

**BUSSEL 484
FEIS**

APPENDIX B:

**Best Management Practices (BMPs)
&
Soil and Water Conservation Practices
(SWCPs)**

Busset 484

Applicable BMPs & Soil and Water Conservation Practices

Introduction

The Clean Water Act, as amended, (33 U.S.C. 1323) directs the Forest Service to meet state, interstate and local substantive as well as procedural requirements respecting control and abatement of pollution in the same manner, and of the same extent as any nongovernment entity.

The Forest Service has the statutory authority to regulate, permit and enforce land-use activities on the National Forest System lands that affect water quality.

As the designated management agency, the Forest Service is responsible for implementing 1) nonpoint source (NPS) pollution control; and 2) the Idaho State Water Quality Standards on National Forest System lands. The Forest Service's water quality policy is to: 1) promote the improvement, protection, restoration and maintenance of water quality to support beneficial uses on all national forest service waters; 2) promote and apply approved Best Management Practices (BMPs) to all management activities as the method for control of NPS pollution; 3) comply with established state or national water quality goals; and 4) design monitoring programs for specific activities and practices that may affect or have the potential to affect in-stream beneficial uses on National Forest System lands.

The Forest Service also coordinates all water quality programs, on National Forest System lands within its jurisdiction, with the local, state and federal agencies, affected public lands users, adjoining land owners, and other affected interests.¹

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 State's water quality standards regulate nonpoint source pollution from timber management and road construction activities through application of Best Management Practices (BMPs). The BMPs are developed under authority of the Clean Water Act to ensure that Idaho'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).

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 State of Idaho. 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 Forest Service Handbook FSH 2509.22. They are developed as part of the NEPA process, with interdisciplinary involvement, and are designed to 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 BMPs identified in Idaho Water Quality Standards (IDAPA 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

¹Memorandum of Understanding Implementing the Nonpoint Source Water Quality Program in the State of Idaho, signed by USEPA, Idaho Departments of Agriculture, Water Resources, and Division of Environment; BLM; and US Forest Service, Regions 1 and 6. 1994

Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code. 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, meteorological and hydrologic environment where the activity takes place (topography, physiography, precipitation, channel density, geology, soil 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 BMPs 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 BMPs 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 (BMPs). The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also included.

FORMAT OF THE BMPS

Each Soil and Water Conservation Practice (SWCP) is described as follows:

Title: Includes the sequential number of the SWCP and a brief title.

Objective: Describes the SWCP objective(s) and the desired results for protecting water quality.

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 (must be applicable to area 2) administrative studies (local or within similar ecosystem); 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.

High: Practice is highly effective (>90%) and one or more of the following types of documentation are available:

- a) Literature/Research - must be applicable to area
- b) Administrative studies - local or within similar ecosystem
- c) Experience - judgement of an expert by education and/or experience.
- d) Fact - obvious by reasoned (logical response)

Moderate: Documentation shows that the practice is effective less than 90% of the time, but at least 75% of the time.

Or

Logic indicates that this practice is highly effective, but there is little or no documentation to back it up.

Or

Implementation and effectiveness of this practice will be monitored and the practice will be modified if necessary to achieve the objective of the BMP.

Low: Effectiveness unknown or unverified, and there is little to no documentation

Or

Applied logic is uncertain in this case, or the practice is estimated to be less than 75% effective.

Or

This practice is speculative and needs both effectiveness and validation monitoring.

The effectiveness estimates given here are general, given the range of conditions throughout the Forest. More specific estimates are made at the project level when the BMPs are actually prescribed.

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.

Implementation: This section identifies: (1) the site-specific water quality protection measures to be implemented and (2) how the practices are expected to be applied and incorporated into the Timber Sale Contract.

ITEMS COMMON TO ALL SOIL AND WATER CONSERVATION PRACTICES

Responsibility For Implementation: The District Ranger (through the Presale Forester) is responsible for insuring the factors identified in the following SWCP's are incorporated into: Timber Sale Contracts through the inclusion of proper B and/or C provisions; or Public Works Contracts through the inclusion of specific contract clauses.

The Contracting Officer, through his/her official representative (Sale Administrator and/or Engineering Representatives for timber sale contracts; and Contracting Officers Representative for public works contracts) is responsible for insuring that the provisions are properly administered on the ground.

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. Basically, 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	SAM = Sale Area Map
TSA = Timber Sale Administrator	COR = Contracting Officer Representative
PWC = Public Works Contract	(I)FPA = (Idaho) Forest Practices Act
SCA = Stream Channel Alteration Act	SWCP= Soil and Water Conservation Practices
BMP = Best Management Practices	EPA = Environmental Protection Agency
SPS = Special Project Specifications	INFISH = Inland Native Fish Strategy
CFR = Code of Federal Regulations	RHCA = Riparian Habitat Conservation Area

There is a **Glossary of Terms** located at the back of this document

KEY SOIL AND WATER CONSERVATION PRACTICES

* CLASSES OF SWCP (BMP)

A = Administrative	G = Ground Disturbance Reduction
E = Erosion Reduction	W = Water Quality Protection
S = Stream Channel Protection/Stream Sediment Reduction	

Class * Soil and Water Conservation Practice (FSH 2509.22)

11 WATERSHED MANAGEMENT

- W 11.07 Oil and Hazardous Substance Spill Contingency Planning
- W 11.09 Management by Closure to Use
- W 11.11 Petroleum Storage & Delivery Facilities & Mgt

13 VEGETATION MANIPULATION

- G 13.02 Slope Limitations for Tractor Operation
- G 13.03 Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows
- E 13.04 Revegetation of Surface Disturbed Areas
- E 13.05 Soil Protection During and After Slash Windrowing
- E 13.06 Soil Moisture Limitations for Tractor Operation
- W 13.07 - Pesticide Use Planning
- W 13.08 - Apply Pesticides According to Label and EPA Registration Directions
- W 13.09 - Pesticide Application Monitoring and Evaluation
- W 13.10 - Pesticide Spill Contingency Planning
- W 13.11 - Cleaning and Disposal of Pesticide Containers and Equipment
- W 13.12 - Protection of Water, Wetlands, and Riparian Areas During Pesticide Spraying

