WATERSHED APPENDIX

Soil and Water Conservation Practices for the Broadaxe Project

Introduction

The Forest Service is required by law to comply with water quality standards developed under authority of the Clean Water Act. The Environmental Protection Agency and the States of Idaho and Washington are responsible for enforcement of these standards. The Idaho Panhandle National Forest Plan states (Chapter II, p. 27) that the Forest will "maintain high quality water to protect fisheries habitat, water based recreation, public water supplies and be within state water quality standards". The use of BMPs is also required in the Memorandum of Understanding between the Forest Service and the States of Idaho and Washington as part of our responsibility as the Designated Water Quality Management Agency on National Forest System lands. The States' water quality standards regulate nonpoint source pollution from timber management and road construction activities through application of Best Management Practices (BMPs). The BMPs were developed under authority of the Clean Water Act to ensure that Idaho's and Washington's waters do not contain pollutants in concentrations which adversely affect water quality or impair a designated use. State recognized BMPs that will be used during project design and implementation are contained in these documents:

a. Rules and Regulations Pertaining to the Idaho Forest Practices Act, (IFPA), as adopted by the Idaho Land Board; and

b. Rules and Regulations and Minimum Standards for Stream Channel Alterations, as adopted by the Idaho Water Resources Board under authority of the Idaho Stream Channel Protection Act (ISCPA).

c. Rules and Regulations Pertaining to the Washington Forest Practices as adopted by the State of Washington

Many of the rules and regulations for stream channel alterations are contained, in slightly different forms, in two Memorandum of Understandings (MOU) between the USFS and the States of Idaho and Washington. These MOUs are incorporated into the Forest Manual and R-1 Supplement 31, contains provisions which are not currently state recognized BMPs.

The practices described herein are tiered to the practices in FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet state and Forest water quality objectives. The purpose of this appendix is to: 1) establish the connection between the Soil and Water Conservation Practice (SWCP) employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (IDAPA 16.01.2300.05) and Washington Forest Practices Rules and Regulations (Title 222 WAC) and 2) identify how the SWCP Standard Specifications for the Construction of Roads, and the Timber Sale Contract provisions meet or exceed the Rules and Regulations pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code as well as the Washington Forest Practices Act RCW 76.09. The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also covered.

The objective of this appendix is to provide conservation practices for use on National Forest Lands to minimize the effects of management activities on soil and water resources. The conservation practices were compiled from Forest Service manuals,

handbooks, contract and permit provisions, to directly or indirectly improve water quality, reduce losses in soil productivity and erosion, and abate or mitigate management effects, while meeting other resource goals and objectives. They are of three basic forms: administrative, preventive and corrective. These practices are neither detailed prescriptions nor solutions for specific problems. They are purposely broad. These practices are action initiating process mechanisms which call for the development of requirements and considerations to be addressed prior to and during the formulation of alternatives for land management actions. They serve as checkpoints which are considered in formulating a plan, a program and/or a project.

Although some environmental impacts may be characteristic of a management activity, the actual effects on soil and water resources will vary considerably. The extent of these management effects on soil and water resources is a function of:

1. The physical, meterorological and hydrologic environment where the activity takes place (topography, physiography, precipitation, channel density, geology, sol type, vegetative cover, etc.).

2. The type of activity imposed on a given environment (recreation, mineral exploration, timber management, etc.) and its extent and magnitude.

3. The method of application and the duration of the activity (grazing system used, types of silvicultural practice used, constant vs. seasonal use, recurrent application or onetime application, etc.).

4. The season of the year that the activity occurs or is applied.

These factors vary within the National Forests in the Northern Region and from site to site. It follows then that the extent and kind of impacts are variable, as are the abatement and mitigation measures. No solution prescription, method, or technique is best for all circumstances. Thus the management practices presented in the following include such phrases as "according to the design", "as prescribed," "suitable for," "within acceptable limits," and similar qualifiers. The actual prescriptions, specifications, and designs are the result of evaluation and development by professional personnel through interdisciplinary involvement in the NEPA process. This results in specific conservation practices that are tailored to meet site specific resource requirements and needs.

BMP Implementation Process

In cooperation with the States, the USDA Forest Service's primary strategy for the control of nonpoint sources is based on the implementation of BMP's determined necessary for the protection of the identified beneficial uses. The Forest Service Nonpoint Source Management System consists of:

1. BMP selection and design based on site-specific conditions; technical, economic and institutional feasibility; and the designated beneficial uses of the streams.

2. BMP Application

3. BMP monitoring to ensure that they are being implemented and are effective in protecting designated beneficial uses.
4. Evaluation of BMP monitoring results.
5. Feeding back the results into current/future activities and BMP design.

The District Ranger is responsible for insuring that this BMP feedback loop is implemented on all projects. The Practices described herein are tiered to the practices in the R1/R4 FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet State and Forest water quality objectives. The purpose of this appendix document is to: 1) establish the connection between the SWCP employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (IDAHO APT 16.01.2300.05) and 2) identify how the SWCP, Standard Specifications for the Construction of Roads, and the Timber Sale Contract provisions meet or exceed the Rules and Regulations Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code (BMP's). The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also included.

Monitoring: Implementation and effectiveness of water quality mitigation measures are also monitored annually. This includes routine monitoring by timber sale administrators, road construction inspectors, and resource specialists which is documented in diaries and project files. Water quality monitoring is a review of BMP implementation and a visual evaluation BMP effectiveness. Any necessary corrective action is taken immediately. Such action may include modification of the BMP, modification of the project, termination of the project, or modification of the state water quality standards.

Abbreviations

TSC = Timber Sale Contract
TSA = Timber Sale Administrator
PWC = Public Works Contract
SCA = Stream Channel Alteration Act
BMP = Best Management Practices
SPS = Special Project Specifications
CFR = Code of Federal Regulations

SAM = Sale Area Map
COR = Contracting Officer Representative
(I)FPA = (Idaho) Forest Practices Act
SWCP= Soil and Water Conservation Practices
EPA = Environmental Protection Agency
INFISH = Inland Native Fish Strategy
RHCA = Riparian Habitat Conservation Area

A Glossary of Terms is located at the end of this document.

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Format

The general format used to present each of the conservation practices in this handbook is as follows:

Heading	Context
PRACTICE	Includes the sequential number of the practice and a brief title. The numbering of the activities does not have any intended significance.
OBJECTIVE	Describes the desired results or attainment of the practice as it relates to soil and water resource or beneficial use protection.
EXPLANATION	Further define the brief title and expresses how the practice is applied. Describes criteria or standards used when applicable.
IMPLEMENTATION	Describes where the practice is applied, who is responsible for application, direction and supervision, and when the practice is employed.
EFFECTIVENESS	Provides a qualitative assessment of expected effectiveness that the implemented BMP will have on preventing or reducing impacts on water quality. The SWCP effectiveness rating is based on: 1) literature and research, 2) administrative studies, and 3) professional experience (judgement of an expert by education and/or experience). The expected effectiveness of the SWCP is rated either High, Moderate or Low.
COMPLIANCE	Provides a qualitative assessment of how the implementation of the specific measures will meet the Forest Practice Act Roles and Regulations pertaining to water quality.
REFERENCES	Identifies the Forest Service Manual, Handbook, contract or permit provision, Code of Federal Regulation, policy statement and/or other references where the practice is further documented. The reference listings are not all inclusive.

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Key Soil and Water Conservation Practices (BMPs)

WATERSHED MANAGEMENT

11.07 Oil and Hazardous Substance Spill Contingency Planning

11.09 Management by Closure to Use

11.11 Petroleum Storage and Delivery Facilities and Management

VEGETATION MANAGEMENT

13.02 Slope Limitations for Tractor Operation

13.04 Revegetation of Surface Disturbed Areas

13.05 Soil Protection During and Following Slash Windrowing

13.06 Soil Moisture Limitations for Tractor Operation

TIMBER

14.06 Riparian Area Designation

14.07 Determining Tractor Loggable Ground

14.08 Tractor Skidding Design

14.09 Suspended Log Yarding in Timber Harvesting

14.10 Log Landing Location and Design

14.11 Log Landing Erosion Prevention and Control

14.12 Erosion Prevention and Control Measures During Timber Sale Operations

14.13 Special Erosion Prevention Measures on Areas Disturbed by Activities

14.14 Revegetation of Areas Disturbed by Harvest Activities

14.14 Erosion Control on Skid Trails

14.15 Stream Channel Protection (Implementation and Enforcement)

14.19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

14.20 Slash Treatment in Sensitive Areas

14.21 Non-recurring “C” Provisions for Soil and Water Protection

14.22 Modification of the Timber Sale Contract

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ROADS AND TRAILS

15.02 General Guidelines for the Location and Design of Roads and Trails

15.03 Road and Trail Erosion Control Plan

15.04 Timing of Construction Activities

15.05 Mitigation of Surface Erosion and Stabilization of Slopes

15.06 Mitigation of Surface Erosion and Stabilization of Slopes

15.07 Control of Permanent Road Drainage

15.09 Timely Erosion Control Measures on Incomplete Roads and Streamcrossing Projects

15.10 Control of Road Construction Excavation and Sidecast Material

15.11 Servicing and Refueling of Equipment

15.15 Streamcrossings on Temporary Roads

15.19 Streambank Protection

15.21 Maintenance of Roads

15.22 Road Surface Treatment to Prevent Loss of Materials

15.23 Traffic Control During Wet Periods

15.24 Snow Removal Controls

15.25 Obliteration of Temporary Roads

FIRE AND FUELS MANAGEMENT

18.02 Formulation of Fire Prescriptions

18.03 Protection of Soil and Water from Prescribed Burning Effects

PRACTICE 11.07 - Oil and Hazardous Substance Spill Contingency Planning

OBJECTIVE: To minimize contamination of waters from accidential spills by prior planning and development of Spill PreventionControl and Countermeasure Plans.

