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Water Quality Management for Forest System Lands in California

Best Management Practices



Photo Illustration: Rachel Driver,
Plumas National Forest

WATER QUALITY MANAGEMENT
FOR NATIONAL FOREST SYSTEM LANDS IN CALIFORNIA
BEST MANAGEMENT PRACTICES
September 2000

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This guidance documents the practices and procedures, which are the structure of the water quality management program for the Pacific Southwest Region. It describes each Best Management Practices (BMP) used for water quality management on National Forest System (NFS) lands within the State of California. It represents a portion of the State of California's Nonpoint Source Management Plan.

The practices, procedures and program are in conformance with, and comply with the provisions and requirements of Sections 208 and 319 of the Federal Clean Water Act (PL 92-500) and the United States Environmental Protection Agency (EPA) (g) guidance for the Coastal Zone Act Reauthorization Amendment. They are also within the guidelines of the Water Quality Control Board (Basin Plans) developed by the nine RWQCB in the State.

Pursuant to Section 208 of the Clean Water Act, all agencies responsible for carrying out any portion of a State Water Quality Management Plan must be designated as a Water Quality Management Agency (WQMA). Through the execution of a formal Management Agency Agreement (MAA) with the Forest Service in 1981, the SWRCB designated the Forest Service (USFS) as the WQMA for NFS lands in California (See Section 14).

The Pacific Southwest Region shall maintain its status as the designated WQMA for NFS lands in California. It is through the proper installation, operation and maintenance of these State certified and EPA approved practices and procedures that the Forest Service will meet its obligations for compliance with water quality standards and fulfill its obligation as a designated WQMA.

10.1 Authority

As a Federal agency, the Forest Service is bound by Federal Laws, Executive Orders, and Department of Agriculture directives, which are the basis for governing Forest Service programs and operations. Federal Laws and Executive Orders of direct and specific application include the following:

1. Organic Administration Act of June 4, 1987. This Act emphasized that the National Forests were created to improve and protect the forests; to secure favorable conditions of water flows; and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States.
2. Multiple Use Sustained-Yield Act of June 12, 1960, and the Wilderness Act of September 3, 1964. These Acts stated that the National Forests are established and will be administered for outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness purposes. The multi-resource management responsibility of the Forest Service is amplified through these laws.
3. National Environmental Policy Act of January 1, 1969. The Act promotes efforts, which will prevent or eliminate damage to the environment and develop an understanding of the inter-relationships of all components of the natural environment and the management of the various natural resources.

4. Environmental Quality Improvement Act of April 13, 1970. This Act describes a National policy for the environment, which provides for the enhancement of environmental quality
5. Clean Water Act of 1972, as amended. This Act establishes goals, policies and procedures for the maintenance and improvement of the Nation's waters. It addresses both point and nonpoint sources of pollution and establishes or requires programs for the control of both sources of pollution. Section 208 required area-wide waste treatment management plans and water quality management plans for nonpoint sources of pollution. The Act established specific roles for Federal, state and local authorities in the regulation, enforcement, planning, control and management of water pollution. More directly, Section 319 addresses nonpoint source pollution and also requires development of water quality management plans.
6. The Forest and Rangeland Renewable Resources Planning Act of August 17, 1974. This Act provides for systematic, long-range planning in managing renewable resources. The plans are based on a National assessment conducted every ten years. The plans are updated every five years and submitted to Congress.
7. National Forest Management Act of October 22, 1976. This Act amended RPA, emphasizing interdisciplinary involvement in the preparation of land and resource management plans. The Act emphasized the concept of multiple use management and added requirements for resource protection.
8. Executive Order 12088 of October 13, 1978. This order requires Federal agency compliance with environmental laws to be consistent with requirements that apply to a private person. Compliance will be in line with authorities and responsibilities of other Federal agencies, State, interstate, and local authorities as specified and granted in each of the various environmental laws.

10.2 Objectives

The objectives of this handbook are:

1. To consolidate direction applicable to BMP application on NFS lands in California for the protection of water-related beneficial uses from nonpoint source contaminants.
2. To establish a uniform process of BMP implementation that will meet the intent of the Federal and State water quality Laws, Executive Orders, and the United States Department of Agriculture (USDA) directives.
3. To incorporate water quality protection and improvement considerations that will result in clean water into the site-specific project planning process.

10.3 Policy

The Forest Service will be responsive, in an ongoing manner, to the environmental intent, goals and objectives provided by the Clean Water Act, as amended.

Regional policy will comply with the objectives, policy and procedures of agency directives, handbooks and manuals to include, but not be limited to, those required in Forest Service Manual (FSM) 2532. It is also Regional policy to conduct water quality management actions in a manner that is consistent and compatible with the intent and provisions of the 1981 MAA between the USFS and the SWRCB, (See Section 14).

The following actions will be used to carry out water quality management:

1. **Correct Water Quality Problems on the National Forests**

NFS lands exhibit conditions that are, or have the potential to be, a source of nonpoint pollution. These conditions exist as a result of past management actions by the Forest Service, or other landowners, and as the result of natural occurrences such as fires and floods.

These existing and potential nonpoint sources will be evaluated to determine the need for and type of treatments necessary. Those lands found to be in need of watershed improvement work will be scheduled for treatment as part of the ongoing work planning and budgeting process. Watershed improvement funds will be used to restore deteriorated watershed land when no other funding sources e.g. roads, grazing, Knutsen-Vandenberh (KV) is available to correct the problem.

Accomplishment is dependent on funding and personnel availability, and work priority relative to other management goals and objectives.

Where a resource management action, due to design, administration, implementation, or other oversight, results in an impact to water quality, the impacting USFS resource function is responsible for providing the financing to mitigate the impact.

Appropriate specialists will assess each specific impact and prescribe actions to correct the problem. These actions are integrated into the forest work planning and budgeting process for accomplishment.