14 TIMBER

- A 14.02 Timber Harvest Unit Design
- A 14.03 Use of Sale Area Maps for Designating Soil and Water Protection Needs
- A 14.04 Limiting the Operating Period of Timber Sale Activities
- E 14.05 Protection of Unstable Areas
- A 14.06 Riparian Area Designation

- G 14.07 Determining Tractor Loggable Ground
- E 14.08 Tractor Skidding Design
- E 14.09 Suspended Log Yarding in Timber Harvesting
- A 14.10 Log Landing Location and Design
- E 14.11 Log Landing Erosion Prevention and Control
- E 14.12 Erosion Prevention and Control Measures During Timber Sale Operations
- E 14.13 Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities
- E 14.14 Revegetation of Areas Disturbed by Harvest Activities
- E 14.15 Erosion Control on Skid Trails
- E 14.16 Meadow Protection During Timber Harvesting
- S 14.17 Streamcourse Protection (Implementation and Enforcement)
- E 14.18 Erosion Control Structure Maintenance
- A 14.19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
- E 14.20 Slash Treatment in Sensitive Areas
- A 14.22 Modification of the Timber Sale Contract

15 ROADS AND TRAILS

- A 15.02 General Guidelines for Road Location/Design
- E 15.03 Road and Trail Erosion Control Plan
- E 15.04 Timing of Construction Activities
- E 15.05 Slope Stabilization and Prevention of Mass Failures
- E 15.06 Mitigation of Surface Erosion and Stabilization of Slopes
- E 15.07 Control of Permanent Road Drainage
- E 15.08 Pioneer Road Construction
- E 15.09 Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects
- E 15.10 Control of Road Construction Excavation & Sidecast Material
- S 15.11 Servicing and Refueling of Equipment
- S 15.12 Control of Construction In Riparian Areas
- S 15.13 Controlling In-Channel Excavation
- S 15.14 Diversion of Flows Around Construction Sites
- S 15.15 Streamcrossings on Temporary Roads
- S 15.16 Bridge & Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)
- E 15.17 Regulation of Borrow Pits, Gravel Sources, and Quarries
- E 15.18 Disposal of Right-of-Way and Roadside Debris
- S 15.19 Streambank Protection
- E 15.21 Maintenance of Roads
- E 15.22 Road Surface Treatment to Prevent Loss of Materials
- E 15.23 Traffic Control During Wet Periods
- G 15.24 Snow Removal Controls
- E 15.25 Obliteration of Temporary Roads
- E 15.27 Trail Maintenance and Rehabilitation

18 FUELS MANAGEMENT

- E 18.02 Formulation of Fire Prescriptions
- E 18.03 Protection of Soil and Water from Prescribed Burning Effects

BEST MANAGEMENT PRACTICES

PRACTICE 11.07 - Oil and Hazardous Substance Contingency Planning

PRACTICE 11.11 - Petroleum Storage and Delivery Facilities and Management

PRACTICE 15.11 - Servicing and Refueling of Equipment

OBJECTIVE: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumens, raw sewage, wastewater and other harmful materials by prior planning and development of Spill Prevention Control and Countermeasure Plans.

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

IMPLEMENTATION: The TSC holds the Purchaser responsible for taking appropriate preventative measures to insure that any spill of oil or oil products does not enter any stream or other waters of the United States. If the total oil or oil products storage exceeds 1,320 gallons, or if any single container exceeds the capacity of 660 gallon, the Purchaser will prepare a Spill Prevention Control and Countermeasure Plan. The plan shall meet EPA requirements including certification by a registered professional engineer. If necessary, specific requirements for transporting oil to be used in conjunction with the contract will be specified in the contract.

The Forest Service will designate the location, size and allowable uses of service and refueling areas. The criteria below will be followed at a minimum:

1. Petroleum product storage containers with capacities of more than 200 gallons, stationary or mobile, will be located no closer than 100 feet from stream, water course, or area of open water. Dikes, berms, or embankments will be constructed to contain the volume of petroleum products stored within the tanks. Diked areas will be sufficiently impervious and of adequate capacity to contain spilled petroleum products.
2. Transferring petroleum products: During fueling operations or petroleum product transfer to other containers, there shall be a person attending such operations at all times.
3. Equipment used for transportation or storage of petroleum products shall be maintained in a leakproof condition. If the Forest Service Representative determines there is evidence of petroleum product leakage or spillage, he/she shall have the authority to suspend the further use of such equipment until the deficiency has been corrected.

In the event any leakage or spillage enters any stream, water course or area of open water, the operator will immediately notify the Forest Service who will be required to follow the actions to be taken in case of hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan.

PRACTICE 11:09 - Management by Closure to Use
PRACTICE 15:23 - Traffic Control During Wet Periods

OBJECTIVE: To reduce the potential for road surface disturbance during wet weather and to reduce sedimentation probability by excluding activities that could result in damage to facilities or degradation of soil and water resources.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: Closures (seasonal, temporary, or permanent) are made when the responsible line officer determines that a particular resource or facility needs protection from use. Specific guidelines for closure of roads during the period of the contract and at the end of the Purchaser's operations will be spelled out in the TSC.

Roads that must be used during wet periods should have a stable surface and sufficient drainage to allow such use with a minimum of resource impact. Rocking, 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 surface.

PRACTICE 13.02 - Slope Limitations for Tractor Operation
PRACTICE 14.07 - Determining Tractor Loggable Ground

OBJECTIVE: To reduce gully and sheet erosion and associated sediment production by restricting tractor operation to slopes where corrective measures for proper drainage are easily installed and effective.

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

IMPLEMENTATION: The TSC requires that the location of all skid trails and landings must be agreed upon before construction. Specific criteria that will be addressed during sale-layout and pre-work with the operator will include:

General:

1. All new or reconstructed landings, skidtrails, and fire trails shall be located on stable areas outside riparian areas. Sidecasting will be held to a minimum.
2. Tractor or wheel skidding will not normally be conducted on slopes over 35 percent. Incidental tractor skidding on slopes greater than this may be allowed when determined by a hydrologist or soils scientist that to do so is preferable to other options (i.e. Building additional road) and that accelerated erosion will not occur.

