize the number and length of access points through riparian areas.

7. Limit the amount of streambank excavation to the minimum necessary to ensure stability of enhancement structures. Place excavated material as far above the high water mark as possible to avoid entry into the stream.

8. Obtain logs for habitat improvement structures from outside the riparian reserve or at least 200 feet from the stream channel, whenever possible, to maintain integrity of riparian habitat and streambanks.

9. Stabilize bare soil areas and control sedimentation through methods such as waterbars, barricades, planting, and seeding with native seed mixes.

D. Uplands

Objective: To increase soil stability, reduce soil erosion, and improve hydrologic functions.

Practice: Use corrective measures to repair degraded watershed conditions and rehabilitate with an ecologically appropriate vegetative cover that will maintain or improve soil stability, reduce surface runoff, increase infiltration, and reduce flood occurrence and flood damages.

Appendix BB - Monument Aquatic Conservation Strategy

The Monument Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within the CSNM. This conservation strategy employs several tactics to approach the goal of maintaining the "natural" disturbance regime. Land use activities need to be limited or excluded in those parts of the watershed prone to instability. Management activities within the Monument must minimize increases in peak streamflows. Headwater riparian areas need to be protected, so that when debris slides and flows occur they contain coarse woody debris and boulders necessary for creating habitat farther downstream. Riparian areas along larger channels need protection to limit bank erosion, ensure an adequate and continuous supply of coarse woody debris to channels, and provide shade and microclimate protection.

Any species-specific strategy aimed at defining explicit management actions for habitat elements would be insufficient for protecting even the targeted species. The Monument Aquatic Conservation Strategy (MACS) must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats. This approach seeks to prevent further degradation and restore habitat over the Monument landscape in conjunction with ACS objectives in watersheds outside the Monument. Because it is based on natural disturbance processes, it may take decades, possibly more than a century, to accomplish all of its objectives. Some improvements in aquatic ecosystems, however, can be expected within 10 to 20 years.

The important phrases in these management actions are "meet Monument Aquatic Conservation Strategy objectives," "does not retard or prevent attainment of Monument Aquatic Conservation Strategy objectives," and "attain Monument Aquatic Conservation Strategy objectives. " These phrases, coupled with the phrase "maintain and restore" within each of the Monument Aquatic Conservation Strategy objectives, define the context for agency review and implementation of management activities. Complying with the Monument Aquatic Conservation Strategy objectives means that an agency must manage the riparian-dependent resources to maintain the existing condition or implement actions to restore conditions. The baseline from which to assess maintaining or restoring the condition is developed through a watershed analysis. Improvement relates to restoring biological and physical processes within their ranges of natural variability.

Proposed activities will be evaluated to determine their compatibility with Monument Aquatic Conservation Strategy objectives during the implementation phase. The evaluation of management actions will also focus on "meeting" and "not preventing attainment" of Monument Aquatic Conservation Strategy objectives. The intent is to ensure that a decision maker must find that the proposed management activity is consistent with the Monument Aquatic Conservation Strategy objectives. The decision maker will use the CSNM Plan and watershed analysis to support the finding. In order to make the finding that a project or management action "meets" or "does not prevent attainment" of the Monument Aquatic Conservation Strategy objectives, the analysis must include a description of the existing condition, a description of the range of natural variability of the important physical and biological components of a given watershed,

and how the proposed project or management action maintains the existing condition or moves it within the range of natural variability. Management actions that do not maintain the existing condition or lead to improved conditions in the long term would not "meet" the intent of the Monument Aquatic Conservation Strategy and thus, would be amended or not implemented.

Monument Aquatic Conservation Strategy Objectives

The CSNM will be managed to:

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

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

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

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

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

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

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

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

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

Components of the Monument Aquatic Conservation Strategy

Riparian Reserves: Lands along streams and unstable and potentially unstable areas where special Monument guidelines direct land use.

Key Watersheds: A system of large refugia comprising watersheds that are crucial to at risk fish species and stocks and provide high quality water.

Watershed Analysis: Procedures for conducting analysis that evaluates geomorphic and ecologic processes operating in specific watersheds. This analysis should enable watershed planning that achieves Monument Aquatic Conservation Strategy objectives. Watershed Analysis provides the basis for monitoring and restoration programs and the foundation from which Riparian Reserves can be delineated. Watershed analyses have been written for the Jenny Creek and Klamath River-Irongate Watersheds and the Upper Bear Creek Watershed Analysis area. The Klamath National Forest has the lead for preparing the Cottonwood Creek watershed analysis, which they anticipated will be completed in 2003.

Watershed Restoration: A comprehensive, long-term program of watershed restoration to restore watershed health and aquatic ecosystems, including the habitats supporting fish and other aquatic and riparian-dependent organisms.

These components are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems. The Old-Growth Emphasis Area is an important component of the Monument Aquatic Conservation Strategy. The management actions under which the Old-Growth Emphasis Area is managed will provide long-term increased protection for all stream types and may offer core areas of high quality stream habitat that will act as refugia and centers from which degraded areas can be recolonized as they recover. Streams in the Old-Growth Emphasis Area may be particularly important for endemic or locally distributed fish species and stocks.

Riparian Reserves

Riparian Reserves are portions of watersheds where riparian-dependent resources receive primary emphasis and where special management actions apply. These management actions prohibit and regulate activities in Riparian Reserves that retard or prevent attainment of the Monument Aquatic Conservation Strategy objectives. Riparian Reserves include those portions of a watershed directly coupled to streams and rivers, that is, the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing waterbodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. Riparian Reserves are primary source areas for wood and sediment such as unstable and potentially unstable areas in headwater areas and along streams. Riparian Reserves occur at the margins of standing and flowing water, intermittent stream channels and ephemeral ponds, and wetlands. Riparian Reserves generally parallel the stream network but also include other areas necessary for maintaining hydrologic, geomorphic, and ecological processes.

Under the Monument Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals

and plants, and provide for greater connectivity of the watershed. The Riparian Reserves will also serve as connectivity corridors within the Monument.