2. **Perpetually Implement Best Management Practices**

The perpetual implementation of BMPs involves three facets: training, keeping BMPs current, and BMP monitoring and evaluation.

a. Training. Forest Supervisors will conduct water quality planning and BMP application training at the forest and district level as often as needed to orient new employees, to keep all employees updated and informed as to what is working and what needs work, and to maintain the most recent state-of-the-art knowledge and capability in water quality protection.

b. Keeping BMPs Current. The text and references for each BMP will be updated as needed to reflect the most recent state-of-the-art methods and techniques of BMP

implementation and changes in Forest Service policy and direction. Revisions and amendments to Forest Service direction at the Regional and Forest levels will be reviewed to identify changes in the direction upon which a BMP is based.

- c. BMP Monitoring and Evaluation. The control of nonpoint source pollution using BMPs is an iterative process of site-specific treatment and control needs identification, implementation, monitoring and evaluation, and feedback (See Figure 1).

Continued tracking of BMP implementation and effectiveness are key in initiating corrections and adjustments of BMP design and specification criteria and/or water quality standards. As warranted Research and/or administrative studies will be initiated to validate criteria and/or assumptions used in applying BMPs. Three types of monitoring are applicable to BMPs: implementation, effectiveness, and validation monitoring (See Figure 2).

Implementation and effectiveness monitoring will be accomplished using the Best Management Practice Effectiveness Evaluation Process (BMPEP), developed for the Region (See Section 15). Individual BMPs will be evaluated on-site where they are installed, the composite set of BMPs for a given project will be evaluated applying an in-channel assessment. Validation monitoring will be initiated where implemented practices are found to be non-effective, and revised criteria, or specifications are required to improve effectiveness. Field data will be collected, stored in computer systems and analyzed at the Regional and Forest level.

Land Use Activity

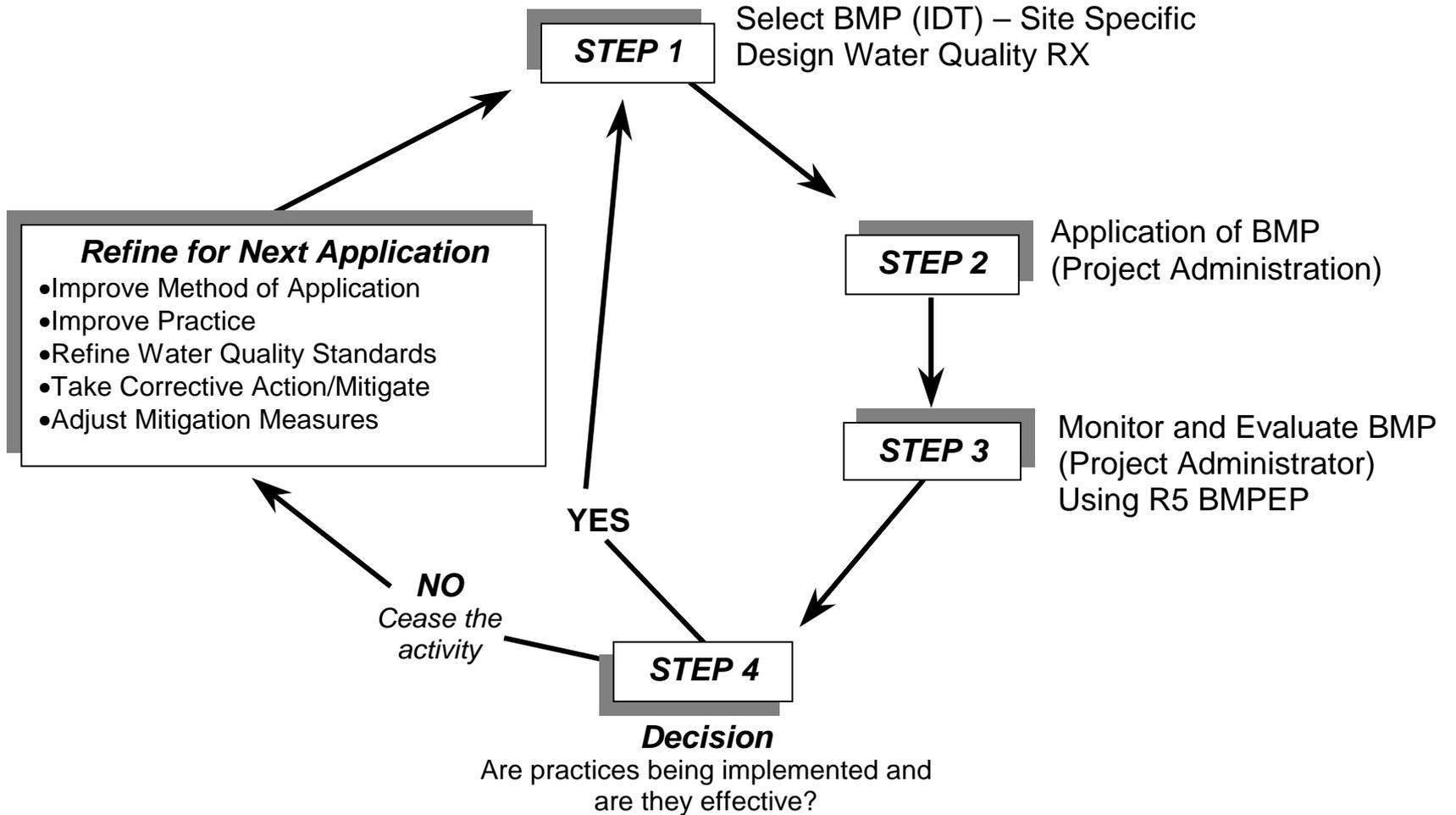


Figure 1: Iterative Process of Non-Point Pollution Control

BMP Water Quality Prescription

Site Specific Water Quality Controls

Implementation

- Was BMP prescription implemented as prescribed?
- Were BMPs from EA included in project plan?
- Did project plan follow prescription?
- Does implementation need refinement, or adjustment?