Skid Trails:

1. Skid trails shall be kept to the minimum feasible width and number.
2. Locate skid trails to avoid concentrating runoff and provide breaks in grade and waterbars.
3. Skidding equipment will be restricted to approved skid trails.

Landings:

1. Landing sizes will be the minimum necessary for safe, economical operation.
2. Landings and log decks will not be located within Riparian Areas.
3. Landings, log decks and/or burn piles will be located a minimum of 300 feet from streams, far enough away that direct (unfiltered) entry of sediment, bark, or ash and burning products will not occur.

PRACTICE 13.04 - Revegetation of Surface Disturbed Areas

PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities

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

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.

IMPLEMENTATION: As determined necessary, temporary roads, landings, skid trails, and anywhere else soil has been severely disturbed by Purchaser's harvesting operations will be seeded within one year after harvesting is completed. Seed mixes (consisting of native species) and fertilizer specifications will be incorporated into TSC provisions. The TSC will also include specifications for scarification/ripping of compacted landing and closed roads where this is deemed necessary by the IDT.

PRACTICE 13.05 - Soil Protection During and Following Slash Windrowing

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

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

IMPLEMENTATION: Windrowing or piling of slash with tractor or grapple piling machine is a common method of fire hazard abatement and site preparation. Potential for damage to soils and water are high. On slopes, windrows should be contoured as much as possible to act as a filter barrier which catches sediment and detains water runoff. Such piling would only be conducted on slopes greater than 50 percent upon the recommendation of a soils scientist or hydrologist. Care must be taken to minimize disturbance to the surface soil layer during these operations. Equipment would be prohibited from operating within 50 feet of streamcourses except at designated crossing areas. Areas where such slash disposal operations are acceptable will be identified in the TSC, where site specific specifications will be included.

Practice 13.06 - Soil Moisture Limitations for Tractor Operation

OBJECTIVE: To minimize soil compaction, puddling, rutting, and gullyng with resultant sediment production and loss of soil productivity by ensuring that activities are done when ground conditions are such that erosion and sedimentation can be controlled .

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

COMPLIANCE: No Related FPA rules.

IMPLEMENTATION: Tractor operations will be limited to periods when the soil moisture content is 18 percent or less, the ground is frozen, or there is at least 18 inches of snow depth. Tractor operations will only be allowed outside of these specifications through the sue of designated skid trails. These requirements will be incorporated into provision of the TSC.

PRACTICE: 13.07 - Pesticide Use Planning

OBJECTIVE: To incorporate water quality and hydrologic considerations into the Pesticide Use Planning Process.

EXPLANATION: The pesticide use planning process will be used to identify problem areas and the objectives of the project, establish the administrative controls, identify treatments and preventive measures, and incorporates the hydrologic considerations contained in SWCP 13.08 through 13.13. The NEPA process addresses these considerations in terms of impacts, mitigation measures, and alternative treatment measures. Project work and safety plans specify management direction.

Factors considered in pesticide selection are: purpose of the project, application methods available, target species, timing of treatment, pest locations, size of treatment area, and need for repeated treatment. Practicability of application considers: registration restrictions, form and method of application, topographic relief and areas to be avoided, and social acceptance of the project. The degree of risk considers: hazard to humans, method of application, transportation and handling hazards, carriers needed, and chemical persistence.

IMPLEMENTATION: The interdisciplinary team evaluates the project in terms of potential site response, potential social and environmental impacts, mitigating measures needed to protect water quality, and the need and intensity of monitoring and evaluation. The responsible Line Officer then prepares the necessary NEPA documentation, Project Plan, and Safety Plan. Depending on the pesticide use, (FSM 2151.04) the Forest pesticide-use coordinator or Integrated pest Management Working Group or Regional IPMWG reviews the documents along with the Pesticide-Use Proposal, form FS-2100-2, and makes recommendations for or against approval of the project.

REFERENCES: NFMA; NEPA; FSM 2150 and 2323; State Hazardous Waste Management Plans; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.08 - Apply Pesticides According to Label and EPA Registration Directions

OBJECTIVE: To avoid water contamination by complying with all label instruction and restrictions.

EXPLANATION: Label directions for each pesticide are detailed and specific, and include legal requirements for use.

IMPLEMENTATION: Constraints identified on the label and other legal requirements of application are incorporated into project plans and contracts. Responsibility for ensuring that label directions and other applicable requirements are followed rests with the Forest Supervisor or a designate such as the Forest Pesticide Use Coordinator. For contracted projects, it is the responsibility of the Contracting Officer to ensure that label directions and all other requirements are followed.

REFERENCES: FSM 2150; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.09 - Pesticide Application Monitoring and Evaluation

OBJECTIVE: To determine and document that pesticides have been applied safely and to provide an early warning for any contamination of water or non-target areas or resources.

EXPLANATION: This practice provides feedback on the placement accuracy, application amount, and any water contamination that might occur from pesticide use, so as to minimize or eliminate hazards to non-target areas or resources. Monitoring and evaluation methods include spray cards, dye tracing, and direct measurement of pesticide in or near water. Type of pesticide, equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of competent laboratory analysis and applicable Federal, State, and local laws and regulations are factors considered when determining the monitoring and evaluation needs.

IMPLEMENTATION: The monitoring and evaluation of pesticide application is a component of SWCP 11.02. The need for a monitoring plan is identified during the Pesticide Use Planning Process/NEPA process. If determined necessary, this monitoring and evaluation plan will consider the same items as in SWCP 11.02. A technical staff familiar in pesticide monitoring will evaluate and interpret the monitoring results in terms of compliance, State water quality standards and adequacy of project specifications.

REFERENCES: FSM 2150; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.10 - Pesticide Spill Contingency Planning

OBJECTIVE: To reduce contamination of water from accidental pesticide spills.

EXPLANATION: A contingency plan that contains a predetermined organization and immediate actions to be implemented in the event of a hazardous substance spill will be prepared. The plan lists notification requirements, time requirements for the notification, how spills will be handled, and who will be responsible for clean-up. Factors considered for each spill are: specific substance spilled, quantity, toxicity, proximity of spill to waters, and the hazard to life, property, and the environment.