Interim widths for Riparian Reserves necessary to meet Monument Aquatic Conservation Strategy objectives for different waterbodies are established based on ecologic and geomorphic factors. These widths are designed to provide a high level of fish habitat and riparian protection until watershed and site analysis can be completed. Watershed analysis identified critical hillslope, riparian, and channel processes that must be evaluated in order to delineate Riparian Reserves that assure protection of riparian and aquatic functions. Riparian Reserves are delineated during implementation of site-specific projects based on analysis of the critical hillslope, riparian, and channel processes and features. Although Riparian Reserve boundaries may be adjusted on permanently-flowing streams, the prescribed widths are considered to approximate those necessary for attaining Monument Aquatic Conservation Strategy objectives. Post-watershed analysis Riparian Reserve boundaries for permanently-flowing streams should approximate the boundaries prescribed in these management actions. However, post-watershed analysis Riparian Reserve boundaries for intermittent streams may be different from the existing boundaries. The reason for the difference is the high variability of hydrologic, geomorphic and ecologic processes in a watershed affecting intermittent streams. At the same time, any analysis of Riparian Reserve widths must also consider the contribution of these reserves to other, including terrestrial, species. Watershed analysis should take into account all species that were intended to be benefitted by the prescribed Riparian Reserve widths. Those species include fish, mollusks, amphibians, lichens, fungi, bryophytes, vascular plants, American marten, bats, and Northern Spotted Owls. The specific issue for Northern Spotted Owls is retention of adequate habitat conditions for dispersal.

Surveys to determine riparian reserves have been completed in portions of Upper Emigrant, Keene Creek, and Middle Jenny Creek Subwatersheds. The prescribed minimum widths of Riparian Reserves, listed below, apply to all watersheds in the CSNM. A site-specific analysis may be conducted and the rationale for adjusting Riparian Reserve boundaries may be presented through the appropriate NEPA decision-making process during the implementation of project level activities. The adjustments of Riparian Reserve boundaries would consistent with attaining Monument Conservation Strategy objectives.

Riparian Reserve Widths

Fish-bearing streams

Riparian reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.

Permanently flowing non-fish-bearing streams

Riparian reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

Constructed ponds and reservoirs, and wetlands greater than 1 acre
Riparian reserves consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or to 150 feet slope distance from the edge of a wetland greater than one acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.

Lakes and natural ponds
Riparian reserves consist of the body of water and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greatest.

Seasonally flowing or intermittent streams, wetlands less than 1 acre, springs, and unstable and potentially unstable areas
This category applies to features with high variability in size and site-specific characteristics. At a minimum the riparian reserves will include:

The extent of unstable and potentially unstable areas;

The stream channel and the area extending to the top of the inner gorge;

The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation;

The area extending from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest.

A site-potential tree height is the average maximum height of the tallest dominant trees (200 years or older) for a given site class.

Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Swales or dry draws. Riparian reserves in these hydrologic features will extend for approximately 25 feet on either side of the middle of the draw. Dry draws are identified as any hydrologic feature that does not meet the criteria for consideration as a perennial or intermittent stream. No surface disturbing activities such as yarding and road construction would occur, and woody vegetation should not be removed from the inside of dry draws and swales. A defined riparian reserve may not be necessary but these areas should be evaluated by an interdisciplinary team before any such management.

Wetlands, Seeps and Springs

The combinations of hydrology, soils, and vegetative characteristics are the primary factors influencing the development of wetland habitats. There must be the presence of surface water or saturated soils to significantly reduce the oxygen content in the soils to zero or near zero concentrations. These low or zero soil oxygen conditions must persist for sufficient duration to promote development of plant communities that have a dominance of species adapted to survive and grow under zero oxygen conditions. These wetland characteristics apply when defining wetlands for regulatory jurisdiction or for technical analysis when conducting inventories or functional assessments. Seeps and springs can be classified as streams if they have sufficient flow in a channel or as seasonal

or perennial wetlands under the criteria defined in the 1987 Corps of Engineers Wetlands Manual. The management actions for wetlands, which are based on the hydrologic, physical and biologic characteristics described in the manual, apply to seeps and springs regardless of their size.

Formal definition for implementing section 404 of the Clean Water Act, adopted by the Environmental Protection Agency, is as follows:

The term wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

Detailed technical methods have been developed to assist in identification of wetlands that meet the above definition. Currently, the field manual being used for implementing the Clean Water Act is the "1987 Corps Manual. "

For purposes of conducting the National Wetland Inventory, the Fish and Wildlife Service has broadly defined both vegetated and non-vegetated wetlands as follows:

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Wetlands typically occur within and adjacent to riparian zones. It is frequently difficult to differentiate wetlands from riparian areas based on the definitions. Most typically, and particularly in forested landscapes, the riparian zone is defined by its spatial relation to adjacent streams or rivers. However, riparian zones are also commonly considered to be lands integrally related to other aquatic habitats such as lakes, reservoirs, intermittent streams, springs, seeps, and wetlands.

Because of such conceptual and definitional vagaries, there is spatial overlap between wetlands and riparian zones. This then results in only a portion of the riparian zone associated with rivers and streams being considered as wetlands. The extent of that portion will depend on the specifics of hydrologic, vegetation, and soil features. The functions of the wetland portion may also be distinct from the nonwetlands. For example, wetlands may provide habitat for specialized plant species or reproductive habitat for amphibians or other organisms that would not be provided by riparian areas.

Once the Riparian Reserve width is established, land management activities allowed in the Riparian Reserve will be directed by management actions for managing Riparian Reserves. The management actions for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the Monument Aquatic Conservation Strategy objectives.

Summary of Monument Aquatic Conservation Strategy for Riparian Reserves:

- Involves portions of the landscape where riparian-dependent and stream resources receive primary emphasis.

- Riparian Reserves are designated for all permanently-flowing streams, lakes, wetlands, intermittent streams, and dry draws.

- Riparian Reserves include the body of water, inner gorges, all riparian vegetation, 100-year floodplain, landslides and landslide prone areas.

- Reserve widths are based on some multiple of a site-potential tree or a prescribed slope distance, whichever is greater. Reserve widths may be adjusted, based watershed analysis or site specific analysis during the project implementation phase, to meet Monument Aquatic Conservation Strategy objectives.

- Management actions prohibit programmed timber harvest, and manage roads, grazing, mining and recreation to achieve objectives of the Monument Aquatic Conservation Strategy.