Effectiveness

- Did BMP prescription achieve its objective?
- Were beneficial water uses protected?
- Is BMP technically sound?
- Is water quality standard correct?
- Does BMP need improvement?

Validation

- Are assumptions valid?
- Are coefficients and thresholds valid?
- Are models accurate?
- Are studies needed to improve analysis?
- Were BMPs correctly selected?
- Were beneficial water uses identified?

Figure 2: Essentials of BMP Monitoring

- Are they over-protecting the uses?
- Do the parameters for which standards are evaluated establish the correct indices to indicate protection of uses?
- Have the correct beneficial uses for the water body been identified?

Where the problem is determined to be an inappropriate standard or beneficial use designation, USFS personnel may contact the appropriate RWQCB, and through dialogue identify appropriate corrective or responsive actions.

Where it is determined that the reason for the problem is a deficiency in the BMP itself, USFS personnel will initiate action to improve the management practice by correcting the deficiency. Where this is the case, cease the activity until appropriate corrective action has been taken onsite.

Validation Monitoring will be used where needed to determine whether the assumptions, coefficients and specifications used to apply BMPs are valid.

USFS staff will initiate administrative and/or research studies as warranted to verify coefficients and assumptions used in the design and selection of the BMP. This monitoring, usually coordinated with research, is data-intensive, using techniques such as permanent plots. Data is commonly used to establish norms for water quality properties, beneficial uses, and economic efficiency in order to:

- a) Detect and define changes over time and space.
- b) Establish range of variation or coefficients for predictive and analytical models.
- c) Define cause and effect relationships.

3. Carry Out Identified Processes for Improving, or Developing Best Management Practices

As a result of management practice monitoring and evaluation, practices will be identified as needing improvement, or development. The final major action is to refine those practices that need improvement and those that need development into BMPs.

The Regional Forester will assign responsibility for the development and improvement action, and will direct staffing needs to carry out the action. The Forest Service intends to test the results of development and improvement studies, and associated conclusions reached, before final adoption of the products as BMPs. Once adopted, implementation of the BMP shall follow the agency policy and direction cited as references for each BMP (See Section 13).

10.4 Responsibility

See FSM 2504 and 2530.4 for the water quality management responsibilities for the Regional Forester, Forest Supervisors and District Rangers.

1. Regional Forester

The Regional Forester will:

- a. Conduct Forest Service activities in accordance with the MAA with the SWRCB signed March 17, 1981 (See Section 14).

2. Regional Staff Director

The Regional Staff Director will:

- b. Review the reference section of the BMP handbooks needed to verify that the directives cited as references for BMPs are still valid source documents. In most cases this will involve the review of multiple BMP reference sets.
- c. Continue to refine and update existing BMPs to keep pace with state-of-the-art knowledge and to develop new practices where voids exist or as needs arise.

3. Forest Supervisor

The Forest Supervisors shall:

- a. Apply BMPs for water quality protection and improvement in day-to-day management activities.
- b. Evaluate attainment of water quality management goals through formal and informal reviews of project planning, and through monitoring using BMPEP protocols.
- c. Conduct BMP training annually on an as needed basis, before each field season for new employees, new line officers, and new resource personnel. Training of a new resource person shall include practical instruction in the application of BMPs for planning and administration of various management activities.

10.5 Definitions

10.51 List of Acronyms

These acronyms are frequently used in the text, with a definition at the point of first use. This list is provided as a ready reference for the reader.

AASHTO	American Association of State Highway and Transportation Officials
ASTM	American Society for Testing and Materials
BMP(s)	Best Management Practice(s)
BMPEP	Best Management Practice Evaluation Program
CDFG	California Department of Fish and Game
CI	Construction Inspector
COR	Contracting Officer's Representative
CFR	Code of Federal Regulations
EHR	Erosion Hazard Rating
EPA	United States Environmental Protection Agency
ER	Engineering Representative
FERC	Federal Energy Regulatory Commission
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSR	Forest Service Representative
IDT	Interdisciplinary Team
KV	Knutsen-Vandenberg
LRMP	Forest Land and Resource Management Plan
MAA	Management Agency Agreement
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System

NOI	Notice of Intent to Operate
NPDES	National Pollutant Discharge Elimination Permit System
OSHA	Occupational Safety and Health Administration
PL	Public Law
R - 5	Region 5 (Pacific Southwest Region) of the U.S. Forest Service
RPA	Forest and Rangeland Renewable Resources Planning Act, August 17, 1974
RWQCB	Regional Water Quality Control Board
SA	Sale Administrator
SAI Plan	Sale Area Improvement Plan
SAM	Sale Area Map
SMZ	Streamside Management Zone
SPCC	Spill Prevention, Containment and Counter Measures
STORET	A storage and retrieval computer system administered by EPA.
SWRCB	State Water Resources Control Board
TSA Handbook	Timber Sale Administration Handbook
TSC	Timber Sale Contract
TSP	Timber Sale Planning Process
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
VIS	Visitor Information Service
WQIO	Environmental Quality Improvement Act of April 3, 1970.
WQMA	Water Quality Management Agency

10.52 Glossary of Terms

Amendment: Revised sections of the FSM and the Forest Service Handbook (FSH) system to keep the text updated.

Apron: A reinforcement mechanism that protects soil from erosional and gravitational displacement.

Armoring: Protective coverings, or structures used to dissipate the erosive energy of water. Aprons and rip-rap are types of armoring.

Beneficial Use: A use of the waters of the state to be protected against quality degradation, including but not necessarily limited to domestic, municipal, agricultural, industrial supply, power generation, recreation, esthetic enjoyment, navigation, conservation and enhancement of fish, wildlife, and aquatic resources.