IMPLEMENTATION: The Pesticide Spill Contingency Plan will be incorporated into the Project Safety Plan. The NEPA process will provide the means for including public and other agency involvement in plan preparation. The plan will list the responsible authorities.

REFERENCES: SWCP 11.07; FSH 2109.12, Pesticide Storage, Transportation, Spills, and Disposal Handbook; FSM 6740, 7442, 7442, and 7460; Oil and Hazardous Substances Pollution Contingency Plan for EPA Regions 8 and 10, 7/26/85; R-1 and R-4 Emergency and Disaster Plan; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.11 - Cleaning and Disposal of Pesticide Containers and Equipment

OBJECTIVE: To prevent water contamination and risk to humans from cleaning and disposal of pesticide containers.

EXPLANATION: The cleaning and disposal of pesticide containers and equipment must be done in accordance with Federal, State, and local laws, regulations, and directives, and in a manner which will safeguard public health, the beneficial uses of water, aquatic organisms and wildlife. Containers are rinsed three times, the rinse water applied on the project area as soon as practical, and the containers taken to the designated disposal site. Application equipment is also rinsed and rinse water applied to the project site before the equipment is moved from the project area.

IMPLEMENTATION: When the pesticide is applied by In-Service personnel, the Forest or District Pesticide Use coordinator will locate proper rinsing and disposal sites, and will arrange for container disposal in an approved

disposal site. When the pesticide is applied by a contractor, the contractor is responsible for proper clean-up and container disposal in accordance with label directions and Federal, State, and local laws.

The Project Contracting Officer will document that the proper disposal methods were followed.

REFERENCES: FSM 2150; FSH 2109.12, Pesticide Storage, Transportation, Spills, and Disposal Handbook; FSH 6709.11, Health and Safety Code Handbook; FSH 6709.12, Safety and Health Program Handbook; SWCP 11.07 and 11.08; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.12 - Protection of Water, Wetlands, and Riparian Areas During Pesticide Spraying

OBJECTIVE: To minimize the risk of a pesticide entering surface or subsurface waters or affecting riparian areas, wetlands, and other non-target areas.

EXPLANATION: When applying pesticides, an untreated buffer strip will be left alongside surface waters, wetlands, and riparian areas. Factors considered in establishing buffer strip widths beyond minimums established by FSM and NEPA documents are: beneficial water uses, adjacent land use, rainfall, temperature, wind speed, wind directions, terrain, slope, soils and geology, vegetative type, and aquatic life. Other considerations include: persistence, mobility, toxicity, and formulation of the pesticide, method of applications, equipment used, spray patterns, droplet size, application heights, and application pattern.

IMPLEMENTATION: Protected areas will be identified and mapped by an interdisciplinary team and the Forest Pesticide Use Coordinator during the NEPA process. Protection of untreated areas is the responsibility of the project supervisor for In-Service projects and the Contracting Officer for contracted projects. The certified commercial applicators are briefed about location of protection areas. These areas are flagged or otherwise marked when necessary to aid in boundary identification.

REFERENCES: FSM 2526, 2527, 2245, AND 2150; see references in "Best Management practice" Definition (05--2 and 3).

PRACTICE 14.02 - Timber Harvest Unit Design

PRACTICE 14.07 - Determining Tractor Loggable Ground

PRACTICE 14.08 - Tractor Skidding Design

PRACTICE 14.09 - Suspended Log Yarding

PRACTICE 14.10 - Log Landing Location and Design

OBJECTIVE: To insure that timber harvest unit design will maintain water quality and soil productivity by utilizing the appropriate harvest systems and by locating/designing landings and skidding patterns to best fit the terrain and avoid soil erosion.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules.

IMPLEMENTATION: Based upon site specific environmental factors and the physical limitations of equipment, the IDT will determine appropriate harvest methods for each harvest unit and this method will be specified in the TSC. During the presale operation, harvest units will be designed to fit selected harvest methods. During contract administration, the location of landings, skid trails, temporary roads, and skyline corridors will be determined keeping in mind that:

1. Machinery may not operate within 50 feet of any stream except when crossing at designated crossings.
2. Full suspension of logs is required across any stream except at approved crossings.
3. One end suspension may be required in certain soils and situations as specified in the EIS.
4. Landings may not be located within 300 feet of any creek unless approved by a hydrologist.
5. Skid trails will be located and designed to minimize soil disturbance.
6. Skid trails will be located so as to avoid concentrating runoff.

PRACTICE 14.03 - Use of Sale Area Maps for Designating Soil and Water Protection Needs

OBJECTIVE: To delineate the location of protection areas and special treatment areas, to insure their recognition, proper consideration, and protection on the ground.

EFFECTIVENESS: High

COMPLIANCE: No related FPA rule

IMPLEMENTATION: The following features will be designated on the Sale Area Map:

- a. Stream courses will be excluded from harvest and fuels activities according to standard INFISH buffers as shown on the Alternative maps in this EIS.
- b. Wetlands (meadows, lakes, potholes, etc.) are to be protected per the timber sale contract clauses.

These features will be reviewed on the ground by the Purchaser and the Sale Administrator prior to harvesting.

A Watershed Specialist (Forest or District) will work with the Presale Forester to insure that the above features have been designated on the Sale Area Map during contract development.

PRACTICE 14.04 - Limiting the Operating Period of Timber Sale Activities
PRACTICE 15.04 - Timing of Construction Activities

OBJECTIVE: To minimize soil erosion, sedimentation and loss in soil productivity by insuring that the Purchaser conducts his operations, including erosion control work, road maintenance, etc., in a timely manner, within the time period specified in the TSC.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: Limited operating periods are identified and recommended during the environmental analysis by the Interdisciplinary Team. Contract language specifies contract termination date and operating periods within that contract. Purchaser's plans must show intent to operate within these time frames prior to approval to commence work. Extensions of time (except for contract term adjustments) and waiver of specified operating periods should be granted only after IDT review.