EXPLANATION: A contingency plan is an immediate reporting and action plan that contains a predetermined organization to be implemented in the event of a hazardous substance spill. Factors considered for each spill are: the specific substance spilled, the quantity, its toxicity, proximity of spill to waters, and the hazard to like, property, and the environment.

The Spill Prevention Control & Countermeasure (SPCC) plan is a docuemnt which requires appropriate measures to prevent oil, petroleum products, or known hazardous materials that could be spilled from entering the navigable waters of the United States. An SPCC plan is needed if the total, above-ground storage of oil, petroleum products, or known hazardous materials exceeds the appropriate "reportable quantity" and if these facilities could reasonably be expected to discharge these hazardous substances into surface waters in the event of a spill.

IMPLEMENTATION: Each Forest is responsible for designating emergency spill coordinators and documenting names and telephone numbers of agencies to call regarding notification and clean-up of spills. Individual Forests may maintain an inventory of materials to use during the clean-up of a spill. Disposal sites will be coordinated with EPA, State, and local officials responsible for safe disposal.

If a spill is from a Forest Service facility or operation, the Forest Service is the "person in charge" and is responsible for all reporting and immediate response actions, as appropriate. If the spill is from a third party operation, the Forest Service will only respond and report the spill if the third party fails to take appropriate action. The Forest Service will generally turn its incident command role over to authorized, Federal On-Scene Coordinators or other authorized, State or local authorities after their arriving at the spill site, and provide support services.

SPCC plans are required for Forest Service owned and special use permitted facilities, and include timber sale operators and other construction contracts. All SPCC plans must be reviewed and certified by a registered professional engineer.

EFFECTIVENESS: Although SPCC Plans cannot eliminate the risk of materials being spilled and escaping into waters, they can, if followed, be effective at reducing adverse effects to tolerable levels. Depending on the location and quantity of a spill, a properly implemented Plan can provide for up to 100 percent containment of a spill.

COMPLIANCE: Meets FPA Rules

REFERENCES: FSH 6740, 7442, 7443, and 7460; 40 CFR 112; FSH 6709.11, Health and Safety Code Handbook; FSH 6709.12, Safety and Health program Handbook; R-1 and R-4 Emergency and Disaster Plan; Oil and Hazardous Substances Pollution Contingency Plan for EPA Regions 8 and 10, 7/26/85; State Hazardous Waste management Plans; SWCP 11.11, 13.07, and 13.10.

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PRACTICE: 11.09 - Management by Closure to Use

OBJECTIVE: To exclude activities that could result in damages to facilities or degradation of soil and water resources.

IMPLEMENTATION: Closures (seasonal, temporary, or permanent) are made when the responsible Line Officer determines that a particular resource or facility needs protection from use. The decision to close an area is made after an evaluation of alternative methods of protection.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

REFERENCES: EO 11644, use of Off-Road Vehicles on the Public Lands, and 11989, Off-Road Vehicles on Public Lands; SWCP 12.10.

PRACTICE: 11.11 - Petroleum Storage and Delivery Facilities and Management

OBJECTIVE: To protect surface and subsurface soil and water resources from petroleum fluid contamination resulting from leaking petroleum delivery systems and storage facilities.

EXPLANATION: Petroleum delivery and storage facilities will be located, designed, constructed, and maintained in a manner that minimizes the potential for contamination of surface and subsurface soil and water resources from leaking flowlines, pipelines and storage tanks. Roads, vegetative manipulation, and other considerations should be evaluated in the construction and maintenance of these facilities.

IMPLEMENTATION: The siting and operation of petroleum delivery systems and storage facilities will follow applicable Federal (EPA) and state guidelines and requirements with regard to:

a. Design/Location.

b. Construction

c. Installation.

d. Oepration procedures.

e. Testing.

f. Release detection systems.

g. Recordkeeping requirements.

h. Leak.spill reportingrequirements.

i. Abandonment.

Storage facilities and delivery systems on National Forest lands will require a license and/or speical use permit. Licenses and permits require the proejct ot comply with all State and local standards. Relevant SWCPs from this and other secitons may be required: 11.04, 11.05, 11.07, 11.08, 11.10, 13.04, 13.07-13.13, 14.12-14.14, 14.20, 15.01-15.18, 15.21.

EFFECTIVENESS: Although SPCC Plans cannot eliminate the risk of materials being spilled and escaping into waters, they can, if followed, be effective at reducing adverse effects to tolerable levels. Depending on the location and quantity of a spill, a properly implemented Plan can provide for up to 100 percent containment of a spill.

COMPLIANCE: Meets FPA Rules

REFERENCES: Resource Conservation and Recovery Act of 1976, (90 Stat. 2795), as amended; Underground Storage Tank Regulations (40 CFR part 280); State Hazardous Waste management Plans; FSM 7460.

PRACTICE: 13.02 - Slope Limitations for Tractor Operation

OBJECTIVE: To reduce gully and sheet erosion and associated sediment production.

EXPLANATION: This measure limits surface disturbance and keeps surface runoff water from concentrating. This practice restricts tractor operation to slopes where corrective measures for proper drainage such as water bars are easily installed and effective. Criteria that may be used to determine slope restrictions are soil stability, mass stability, infiltration rate, and soil water holding capacity. This data may be interpreted from soil and landtype inventories, geologic maps, and climatic and hydrologic information. Subsequent field verification may be necessary.

IMPLEMENTATION: Recommended provisions and management controls for operating machinery on steep slopes is identified during the NEPA process. These provisions should be included in the contract. The contracting Officer is responsible for ensuring implementation of these contract provisions. For In-Service projects, the project supervisor is responsible for enforcement of management requirements and for identification of additional areas where operations should be limited.

EFFECTIVENESS: In general, the less the slope percentage, the less are the chances of rilling, gullying, or soil displacement as a consequence of tracked or wheeled skidding.

COMPLIANCE: Meets FPA Rules

REFERENCES: SWCP 14.07; See references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.04 - Revegetation of Surface Disturbed Areas

OBJECTIVE: To protect soil productivity and water quality by minimizing soil erosion.

EXPLANATION: This practice is used to stabilize the surface of the disturbed area through the influence of vegetation. The vegetation will be selected to meet many or most of the management objectives for the area; range, wildlife, timber, fuels, minerals, aesthetics, and so forth. Grass or browse species may be seeded between recently planted trees for erosion prevention, wildlife habitat enhancement, or other management needs.

The factors evaluated are soil fertility, slope, aspect, landtype characteristics, soil water holding capacity, climatic factors, vegetation species characteristics, and

project objectives. These are filed determinations and office interpretations made by an interdisciplinary team.

IMPLEMENTATION: The identification of disturbed areas and species mix will be determined during the NEPA process. The responsible Line Officer assigns specific individuals to execute the project. Projects are subsequently monitored to assess the revegetation effectiveness, and need for follow-up action.

EFFECTIVENESS: Revegetation can be moderately effective at reducing surface erosion after one growing season, following disturbance, and highly effective in later years. Effectiveness has been shown to vary from 10 percent on 3/4:1 slopes to 36 percent on 1:1 slopes to 97 percent on 1:1 slopes in later years (Burroughs, E.R., Jr. and J.G King. 1989. Reduction of Soil Erosion on Forest Roads. Intermountain Research Station, GTR-264).

COMPLIANCE: Meets FPA rules.

REFERENCES: FSM 2522, 2405, 2472, and 7721; SWCP 11.02, 11.03, and 14.13; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.05 - Soil Protection During and Following Slash Windrowing

OBJECTIVE: To prevent removal or severe disruption of the productive surface soil and to minimize losses from erosion.

EXPLANATION: Windrowing is a common method of slash treatment removal and surface scarification. On slopes the material should be windrowed on the contour to act as a filter barrier which catches sediment and detains runoff water. On many forest soils, great care must be taken to preserve the surface soil layer during the windrowing operation.

IMPLEMENTATION: Recommendations on slash windrowing are identified during the NEPA process. The project supervisor is responsible for enforcing applicable management requirements. The Contracting Officer is responsible for enforcing contract clauses.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: SWCP 13.01; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.06 - Soil Moisture Limitations for Tractor Operation

OBJECTIVE: To minimize soil compaction, puddling, rutting, and gullying with resultant sediment production and loss of soil productivity.

EXPLANATION: This measure minimizes surface disturbance during high soil moisture conditions which would result in compaction, puddling, rutting, and gullying problems. This practice reduces the need to correct these soil and water resource problems later. Soil erodibility, compatibility, climatic factors, soil/water relationships, and mass stability are factors that are used to evaluate tractor limitations during the NEPA process.

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IMPLEMENTATION: Contract provisions and management requirements for soil moisture limitations are identified during the environmental analysis. The project supervisor and/or Contracting Officer are responsible for determining when the soil surface is unstable and susceptible to damage and is then responsible for suspending or terminating operations.

EFFECTIVENESS: Responsible implementation and enforcement are required for high effectiveness.