Best Management Practice: A practice, or a combination of practices, that is determined by the State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practicable (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.

Best Management Practice Evaluation Program: The field evaluation process developed and used by Region 5, to systematically evaluate the implementation and effectiveness of BMP.

Cross Drain: A ditch 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 either side of the road prism.

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

Designated Swimming Waters: Those waters in which swimming, wading, dabbling, diving, and other forms of primary water-contact recreation are specifically encouraged by signs, or public notice.

Earth Scientist: Air resource specialists, geologists, hydrologists, and soil scientists working for the Forest Service in the field of natural sciences. These personnel, with knowledge and skills in the fields of soil-precipitation-runoff relationships, are primarily concerned with on-site productivity and protection of water quality.

Erosion Hazard Rating (EHR): A relative rating of the potential for soil erosion on a given site. Commonly used to estimate the erosion response expected from a given land management activity. Ratings are the result of a composite analysis of the following factors: soil, topography, climate, soil cover.

Extremely Unstable Lands: Land areas exhibiting one, or more of the following characteristics:

1. Active landslides.
2. EHR is greater than a score of "29" on the R-5 rating scale.
3. Inner gorges.
4. Portions of shear zones and dormant landslides having slope gradients that are typically steeper than 60 to 65%.
5. Unconsolidated deposits with slope gradients at, or steeper than the stable angle of repose.
6. Lands with slope gradients at, or steeper than the mechanical strength of the underlying soil and rock materials.

Floodplain: The areas adjoining inland streams and standing bodies of water and coastal waters, including debris cones and flood-prone areas of offshore islands, including at a minimum, that area subject to a 1% chance of flooding in any given year.

Ground Cover: Material on the soil surface that impedes raindrop impact and overland flow of water. Material may include duff and organic matter such as needles, sticks, limbs, etc., and exposed roots, stumps, surface gravels and living vegetation

Hazardous Substances: Any of a wide variety of materials, solid liquid, or gas, which require specific cautionary handling and procedures to permit their safe use. (Health and Safety Code 6709.11, Chapter 9)

Horizontal Drains: Horizontal pipes installed in road cut slopes and fills to drain subsurface water and guard against landslides. Includes perforated metal, or plastic pipes in horizontal drill holes in water-bearing formation.

Inner Gorge: A geomorphic feature that consists of the area of channel side slope situated immediately adjacent to the stream channel, and below the first break in slope above the stream channel. Debris sliding and avalanching are the dominant mass wasting processes associated with the inner gorge.

Land and Resource Management Plan (LRMP): A forest-wide document that provides direction for managing NFS lands within the forest boundaries, with the goal to fully integrate a mix of management actions that provide for multiple use and protection of forest resources, satisfy guiding legislation, and address local regional and national issues for the plan period. Also frequently referred to as LMP.

National Pollutant Discharge Elimination Permit System: The system for issuing, conditioning, and denying permits for the discharge of pollutants from point sources, by State water quality regulatory authorities, or the EPA. The program is administered by the RWQCBs of California.

Nonpoint Source: Diffuse sources of water pollution that originate at indefinable sources, such as from silvicultural and recreational activities. Practically, nonpoint sources do not discharge at a specific, single location such a conveyance pipe.

Outsloping: Shaping a road prism without an inside drainage ditch to direct runoff to the outside shoulder, as opposed to insloping which directs runoff to an inside ditch. Emphasis is on maintaining flow at an angle across the road to avoid buildup of an erosive flow of water.

Permittee: Individual, or entity that uses NFS resources by permit from the Forest Service.

Pesticide: A general term applied to a variety of chemical pest controls, including insecticides for insects, herbicides for plants, fungicides for fungi, and rodenticides for rodents.

Pipe Underdrains: A perforated pipe, or fabric at the bottom of a narrow trench backfilled with filter material. This kind of installation is used where there is a need to lower the water table adjacent to the roadbed, or other structure.

Pitting. Making shallow pits, or basins of adequate capacity and distribution to retain water from snowmelt and rainfall to enhance infiltration, augment soil moisture, and retard runoff.

Point Source: Water pollution originating from a discrete identifiable source, or conveyance.

Sale Area Improvement Plan (SAI Plan): A plan of work for post sale enhancement and improvement of the sale project area. The plan addresses development, protection, and maintenance actions for the future production of renewable resources.

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

Sale Plan: The document used to identify the approved locations for timber harvest and transportation improvements in a given sale, including a description of project results to be accomplished. The sale plan also includes required mitigation measures that were identified in the environmental documentation process.

Specified Road: A forest development transportation-system road identified (specified) in a timber sale contract.

Stabilization Trenches: These are wide trenches with sloping sides having a blanket of filter material approximately three feet thick on the bottom and sides. Perforated drainpipes are installed on the bottom of the trench to transmit the collected water. Stabilization trenches are placed in swales or ravines and under side hill fills, to stabilize fill foundation areas that are saturated.

Standard Specifications: Standards and design requirements, from the current version of "Engineering Management (EM) 7720-100", Forest Service Standard specifications for construction of roads and bridges, which direct Forest Service construction activities.

Stream Classification: The ordering of streams in a manner that reflects (1) flow characteristics, (2) present and foreseeable downstream values of the water, and (3) physical characteristics of the stream environment—as evaluation criteria. Class I is the highest value stream, Class IV is the lowest value stream.

Streamside Management Zone (SMZ): An administratively designated zone adjacent to ephemeral, intermittent and perennial channels and around standing bodies of water, wetlands, springs, seeps and other wet or marshland areas. SMZ is also meant to include other naming conventions for streamside buffering areas such as; stream protection zone, riparian reserves, riparian habitat conservation areas and so forth. SMZ are designed and delineated for the application of special management controls aimed at the maintenance and/or improvement of

water quality. SMZ delineation may include floodplains and riparian areas when present. SMZ delineation can have synergistic benefits to other resources such as maintenance and improvement of riparian area dependent resources, visual and aesthetic quality, wildlife habitat and recreation opportunities.