PRACTICE 14.06 - Riparian Designation

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

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The Riparian Habitat Conservation Areas are identified during the environmental analysis by the interdisciplinary team. The timber sale project is designed to include site specific (INFISH) Standards and Guidelines 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 Riparian Area protection measures in the Timber Sale Contract and on the Sale Map Area. The Sale Administrator is responsible for contract compliance during harvest operations.

PRACTICE: 14.11 - Log Landing Erosion Prevention and Control

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

PRACTICE: 14.15 - Erosion Control on Skid Trails.

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

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The following minimum criteria will be used in controlling erosion and restoring landings and skid trails so as to minimize erosion:

General:

1. Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable locations at least 100 feet outside of the appropriate Stream Protection Zone.
2. Seeding will be done with a seed/fertilizer mix specified in the contract.

Landings:

1. During period of use, landing will be maintained in such a manner that debris and sediment are not delivered to any streams.
2. Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed.
3. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.

Skid Trails:

1. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff.
2. Spacing of water bars on skid trails will be based on guides for controlling sediment from secondary logging roads (no date). If necessary, additional water bars will be prescribed by the sale administrator and/or watershed specialist.

PRACTICE 14.17 - Stream Channel Protection (Implementation and Enforcement)

PRACTICE 15.19 - Streambank Protection

OBJECTIVES: To protect stream beds and streamside vegetation, during and after forest practice operations and road construction, by (1) maintained unobstructed passage of stormflows; (2) reducing sediment and other pollutants from entering streams; and (3) restoring the natural course of any stream, as soon as practical, if the stream is diverted as a result of timber management activities.

EFFECTIVENESS: High

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: Protecting stream channels during timber harvesting is accomplished by contract clause incorporated into the sale contracts. This is normally accomplished by designating particular streams as protected streamcourses and limiting or restoring timber management operations in streamside zones. There is substantial overlap between timber sale provisions to protect stream channels, and regulations that govern road construction and other practices.

The intent of the regulations and clauses is to protect the integrity of stream channels and minimize adverse impacts to the channel and downstream resources and beneficial uses. The following items are a minimum that will be incorporated into the TSC specifically to govern channel protection in the project area.

1. Purchaser shall repair all damage to a streamcourse if the Purchaser is negligent in their operations, including damage to banks and channel, to an acceptable condition as specified by the Forest Service.
2. All project debris shall be removed from streamcourse, in an agreed manner that will cause the least disturbance. Specifically:
Whenever possible trees shall be felled, bucked, and limbed in such a manner that the tree or any part thereof will fall away from any streams. Within 24 hours, slash and other debris that enters streams as a result of harvesting operations shall be removed. If the slash would be beneficial (i.e. provide sediment filtering) then the Sale Administrator may allow the Purchaser to leave the slash in place below culverts.
3. Location and method of stream crossing will be designed and agreed to prior to construction.
4. Wheeled or track laying equipment shall not be permitted to operate within 50 feet slope distance of the streams except at approved crossings.
5. On perennial streams, dewatering with filter fabric and/or diversion shall be considered prior to excavation for culvert placement.
6. Filter cloth, erosion control blankets, plastic, straw bales, and rip- rap will be used as appropriate to keep live water from contacting new fill during culvert installations.
7. When dewatering of a stream crossing is required, a non-erodible conduit, flex pipe or geotextile fabric will be used on all crossings. Silt fences shall be constructed below the stream crossing(s) prior to any streambank disturbance.
8. The construction activities in or adjacent to the stream may be limited to specific times to protect beneficial water uses.
9. Logs will be end-lined out of streamside and Riparian Areas. Equipment is permitted to enter streamside areas only at locations and times agreed by the Forest Service.
10. Material from temporary road and skid trail stream crossings will be removed and streambanks restored to an acceptable condition.

11. When cable yarding across or inside the riparian areas is necessary logs should be fully suspended across a stream and immediately above streambanks. Yarding shall be done in such a manner as to minimize streambank channel disturbance.
12. Construction equipment may cross, operate in or operate near streamcourses only where so agreed to and designated by the Forest Service prior to construction. Crossing of perennial stream channels will be done in compliance with the specifications included in the contract.
13. On perennial streams, stream channel alteration specifications will include the following:
 - a. Ford the stream only at one location.
 - b. Any cofferdams or temporary crossings should be designed to handle high streamflows.
 - c. Protect streambank vegetation as much as possible.
 - d. All fill materials shall be placed and compacted in horizontal lifts.
 - e. If rip rap is used, it shall extend at least one foot above anticipated high water mark, and meet minimum size criteria.
 - f. Rip rap shall extend far enough upstream and downstream to reach stable areas.
15. If the channel is damaged during construction, it will be restored as nearly as possible to its original configuration without causing additional damage to the channel.
16. Construction methods shall provide for eliminating or minimizing discharges of turbidity, sediment, organic matter or toxic materials. A settling basin may be required for this purpose.

PRACTICE 14.18 - Erosion Control Structure Maintenance

OBJECTIVE: To ensure that construction erosion control structures are stabilized and working effectively.

EFFECTIVENESS: High

IMPLEMENTATION: The TSC requires that during the period of the contract, the Purchaser shall provide maintenance of soil erosion control structures constructed by the Purchaser until they become stabilized, but not for more than one year after their construction. After 1 year, any erosion control work needed is accomplished through the Forest Service funding.

The TSC also requires the Purchaser to maintain the erosion control structures concurrently with his operations under the sale, and in any case, not later than 15 days after completion of skidding each unit or subdivision.

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.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA rule.

IMPLEMENTATION: The TSC requires that upon the Purchaser's written request and assurance that work has been completed the Forest Service shall perform an inspection. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. The Forest Service will not accept as complete, erosion control measures which fail to meet this criteria.

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.

EFFECTIVENESS: Moderate

COMPLIANCE: No directly related FPA rule.

IMPLEMENTATION: Sensitive areas needing special protection are identified by the IDT in the Timber Sale Planning Process. Results are documented and identified in the slash treatment plan. The TSC is prepared to incorporate provisions to provide the level of protection prescribed.

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.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA rules.

IMPLEMENTATION: If evidence indicates that unacceptable impacts would occur to soil and water resource 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 as allowed by the TSC.