Key Watersheds

Jenny Creek watershed is the only watershed within the CSNM that has a Tier 1 key watershed designation. Jenny Creek is a Tier 1 key watershed because it meets the qualifications of either providing, or expected to provide, high quality habitat. A system of Key Watersheds that serve as refugia is crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. These refugia include areas of high quality habitat as well as areas of degraded habitat. The high quality conditions of Jenny Creek watershed will serve as anchors for the potential recovery of depressed stocks. The areas of lower quality habitat have a high potential for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program (see Watershed Restoration later in this section of these management actions).

Roadless Areas and Key Watersheds

The amount of existing system and non-system roads within the Jenny Creek Key Watershed should be reduced through decommissioning. Road closures with gates or barriers do not qualify as decommissioning or a reduction in road mileage. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in Key Watersheds. That is, for each mile of new road constructed, at least one mile of road would be decommissioned, and priority given to roads that pose the greatest risks to riparian and aquatic ecosystems.

Watershed Analysis

Watershed Analysis has followed the process described in Ecosystem Analysis at the Watershed Scale, Federal Guide for Watershed Analysis, version 2.2.

Watershed Restoration

Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality in the CSNM. Restoration will be based on watershed analysis and planning. In many watersheds the most critical restoration needs occur on private lands downstream from federally managed lands. Efforts would be made to work with private land owners adjacent to the CSNM in addressing restoration needs.

The most important components of a watershed restoration program are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity. Other restoration opportunities exist, such as meadow and wetland restoration and mine reclamation, and these may be quite important in some areas. Decisions to apply a given treatment depend on the value and sensitivity of downstream uses, transportation needs, social expectations, risk assessment of probable outcomes for success at correcting problems, costs, and other factors.

Roads

Road treatments range from full decommissioning (closing and stabilizing a road to eliminate potential for storm damage and the need for maintenance) to simple road upgrading, which leaves the road open. Upgrading can involve practices such as removing soil from locations where there is a high potential of triggering landslides, modifying road drainage systems to reduce the extent to which the road functions as an extension of the stream network, and reconstructing stream crossings to reduce the risk and consequences of road failure or washing out at the crossings.

Riparian Vegetation

Active silvicultural programs will be necessary to restore large conifers in Riparian Reserves. Appropriate practices may include planting unstable areas such as landslides along streams and flood terraces, thinning densely-stocked young stands to encourage development of large conifers, releasing young conifers from overtopping hardwoods, and reforesting shrub and hardwood-dominated stands with conifers. These practices can be implemented in conjunction with silvicultural treatments in adjacent uplands areas, although the practices will differ in objective and, consequently, design.

In-Stream Habitat Structures

In-stream restoration, based on the interpretation of physical and biological processes and deficiencies identified during watershed analysis, can be an important component of an overall program for restoring fish and riparian habitat. In-stream restoration measures are inherently short-term and must be accompanied by riparian and up-slope restoration to achieve long-term watershed restoration. Maintaining desired levels of channel habitat complexity, for example, may best be achieved in the short-term by introducing structures. In this context, the word structures refers to logs and/or boulders strategically placed to enhance aquatic habitat quality. However, a riparian area with the complete array of functions and processes should provide coarse woody debris to the channel in the long-term.

In-stream restoration will be accompanied by riparian and up-slope restoration if watershed restoration is to be successful. In-stream restoration, including in-channel structures, will not be used to mitigate for management actions that degrade existing habitat, as a substitute for habitat protection, or to justify risky land management activities and practices. Priority must be given to protecting existing high quality habitat.

Summary of Monument Aquatic Conservation Strategy for Watershed Restoration:

- Watershed restoration restores watershed processes to recover degraded habitat.
- Watershed restoration should focus on removing and upgrading roads.
- Silvicultural treatments may be used to restore large conifers in Riparian Reserves.
- Watershed restoration should restore channel complexity. In-stream structures should only be used in the short term and not as a mitigation for poor land management practices.

Management Actions/Direction for Riparian Reserves

As a general rule, management actions / direction for riparian reserves prohibits or regulates activities that retard or prevent attainment of Monument Aquatic Conservation Strategy objectives and riparian reserve objectives. Watershed analysis and appropriate NEPA compliance will be required to change riparian reserve boundaries in all watersheds.

Management Actions/Direction - General

Apply the management actions / direction in the Special Status Species Standards and Guidelines (Appendix Z of CSNM DRMP).

Management Actions/Direction - Vegetation Management

1. Prohibit timber harvest including fuelwood cutting in riparian reserves, with the following exceptions:

   a. Allow salvage and fuelwood cutting if required to attain Monument Aquatic Conservation Strategy and Riparian Reserve objectives where catastrophic events such as fire, flooding, volcanic, wind, or insect damage results in degraded riparian conditions;

   b. Remove salvage trees only when present and future woody debris needs are met and other Monument Aquatic Conservation Strategy and Riparian Reserve objectives are not adversely affected; and

   c. Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Management Actions/Direction - Roads Management

1. Cooperate with Federal, State, and county agencies and work with private parties with road use agreements to achieve consistency in road design, operation, and maintenance necessary to attain Monument Aquatic Conservation Strategy and riparian reserve objectives.

2. For each existing or planned road, meet Monument Conservation Strategy and riparian reserve objectives by:

a. Avoiding the construction of roads and landings in Riparian Reserves unless approved by interdisciplinary team consisting of fisheries biologist, hydrologist and soil scientist.

b. preparing road design criteria, elements, and standards that govern construction and reconstruction.

c. preparing operation and maintenance criteria that govern road operation, maintenance, and management;

d. minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow;

e. restricting sidecasting as necessary to prevent the introduction of sediment to streams; and

f. avoiding wetlands entirely when constructing new roads.

3. Determine the influence of each road on the Monument Aquatic Conservation Strategy and Riparian Reserve objectives through watershed analysis. Meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives by:

a. reconstructing roads and associated drainage features that pose a substantial risk;

b. prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected; and

c. closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects to Monument Aquatic Conservation Strategy and riparian reserve objectives and considering short-term and long-term transportation needs.

New culverts, bridges and other stream crossings shall be constructed, and existing culverts, bridges, and other stream crossings determined to pose a substantial risk to riparian conditions will be improved to accommodate at least a 100-year flood, including associated bedload and debris. Priority for upgrading will be based on the potential impact and the ecological value of the riparian resources affected. Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

Minimize sediment delivery to streams from roads. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hill slopes.

Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams (e.g., streams that can be made available to anadromous fish by removing obstacles to passage).

Develop and implement a road management plan or a transportation management plan that will meet the Monument Aquatic Conservation Strategy and riparian reserve objectives. As a minimum, this plan will include provisions for the following activities:

- inspections and maintenance during storm events;
- inspections and maintenance after storm events;

- road operation and maintenance giving high priority to identifying and correcting road drainage problems that contribute to degrading riparian resources;

- traffic regulation during wet periods to prevent damage to riparian resources; and

- establishing the purpose of each road by developing the road management objectives.

Management Actions/Direction - Grazing Management

Through a planning and environmental analysis process appropriate to the action, adjust or eliminate grazing practices that retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

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

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

Management Actions/Direction - Recreation Management

If new recreational facilities are designed within Riparian Reserves, including trails and dispersed sites, so as not to prevent meeting Monument Aquatic Conservation Strategy and riparian reserve objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impacts to ensure that these do not prevent, and to the practicable extent contribute to, attainment of Monument Aquatic Conservation Strategy and riparian reserve objectives.

Adjust dispersed and developed recreation practices that retard or prevent attainment of Monument Aquatic Conservation Strategy and riparian reserve objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and / or specific site closures are not effective, eliminate the practice or occupancy.

Address attainment of Monument Aquatic Conservation Strategy, riparian reserve objectives in wilderness management plans.

Management Actions/Direction - Fire/Fuels Management

Design fuel treatment, fire suppression strategies, practices, and activities to meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies will recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management activities could be damaging to long-term ecosystem function.

Locate incident bases, camps, helibases, staging areas, helispots and other centers for incident activities outside of Riparian Reserves. If the only suitable location for such activities is within the riparian reserve, an exemption may be granted following a review

and recommendation by a resource advisor. The advisor will prescribe the location, use conditions, and rehabilitation requirements. Utilize an interdisciplinary team to predetermine suitable incident base and helibase locations.

Minimize delivery of chemical retardant, foam, or other additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exists, or following a review and recommendation by a resource advisor when an escape would cause more long-term damage.

Design prescribed burn projects and prescriptions to contribute to attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Immediately establish an emergency team to develop a rehabilitation treatment plan needed to attain Monument Aquatic Conservation Strategy and Riparian Reserve objectives whenever Riparian Reserves are significantly damaged by a wildfire or a prescribed fire burning outside prescribed parameters.

Consider rapidly extinguishing smoldering coarse woody debris and duff.

Locate and manage water drafting sites (e.g., sites where water is pumped to control or suppress fires) to minimize adverse effects on riparian habitat and water quality as consistent with Monument Aquatic Conservation Strategy and riparian reserve objectives.

Management Actions/Direction - Land Management

Issue leases, permits, rights-of-way, and easements to avoid adverse effects that retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives. Where legally possible, adjust existing leases, permits, rights-of-way, and easements to eliminate adverse effects that retard or prevent the attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives. If adjustments are not effective and where legally possible, eliminate the activity. Priority for modifying existing leases, permits, rights-of-way and easements will be based on the actual or potential impact and the ecological value of the riparian resources affected.

Use land acquisition, exchange, and conservation easements to meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives to facilitate restoration of fish stocks and other species at risk of extinction.

Management Actions/Direction - General Riparian Area Management

Identify and attempt to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

Fell trees in Riparian Reserves when they pose a safety risk. Keep felled trees on site when needed to meet coarse woody debris objectives.

Apply herbicides, insecticides, other toxicants, and other chemicals only in a way that avoids impacts that retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and instream flows needed to maintain riparian resources, channel conditions, and fish habitat.

Management Actions/Direction - Watershed and Habitat Restoration

Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based coordinated resource management plans or other cooperative agreements to meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Prevent watershed and habitat degradation rather than relying on mitigation measures or planned restoration.

Management Actions/Direction - Fish and Wildlife Management

Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Design, construct and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian reserve objectives. For existing fish and wildlife interpretative and other user-enhancement facilities inside Riparian Reserves, ensure that Monument Aquatic Conservation Strategy and Riparian Reserve objectives are met. Where Monument Aquatic Conservation Strategy and Riparian Reserve objectives cannot be met, relocate or close such facilities.

Cooperate with Federal, Tribal, and State wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, harvest and poaching that threaten the continued existence and distribution of native fish stocks occurring on Federal lands.

Management Actions/Direction - Key Watersheds

Reduce existing road mileage within key watersheds. If funding is insufficient to implement reductions, neither construct nor authorize through discretionary permits a net increase in road mileage in key watersheds. Give highest priority to watershed restoration in key watersheds.

Research

A variety of research activities may be ongoing and proposed in Key Watersheds and Riparian Reserves. These activities must be analyzed to ensure that significant risk to the watershed values does not exist. If significant risk is present and cannot be mitigated, study sites must be relocated. Some activities not otherwise consistent with the objectives may be appropriate, particularly if the activities will test critical assumptions of these

management actions; will produce results important for establishing or accelerating vegetation and structural characteristics for maintaining or restoring aquatic and riparian ecosystems; or the activities represent continuation of long-term research. These activities should be considered only if there are no equivalent opportunities outside of Key Watersheds and Riparian Reserves.

Current, funded, agency-approved research, which meets the above criteria, is assumed to continue if analysis ensures that a significant risk to Monument Aquatic Conservation Strategy objectives does not exist.

Monitoring

The following monitoring section is specific to achieving the stated objectives of the Monument Aquatic Conservation Strategy. Implementation, effectiveness, and validation monitoring need to be conducted consistent with the monitoring discussion in the Components of the Monument Monitoring Strategy (Appendix LL).

General objectives of monitoring will be to: (1) determine if Best Management Practices have been implemented, (2) determine the effectiveness of management practices at multiple scales, ranging from individual sites to watersheds, and (3) validate whether ecosystem functions and processes have been maintained or improved as predicted. In addition, monitoring will provide feedback to fuel the adaptive management process.