Suitable Forest Land: Land that is subject to being managed for timber production on a sustained scheduled basis. Some of the determinants of land suitability for harvesting are reforestation potential, timber growth rate, economics, and land stability. Also included are forest lands where the land and resource management plan recognized an emphasis for achieving other key resource objectives, such as recreation, visual, wildlife, water and so forth in addition to timber management.

Timber Sale Contract (TSC) Provisions: Often referred to by the section of the TSC in which they occur.

- *B Provisions* - Standard provisions for Forest Service timber sale contracts, located in section "b" of the contract.
- *C Provisions* - Special provisions needed to tailor the timber sale contract to meet specific management objectives in R-5, located in section "c" of the contract.

Unsuitable Forest Land: Forest land that is not currently suitable for timber production. Some reasons for classifying land as unsuitable include: potential soil productivity loss and potential, irreversible damage to soil which cannot be prevented using current technology, mineral withdrawals, low volume growth rates, and inadequate assurance that the land can be restocked within 5 years after harvest.

Wetlands: Those areas that are inundated by surface, or groundwater with a frequency sufficient to support a prevalence of vegetation, or aquatic life that requires saturated, or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, springs, seeps, wet meadows, river overflows, mud flats and natural ponds.

11 Introduction

Water quality and associated beneficial uses are most effectively and efficiently protected from degradation due to nonpoint sources of pollution by the application of BMPs. This guidance documents the regions' water quality management program for controlling and preventing nonpoint source water pollution. It documents an iterative process of site-specific practice identification, implementation, monitoring and feedback.

It also describes the BMPs themselves, the process for development of site-specific methods and techniques for applying BMPs, and lists the references for each BMP. The directives, policies, laws, and other source documents listed in these references are regular reference materials for persons involved in project evaluation, design, implementation and quality control. The text documents the working relationship with the SWRCB, the Forest Service water quality management performance standards and regulatory agency expectations as required by the 1981 MAA.

11.1 NEPA and Interdisciplinary Approach.

The NEPA process is crucial for the development of site-specific methods and techniques for applying BMPs to fit individual project needs. Direction for environmental evaluations and preparation of environmental documents to comply with NEPA are contained in established NFS policy and procedures found in FSM 1900, FSM 1950 and FSH 1909.15. These references also contain direction to incorporate the interdisciplinary process into planning and decision making.

The BMPs documented herein have been considered in the development of Forest Land and Resource Management Plans and incorporated by reference. During the Forest Plan Implementation phase, this text will be used by the Interdisciplinary Team (IDT) to develop applications of the BMPs to protect and improve water quality. Inter-relationships between Forest Planning and Forest Plan Implementation are described in FSM 1922 and FSH 1909.12.

Under NEPA, interdisciplinary involvement is required to evaluate projects that may influence water quality and to develop the appropriate BMP applications for maintenance and improvement of water quality. The line officer responsible for a project selects and convenes an IDT to evaluate a proposed activity, and assigns them the task of formulating and evaluating alternatives. A major part of the IDT evaluation is an analysis of environmental consequences. Alternatives that cannot fully protect water quality and associated beneficial uses with full application of BMP will not be considered viable alternatives.

An IDT is comprised of individuals representing two, or more areas of professional knowledge and skills. They are not a fixed set of professionals. Each team is a unique combination of skills that the line officer selects according to the identified issues, concerns, and opportunities associated with each project proposal. The IDT does not make decisions, but provides the line officer with alternatives, evaluations and recommended mitigation and protection measures needed to make a reasoned decision and protect the environment. The final decision authority lies with the line officer.

1. IDT development of BMPs

The BMPs are water quality protection measures that must be considered in formulating a resource management plan, program, or project. Their purpose is to directly or indirectly protect water quality and mitigate adverse watershed impacts while meeting other resource goals and objectives. They are action-initiating mechanisms that lead to the development of detailed protection measures to be applied during project development and onsite implementation.

The IDT will identify the methods and techniques for applying BMPs for specific sites during the project planning process following onsite evaluation of the project area. In this manner the methods and techniques can be custom fitted to the specific environment, as well as the proposed project activities.

As a result of interaction between team members the appropriate mix of implementation methods and techniques are selected. The final combination of practices are selected which will control nonpoint pollution, and also meet other resource needs. Site-specific applications utilize innovations and refinements that have developed through monitoring and feedback.

Commonly, the methods and techniques for water quality protection that apply to a project site are a composite package of multiple BMPs with site-specific applications developed by the IDT. The appropriate BMPs and the methods and techniques of implementing the BMP are included in the environmental documentation, permit, contract, or other controlling document used to conduct and administer the project. The BMPs will be incorporated into these documents in various ways such as, design specifications, contract clauses, or management requirements and mitigation measures. This assures that they are part of the project work to be accomplished.

2. Implementation of BMPs

There are various methods and techniques available to implement a BMP, and not all are applicable to every site.

For example, BMP 2-7 "Control of Road Drainage" dictates that roads will be correctly drained to disperse water runoff to minimize the erosive effects of concentrated water flow. Some methods and techniques for draining a road are: out slope the road prism, install water bars, or inslope the road to a ditch line and install culverts. It is during the onsite evaluation of a specific road project that the appropriate method or combination of methods—to correctly drain the road—are identified. The methods are thereby custom fitted to the physical and biological environment of the project area.

The BMPs are presented under eight different resource categories in this handbook. The sequence in which these resource categories are presented has no intended significance.

Further, because a particular BMP is located within a given category of BMPs does not imply that it has no applicability in another resource area.