COMPLIANCE: No Related FPA rules.

REFERENCES: FSM 2522; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.06 - Riparian Area Designation

OBJECTIVE: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.

EXPLANATION: The Riparian Area is not a zone of exclusion, but an area of closely managed activity. It acts as (1) an effective filter and absorptive zone for sediment; (2) maintains shade; (3) protects aquatic and terrestrial riparian habitats; (4) protects channel and streambanks; and (5) promotes floodplain stability. As a preventive measure, roads, skid trails, landings, and other timber harvesting facilities will be kept out of these areas when feasible or at a prescribed distance from streams and wetlands. Factors such as stream class, channel stability, sideslope steepness, slope stability, resources dependent on these areas, and standards, guidelines, and direction from Forest Plans are considered in determining the management of activities and width of Riparian Areas. Fisheries habitat condition and its estimated response to the proposed timber sale are also evaluated.

IMPLEMENTATION: The Riparian Area requirements are identified during the environmental analysis by the interdisciplinary team. The timber sale project is designed to include site specific recommendations for the prevention of sedimentation and other stream damage from logging activities. The environmental analysis will provide for planning of harvests to insure long-term health and revegetation of the Riparian Areas, while meeting shading, debris recruitment, and other management objectives. As appropriate, monitoring and evaluation will be identified in the environmental analysis documentation. The Presale Forester is responsible for the inclusion of the Riparian Areas in the Timber Sale Contract and on the Sale Area Map. The certified Sale Administrator is responsible for contract compliance during harvest operations.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: FSM 2405.13, 2453.2, 2526, and 2471, NEPA; NFMA; Timber Sale Contract Provision C6.5 (R-1), C5.421; SWCP 11.02, 11.05, 13.03, and 14.03; FSH

2409.15, Timber Sale Administration Handbook and FSH 2409.18 Sale Preparation Handbook; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 14.07 - Determining Tractor Loggable Ground

OBJECTIVE: To protect water quality from degradation caused by tractor logging ground disturbance.

EXPLANATION: This practice is intended to minimize soil erosion and subsequent sedimentation and water quality degradation. Tractor loggable ground is a product of local slope limitations, the volume of timber to be harvested from the site, and the soil, land type, geologic, climatic, and hydrologic characteristics of the site. On-the-ground reconnaissance may be necessary.

IMPLEMENTATION: The determination of tractor loggable ground is performed by the interdisciplinary team during the transportation planning portion of the Timber Sale Planning Process. The results of this determination are presented in a NEPA document. These results are considered during the selection of logging and silvicultural methods and are used in determining the intensity of and restrictions for land disturbance activities, Provisions in the Timber Sale Contract specify the areas and conditions upon which tractors can operate (such as, requiring tractor logging on snow in riparian areas).

EFFECTIVENESS: In general, the less the slope percentage, the less are the chances of rilling, gullying, or soil displacement as a consequence of tracked or wheeled skidding.

COMPLIANCE: Meets FPA Rules

PRACTICE: 14.08 - Tractor Skidding Design

OBJECTIVE: To minimize erosion and sedimentation and protect soil productivity by designing skidding patterns to best fit the terrain.

EXPLANATION: This is a preventive practice. The watershed factors that are considered include slope, aspect, soil stability, vegetative cover, Riparian Areas, meadows, and other factors that may affect the flood and sediment yield potential of the land. The careful control of skidding patterns serves to avoid onsite and downstream channel impacts, the build up of destructive runoff flows, erosion in sensitive watershed areas such as meadows and Riparian Areas, and a reduction in soil productivity.

Two complementary methods of protecting soil and water resources by tractor skid trail design are:

a. End-Lining. This method involves winching the log directly out of the sensitive areas (such as meadows and Riparian Areas) with a cable operated from outside the sensitive area. In this manner, logs can be removed from the sensitive areas while avoiding encroachment by heavy equipment and associated site damage.

b. Felling to the Lead. This method involves felling trees toward a predetermined skid pattern. This procedure facilitates an uncomplicated

approach of the tractor operating between the log and the skid trail. Soil disturbance and compaction are consequently lessened and residual stand and site impacts are minimized.

IMPLEMENTATION: For skid trail design, sensitive areas are identified and evaluated in the environmental analysis during the Timber Sale Planning Process. If necessary, prescriptions can be included in the Timber Sale Contract through the use of a special provision. The certified Sale Administrator then executes the prescription on the ground by locating the skid trails with the timber purchaser or by agreeing to the Purchaser's proposed locations prior to construction.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: Timber Sale Contract Provision B6.422, B6.424, and C6.6; FSM 2524 and 2451; FSH 2409.18, Sale Preparation Handbook and FSH 2409.15, Timber Sale Administration handbook; see references in "Best Management Practice' Definition (05--2 and 3); in R-4, R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.09 - Suspended Log Yarding in Timber Harvesting

OBJECTIVES: To protect the soil from excessive disturbance and accelerated erosion and to maintain the integrity of the Riparian Area and other sensitive watershed areas.

EXPLANATION: Suspended log yarding includes all yarding systems which suspend logs either partially or wholly off of the ground. These systems include hilead, skyline, helicopter, and balloon yarders. The systems are used on steep or unstable slopes and in Riparian Areas where tractors cannot operate. All of the systems result in less soil disturbance since heavy machinery is not used over the sale area. In most cases, these systems require fewer roads because of longer skidding distances. Fewer roads and less soil disturbance will result in less impact on the soil and water resource.

IMPLEMENTATION: Areas where suspended log yarding is to be used are determined and identified in the environmental analysis. The specific systems are included in the contract and designated on the Sale Area Map by the Presale Forester. The certified Sale Administrator oversees the project operation using the guidelines and standards established in the Timber Sale Contract with reference to the environmental analysis documentation.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: Timber Sale Contract Provisions B6.42 and C6.4; FSH 2409.18, Sale Preparation handbook and 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3); in R-4, R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.10 - Log Landing Location and Design

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OBJECTIVE: To locate landings in such a way as to avoid soil erosion and water quality degradation.

EXPLANATION: This practice is both administrative and preventive. Location of all landing clearing limits shall be agreed to by the Forest Service and Purchaser prior to construction. The following criteria are used in evaluating landings:

a. The cleared or excavated size of landings shall not exceed that needed for safe and efficient skidding, decking, and loading operations. Every landing must meet the safety requirements of the Occupational Safety and Health Administration.

b. Where a choice exists, landing locations are selected which involve the lease amount of excavation and the least erosion potential.

c. Where possible, landings are located near the points of ridges so that felled timber lying between drainages can be skidded to the lading without crossing channels or impacting Riparian Areas.

d. Landings are located where the lease number of skid roads are required and sidecast will neither enter drainages nor damage other sensitive areas.

e. If possible, landings are positioned such that the skid road approach will be nearly level.

f. Locate landings to minimize the number of tractor roads entering a given landing.

g. Some landings are designed and constructed as part of specified roads.

h. Landings are shaped to drain in a planned direction and manner to minimize erosion and sediment delivery to stream courses.

i. Major landings, such as those for helicopter logging, are treated to restore soil infiltration rates when use is completed.

IMPLEMENTATION: Landing locations chosen by the Purchaser must be agreed to by the certified Sale Administrator. The Sale Administrator can negotiate with the Purchaser's representative to select mutually acceptable landing locations. Acceptable lands must meet the above criteria. Should agreement not be reached, the decision of the Forest Service shall prevail within the limitations of law.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: Timber Sale Contract Provisions B6.422; FSH 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.11 - Log Landing Erosion Prevention and Control

OBJECTIVE: To reduce the impacts of erosion and subsequent sedimentation from log landings through the use of mitigating measures.

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EXPLANATION: This practice employs administrative, preventive, and corrective controls to meet the objective. Timber Sale Contract requirements provide for erosion prevention and control measures on all landings. Provisions are made in the Timber Sale Contract for landings to have proper drainage. After landings have served the Purchaser's purpose, the Purchaser shall ditch or slope the landings to permit the drainage and dispersion of water. Provisions are also made for revegetation. Other provisions may include scarifying, smoothing and sloping construction of drainage ditches, prevention of water draining off roads from reaching a landing, spreading slash, covering with wood chips, or applying straw mulch. Unless agreed, cut and fill banks around landings shall be sloped to remove overhangs and otherwise minimize erosion. The specific work needed on each landing will depend on the actual ground conditions.

IMPLEMENTATION: The Presale Forester and certified Sale Administrator assess the need for stabilization with technical resource staff input as needed. It is the responsibility of the certified Sale Administrator to insure that this practice is properly implemented on the ground.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: Timber Sale Contract Provisions B6.6, B6.63, B6.422, C6.4, C6.6, C6.601; FSM 2405.13; FSH 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.12 - Erosion Prevention and Control Measures During Timber Sale Operations

OBJECTIVE: To ensure that the Purchaser's operations shall be conducted reasonably to minimize soil erosion.

EXPLANATION: timber is purchased by individuals or companies who either harvest the timber themselves or contract harvest to other parties. Therefore, it is necessary to insure that purchasers understand and adhere to soil and water resource prescriptions arrived at in the Timber Sale Planning Process. This is accomplished by setting forth the Purchaser's responsibilities in the Timber Sale Contract.