Specific monitoring objectives will be derived from the Monument Monitoring Strategy (Appendix LL). Monitoring at the watershed level will link monitoring for ecosystem management objectives for multiple scales of province, river basin, smaller watershed and site-specific levels. Specific locations of unstable and potentially unstable areas, roads, and vegetative management activities will be identified. In addition, the spatial relationship of potentially unstable areas and management actions to sensitive habitats such as wetlands will be determined. This information provides a basis for targeting watershed monitoring activities to assess outcomes associated with risks and uncertainties identified during watershed analyses.

Under natural conditions, stream habitats within the CSNM exhibit an extremely wide diversity of conditions depending on past disturbances, topography, geomorphology, climate and other factors. Consequently, riparian area monitoring must be dispersed among the various landscapes rather than concentrated at a few sites and then extrapolated to the entire monument. Logistical and financial constraints require a stratified monitoring program that includes:

- Post-project site review
- Reference to subwatersheds and drainage areas
- Watershed monitoring
- A water quality network
- Landscape integration of monitoring data

A stratified monitoring program examines watersheds at several spatial and temporal scales. Information is provided on hillslope, floodplain, and channel functions, water quality, fish and wildlife habitat and populations, and vegetation diversity and dynamics.

Parameters selected for monitoring depend on the activities planned for a given watershed designed to specifically address management activities with the Monument. Two of the

more extensive activities related to water quality are vegetative management and road related operations. In addition to chemical and physical parameters, biological criteria may be appropriate to monitor using techniques such as Rapid Bioassessment Protocols for macroinvertebrates or the index of biotic integrity for fish diversity.

Long-term systematic monitoring in selected watersheds will be necessary to provide reference points for effectiveness and validation monitoring. These watersheds should represent a range of forest and stream conditions that have been exposed to natural and induced disturbance. Reference watersheds, sub-basins, and individual sites will be selected as part of the overall adaptive management process described as part of these management actions.

Study plans will be cooperatively developed based on province, river basin, and / or watershed level analyses. Long-term data sets from reference watersheds will provide an essential basis for adaptive management and a gauge by which to assess trends in in-stream condition.

Monitoring plans must be tailored for each watershed within the Monument. Significant differences in type and intensity of monitoring will occur based on watershed characteristics and management actions. For example, carefully targeted restoration activities may only require effectiveness monitoring of single activities, whereas watershed-scale restoration would be accompanied by extensive riparian and in-stream monitoring. The specific design of monitoring programs can best be accomplished by the local interdisciplinary teams working in cooperation with state programs. Pooling the monitoring resources of federal and state agencies is a necessity to provide interagency consistency and to increase available resources.

Appendix CC - CSNM Transportation Management Plan

The purpose of this Transportation Management Plan (TMP) is to provide goals, objectives, and guidelines for managing the Bureau of Land Management's (BLM) road and trail transportation system throughout the Cascade-Siskiyou National Monument (CSNM). The transportation system provides access across the CSNM to major points of interest, resource management areas, and other public and private lands. While the TMP supplies general guidance and direction, Transportation Management Objectives (TMOs) recommend specific management on individual roads.

Implementation of the TMP requires a detailed analysis of individual roads through the TMO process. The purpose of this process is to provide for safe access for users, to protect natural resources, to enable private property access, and to fulfill other land management objectives. Due to the complex checkerboard land/road ownership pattern in the CSNM, budgetary, and environment analysis requirements it is anticipated that complete implementation of this TMP (with accompanying TMOs) may take a few years. This plan will be used to update maintenance plans, to identify potential road management/restoration projects, to prioritize funding for maintenance or other transportation related projects, and to coordinate with other agencies in their transportation planning.

The management and direction of the CSNM would require some roads to be removed from the system, closed until needed, kept at low maintenance levels, or converted to trails (see TMOs). In addition, road density would be reduced to improve water quality and enhance wildlife habitat. Transportation planning considers the importance and interdependency of all resources, including people, and is an important element in ecosystem management.

A major element of the TMP is the management and protection of the basic resources of water, soils, fish, wildlife, and vegetation. The road and trail systems along with people's desire to use and enjoy them affect these resources. Access into habitat areas can increase disturbance to wildlife and sensitive plants.

The TMP in the CSNM considers: 1) the protection of resources, 2) access requirements of adjacent landowners, 3) fire suppression needs on BLM lands as well as adjacent public and private lands, 4) roads that access fire suppression facilities such as pump chances, ponds, and other water sources, 5) the need for legal public access when acquiring new or reviewing existing access rights.

The transportation system within the CSNM will be managed to maintain the ecological health of the environment while providing existing legal access for private individuals. The TMO process will be used for road management recommendations and to prioritize road maintenance needs.

ACCESS

BLM roads are not public roads and are best described as "private government roads." A factor in this determination is that the BLM is not a public road authority and cannot

dedicate public roads. BLM roads also do not fit the criteria for public roads as established by the Secretary of Transportation. Public use of BLM roads is dictated by BLM policy or administrative decision and not by right. The United States, as proprietor of the public lands, may construct roads and prescribe the type, manner, and extent of use which they receive.

Due to BLM's checkerboard land ownership, the Bureau has entered into numerous reciprocal right-of-way and road use agreements. These agreements do not include rights for the general public to use roads constructed under these reciprocal right-of-way agreements. These agreements enable the BLM to use private roads to access BLM lands and private landowners to access their lands over BLM roads. The agreements are an essential part of a complete transportation system and have resulted in significant cost savings to the public, environmental benefits, and fewer roads. There are five reciprocal right-of-way and road use agreements in the Monument with Boise Cascade Corporation, U. S. Timberlands Services company, LLC and three private landowners. The lands under reciprocal right-of-way and road use agreements are display on map 34.

Private landowners rely on a significant portion of the transportation system to gain access across BLM lands for access to their property. Private hauling of timber or rock on BLM controlled roads requires a permit from the BLM.

Service roads are used to access and maintain land use authorizations such as fences, ponds, utility lines, and irrigation ditches. These roads are normally high clearance 4-wheel drive roads that are normally not part of the transportation system.

The existing BLM transportation system provides access to a variety of dispersed and developed recreation facilities and areas, trails and trails heads, scenic landscapes, and special areas. Public demand for recreation increases with population increases. Therefore, the important role that recreation plays will be considered as the current transportation system changes. While the BLM promotes the safety of all the users of the public lands, it should be noted that the BLM's transportation system is not designed to the same safety standards as public roads. Under State law (ORS 105.699), "the [BLM] owes no duty of care to keep the lands safe for entry or use by others for any recreational purposes or to give any warning of a dangerous condition, use, structure, or activity on the land to persons entering thereon for any such purpose."