For example, consider a situation of tree removal within a developed campground for safety (hazard tree removal), or campground expansion, or insect infestation eradication purposes. Even though BMP 1-11, "Suspended Log Yarding In Timber Harvest", and BMP 1-12, "Log Landing Location", reside in the Timber Management category of BMPs, they are also applicable to tree removal in the developed campground area, even where the tree removal does not fall into the formal definition of a timber sale. It is appropriate that yarded logs in the recreation area be suspended when necessary to preclude excessive soil disturbance, or to maintain the integrity of the SMZ. It is also appropriate that any log landings be located to avoid creating hazardous watershed conditions and water quality.

The same is true for the "Road And Building Site Construction" BMP whether the road is for timber harvesting, mining, recreation access, or some other purpose; the road and building site BMPs are applicable.

This multi-resource, cross-resource utility is true for all BMPs in this guidance whenever applicable. The site of BMP documentation will be different (e.g. the recreation development plan may apply in place of the timber sale plan), and the person responsible for BMP implementation and monitoring will be different (e.g. recreation staff officer in place of the timber sale administrator), but the intent and application of the BMPs to protect and improve water quality is constant, and not necessarily vested with a given resource functional area.

11.2 Application of BMPs

After the BMP are identified, and the site-specific protective measures documented, they will be implemented along with any other mitigation measures, requirements and controls that are designated for the project and site-specific area.

1. Project application of BMP: The application of the BMPs is achieved by the Forest Service Official responsible for project implementation. Each of these personnel uses the BMP source documents as technical guidelines e.g. TSC, Timber Sale Administration (TSA) Handbook, FSM, FSH and Code of Federal Regulations (CFR).
2. Feedback to Line Officers: The effectiveness of the selected BMP is evaluated by the Forest Service officials responsible for the project and if required, qualified earth scientists. The evaluation includes a comparison of the actual results realized, to that, which was predicted in the environmental document. The reporting of monitoring and evaluation results by Forest Service personnel provides feedback to line officers for consideration in adapting future similar projects.
3. Technical assistance and training in the effective application of BMPs: One role of the earth scientist in BMP application is to provide technical assistance and training for resource project leaders, to:
 - a. Ensure the effective application of the BMPs on the ground.
 - b. Update and refine BMP as a result of knowledge gained from monitoring and evaluating previous applications.
 - c. Conduct training for personnel as needed to maintain the most recent state-of-the-art knowledge and capability in water quality protection.

Training personnel in the attributes of water quality management and the effective application of BMPs is a critical link in the water quality management process. With more intensive land management and a wider variety of beneficial uses dependent on the quality of water, an ever expanding skill base in the fields of land and watershed management becomes mandatory.

A training and information program is essential to ensure consistent application and continued effectiveness of the practices. All Forest Service personnel will be trained on a periodic, recurring basis to ensure new and transferred employees receive the training, and as a refresher course for others.

Training

Training programs will focus on both water quality protection through BMP application and program monitoring through BMPEP.

Training for water quality protection through BMP application will focus on all USFS employees including:

- Administration employees not commonly associated with resource management field activities.
- Line and primary staff officers

- Field personnel that are responsible for the planning and conduct of projects

Training for program monitoring through BMPEP will focus on those Forest personnel responsible for project planning, implementation , quality control and reporting.

Training will be continually updated and conducted using state-of-the art tools and techniques to ensure effectiveness.

11.3 Environmental Variability and Best Management Practices

The management practices described herein are neither detailed prescriptions nor solutions to specific nonpoint pollution sources. Although some pollutants will be thought of as characteristic of a management activity, the actual effect of any activity on water quality will vary. The magnitude, scope, and duration of pollution are not activity-specific. The extent to which contaminants from an activity have the potential to degrade water quality is a function of:

1. The physical, biologic, meteorologic and hydrologic environment within which the activity takes place (e.g. topography, physiography, precipitation, channel density, soil type, vegetative cover).
2. The type of activity imposed on a given environment (recreation, mineral exploration, timber management), and the proximity to surface waters within the given environment.
3. The method of application and time frame over which the activity is applied (grazing system used, types of silvicultural practices used, constant use as opposed to seasonal use, recurrent application, or one-time application).
4. The kind of beneficial uses of the water in proximity to the management activity and their relative sensitivity to the type of contaminants associated with the activity.

These four factors vary throughout the State of California, from National Forest to National Forest, and from site to site on individual Forests. It follows then, that the extent and kind of contaminants are variable, as are the abatement and mitigation measures. No solution, prescription, method, or technique is best for all circumstances. The management practices presented in the following include such phrases as: "according to design," "as prescribed," "suitable for," "within acceptable limits," and so on. The actual methods and techniques applied to a project to implement a given BMP are the result of site-specific evaluation and development by professional personnel through interdisciplinary involvement in the decision-making process.

12 MANAGEMENT PRACTICES DOCUMENTATION

This section identifies the BMPs employed to protect water quality.

1. Source Documents of BMP. The BMPs described in this section were compiled from Forest Service manuals, handbooks, contract and permit provisions, and policy statements. These practices act as checks and balances that protect the quality of the water resource by requiring coordination, inventory, monitoring, analysis and evaluation of proposed management actions. They are consistent with legislative direction and complement an informed and reasoned planning and decision-making process. Their

purpose is to directly or indirectly maintain, or improve water quality and abate, or mitigate impacts, while meeting other resource goals and objectives.

2. Categories of BMP by Resources. The BMPs are identified in the following categories:

- 1 Timber Management
- 2 Road and Building Site Construction
- 3 Mining
- 4 Recreation
- 5 Vegetation Manipulation
- 6 Fire Suppression and Fuels Management
- 7 Watershed Management
- 8 Range Management

BMPs cover three types of activities, administrative, preventive, and corrective. These practices are neither detailed prescriptions, nor solutions for specific problems. They are action-initiating mechanisms, processes, practices, which call for the development of site-specific, detailed prescriptions and solutions. They identify management considerations that must be taken into account prior to and during the formulation of alternatives for land management actions. They serve as checkpoints to consider in formulating a resource plan, a program, or a project.