IMPLEMENTATION: Equipment shall not be operated when ground conditions are such that excessive impacts will result. The kinds and intensity of control work done by Purchaser shall be adjusted to ground and weather conditions and the need for controlling runoff. The certified Sale Administrator is responsible for insuring that the Purchaser conducts his operations according to the Timber Sale contract. Erosion control work shall be kept current immediately preceding expected seasonal periods of precipitation or runoff. If the Purchaser fails to do erosion control work prior to any seasonal period of precipitation or runoff, the Forest Service may temporarily assume responsibility for the work and any unencumbered deposits (performance bonds) may be used by the Forest Service to do the work.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: Timber Sale Contract Provisions B4.225, C6.3, C6.312, C6.6, C6.601; FSM 2451, 2453.2, and 2533, SWCP 14.04; FSH 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.13 - Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities

OBJECTIVE: To prevent erosion and sedimentation on disturbed areas.

EXPLANATION: Where soil is disturbed by Purchaser's operations on tractor roads, skid trails, landings, temporary road fills, and other logging sites, the purchaser shall provide adequate treatment to protect exposed soils. This may be accomplished by spreading slash or wood chips, mulching, establishing an adequate cover of grass or other vegetating acceptable to the Forest Service, or preforming other agreed stabilization measures. This provision is to be used only for sales which contain special soil stabilization problems and are not expected to be revegetated by the normal methods prescribed under the standard Timber Sale Contract.

IMPLEMENTATION: The interdisciplinary team will identify areas needing special stabilization measures during the Timber Sale Planning Process. Treatment areas will be verified during sale layout and the estimate of work needed will be carried to the timber sale appraisal. Specific locations to be treated will be designated on the ground by the Forest Service. The Forest Service, upon request, shall provide advice as to soil preparation and the application of suitable seed mixtures, mulch, and fertilizer, and the timing of such work. It is the responsibility of the certified Sale Administrator to make sure that stabilization work is done correctly and in a timely manner.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

REFERENCES: Timber Sale Contract Provisions B6.6, C6.6, and C6.601; SWCP 14.04; FSH 2409.15, Timber Sale Administration Handbook and FSH 2409.18, Sale Preparation handbook.

PRACTICE: 14.14 - Revegetation of Areas Disturbed by Harvest Activities

OBJECTIVES: To establish a vegetative cover on disturbed sites to prevent erosion and sedimentation.

EXPLANATION: Where soil has been severely disturbed by Purchaser's operations and establishment of vegetation is needed to minimize erosion, the Purchaser shall take appropriate measures normally used to establish an adequate cover of grass or other vegetation acceptable to Forest Service or take other agreed stabilization measures. This measure is applied in contracts where it is expected that disturbed

soils in parts of the sale area will require vegetative cover for stabilization and the problems will not be mitigated by other contract provisions.

IMPLEMENTATION: An estimate of the need is included in the environmental analysis and timber sale appraisal. The Forest Service shall annually designate on the ground the disturbed soils, such as logging areas and temporary roads, that must be treated.

The Forest Service, upon request, shall provide advice as to soil preparation and the application of suitable seed mixtures, mulch, and fertilizer, and the timing of such work. It is the responsibility of the certified Sale Administrator to make sure that revegetation work is done correctly and in a timely manner.

EFFECTIVENESS: Revegetation can be moderately effective at reducing surface erosion after one growing season, following disturbance, and highly effective in later years. Effectiveness has been shown to vary from 10 percent on 3/4:1 slopes to 36 percent on 1:1 slopes to 97 percent on 1:1 slopes in later years (King, John G. and E. Burroughs. Reduction of Soil Erosion on Forest Roads. Intermountain Research Station General Technical Report, 1988).

COMPLIANCE: Meets FPA rules.

REFERENCES: Timber Sale Contract Provisions B6.6, C6.6, and C6.601; SWCP 14.14; FSH 2409.15, Timber Sale Administration Handbook and FSH 2409.18, Sale Preparation Handbook.

PRACTICE: 14.15 - Erosion Control on Skid Trails

OBJECTIVE: To protect water quality by minimizing erosion and sedimentation derived from skid trails.

EXPLANATION: This practice employs preventive controls to reach the objective. The Timber Sale Contract requires the installation of erosion control measures on skid trails, tractor roads, and temporary roads. Normally, the work involves constructing cross ditches and water spreading ditches. Other methods such as backblading may be agreed to in lieu of cross drains. Gras seeding may also be required by a "C" provision which may be added to the Timber Sale Contract. Areas in need of erosion control measures are shown on the Sale Area Map and designated on the ground annually as logging and temporary access construction progresses.

IMPLEMENTATION: Location of all erosion control measures are designated and agreed to on the ground by the certified Sale Administrator. The Timber Sale Administration Handbook contains guidelines for spacing of cross drains, construction techniques, and cross drain heights. The Sale Administrator can use these guidelines on the ground to identify site specific preventive work to be required of the Purchaser. The Purchaser is obligated to complete and maintain erosion control work as specified in contract provisions.

REFERENCES: Timber Sale Contract Provisions B6.422, B6.6, B6.66, and C6.601; FSH 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

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PRACTICE: 14.17 - Stream Channel Protection (Implementation and Enforcement)

OBJECTIVES: (1) To protect the natural flow of streams; (2) to provide unobstructed passage of stormflows; (3) to reduce sediment and other pollutants from entering streams; and (4) to restore the natural course of any stream as soon as practicable if the stream is diverted as a result of timber management activities.

EXPLANATION: This management practice employs administrative, preventive, and corrective measures to meet the objectives. The following points are fundamental to protecting stream channels:

a. Location and motif of stream crossings must be agreed to prior to construction. This is done when locations of skid trails, tractor roads, and temporary roads are agreed on by the Forest Service and the Purchaser.

b. Purchaser shall repair all damage to a streamcourse caused by Purchaser's operations, including damage to banks and channel, to an acceptable condition as agreed to by the certified Sale Administrator and Purchaser's representative.

c. All project debris shall be removed from streamcourse and in an agreed manner that will cause the least disturbance.

d. Wheeled or track laying equipment shall not operate within 50 feet slope distance of the apparent high water mark of streamcourses designated for protection in the Timber Sale Contract, except as agreed to by the certified Sale Administrator and the Purchaser.

e. When ground skidding systems are employed, logs will be end-lined out of streamside and Riparian Areas, Equipment is permitted to enter streamside areas only at locations and times agreed to by the certified Sale Administrator and the Purchaser.

f. Water bars and other erosion control structures will be located to prevent water and sediment from being channeled into streamcourses, and to dissipate concentrated flows.

g. Material from temporary road and skid trail stream crossings is removed and streambanks restored to an acceptable condition, as agreed to by the certified Sale Administrator and Purchaser's representative.

h. Logs or products shall be fully suspended above the ground when crossing streamcourses designated for protection in the Timber Sale Contract.

IMPLEMENTATION: The certified Sale Administrator works with the Purchaser's representative to insure that the Timber Sale Contract clauses covering the above items are carried out on the ground. Technical resource staffs can be consulted to help the Sale Administrator with decisions. In the event Purchaser causes debris to

enter streamcourses in amounts which adversely affect the natural flow of the stream, water quality, or fishery resources, Purchaser shall remove such debris within 48 hours and in an agreed manner that will cause the least disturbance to streamcourses.

EFFECTIVENESS: High

COMPLIANCE: Meets FPA rules.

REFERENCES: FSM 2405.13 and 2452; FSH 2409.15, Timber Sale Administration Handbook; Timber Sale Contract Provisions B6.5, B6.6, C6.5 (R-1), C6.6, C6.51 (R-1), and C6.53 (R-1); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

OBJECTIVE: To assure the adequacy of required erosion control work on timber sales.

EXPLANATION: The effectiveness of soil erosion prevention and control measures is determined by the results found after sale areas have been exposed one or more years to the elements. Although a careful check is required before a timber sale is closed to assure that planned erosion work has been completed to the standard prescribed, the erosion prevention work done in previous years should be periodically inspected during the life of the timber sale. These inspections will help determine whether the planned work was adequate, if maintenance work is needed, the practicability of the various treatments used, and the necessity for modifying present standards or procedures.

IMPLEMENTATION: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified Sale Administrators will not accept as complete erosion control, measures which fail to meet this criteria.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA rules.

REFERENCES: FSM 2451, 2452, 2453, and 2456; Timber Sale Contract Provisions B6.6, B6.63, B6.64, B6.65, B6.66, and C6.6; SWCP 11.02; FSH 2409.15, Timber Sale Administration Handbook.

PRACTICE: 14.20 - Slash Treatment in Sensitive Areas

OBJECTIVE: To protect water quality by protecting sensitive tributary areas from degradation which would result from using mechanized equipment for slash disposal.

EXPLANATION: Special slash treatment may be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment. Meadows, wetlands, Riparian Areas, and landslide areas are typically sensitive areas where equipment

use is normally prohibited. Slash treatment methods are indicated for each harvest unit on the Slash Treatment Map and referenced in associated contract provisions.

IMPLEMENTATION: Sensitive areas needing protection are identified by the interdisciplinary team in the Timber Sale Planning Process. Results are documented during the environmental analysis and identified in the Timber Sale Contract and on the Slash Treatment Map. The certified Sale Administrator inspects the treatment for correct and satisfactory slash disposal accomplishment.

EFFECTIVENESS: Moderate

COMPLIANCE: No directly related FPA rules.