ROAD MAINTENANCE

BLM is responsible for maintaining roads under its control to standards set forth in BLM 9100 Series Manuals and the CSNM BMPs. Maintenance is intended to provide for resource protection and reasonable accommodation of its users. Each road within the transportation system is assigned a level of maintenance designed to meet its TMO. The levels provide a progressive system of maintenance with even the lowest level ensuring resource protection by controlling surface erosion and sedimentation. Roads will be prioritized for maintenance needs or may be maintained at lower levels depending upon funding. See the TMO section of this TMP for maintenance descriptions.

All roads maintained by the BLM may receive a higher maintenance level during periods of intense use such as commercial hauling of forest products. The benefitting activity/party will normally be responsible for funding the work required. After completion of such activity, the road will be allowed to return to the lower maintenance level. Snow removal is not considered part of normal maintenance.

Existing rock quarries may be used for restoration, stabilization, or other projects which serve to protect the objects identified in the proclamation. No new quarries would be developed. Roads not owned or controlled by the BLM, but constructed on BLM administered lands under right-of-way grants or permits, will be maintained in accordance with the terms of the grant or permit. Roads and trail access across BLM lands is authorized by the Federal Land Policy Management Act (FLPMA), through rights-of-way grants, or reservations.

ACCESS CONTROLS

The primary objectives of access controls (gates, barricades) are to reduce sedimentation, to restore hydrologic processes, and to reduce impacts to wildlife and botanical resources. Special designated areas also benefit from road closures. In addition, compliance with the Monument Aquatic Conservation Strategy (MACS) warrants a reduction in the miles of roads within the Jenny Creek Key Watershed.

BLM controlled roads will be managed in varying states of accessibility. The goals and objectives of the various resources are incorporated into the TMO process to determine the status of each road. The BLM will coordinate with potentially affected rights-of-way holders on decisions to change road access status.

All methods of road closures are appropriate measures to reduce the amount of open road density for wildlife and may also be used to for water quality concerns. The appropriate method of road closure to address wildlife and water quality issues will normally be determined through the interdisciplinary process based upon a site specific considerations.

The following are road closure methods:

Temporary/Seasonal Road Closure - These are generally local roads, temporarily closed with a gate or similar barrier. The road will be seasonally closed to the general public but may be open at times for authorized activities. The road may or may not be closed to BLM administrative uses on a seasonal basis depending upon impacts to the resources. Drainage structures will be left in place.

Long Term Road Closure - These will be based on resource protection needs identified through analysis and directives. The road will be closed to vehicles on a long-term basis, but may be used again in the future. Prior to closure, the road will be prepared to avoid future maintenance needs; the road will be left in an "erosion-resistant" condition by establishing cross drains, removing stream crossing structures, and repair potentially unstable areas. Exposed soils will be treated to reduce sedimentation by practices such as seeding, mulching, or rock armoring. The road may be closed with a device similar to an earthen barrier (trench barricades) or equivalent.

Natural Decommission - Roads determined through an interdisciplinary process to have no future need would be allowed to decommission naturally. Treatments may include selective ripping, removal of drainage structures, providing for natural drainage by constructing water bars, and by constructing barricades. This treatment would normally be used for stable natural surfaced roads that have not been used very often and are revegetating naturally. The road should not require future maintenance.

Decommission - Roads determined through an interdisciplinary process to have no future need may be ripped (or tilled), seeded, mulched, and may be planted to reestablish vegetation. Cross drains, crossing structures and fills in stream channels, and potentially unstable fill areas will be removed to restore natural hydrologic flow. The road will be closed with a device similar to an earthen barrier (trench barricades) or equivalent. The road should not require future maintenance.

Obliteration (full site restoration) - These roads will have all drainage structures removed. Fill material used in the original road construction will be excavated and placed on the sub grade in an attempt to reestablish the original ground line (re-contoured). Exposed soil will be re-vegetated with trees or other native species. Roads receiving this level of treatment would not be planned for use at any time in the future.

TRAIL MANAGEMENT

In some alternatives trails may be provided for users on the public lands, including hiking, horseback riding, cross-country skiing, and administrative purposes. Trails crossing BLM administered lands must be located, designed, constructed, and maintained to preserve natural, historic, cultural, scenic values and meet Monument Aquatic Conservation Strategy (MACS) objectives. Unauthorized trails should be identified and appropriate measures undertaken to close and rehabilitate the location.

Trail Construction - Trails will be designed and constructed in accordance with the policies and standards set forth in BLM Manual 9114.

Trail Closure - Trails may be closed or use restricted to fulfill management objectives such as protecting public health and safety or preserving resources. Trails may also be subject to State and other Federal Regulations as necessary to protect public health or resources.

Trail Restrictions - Limitations that may be placed on the use of trails include: no bicycles, no equestrians, no motorized vehicles, permit required for use, and seasonal closure.

Trail Maintenance - The BLM is responsible for maintaining trails under its control in accordance with the policies and standards set forth in BLM Manual 9114. Maintenance provides for resource protection and reasonable safety of users. Trail maintenance is divided into 5 levels. Each trail within the transportation system is assigned a level of maintenance designed to meet management objectives. The levels provide a progressive system of maintenance with all levels ensuring resource protection by controlling surface erosion and sedimentation.

Trail Maintenance Levels - The assigned maintenance level reflects the appropriate level of maintenance required to meet management objectives.

Level 1 - These trails are closed to motorized and non-motorized use. This level is the minimum maintenance required to protect adjacent lands and resource values. The objective is to remove these trails from the trail system.

(Minimum standards for Level 1) - Emphasis is given to maintaining drainage and runoff patterns as needed to protect adjacent lands. Brushing and removal of hazards is not performed unless trail drainage is being adversely affected, causing erosion. Closure devices are maintained.

Level 2 - Low use trails with little or no contact between parties. Little or no monitoring or management of visitor use. Visitors may encounter obstructions like brush and dead fall.

(Minimum standards for Level 2) - Trail would require condition surveys once every year. Repairs will be done at the beginning of the use season to prevent environmental damage and maintain access. Emphasis is given to maintaining drainage and mitigating

hazards. The trail may be signed "Not Regularly Maintained". Major repair may not be done for several seasons.