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.

EFFECTIVENESS: Moderate

COMPLIANCE: Exceeds FPA rules

IMPLEMENTATION: As the TSC is assembled, road location and design criteria are assembled from several volumes of standards, and optional specifications and guidelines. Specific roads and road segments often have specifications that are unique to the road or road segment. The following listed items, however, are general road location and design guidelines for minimizing impacts on water quality.

1. Fit the road to the topography - Use natural benches, follow contours, avoid long, steep road grades. Balance cut/fill where possible to avoid waste areas.
2. Locate on stable topography. Whenever possible, avoid slumps and slide prone areas and steep side hills.
3. Locate roads a safe distance away from streams and other water bodies, and provide an adequate buffer zone to trap sediment before it enters into any water body.
4. Minimize the number of stream crossings and choose stable sites. Structures will be designed (sized) for long-term stability, generally for the Q100 and will provide for fish passage, if present.
5. Locate and design roads to drain naturally by appropriate use of outsloping and insloping with cross drainage and grade changes, where possible. Cross drains will be installed to 1) carry interpreted flow across constructed areas; 2) to relieve the length undrained ditch; and 3) to reduce disruption of normal drainage patterns. Road and trail drainage should be channeled to effective buffer areas, either natural or manmade, to maximize sediment deposition prior to entry into live water.

6. Ditchlines and road grades will be designed to minimize unfiltered flow into streams. A rolling dip, relief culvert or similar structure will be installed as close as practical to crossings to minimize direct sediment and/or water input directly into streams. The drainage will be routed through buffer strips or other sediment settling structures where possible.
7. At a minimum, windrows will be installed 100 feet on both sides of perennial stream crossings and where installation will minimize sediment delivery to nearby streams or channels. Windrows will also be installed where fill slope erosion is possible, or where road derived erosion may be delivered; (i.e. outflow area of culverts or rolling dips, etc).
8. Design to the standard necessary to accomplish anticipated use and equipment needs safely, while providing for long-term protection of the soils and water.
9. Seeding and fertilization of erodible surfaces exposed during construction will be accomplished. Next season seeding will be done where original treatment is not fully successful.
10. Road construction occurring outside the normal operating season will have additional restrictions on the amount of pioneered road and additional erosion control measures.

PRACTICE 15.03 - Road and Trail Erosion Control Plan

OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation through timely implementation of erosion control practice.

EFFECTIVENESS: Moderate

COMPLIANCE: No related FPA rule

IMPLEMENTATION: 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. Erosion control work to be done by the Purchaser will be defined in Standard Specification 204 and/or in the Drawings. The schedule shall consider erosion control 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 by the TSA, District Watershed Specialist, and Engineering to insure their compatibility before any schedules area approved. The Engineer will certify that the Purchaser's Erosion Control Plan meets the specifications.

PRACTICES: 15.05 - Slope Stabilization and Prevention of Mass Failures

OBJECTIVES: To reduce sedimentation by minimizing the chances for road-related mass failures, including landslides and embankment slumps.

EXPLANATION: Road construction in mountainous terrain requires cutting and loading natural slopes which may lead to landslides and/or embankment failures depending on the soil strength, geology, vegetation, aspect, and groundwater regime. Landslides and embankment failures are undesirable because they interrupt traffic, are costly to repair, visually unacceptable, and generate large quantities of erosion and sedimentation.

Roadways may drastically change the subsurface drainage characteristics of a slope. Since the angle and height of cut and fill slopes increase the risk of instability, it is often necessary to provide subsurface drainage to avoid moisture saturation and subsequent slope failure. Where it is necessary, horizontal drains, drainage trenches, or drainage blankets may be used to lower the subsurface water levels and to prevent groundwater from entering embankments.

In areas with high landslide potential, the composition and characteristics of embankments may be controlled since they are essentially engineered structures. Care must be taken to prevent the incorporation of construction slash or other organic material and the embankment material should be placed by one of the following methods.

- a. Layer placement.

- b. Controlled compaction.
- c. Controlled compaction using density controlled strips.
- d. Compaction controlled with a special project specification.

IMPLEMENTATION: In areas with intrinsic slope stability problems, appropriate technical resource staffs must be involved in an interdisciplinary approach to route location. Sufficient subsurface investigation and laboratory testing must be performed to general design parameters and mitigating features which will meet the constraints and requirements developed through the NEPA process.

In contracted projects, compliance with environmental analysis requirements and controls which have been provided for in the specifications is assured by enforcement of the Timber Sale Contract Provisions by the Contracting Officer and/or Engineering Representative.

REFERENCES: FSM 7706.11, 7706.12, 7710, and 7720; Standard Specifications 203, 212, 605, 613, 619, 630, and 631; Timber Sale Contract Provisions B6.31, B6.62, C5.2, C5.4, and C6.36; FSH 7709.11, Transportation Engineering Handbook and 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.

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

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

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rule

IMPLEMENTATION: Areas requiring mitigation of surface erosion may occur anytime during the life of the timber sale contract. When these are found, the following provisions will be implemented.

- a. All disturbed areas associated with road construction and reconstruction will be seeded. The first seeding will be applied as soon as practical after cuts and fills are brought to grade within seeding seasons as established in the TSC. A second seeding in the fall or spring season following road construction will be required where original seeding did not adequately revegetate exposed soil areas.
- b. Where surface erosion is occurring because of inadequate vegetative cover, additional seeding and re-fertilization will occur using recommended seed and fertilizer mixes. If the Purchaser has done his required seeding, or bare spots are not caused by the Purchaser, seeding will be done by the Forest Service.
- c. Where ditches are carrying erosion products into stream channels, straw bale and erosion cloth ditch blocks will be installed to "short-circuit" the delivery. Seeding of the eroding surfaces and seeding of the stored sediment in the ditch will also be accomplished.
- d. Where either straw bale/erosion cloth structures are not felt to be effective, underdrains or other measures will be installed to drain the ditches onto suitable ground, or at least reduce erosion impacts to the stream.
- e. Slumping of cutslopes will require a combination of both mechanical and vegetative controls. If/when this problem is found, a solution will be determined in consultation with Engineers, geotechnical and resource specialists and appropriate actions taken to remedy the situation or minimize adverse impacts.

f. Additional underdrains (e.g. French drains) will be constructed where intercepted moisture is encountered on incised stream approaches. Erosion control blankets and straw bales will be used to dissipate ditch scour and stabilize fill slopes.

g. At ditch relief culvert locations, or at culvert locations in dry or intermittent wet draws, the piles shall not be broken but shall be placed a minimum of 20 feet below the culvert outlet. At culvert locations in live streams, piles shall not be broken but shall be continued at the toe of the embankment over the top of the culvert. No slash shall be allowed to restrict the flow of water from the culvert.