REFERENCES: Timber Sale Contract; SWCP 14.08, 14.16, and 14.17; FSH 2409.15, Timber Sale Administration Handbook and FSH 2409.18, Sale Preparation Handbook.

PRACTICE: 14.21 - Non-recurring "C" Provisions For Soil and Water Protection

OBJECTIVE: To exercise the option of inserting non-recurring (Special) "C" provisions into the Timber Sale Contract to protect soil and water resources, where standard "B" or "C" provisions do not apply or are inadequate to protect watershed values.

EXPLANATION: Non-recurring "C" provisions are sometimes needed to meet management objectives on a particular sale area. They require Regional Forester approval and may only be included in the sale for which approval was given. This practice can be used for a variety of special situations which may occur on any timber sale. There are no standard or set provisions that can be referenced, since each Special "C" provision is unique and specific to one sale.

IMPLEMENTATION: The need for non-recurring "C" provisions is identified during the Timber Sale Planning Process and environmental analysis by the interdisciplinary team. The Presale Forester prepares the non-recurring "C" provision and submits it through Line Officers to the Regional Forester for approval. The Regional Forester insures that the wording complements the Timber Sale Contract and returns it to the District with approval. The non-recurring "C" provision is applied by the certified Sale Administrator in the same manner as the standard contract provisions.

REFERENCES: FSM 2431.2, 2431.3, and 2431.4; FSH 2409.18, Sale Preparation Handbook.

PRACTICE: 14.22 - Modification of the Timber Sale Contract

OBJECTIVE: To modify the Timber Sale contract if new circumstances or conditions indicate that the timber sale will cause irreversible damage to soil, water, or watershed values.

EXPLANATION: Once timber slaes are sold, they are havested as described in the Timber Sale Contract. However, it may be necessary to modify a timber sale contract because of new concerns about the effects of the sale on soil and water resources.

IMPLEMENTATION: If evidence indicates that unacceptable impacts would occur to soil and water resources if the sale was harvested as planned, the Forest Service Representative will request the Contracting Officer to gain Regional Forester advice and approval to proceed with a resource environmental modification, mutual cancellation, or unilateral cancellation of the Timber Sale Contract. Once the decision to take action is approved by the Regional Forester, the appropriate Line Officer will assign an interdisciplinary team to make recommendations for implementation.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA rules.

REFERENCES: NFMA, Section 6; Timber Sale Contract Provision B8.3; SWCP Handbook 10.40, Feedback Mechanism.

PRACTICE: 15.02 - General Guidelines for the Location and Design of Roads and Trails

OBJECTIVE: To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.

EXPLANATION: There are several considerations which must be incorporated into the location and design of roads and trails. These factors directly affect protection of water quality, soil, and other resource values. The following coordination instructions apply to all transportation activities:

a. Area Transportation Analysis and project planning will be completed using an interdisciplinary process, and the appropriate NEPA document will be prepared and tiered to the Forest Plan. Area Transportation analysis is an extremely effective tool to reduce overall road mileages and, thus, minimize potential resource impacts.

b. Location, design, and construction activities shall utilize appropriate technical resource staffs, when needed, to evaluate effects of transportation development and operations, and recommend mitigating measures to minimize adverse impacts.

c. Roads and trails will be located and designed to facilitate completion of the transportation system, serve specific resource management needs, fit the terrain, and minimize damage to improvements and resources. Fragile, unstable, sensitive, or special areas should be avoided.

d. Roads and trails should be designed based on traffic and safety requirements of anticipated use and to meet the overall transportation plan. The design shall incorporate features to prevent or minimize soil movement and sedimentation as well as undue disruption of water flow.

e. Stream crossing structures shall be designed to provide the most efficient drainage facility consistent with resource protections, importance of the road, legal obligations, and total costs. The design may involve a hydrologic analysis to determine runoff rates and volumes, flood conditions, velocities, scour, open channel shapes, approach topography, materials-foundation

condition, and fish passage, as required. An economic comparison of various flood frequencies versus structure sizes and types is also considered.

f. Locate and design roads and trails to drain naturally by appropriate use of out-sloping or in-sloping with cross drainage and grade changes, where possible. Relief culverts and roadside ditches will be designed whenever reliance upon natural drainage would not protect the running surface, excavation, or embankment. Road and trail drainage should be channeled to effective buffer areas to maximize sediment deposition prior to entry into live water.

IMPLEMENTATION: during the environmental analysis, an interdisciplinary team will be used to insure that management needs, objectives, requirements, and controls are incorporated in the location and design of roads and trails. Mitigation measures needed to protect soil and water resources will be identified in the NEPA process. Contract provisions will be prepared that meet the soil and water resource protection requirements.

EFFECTIVENESS: Moderate

COMPLIANCE: Exceeds FPA rules.

REFERENCES: FSM 7710 and 7720; NFMA; FSH 7709.56, Road Preconstruction Handbook; NEPA; SWCP 15.01; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.03 - Road and Trail Erosion Control Plan

OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and maintenance activities through effective contract administration during construction and timely implementation of erosion control practices.

EXPLANATION: Land disturbing activities usually result in at least short-term erosion. Poorly designed, located, constructed, and maintained roads and trails are usually responsible for the majority of stream sedimentation problems associated with forest management practices. By effectively planning for erosion control, sedimentation can be minimized.

Roads and trails require a variety of erosion control measures. Many erosion control practices will not only protect water quality but also maintain road prism integrity, reduce maintenance costs, and improve trafficability. The location of the road or trail with respect to streams, beneficial uses of that water, soil, and geologic information and other site factors govern the degree of stabilization required. Stabilization usually includes a combination of practices that promotes the reestablishment of vegetation on exposed slopes, provides physical protection to exposed surfaces, prevents and downslope movement of soil, or controls road drainage.

Since a newly constructed road is most susceptible to erosion from seasonal precipitation, the timing of erosion control practices is of primary concern. Those

practices that can be accomplished concurrent with road counteractions shall be favored as a means of immediate protection of the water resource.

IMPLEMENTATION: Erosion control objectives and detailed mitigation measures are developed using an interdisciplinary approach during the environmental analysis. These measures and objectives shall be reflected in the contract specifications and provisions for the road or trail. When standard specifications do not provide the degree of mitigation required, special project specifications will be developed by the interdisciplinary team.

Prior to the start of construction, the Purchaser shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. The schedule shall consider erosion control work necessary for all phases of the project. The Purchaser's construction schedule and plan of operation will be reviewed in conjunction with the erosion control plan to insure their compatibility before any schedules are approved. No work will be permitted on the project until all schedules have been approved by the Contracting Officer.

The Contracting Officer or Engineering Representative shall ensure that erosion control measures are implemented according to the approved schedule and are completed in an acceptable fashion. Field reviews and on-site inspection by the Line Officer and/or Forest Engineer will identify any additional erosion control measures required to protect the streams that were not recognized during planning or design. Necessary correction measures shall be implemented immeidately through normal administrative channels.

The following items may be considered as erosion control measures when constructed in a timely manner. To maximize effectiveness, erosion control measures must be in place and functional prior to seasonal precipitation or runoff.

a. Measures to reestablish vegetation on exposed soils. This is usually accomplished by seeding suitable grass and legume species in conjunction with mulching and fertilization. In some situations, treatments may include tree seedling planting or sprigging of other woody species.

b. measures which physically protect the soil surface from detachment or modify the topography to minimize erosion. These treatments may include the use of dust oil or gravel on the road travelway and ditches and the use of mulches, riprap, erosion mats, and terracing on cuts, fills, and ditches. Temporary waterbars in areas of uncompleted roads and trails can be effectively utilized to reduce sedimentation.

c. Measures which physically inhabit the downslope movement of sediments to streams. These may include the use of slash filter windrows on or below the fill slopes, baled straw in ditches or below fillslopes, catch basins at culvert inlets, and sediment basin slash filter windrows may be utilized in live water drainages where fish passage is not required and where peakflows are low.

d. Measures that reduce the amount of soil disturbance in or near streams. These measures may include dewatering culvert installation or other construction sites, and immediate placement of permanent culverts during road pioneering. Temporary pipes should not be allowed unless positive control of sedimentation can be accomplished during installation, use, and removal.

e. Measures that control the concentration and flow of surface and subsurface water. These may include insloping, outsloping, ditches, cross drains, under drains, trenches, and so forth.

EFFECTIVENESS: Moderate

COMPLIANCE: No related FPA rules.

REFERENCES: FSM 7721, 7722, and 7723; Timber Sale Contract Provisions B6.31, B6.5, B6.6, and C6.3; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion prevention and Control on Timber Sale Areas, May 1981; Cook, M.J. and J.G. King. 1983. Construction Cost and Erosion Control Effectiveness of Filter Windrows on Fill Slopes. USDA Forest Service Research Note, INT-335; SWCP Handbook 10.40 Feedback mechanism; FSH 7709.56b, Drainage Structures Handbook.

PRACTICE: 15.04 - Timing of Construction Activities

OBJECTIVE: To minimize erosion by conducting operations during minimal runoff periods.

EXPLANATION: Erosion and sedimentation are directly related to runoff. Scheduling operations during periods when the probabilities for rain and runoff are low is an essential element of effective erosion control. Purchasers shall schedule and conduct operations to prevent erosion and sedimentation. Equipment shall not be operated when ground conditions are such that excessive impacts will result. Such conditions are identified by the Contracting Officer or Engineering Representative with assistance from technical resource staffs as needed. Temporary erosion control measures may be required to prevent, control, and mitigate erosion and sedimentation.