Level 3 - Moderate use trails with visitor use on a seasonal and/or peak use period with frequent contact between parties. Trail management is conducted with occasional monitoring or management of visitor use. Visitors are not likely to encounter obstructions.

(Minimum standards for Level 3) - The trail shall a minimum of one condition survey 1 to 2 times per season. Major repairs shall be completed annually. Maintenance shall be scheduled two or three times per season, if required, to repair the trail for environmental damage and to maintain access. The trail is kept in fair to good condition.

Level 4 - High use trails used during specific times of the year with high frequencies of contact between parties. Regularly scheduled monitoring or management of visitor use.

(Minimum standards for Level 4) - Scheduled maintenance shall occur frequently during the use season (three or four times per season). Trail condition and accessibility for persons with disabilities is a major concern. Significant repairs shall be completed within 10 working days. Trail is kept in good to very good condition.

Level 5 - A special high use trails with routine monitoring or management of visitor use.

(Minimum standards for Level 5) - Has a scheduled maintenance program. Trail condition and accessibility for persons with disabilities is a major concern. Trails are kept in excellent condition.

IMPLEMENTATION OF THE TMP

Successful implementation of the TMP depends on many factors. The TMP will be implemented by working cooperatively with regional and local governments, permittees, commercial operators, and private individuals. The Plan will follow applicable laws and BLM policies. This TMP offers guidance for the TMO process. TMO recommendations will be carried forward to other management planning processes and implemented over time. Monitoring the effectiveness and impacts of the TMP will be ongoing and changes to the Plan will reflect new information. Consistent application of the TMP is essential to its success.

TRANSPORTATION MANAGEMENT OBJECTIVES (TMO)

Transportation Management Objectives (TMOs) are a major component of the TMP. TMOs are created on all existing BLM controlled roads. Key items such as resource protection, private land access, road stability, erosion potential, recreation needs, and specific resource management objectives are examined through an interdisciplinary team approach to identify the needs and objectives of each road segment. The TMO recommends one or several management actions for each BLM controlled road within CSNM as determined by present and future road management needs. This process can be used to effectively identify the current/future use and constraints of each road.

As new information becomes available or after various land management activities occur within the CSNM, TMOs will be reassessed to ensure that the recommended management is in compliance with directives. The impacts from the transportation system will

likely surface during analysis as an issue in terms of resource impacts and access needs for recreation, fire suppression, and other land management activities. Decisions regarding the management of the transportation system will likely be necessary to resolve issues identified by analysis.

The following are TMO definitions for the CSNM. See Plate 1 and Maps 30, 31, 32, and 33 for individual road TMO designations.

TMO 4_OPEN (BP-OP) - This is assigned to roads where management objectives require the road to be open all year (except maybe closed or have limited access due to snow conditions) and which connect major administrative features (recreation sites, local road systems administrative sites, etc.) to county, state, or federal roads. Typically these roads are single or double lane, aggregate, or bituminous surface, with a higher volume of commercial and recreational traffic than administrative traffic. Minimum standards are for the entire roadway to be maintained at least annually, although a preventive maintenance program may be established. Problems are repaired as discovered.

TMO 3_OPEN (BP-OP) - This is assigned to roads where management objectives require the road to be open year-round (except maybe closed or have limited access due to snow conditions) for commercial, recreation, and public access. Typically, these roads are aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 3_SEASONAL (BP-SC) - This is assigned to roads where management objectives require the road to be open seasonally for commercial, recreation, and public access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 3_RESTRICTED (BA, BR-OP) or (BA-SC, ST) - This is assigned to roads where management objectives require the road to be open seasonally or year round for permittee, commercial, and administrative access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 3_RESTRICTED SEASONAL (BR-SC) - This is assigned to roads where management objectives require the road to be open seasonally for permittee, commercial, and

administrative access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 2_OPEN (BP-OP) - This is assigned to roads where the management objectives require the road to be opened for limited commercial, recreation, and public access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_SEASONAL (BP-SC) - This is assigned to roads where the management objectives require the road to be opened seasonally for limited commercial, recreation, and public access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_RESTRICTED (BA, BR-OP) - This is assigned to roads where the management objectives require the road to be opened for permittee, commercial, and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_RESTRICTED SHORT TERM (BR-ST) - This is assigned to roads where the management objectives require the road to be closed seasonally except for permittee, commercial, and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_RESTRICTED SEASONAL (BR-SC) - This is assigned to roads where the management objectives require the road to be open seasonally for permittee, commercial, and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_TEMPORARY CLOSURE (BA-SC, ST) - This is assigned to roads where the management objectives require the road to be closed except commercial and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 1_PERMANENT CLOSURE (BA, BR-ST) - This level is assigned to roads where minimum maintenance is required to protect adjacent lands and resource values. These roads are no longer needed and are closed to traffic. The objective is to remove these roads from the transportation system. Minimum standards are to maintain drainage and runoff patterns as needed to protect adjacent lands. Grading, brushing, or slide removal is not performed unless roadbed drainage is being adversely affected, causing erosion. Closure and traffic restrictive devices are maintained.

TMO 1_DECOMMISSIONED (BA, BR, BP-DR, FD, OB) - This level is assigned to roads where no maintenance is required. These roads are no longer needed and are closed to traffic. The objective is to remove these roads from the transportation system. Closure and traffic restrictive devices are maintained.

IMPLEMENTATION of TMOs

The TMO process determines among other things road maintenance levels and recommended actions (i.e., road improvement or closure). These items will be utilized and prioritized in several BLM planning and budgetary processes and are the first steps in implementation of the TMO recommendations.

If needed, road maintenance levels would be revised based upon critical resource needs in order to adjust the work load to the available funding. Maintenance of road closure devices should also be incorporated into this step.

The recommended actions identified by TMOs are analyzed by management through the appropriate environmental assessment process at the time of project implementation, as required under the National Environmental Policy Act (NEPA). NEPA analysis incorporates interdisciplinary and public review of the proposed projects and alternatives before a final decision is approved. New road/trail construction will be analyzed through the NEPA process. New roads will also be assessed by the TMO process to ensure that they are properly incorporated into the transportation system.

MONITORING

The main objectives of monitoring are to determine whether management practices are being implemented and their effectiveness.