Unless caused by the Purchaser during his maintenance operations, or known before sale award and included in TSC, these items (a-g) will be beyond the scope of Purchaser responsibility. Repair and/or improvement would be then handled by contract modification or by the Forest Service.

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.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The following items will be included in the identified road contract specifications or drawings.

1. *For New Construction and Reconstruction* - During and following operations on out sloped roads, retain out slope drainage and remove berms on the outside except those intentionally constructed for protection of road grade fills.
2. *For New Construction* - The following criteria will be incorporated into new road design:
 - a. Construct cross drains and relief culverts to minimize erosion of embankments. Minimize the time between construction and installation of erosion control devices. Use riprap, vegetative matter, downspouts and similiar devices to minimize erosion of the fill.
 - b. Prior to fall or spring runoff, install drainage structures or cross drain uncompleted roads which are subject to erosion.
 - c. Install relief culverts at a minimum grade of 1 percent greater than road gradient.
3. *For Existing Roads* - At a minimum, the following items will be added to or improved in the existing road system that will be used for purposed timber haul:
 - a. Energy dissipaters or downspouts will be placed below problem culvert outlets (Reconstruction item).
 - b. In all areas where ditch erosion is significant at this time, relief culverts that drain onto suitable areas will be installed (Reconstruction item).
 - c. Roads restricted after use will also have erosion control measures in place prior to final pull-out.
 - d. For all native surface roads to be restricted after use, the travelway will be seeded and fertilized: and will have the surface roughened to accept seed germination and vegetative establishment where necessary

and beneficial.

PRACTICE 15.08 - Pioneer Road Construction

OBJECTIVE: To minimize sediment production and mass wasting associated with pioneer road construction.

EFFECTIVENESS: Moderate

COMPLIANCE: No directly related FPA rule.

IMPLEMENTATION: The following contract specifications will be required:

- a. Construction of pioneer roads shall be confined to the roadway limits unless otherwise approved by the Contracting Officer.
- b. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, and to prevent avoidable deposition of materials outside the designated roadway limits.
- c. Erosion control work will be completed concurrent with construction activity or prior to the wet season. During the wet and winter season, no more than 1,000 feet of road can be in the pioneer state without the required erosion control work completed.
- d. Permanent culverts will be installed during the pioneer phase unless positive control of sediment can be accomplished during installation, use, and removal of the temporary structure.

PRACTICE 15.09 - Timely Erosion Control Measures on Incomplete Road and Stream Crossing Projects:

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

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The following measures will be implemented during projects:

1. Temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion will be installed as necessary. The removal of temporary culverts, culvert plugs, diversion dams, or elevated streamcrossing causeways will be completed as soon as practical.
2. Removal of debris, obstruction, and spoil material from channels and floodplains.
3. Seeding with native species to minimize erosion.
4. Installation of drainage structures or cross draining uncompleted roads which are subject to erosion prior to fall or spring runoff.

Erosion control measures must be kept current with ground disturbance, to the extent that the affects area can be rapidly "closed" if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

PRACTICE 15.10 - Control of Road Construction Excavation and Sidecast Material

PRACTICE 15.18 - Disposal of Right-of-Way and Roadside Debris

Objective: To measure that unconsolidated excavated and sidecast material, construction slash, and roadside debris generated during road construction is kept out of streams, and to prevent slash and debris from subsequently obstructing channels.

Effectiveness: High

Compliance: Meets FPA rules

Implementation: In the construction of road fills near streams, compact the material to reduce the entry of water, and minimize the amount of snow, ice, or frozen soil buried in the embankment. No significant amount of woody material shall be incorporated into fills. Slash and debris may be windrowed along the toe of the fill, but in such a manner as to avoid entry into a stream and culvert blockage.

Where slash windrows are not desirable or practical, other methods of erosion control such as erosion mats, mulch, and straw bale or fabric sediment fences will be used. Where exposed material (excavation, embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediments would enter streams, the material will be stabilized prior to fall or spring runoff by seeding, compacting, rip-rapping, benching, mulching or other suitable means.

PRACTICE 15.13 - Controlling In Channel Excavation

OBJECTIVE: To minimize downstream sedimentation by insuring that all in-channel excavations are carefully planned.

EFFECTIVENESS: High

COMPLIANCE: Meets SCA rules

IMPLEMENTATION: Location and method of stream crossings will be designed and agreed to prior to construction. The following items highlight some of the principal provisions which can be incorporated into the TSC that will govern channel protection:

1. Construction equipment may cross, operate in, or operate near stream courses only where so agreed to and designed by the Forest Service prior to construction.
2. No construction equipment shall be operated below the existing water surface except that fording the stream at one location only will be permitted, and work below the water level that is necessary for culvert bedding or footing installations will be permitted to the extent that it does not create unnecessary turbidity or stream channel disturbance.
3. Construction of any hydraulic structures in stream channels will be in compliance with TSC specifications.

PRACTICE 15.14 - Diversion of Flows Around Construction Sites

OBJECTIVE: To minimize downstream sedimentation by insuring that all stream diversions are carefully planned.

EFFECTIVENESS: High

COMPLIANCE: Meets SCA Rules

IMPLEMENTATION: Flow in streamcourses may only be diverted if the Forest Service deems it necessary for the contractor to meet contractual specifications. Such a diverted flow shall be restored to the natural streamcourse as soon as practicable. Stream channels impacted by construction activity will be restored to their natural grade, condition, and alignment.