In addition, it is important to keep permanent erosion control work as current as practicable with ongoing operations. Construction of drainage facilities and performance of other contract work which will contribute to the control of erosion and sedimentation shall be carried out concurrent with earthwork operations or as soon thereafter as practicable. Limitation of the amount of area being graded at a site at any one time, and minimization of the time that an area is laid bare should be a consideration in contract preparation. Erosion control work must be kept current when road construction occurs outside of the normal operating season.

IMPLEMENTATION: Detailed erosion control measures are developed by an interdisciplinary team during the environmental analysis and are incorporated into the

contract specifications. Compliance with plans, specifications, and the operating plan is assured by the Contracting Officer and/or Engineering Representative.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

REFERENCES: FAR 52.236-15; Timber Sale Contract Provisions C6.3, C6.36, and B6.31; SWCP 15.03; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.06 - Mitigation of Surface Erosion and Stabilization of Slopes

OBJECTIVE: To minimize soil erosion from road cutslopes, fillslopes, and travelway.

EXPLANATION: Road construction exposes fresh, loose soil to the erosive force of wind, water, and traffic. Surface erosion from roads is greatest during the first year following construction. If is desirable to minimize erosion due to the adverse impacts on water quality, vehicle maintenance, road maintenance, and safety. Erosion can occur on cutslopes, fillslopes, and/or travelway. Each of the three surfaces has unique erosion consideration which are outlined below:

Surface	General Characteristics	Stabilization-Mitigation Measures
Cutslope	Steeper, undisturbed, and more sterile soil	Vegetative and mechanical stabilization
Fillslope	Flatter, loose, and more fertile soil	Vegetative and mechanical stabilization
Travelway	Flattest, compact (due to traffic)	Surface Stabilization

Vegetative measures include seeding herbaceous species (grass, legumes, or browse species) or the planting of brush or trees.

Fertilization, mulching, watering, and/or erosion netting and fabrics may be required to insure success.

Mechanical measures include construction of slash windrows, straw bale dams, erosion netting and fabrics, terraces, or benching, riprapping, tackifiers, and gunnite.

Surface stabilization includes watering, dust oiling, dust pallatives, aggregate layer, bituminous surface treatment, or asphalt paving depending on traffic, soils, and climatic factors.

An integrated system of collection control, and dispersion of concentrated surface water is very important in order to prevent erosion on fillslopes, travelways, and natural slopes below cross drains and culverts.

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IMPLEMENTATION: During the NEPA process, detailed mitigation measures and slope stabilization techniques are incorporated into the design package by the interdisciplinary team. Compliance with environmental analysis controls and requirements is obtained by the Contracting Officer and/or Engineering Representative through the Standard Specifications and/or Timber Sale Contract Provisions.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

REFERENCES: FSM 7706.11, 7706.12, 7706.13, and 7720; Standard Specifications 50.4, 203, 204, 206A, 210, 212, 412, 619, 625, 626, 629, and 630; Timber Sale Contract Provisions B6.31, B6.6, B6.62, B6.65, B6.66, C5.2, C5.23, C5.4, C5.441, C5.46, R-1 C6.36, C6.52, C6.6, C6.601, and C6.622; SWCP 15.03 and 15.04; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4

PRACTICE: 15.07 - Control of Permanent Road Drainage

OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

EXPLANATION: Degradation of water quality by sediment and the erosive effects of surface runoff can be minimized by stabilizing the road prism and adjacent disturbed areas from erosion. Velocities in the road drainage system can be dissipated before entry into the natural system by design and construction of control structures.

A number of measures can be used alone or in combination to control the detrimental effects of road drainage. Methods used to control water and reduce erosion may include: properly spaced culverts, cross drains, water bars, rolling dips, energy dissipaters, aprons, gabions, and armoring of ditches and drain inlets and outlets. Dispersal of runoff can also be accomplished by rolling the grade, insloping, outsloping crowning, contour trenching, installation of water spreading ditches, and so forth.

IMPLEMENTATION: Project location, design criteria, drainage control features, and detailed mitigation measures are determined during the NEPA process by an interdisciplinary approach. Compliance with plans, specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

REFERENCES: SWCP 15.02, 15.03, 15.06; Timber Sale Contract Provisions B6.6, B6.66, C6.3, C6.6, and C6.601; FSM 7721, 7723, 7706.11, and 7706.12; FSH 7709.56b, Drainage Structures Handbook; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion prevention and Control on Timber Sale Areas, May 1981.

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PRACTICE: 15.09 - Timely Erosion Control Measures on Incomplete Roads and Streamcrossing Projects

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

EXPLANATION: The best drainage design and erosion control measure can be useless if projects are incomplete at the end of the normal operating season. Affected areas can include roads, fills, tractor trails, skid trails, landings, streamcrossings, bridge excavations, and firelines. Preventive measures include:

a. The removal of temporary culverts, culvert plugs, diversion dams, or elevated streamcrossing causeways.

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

c. The removal of debris, obstructions, and spoil material from channels and floodplains.

d. Grass seeding, planting deep rooted vegetation, and/or mulching.

IMPLEMENTATION: Protective measures must be applied to all areas of disturbed, erosion-prone, unprotected ground that is not to be further disturbed in the present year. When conditions permit operations outside the Normal Operating Season, erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly closed, if the weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

Project location and mitigative measures are developed in the NEPA process using an interdisciplinary approach. Compliance with environmental analysis controls and requirements, contract specifications, and operating plans are assured by the Contracting Officer or Engineering Representative.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

REFERENCES: FSM 7721; Standard Specification 206; Timber Sale Contract Provisions B6.31, B6.6, C6.6; FAR 52.213-3, 52.236-15, and 4G-52.235-107; SWCP 15.03 and 15.04; see reference in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.10 - Control of Road Construction Excavation and Sidecast Material

OBJECTIVE: To reduce sedimentation from unconsolidated excavated and sidecast material caused by road construction, reconstruction, or maintenance.

EXPLANATION: Unconsolidated material from road construction is frequently exposed on cut and fillslopes, can be difficult to stabilize, and represents a major

sediment source. The area of exposed material is often reduced when the cut and fillslopes and roadbed are constructed to the lines, grades, and dimensions shown on the drawings or designated on the ground. The Contracting Officer and/or Engineering Representative insures that construction is within tolerances, particularly on sections of high erosion or stability hazards. In some cases layer placement and/or benching may be necessary for stabilization and to obtain the proper dimensions and fill slope ratios. End hauling and retaining structure may be necessary to prevent thin layers of consolidated material from being sidecast on steep slopes where compaction is impractical. Prior to commencing construction, reconstruction, or maintenance activities, waste areas should be located where excess material can be deposited and stabilized. If waste areas are located on steep slopes, sidecast materials should be consolidated and stabilized. Disposal of slide debris should be in areas where it can be stabilized. The purchaser may be required to remove excess material not placed according to the contract and/or restore damaged areas.

Normal erosion control such as seeding should be supplemented with special mitigation measures such as jute netting, erosion cloth, mulching, slash windrows, sediment ponds, hay bale dams, and rock gabions, when such measures are determined necessary for local conditions.

IMPLEMENTATION: Project location, selected disposal areas, and mitigative measures are developed through the NEPA process, using an interdisciplinary approach. Forest Service supervisors are responsible for insuring that In-Service projects meet design standards and project requirements. For contracted projects, compliance with specifications and operating plans is assured by the Contracting Officer and/or Engineering Representative.

REFERENCES: FSM 7720.3. 7706.11, and 7721; Standard Specification 203; SWCP 15.03, 15.05, 15.06, and 15.09; Timber Sale Contract Provisions C6.221 and C5.4; see reference in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.11 - Servicing and Refueling of Equipment

OBJECTIVE: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials.

EXPLANATION: During servicing or refueling, pollutants from logging or road construction equipment may enter a watercourse. This threat is minimized by selecting service and refueling areas well away from wet areas and surface watercourses and by using berms around such sites to contain spills.

IMPLEMENTATION: The Contracting Officer, Engineering Representative, or certified Sale Administrator will designate the location, size and allowable uses of service and refueling areas. They will also be aware of actions to be taken in cause of a hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan (SWCP 11.07).

EFFECTIVENESS: High

COMPLIANCE: Meets FPA Rules

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REFERENCES: SWCP 11.07; Timber Sale Contract Provisions B6.34, C6.341, and C6.34; Standard Specifications 204.42; FSH 2409.15, Timber Sale Administration Handbook; see reference in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.15 - Streamcrossings on Temporary Roads

OBJECTIVE: To keep temporary roads from unduly damaging streams, disturbing channels, or obstructing fish passage.

EXPLANATION: Culverts, temporary bridges, low water crossings, or fords will be required on temporary roads at all locations where it is necessary to cross streamcourses. Such facilities shall be designed and installed to provide unobstructed stream flow and fish passage, and to minimize damage to streamcourses.

The number of crossings shall be kept to the minimum needed for access. Channel crossings should generally be as perpendicular to streamcourses as possible. Streambank excavation shall be kept to the minimum needed for use of the crossings.

Crossing facilities shall be removed when the facility has served its purpose and is no longer needed. Fills associated with these facilities shall also be removed.