TMO Process - As TMOs are dynamic, periodic reviews of the information and recommendations are necessary. Changes in TMOs may occur to ensure that the recommended transportation management is in compliance with overall resource management direction.

Construction - Roads & Trails - Monitoring of construction is performed by BLM project inspectors. It is their responsibility to ensure compliance with contractual stipulations (including the design features) associated with contracts. If a problem arises due to adverse environmental impacts, the problem will be brought to the attention of the Contracting Officer and the resource specialist for resolution. Final inspection and reports will be completed to help determine if management objectives have been met.

Maintenance - Special inspections and maintenance will be conducted after large storm events to correct any problems that might occur; if safety permits, inspections may occur during storm events. On roads where the TMOs or minimum maintenance standards are not being met, efforts will be taken to re-prioritize maintenance work loads, reevaluate the maintenance level, or pursue means to obtain sufficient funding.

Roads - Monitoring the effectiveness of road maintenance will be performed by appropriate resource area specialists (i.e., engineers, hydrologists, soil scientists). Routine maintenance and inspections are conducted on the schedule prescribed by the assigned maintenance level or TMO. Agency personnel using the transportation system are responsible for reporting maintenance needs. Such reports are directed to the resource area engineering staff.

Trails - Monitoring trail use will help determine the appropriate BLM trail maintenance level. Condition surveys will be conducted according to the assigned maintenance level to determine the maintenance needs.

Road Closure - Roads that are closed and remain part of the road inventory will continue to be monitored as existing roads in accordance with their maintenance level. Roads that are removed from the road inventory will revert back to the appropriate land base allocation. Monitoring will be conducted to ensure that the decommissioning practices have been effective. Monitoring should be conducted by the appropriate disciplines.

Bridges/Major Culverts shall be inspected in accordance with BLM Manual 9112.

AUTHORITY

A number of federal laws and internal regulations give BLM the authority to develop and manage an integrated road and trail system:

The following laws and Executive Orders address transportation planning, operation, and maintenance:

FLPMA - Federal Land Policy and Management Act of 1976, Public Law 94-579, Sections 202 and 502. Provides for resource management rehabilitation, protection, improvement, planning, and administration on the basis of a sustained yield. It provides for the management of transportation systems on public lands in a manner that will protect the ecological, air, water, scientific, scenic, historical, and archaeological values, and Areas of Critical Environmental Concern (ACEC). It requires the preparation and maintenance of the inventory of public land resources, including the transportation system, on a continuing basis. It also provides for receiving fair market value for the use of the transportation system.

Title 23, U.S.C. (as amended by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)) - Public Law 102-240. The ISTEA of 1991 requires State Transportation Agencies to develop a Statewide Transportation Plan, which includes transportation plans of Federal agencies. As part of the ISTEA implementation initiative, the Bureau is required to identify and include land management highways as part of its transportation plans.

Executive Order 12088, October 13, 1978, Federal Compliance with Pollution Control Standards. Requires that BLM ensure that all necessary actions are taken for prevention, control, and abatement of environmental pollution with respect to transportation facilities and activities.

Executive Order 11644, February 8, 1972, Use of Off-Road Vehicles on Public Lands Executive Order 11989, May 24, 1977, Off-Road Vehicles on Public Lands. Requires that BLM provides procedures that will ensure that the use of off highway vehicles on public lands will be controlled and directed to protect the resources of those lands, to promote the safety of all users, and to minimize conflicts among the various users of those lands.

Executive Order 11514, March 5, 1970, Protection and Enhancement of Environmental Quality, as amended by Executive Order 11991, (Secs. 2(g) and 3(h), May 24, 1977). Requires BLM to provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Requires BLM transportation policies, plans, and programs to meet national environmental goals.

National Environment Policy Act (NEPA) of 1969. Requires the preparation of Environmental Impact Statements for any transportation project that may have significant affect on the environment. It requires systematic and interdisciplinary planning in making decisions about major BLM actions or proposals from the public that may have significant influence on the environment.

Clean Water Act as amended in 1987 and Clean Air Act of 1990 as amended. Requires BLM to protect air and water quality, maintain Federal and State designated water and air quality standards, and abide by the requirements of the state implementation plans.

The U.S. Code of Federal Regulations (CFR) contains traffic and engineering regulations that BLM must follow in the management and operation of Bureau roads. Through the CFR, the Managers have the authority to implement traffic rules and issue Federal Orders that close or restrict road and trail use.

- 43 CFR 2800 Rights-of-Way, Principles and Procedures
- 43 CFR 2810 Tram Roads and Logging Roads
- 43 CFR 3809 Surface Management
- 43 CFR 8340 Off-Road Vehicles
- 43 CFR 8350 Wild and Scenic Rivers and the National Trails System
- 43 CFR 8360 Visitor Services

POLICY

The TMP is based on the following policies and responsibilities taken from various BLM Manuals and documents:

- BLM Handbook H-2812-1 - Logging Road Rights-of-Way
- BLM Manual 9110 - Transportation Facilities, BLM Handbook H-9110-1- Transportation Planning, and BLM
- Handbook H-9110-2 - Land Management Highways
- BLM Manual 9112 - Bridges and Major Culverts
- BLM Manual 9113 - Roads
- BLM Manual 9114 - Trails and BLM Handbook 9114-1
- BLM Manual 8357 - ByWays and Handbook 8357-1
- BLM Manual 8342 - Designation of Areas and Trails (Off-Road Vehicles)

Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, April 1994 (Northwest Forest Plan)

Standards and Guidelines for Management of Habitat for Late-Successional nd Old-Growth Forest Related Species within the Range of the Northern Spotted Owl, April 1994

Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, February 1994

Decision Record for the Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California

District's Fish & Wildlife 2000 Plan, A Strategy for the Management of Biological Resources

Approved District (includes Klamath Falls Resource Area) Resource Management Plans/ Record of Decision identify how the transportation system will be managed and operated.

District Manuals and Handbooks addressing transportation planning, operation, and maintenance for each District.

Western Oregon Road Fee Collection Pilot Project (October, 1992), I.M. OR-93-49 (December 17, 1992). Implemented procedures to improve tracking, monitoring, and verification of hauling of forest products over BLM roads, fee collection accountability, and collection of road use and maintenance fees.