3. Interagency accountability for implementation. BMPs are the practices both the State and Federal water quality regulatory agencies expect the Forest Service to implement to meet our obligation for compliance with applicable water quality standards, and to maintain and improve water quality. They are the performance standards for the agency.

The BMPs are dynamic and always subject to improvement and development. Monitoring and evaluation of existing practices may disclose areas where refinement is warranted. Research, academia, and administrative studies are continually evolving new methods and techniques applicable to water quality protection. Provision has been made to allow for the continued updating and refinement of the existing practices as well as development of new practices. Attachment "A" of the 1981 MAA is updated annually to document and schedule BMP refinement and development needs (See Section 14).

4. Format of BMPs. Each practice is organized according to the following format:

Heading	Context
Practice	Includes the sequential number of the BMP and a brief title.
Objective	Describes the desired results or attainment of the practice as it relates to water quality protection.
Explanation	Further amplifies the brief title and expresses how to apply the practice. Describes criteria, or standards used when applicable.
Implementation	Describes where to apply the practice, who is responsible for application, direction and supervision, and when to employ the practice.

12.1 Synopsis for Timber Management

Timber harvesting and reforestation are the culmination of several years of multiple resource assessment and detailed project planning.

Timber harvest includes felling, bucking, skidding, yarding, loading and hauling designated trees to a mill. Harvest can be followed by reforestation, which includes preparation of the harvested site to treat excess fuels and competing vegetation, followed by tree planting, and stand maintenance as needed.

An effective point of identifying, documenting and incorporating BMPs in the Timber Sale Planning Process (TSPP) is during the formulation of silvicultural prescriptions. Forest and districts may differ in how and when they formulate prescriptions in the planning process, but they generally follow the sequence of: stand examination, diagnosis of stand treatment and detailed silvicultural prescriptions, with post-treatment monitoring and evaluation.

Silvicultural prescriptions are developed by certified silviculturists. These persons must meet high standards of professional knowledge, skills and experience in multiple-use silviculture. Their training for certification requires continuing education in soils and watershed management. They are familiar with the terminology of these disciplines, and consult with soil and water specialists in the process of writing, or approving timber harvest prescriptions.

Timber sale proposals are evaluated and refined during the interdisciplinary preparation of environmental documentation as required by NEPA. The line officer identifies the members that are to comprise the IDT, and assign them the responsibility for environmental document preparation, including the conduct of requisite field investigation of the proposed harvest site.

The team selects those BMP necessary to protect or improve the water quality for specific sites, and the appropriate method and technique for their implementation, and incorporates them into the environmental document. When the appropriate line officer approves the environmental document, the BMP are officially made a part of the harvest plan.

Planning begins one to five years before timber harvesting begins. Timber harvest planning and implementation also must follow the guidelines and requirements of the Forest Land and Resource Management Plan.

The TSPP includes the following steps:

1. Position statement Development.
2. Sale Area Design. (Includes the environmental documentation process).
3. Sale Plan Implementation. (Includes harvest unit layout and stand record card updates).
4. Final Sale Package Preparation. (Includes Sale Area Improvement Plan and contract preparation).
5. Sale Award.

While the timber sale is in progress, the implementation and effectiveness of the BMP prescription for the sale area are evaluated. This evaluation process continues through the completion of reforestation. This is the time that the actual environmental effects onsite are compared to the expected effects that were estimated by the IDT.

The findings are documented to be used by future IDTs on proposed timber sales and to update BMPs where warranted.

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12.12 Timber Management Best Management Practices

The following are the BMPs for the control of nonpoint source pollution associated with timber management activities. The line officer on each administrative subunit is responsible for fully implementing the directives that provide for water quality protection and improvement during timber harvest and management activities. The directives, referenced for each BMP in section 13, give details on methods to incorporate water quality controls into each phase of the timber management program.

Earth scientists and other trained and qualified individuals are available to work with the timber management work force to provide technical assistance in identifying beneficial uses, the most recent state-of-the-art water quality control, methods and techniques, and evaluation of results.

1. Timber Sale Planning Process (PRACTICE: 1-1)

- a. Objective: To incorporate water quality and hydrologic considerations into the TSP
- b. Explanation: The IDT will address potential water quality problems and provide for administrative controls, corrective treatments, and preventive measures. As warranted a qualified specialist will define and quantify the potential changes to water quality and instream beneficial uses.

The result is an environmental document and sale contract(s). These documents describe methods to prevent unacceptable effects to water quality during and following sale layout and logging operations. They document mitigation measures to ameliorate, and/or preclude adverse effects for those treated areas. Silvicultural treatment is excluded from environmentally sensitive areas where adverse environmental effects from the activity cannot be mitigated to conform to Federal, State and Local water quality standards.

- c. Implementation: Earth scientists or other trained and qualified individuals participate in the environmental documentation process to evaluate onsite watershed characteristics and evaluate the potential environmental consequences of the proposed timber harvest and related activities. They design the timber sale to include site-specific prescriptions for each area of water quality concern. The resulting contract will include those provisions set forth in the environmental document to meet water quality protection objectives.

2. Timber Harvest Unit Design (PRACTICE: 1-2)

- a. Objective: To ensure that timber harvest unit design will secure favorable conditions of water quality and quantity while maintaining desirable stream channel characteristics and watershed conditions. The design should consider the size and distribution of natural structures (snag and down logs) as a means of preventing erosion and sedimentation.
- b. Explanation: This is an administrative and preventive practice. The proposed timber harvest units will be evaluated to predict watershed response to the proposed timber harvest unit design. This includes onsite examination of the watersheds to evaluate their ability to absorb the effects of the proposed harvest without incurring unacceptable effects on water quality.