IMPLEMENTATION: Project location and protective measures are developed by the interdisciplinary team during the NEPA process. Those developed by the Purchaser will be reviewed and approved by the certified Sale Administrator or Contracting Officer. Forest Service supervisors are responsible for insuring that In-Service projects meet management objectives and requirements. For contracted projects, compliance with specifications and operating plans is assured by the Contracting Officer, certified Sale Administrator, or Engineering Representative.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets SCA Rules

REFERENCES: Timber Sale Contract Provisions B6.5, B6.62, B6.65, C6.3, C6.51, C6.52, C6.6, and C6.753; FSH 2409.15, Timber Sale Administration Handbook, FSM 2505.1 and 7721; FAR 4G-52.236-107; SWCP 11.04, 11.05, 14.03 14.06, 14.17, 15.12, 15.13, and 15.14; see reference in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide-Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.19 - Streambank Protection

OBJECTIVE: To minimize sediment production from streambanks and structural abutments in natural waterways.

EXPLANATION: The stabilization of stream embankments disturbed by the construction of a water crossing or a raodway fill parallel to a streamcourse, is necessary to prevent erosion of the material during natural stream flow. To reduce sediment and channel bank degradation, it is necessary to incorporate "armoring" in

the design of a structure to allow the water course to stabilize after construction. Riprap, gabion structures, and other measures are commonly used to armor stream banks and drainage ways from the erosive forces of flowing water. These measures must be sized and installed in such a way that they effectively resist erosive water velocities. Stone used for riprap should be free from weakly structured rock, soil, organic material and materials of insufficient size, all of which are not resistant to stream flow and would only serve as sediment sources. Outlets for drainage facilities in erodible soils commonly require riprapping for energy dissipation.'

IMPLEMENTATION: Project location and detailed mitigative measures are developed through the NEPA process to meet the objectives and requirements of the management. Forest Service supervisors are responsible for implementing In-Service projects to design standards and management requirements. For contracted projects, compliance with contract specifications and operating plans is assured by the Contracting Officer or Engineering Representative.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

REFERENCES: SWCP 15.03; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide-Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.21 - Maintenance of Roads

OBJECTIVE: To maintain all roads in a manner which provides for soil and water resource protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities.

EXPLANATION: Roads normally deteriorate because of use and weather impacts. This deterioration can be minimized through proper and timely maintenance and/or restriction of use (SWCP 11.09). All system roads will be maintained to at lease the following level: Provide the basic custodial care required to protect the road investment and to insure that damage to adjacent land and resources is held to minimum. This level of maintenance often requires an annual inspection to determine what work, if any, is needed to keep drainage functional and the road stable. This level is the normal prescription for roads that are closed to traffic. As a minimum measure, maintenance must protect drainage facilities and runoff patterns. Higher levels of maintenance may be chosen to reflect greater use or resource administrative needs. Additional maintenance measures could include resurfacing, outsloping, clearing debris from dips and cross drains, armoring of ditches, spot rocking, and drainage improvement.

Maintenance needs will be reflected in an annual road maintenance plan developed to include all roads under Forest Service control. Individual maintenance plans will be developed annually for each timber sale and for each cost share area outlining performance standards, responsibilities, and timing.

For maintenance of roads on active timber sales, the Forest Service and the Purchaser shall annually agree at the beginning of the operating season on an Annual Road Maintenance Plan outlining responsibilities and timing. If the road is

subjected to commercial use, the Forest Service may collect deposits to facilitate road maintenance and to equitably assess maintenance cost of each user.

In addition to timely performance of regular maintenance, each Forest should have an emergency action plan which identifies procedures to be used during periods of high runoff to protect facilities and reduce resource damage.

IMPLEMENTATION: The work is controlled through the Forest Engineer who is responsible for the development of the annual road maintenance plan based on condition surveys. Maintenance levels are established for each road and maintenance performed in accordance with standards. On timber sales, maintenance is a Purchaser responsibility and compliance with standards is assured by the Contracting Officer, Engineering Representative, or certified Sale Administrator. On system roads outside of active timber sales, road maintenance is insured by the Engineering Representative or Contracting Officer.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

REFERENCES: FSM 7730.2, 7732, and 7735; FSH 2409.15, Timber Sale Administration Handbook and FSH 7709.15, Transportation System Maintenance Handbook; Timber Sale Contract provision C5.4; SWP 11.09; see references in "Best management Practice" Definition (05--2 and 3).

PRACTICE: 15.22 - Road Surface Treatment to Prevent Loss of Materials

OBJECTIVE: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production.

EXPLANATION: Unconsolidated road surface material is susceptible to erosion during precipitation events. Likewise, dust derived from road use may settle onto adjacent water bodies. On timber sale roads, the Purchaser shall undertake measures to prevent excessive loss of road material if the need for such action has been identified. Road surface treatments may include: water, dust, oiling, penetration oiling, sealing aggregate surfacing, chip-sealing, or paving.

IMPLEMENTATION: Project location and detailed mitigative measures are developed by an interdisciplinary approach to meet environmental analysis criteria. Forest Service supervisors are responsible for insuring that In-Service projects meet design standards and management requirements. On contracted projects, compliance with contract specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: Timber Sale Contract; FSH 2409.15, Timber Sale Administration Handbook.

PRACTICE: 15.23 - Traffic Control During Wet Periods

OBJECTIVES: To reduce the potential for road surface disturbance during wet weather and to reduce sedimentation probability.

EXPLANATION: The unrestricted use of many National Forest roads during wet weather often results in rutting and churning of the road surfaces. Runoff from such disturbed road surfaces often carries a high sediment load. The

damage/maintenance cycle for roads that are frequently used during wet periods can create a disturbed road surface and sediment source.

Roads that must be used during wet periods should have stable surface and sufficient drainage to allow such use with a minimum of resource impact. Rocking, oiling, paving, and armoring are measures that may be necessary to protect the road surface and reduce erosion potential. Roads not constructed for all weather use should be closed during the wet season. Where winter field operations are planned, roads may need to be upgraded and maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surfaces.

IMPLEMENTATION: Road closures (SWCP 11.09) and traffic control measures should be implemented on all roads when damage would occur as a result of use during wet weather. Project-associated implementation procedures can be enforced by District personnel. Hauling activity can be controlled by the certified Sale Administrator within active timber sales. The decision for closure is made when the responsible Line Office determines that a particular resource or facility needs protection from use.

Detailed mitigative measures are developed by an interdisciplinary approach as necessary. Forest Service supervisors are responsible for implementing In-Service projects according to design standards. For contracted projects, compliane with plans, specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

REFERENCES: FSM 7731.4, SWCP 11.09, 13.06, and 14.04; Timber Sale Contract provisions B5.12, B5.22, and C5.12; FSH 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.24 - Snow Removal Controls

OBJECTIVE: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

EXPLANATION: This is a preventive measure used to protect resources and indirectly to protect water quality. Forest roads are sometimes used throughout the winter for a variety of reasons. For such roads, the following measures are employed to meet the objectives of this practice:

a. The Purchaser is responsible for snow removal in a manner which will protect roads and adjacent resources.

b. Rocking or other special surfacing and/or drainage measures may be necessary, before the operator is allowed to use the roads.

c. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the road surface is damaged, the purchaser shall replace lost surface

material with similar quality material and repair structures damaged in blading operations.

d. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodable fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culverts and culvert inlets are not damaged.

IMPLEMENTATION: Project location and detailed mitigative measures are developed by the interdisciplinary team during the NEPA process. Contracted projects are implemented by the Purchaser. Compliance with criteria in the contract specifications and operating plan is assured by the contracting Officer or Engineering Representative.

EFFECTIVENESS: Moderate

COMPLIANCE: No directly realted FPA Rules

REFERENCES: Timber Sale Contract provisions C5.46; Standard Specifiation 203.09; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.25 - Obliteration of Temporary Roads

OBJECTIVE: To reduce sediment generated from temporary roads by obliterating them at the completion of their intended use.

EXPLANATION: Temporary roads are constructed for a specific short-term purpose, such as, ski area development roads, logging spurs on a timber sale, and so forth. In order to prevent continued low level casual use, such roads are obliterated at the completion of their intended use. Due to short-term nature of temporary roads, continued maintenance funds can not be used for work on temporary roads. Temporary roads that are allowed to remain in use beyond their prescribed time are subject to continued, uncorrected damage, and they can become chronic sediment sources.

Effective obliteration is generally achieved through a combination of the following measures:

a. Road effectively drained and blocked.

b. Temporary culverts and bridges removed and natural drainage on figuration re-established.

c. Road returned to resource production through revegetation (grass, browse, or trees).

d. Sideslopes reshaped and stabilized.

IMPLEMENTATION: For timber sales, temporary road closure, stabilization and removal of temporary structures are accomplished by the Timber Purchaser. Compliance with plans and the Timber Sale Contract is assured by the certified Sale

Administrator. Forest Service supervisors are responsible for insuring that other temporary roads developed by the Forest Service met design standards and management requirements. Temporary road development on Forest Service lands that are allowed through special use permits and/or easements are subject to the same obliteration requirements as temporary roads on timber sales. District Rangers or their representatives are responsible for assuring the obliteration of such roads is accomplished.

EFFECTIVENESS: High

COMPLIANCE: Meets FPA Rules

REFERENCES: Timber Sale Contract provisions B6.62, B6.5, C6.6, and C6.601; FSM 2522; SWCP 11.03, 11.08, 11.09, 13.04, 14.12 - 14, 14.19, and 15.03; NFMA; FSH 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 18.02 - Formulation of Fire Prescriptions

OBJECTIVE: to provide for soil and water resource protection while achieving the management objective through the use of prescribed fire.