PRACTICE 15.15 - Stream Crossings on Temporary Roads

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

EFFECTIVENESS: Moderate

COMPLIANCE: Meets SCA Rules

IMPLEMENTATION: The following preventive measures will be included in contract specifications for such installations:

- a. Divert stream flow through or around project sites during construction when that will minimize downstream sedimentation. Active streams will be de-watered or diverted during culvert installations only at the direction of the Forest Service.
- b. Erodible material shall not be deposited into live streams.
- c. Any material stockpiled on floodplains shall be removed before rising

water reach the stockpiled material.

- d. During excavation in or near the streamcourse, it may be necessary to use suitable coffer dams, caissons, cribs of sheet piling. This will usually be the case where groundwater is contributing a significant amount of water to the immediate excavation area. If any of the aforementioned devices are used, they will be practically watertight and no excavation will be made immediately outside of them.
- e. Water pumped from foundation excavation shall not be discharged directly into live streams, but shall be pumped into settling ponds or into locations where water will not re-enter stream.

PRACTICE 15.17 - Regulation of Borrow pits, Gravel Sources and Quarries

OBJECTIVE: To minimize sediment production from borrow pits, gravel sources, and quarries, and limit channel disturbances in those gravel sources suitable for development in floodplains.

EFFECTIVENESS: High

COMPLIANCE: No Related FPA RULE

IMPLEMENTATION: Minimize opportunities for erosion from borrow pits and gravel sources from entering streams.

1. Complete any crushing and/or screening of excavating bedload away from any active stream channels and minimize future opportunities for waste materials to enter area streams, even under flood conditions.
2. Identify and implement opportunities to minimize erosion from existing borrow pits within the drainage.
3. If development of new rock sources are needed within the watershed, complete a pit development plan or rock source development plan which outlines all mitigation measures needed to control future erosion of the rock source.

PRACTICE 15.18 - Disposal of Right-of-Way and Roadside Debris

OBJECTIVE: To insure that debris generated during road construction is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

Also see Practice 15.10

EFFECTIVENESS: High

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: Disposal of Right-of-Way and roadside slash be accomplished with one or more of the following practices.

1. Windrowing
2. Scattering
3. Chipping
4. Piling and Burning
5. Removal to previously agreed to locations.

Solid cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood. No wood may obstruct flow in ditchlines or culverts.

PRACTICE 15.19 Streambank Protection

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

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: To reduce sediment and channel bank degradation at sites disturbed by construction of stream crossing or roadway fill, it may be 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 the flowing water. These measures must be sized and installed in such a way that they effectively resist erosive water velocities. Stone use 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 rip-rapping for energy dissipation. See conservation practice 14.17 for additional measures.

PRACTICE 15.21 - Maintenance of Roads

OBJECTIVE: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: For roads in active timber sale areas standard TSC provisions require the Purchaser to perform or pay for road maintenance work commensurate with the Purchaser's use. Purchaser's maintenance responsibility shall cover the before, during and after operations period during any year when operations and road use are performed under the terms of the Timber Sale Contract. All maintenance work shall be done concurrently, as necessary, at least to the following minimum standards:

1. Culverts and ditches shall be kept functional.
2. During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or waterbarred, and berms removed from the outside edge except those intentionally constructed for protection of fills.
3. The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage.
4. If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams.
5. Sidecast of all material associated with road maintenance will be done in a manner to prevent its entry into streams.
6. Slumps, slides and other erosion features causing stream sedimentation will be kept repaired and stabilized.

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.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA Rule

IMPLEMENTATION: 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 by the IDT. Road surface treatments may include: watering, applying magnesium chloride, sealing, aggregate surfacing, chip-sealing, or paving.

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.

EFFECTIVENESS: Moderate

COMPLIANCE: No directly related FPA Rule

IMPLEMENTATION:

1. The Purchaser is responsible for snow removal in a manner which will protect roads and adjacent resources.
2. Rocking or other special surfacing and/or drainage measures may be necessary, before the operator is allowed to use the roads.
3. 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.
4. 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 spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On in sloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culvert inlets are not damaged.

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.

EFFECTIVENESS: High

COMPLIANCE: Meets FPA Rules

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

1. Road effectively drained and blocked.
2. Temporary culverts and bridges removed and any modified channel slopes stabilized and revegetated.
3. Road returned to resource production through revegetation (native species, or trees).
4. Sideslopes reshaped and stabilized.

PRACTICE: 15.27 - Trail Maintenance and Rehabilitation

OBJECTIVE: to minimize soil erosion and water quality problems resulting from trail erosion.

EXPLANATION: Trails often have erosion problems due to poor location, improper maintenance, and the amount or type of use. This deterioration can often be minimized by proper maintenance, restriction of certain types of use, and/or relocation. Mainline and heavy use trails should have a functional drainage systems (waterbars, culverts at small stream crossings, corduroy, puncheon or boardwalks in boggy areas). Additional measures (lateral ditching, trail relocation, reconstruction, and so forth) may be required in heavy sue or problem areas.

IMPLEMENTATION: Each District will develop a trail maintenance plan which determines level, timing and frequency of maintenance. The need for closures will be identified through Forest Transportation Planning. Closure is done by authority of the Forest Supervisor (SWCP 11.09).

REFERENCES: SWCP 11.03, 11.09, 15.01, 15.02, and 15.03; FSH 7709.56b, Drainage Structures Handbook; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE 18.02 - Formulation of Fire Prescriptions

PRACTICE 18.03 - Protection of Soil and Water form Prescribed Burning

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

EFFECTIVENESS: High

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: The prescription elements are defined by the interdisciplinary team during 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. 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 litter significantly affects erosion rates, water quality and runoff volumes.

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 from 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 of 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 Habitat Conservation Area (RHCA). 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 given horizontal distance from the normal high water line of a stream, or from the shoreline of a standing body of water (INFISH 1991). An RHCA is not a zone of exclusion, but an area of closely managed activity. RHCAs act as an effective filter and absorptive zone for sediment; maintains shade; protects aquatics and terrestrial riparian habitats; protect channel and streambeds; and promotes 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 by 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.

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.