EXPLANATION: prescription elements will include such factors as fire weather, slope, aspect, soil moisture, and fuel moisture which influence the fire intensity. These elements have a direct effect on whether or not a litter layer remains after burning and whether or not a water repellent layer is formed. The amount of remaining latter and induced water repellency can significantly affect erosion rats, water quality, and runoff volumes.

IMPLEMENTATION: The prescription elements are defined by the interdisciplinary team durng the environmental analysis. Field investigations are conducted to identify site specific conditions which may affect the prescription. Both the optimum and tolerable limits for soil and water resource needs should be established.

EFFECTIVENESS: High

COMPLIANCE: No directly realted FPA Rules

REFERENCES: FSM 5140, 5150.3, 5151, AND 5153.

PRACTICE: 18.03 - Protection of Soil and Water from Prescribed Burning Effects

OBJECTIVES: To maintain soil productivity, minimize erosion, and prevent ash, sediments, nutrients, and debris from entering surface water.

EXPLANATION: Some of the techniques used to prevent soil erosion and water quality degradation are: (1) construct water bars in fire lines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan for sufficient ground cover to prevent erosion of the burned sites; and (6)

removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.

IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes water barring firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellent tendencies as part of the environmental analysis.

EFFECTIVENESS: High

COMPLIANCE: No directly realted FPA Rules

REFERENCES: FSM 5140, 5142, 5150.3, 5151, and 5153; SWCP 11.02, 11.05, 11.06, and 13.04.

WATERSHED APPENDIX

Soil and Water Conservation Practices for the Broadaxe Project

Glossary of Terms

Area Transportation Plan. A plan that identifies the transportation facilities needed to manage the lands and resources for a given area.

Armoring. Protective coverings or structures used to displace the erosive force of water. Rip-rapping is a type of armoring.

Baseline Data. Data representative of a particular base period or concurrent control sample. Normally representative of the undisturbed, undeveloped state.

Best Management Practice (BMP). A practice or a combination of practices, that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practical (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (40 CFR 130.2(q)).

Contract Provisions. Controls constraints, and/or general direction included in Contracts offered by the Forest Service.

Cross Drain/Ditch. A man made ditch or channel constructed to intercept surface water runoff and divert it before the runoff concentrates to erosive volumes and velocities.

Crowning. Forming a convex road surface which allows runoff to drain from the running surface to both sides of the road prism.

Cumulative Effect. The impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other action (40 CFR 1508.7).

Degraded Watershed. A basin which has suffered environmental damage, resulting in accelerated soil or vegetative loss or chemical contamination to the quantifiable detriment of other resources.

Designated Streams. A stream or portion of a stream identified as warranting special consideration in management decisions and project activities. See also Stream or Streamcourse.

Floodplain. The lowland and relatively flat areas during adjoining inland waters that are covered by its waters during flooding.

Hazardous Substance. Materials which by their nature are toxic or dangerous to handle or dispose of, such as radioactive materials, petroleum products, pesticides, chemicals and biological wastes.

In-Service. Pertains to activities, actions or personnel within the USDA Forest Service.

Interdisciplinary Team (IDT). A group of two or more individuals, with different training or skills, assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. The members of the team proceed to solution with frequent interaction,

so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions. This is different form a multidisciplinary team, where each specialist is assigned a portion of the problem and their partial solutions are linked together at the end to provide the final solution. The forming of the team, the data collection and analysis, team discussions, interactive evaluation, and joint resolution of the problem in the Interdisciplinary Process.

Line Officer. Management personnel within the Forest Service Organization consisting of: Secretary of Agriculture, Chief of Forest Service, Regional Foresters, Forest Supervisors, and District Rangers. Refers to the line of authority and responsibility.

Log Landing. An area where logs are skidded or yarded prior to loading and transportation to a mill.

Mitigate. To offset or lessen real or potential impacts of effects through the application of additional controls or actions. Counter measures are employed to reduce or eliminate undesirable or unwanted results.

Monitoring. The periodic evaluation or resources or activities on a representative sample basis to establish long-term trends, assess the impacts of land management activities, determine how well objectives have been met, and check compliance against established standards.

Nonpoint Source (NPS) Pollution. Diffuse sources of water pollution that originate from many indefinable sources and normally include agricultural and urban runoff, runoff from construction activities, etc. In practical terms, nonpoint sources do not discharge at a specific, single location (such as a single pipe). Nonpoint source pollutants are generally carried over or through the soil and ground cover via stormflow processes. Unlike point sources of pollution (such as industrial and municipal effluent discharge pipes), nonpoint sources are diffuse and can come from any land area. It must be kept in mind that this definition is necessarily general: legal and regulatory decisions have sometimes resulted in certain sources being assigned to either the point or nonpoint source categories because of consideration other than their manner of discharge (for example, irrigation return flows are designated as "nonpoint sources" by law, even though the discharge is through a discrete conveyance).

Normal Operating Season. A portions of a year when normal timber harvesting operations are expected to take place uninterrupted by adverse weather conditions.

Outsloping. Shaping a road to cause drainage to flow toward the outside shoulder (generally the fill slope), as opposed to insloping which encourages drainage to flow to the inside shoulder (generally the cut slope). Emphasis is on avoiding concentrated water flow.

Permittee. Individual or entity that has received a grazing or Special Use Permit from the Forest Service.

Pesticide. A general term applied to a variety of chemical materials including insecticides, herbicides, fungicides and rodenticides.

Point Source. Originating from a discrete identifiable source or conveyance.

Purchaser. The entity which is awarded a USDA Forest Service contract after bidding, usually with competition. As used in timber, the entity which has purchased timber as identified in a timber sale contract.

Reforestation. A renewal of forest cover by seeding, planting or natural means.

Revegetation. The replacement of vegetative cover which has been harvested or lost due to natural occurrences. Accomplished either through planting or nursery stock or seeding, or through natural processes.

Riparian Area. Areas with distinctive resource values and characteristics that are comprised of an aquatic ecosystem and adjacent upland areas that have direct relationships with the aquatic system (riparian ecosystems). This includes wetlands and all areas within a horizontal distance of approximately 100 feet from the normal high water line of a perennial stream, or from the shoreline of a standing body of water. The Riparian Area is not a zone of exclusion, but an area of closely managed activity. Riparian Areas act as an effective filter and absorptive zone for sediment: maintain shade; protect aquatics and terrestrial riparian habitats; protect channel and streambeds; and promote floodplain stability.

Rip Rapping. The use of a large rock, boulders, concrete chunks or similar non-erosive, heavy objects as an armoring device.

Road Maintenance Plan. A document schedule and program for upkeep of roads to provide a level of service for the user and protection of resources. There are five levels of maintenance; Level I being the least intense and Level V being the most intensive.

Rocking. The application of aggregate to a roadbed to provide strength and a more stable erosion resistant surface.

Sale Area Map. A map of suitable scale and detail to be legible which part of a timber sale contract. The map identifies sale area boundaries and contract requirements specific to the sale.

Significant Disturbance. Disturbance of surface resources, including soil, water and vegetation, which has the potential to degrade water quality to a level requiring corrective action.

Site Preparation. A general term for removing unwanted vegetation, slash and even roots and stones from a site before reforestation. It is generally accomplished bye either mechanical, chemical, or biological means, or controlled fire.

Site Specific. Pertains to a discernible, definable area of point on the ground where a project or activity will (or is proposed) to occur.

Soil and Water Conservation Practice (SWCP). The set of practices which, when applied during implementation of a project, ensures that soil productivity is maintained, soil loss and water quality impacts are minimized, and water related beneficial uses are protected. These practices can take several forms. Some are defined by state regulation or Memoranda of Understanding between the Forest Service and the States and thus are recognized as Best Management Practices

(BMPs). Others are defined by the Forest Service interdisciplinary teams or described in FS Handbooks for application Forest-wide. Both kinds of SWCP are included in the Forest Plan as Forest-wide standards or are referenced in the plans. A third kind of SWCP is identified by the interdisciplinary team for application to specific management areas; these are included as Management Area Standards in the appropriate management areas in the Forest Plan. A fourth kind, project level SWCPs, are based on site specific evaluations and represent the most effective and practical means of accomplishing the soil and water resource goals of the specific area involved in the project. These project level conservation practices can either supplement or replace the Forest Plan for specific projects. This handbook will aid in the development of the fourth kind of SWCP.

Soil Productivity. The capacity of the soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture and nutrients and length of growing season.

Specified Road. A forest development transportation system road that is identified in and to be constructed or reconstructed under a Forest Service contract.

Streamside Management Zone (SMZ). A designated zone that consists of the steam and an adjacent area of varying width where management practices that might affect water quality, fish, or other aquatic resources are modified. The SMZ is not a zone of exclusion, but a zone of closely managed activity. It is a zone which acts as an effective filter and absorptive sone for sediment, maintains shade, projects aquatic and terrestrial riparian habitats, protects channel and streambanks, and promotes floodplain stability. The SMZ may be wider than the riparian area.

Wetlands. Those areas that are inundated by surface or groundwater with a frequency sufficient, under normal circumstances, to support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated solid conditions for growth and reproduction. Wetlands included marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, seeps and springs.

Windrowing. To pile slash or debris is a row along the contour of the slope.