Characteristics to be evaluated can include the recovery from past harvests; the size and extent of past management activities; the protection of channels; the number, size and location of harvest units; planned location and size of roads, landings and skid trails; logging system design; potential natural recovery rate of the watershed; and the needs of associated beneficial uses.

Where it is not possible to mitigate adverse effects on water quality and undesirable streamflow conditions the harvest unit design will be modified to reduce adverse effects. To the fullest extent possible the unit design is made to be amendable to implementation of mitigation measures.

- c. Implementation: Earth Scientists or qualified specialists will conduct a hydrologic and geologic survey of the area effected by proposed harvest activities. Mitigations or changes needed to stabilize slopes and project or improve stream courses will be incorporated into the harvest unit design. It is the responsibility of the Sale Administrator (SA) to carry out on-the-ground accomplishments of environmental protection measures and the TSC Specific areas will be identified during design for monitoring attainment of water quality objectives.

3. Determination of Surface Erosion Hazard for Timber Harvest Unit Design (PRACTICE: 1-3)

- a. Objective: To identify high erosion hazard areas in order to adjust treatment measures to prevent downstream water quality degradation.
- b. Explanation: This is a preventive practice.

The California Soil Survey Committee EHR system is a method used to estimate the potential erosion hazard of a given area. It evaluates the soil-topography-climate-soil cover relationships of site-specific areas. Where the post-harvest hazard is predicted to be "moderate", an onsite evaluation is conducted to determine the need for erosion control measures. Where the post-harvest hazard is predicted to be "high", or "very high", erosion control measures are necessary to reduce the potential risk of accelerated erosion to a low or moderate level.

Where the harvest impacts cannot be reduced to a low or moderate level with treatments, then the harvest units should be avoided or harvest methods modified or both. (See also BMP 1-6)

- c. Implementation: The erosion hazard determination is part of the pre-sale planning process, as input to the environmental document. The EHR for individual harvest units will be established only by trained and qualified Forest Service employees. The timber sale Planning Forester uses the information to help design the timber sale, and apply appropriate erosion control.

4. Use of Sale Area Maps (SAM) and/or Project Maps for Designating Water Quality Protection Needs (PRACTICE: 1-4)

- a. Objective: To ensure recognition and protection of areas related to water quality protection delineated on a SAM or Project Map.
- b. Explanation: This is an administrative and preventative practice. The following are examples of water quality protection features that can be designated by pre-sale foresters on the SAM or Project Map, thereby ensuring their incorporation as TSC requirements:

- 1) Location of streamcourses and riparian zones to be protected, including the width of the protection zone required for each stream.
- 2) Wetlands (meadows, lakes, springs, and so forth) to be protected.
- 3) Boundaries of harvest units.
- 4) Specified roads.
- 5) Roads where log hauling is prohibited, or restricted.
- 6) Structural improvement.
- 7) Area of different skidding and/or yarding method application.
- 8) Sources of rock for road work, riprapping, and borrow materials.
- 9) Water sources that are available for purchasers' use.
- 10) Other features that are required by contract provisions.
- 11) Site preparation/fuel treatment.

- c. Implementation: The IDT will identify and delineate these and other features on maps, as part of the environmental documentation process. The Sale Preparation Forester will include them on the SAM at the time of contract preparation. The SA and the purchaser will review these areas on the ground prior to the commencement of harvesting.

5. Limiting the Operating Period of Timber Sale Activities (PRACTICE: 1-5)

- a. Objective: To ensure that the purchasers conduct their operations, including, erosion control work, road maintenance, and so forth, in a timely manner, within the time specified in the Timber Sale Contract.
- b. Explanation: Contract provision C6.3, "Plan of Operation" is required in all TSC. This provision states that the purchaser must submit a general plan of operation which will set forth planned periods for, and methods of road construction, timber harvesting, completion of slash disposal, erosion control work and other contractual requirements. Forest Service written approval of the Plan of Operation is prerequisite to commencement of the purchaser's operation.

Contract clause B6.31, "Operation Schedule", requires that the purchaser will provide an annual schedule of anticipated activities such as road maintenance and erosion control work until the sale is closed.

Contract clause C6.313, "Limited Operating Period", will be used in a contract to limit the purchaser's operation to specified periods when adverse environmental effects are not likely. Contract provision B6.6 can be used to close down operations due to the rainy season, high water and other adverse operating conditions, in order to protect resources.

- c. Implementation: Limited-operating periods will be identified and recommended during the TSPP by the IDT. The Sale Preparation Forester prepares the contract to include clause C6.313. Provisions B6.3, B6.31, and C6.3 are all mandatory provisions of the TSC. Provision C6.3 is only mandatory for sales over a two-year contract period. The purchaser must submit a general plan and annual plans to the Forest Service. The purchaser may commence operations only after written Forest Service approval of the general plan under C6.3.

6. Protection of Unstable Lands (PRACTICE: 1-6)

- a. Objective: To provide special treatment of unstable areas to avoid triggering mass slope failure with resultant erosion and sedimentation.
- b. Explanation: This practice is an administrative and preventative control. Where unstable lands are delineated, they are taken out of suitable forest lands and are reclassified as unsuitable forest land. Using existing harvest technologies, unsuitable forest lands cannot be managed for timber production where irreversible adverse effects to soils, productivity, or watershed conditions may occur. Timber harvesting is deferred pending technology development proven to be operational on these sites without causing adverse environmental effects.
- c. Implementation: The IDT will prepare plans and environmental documents, utilizing information provided by specialists trained and qualified to identify unstable areas. When warranted based on location and size of the sale proposed harvest units may be assessed for relationships to unstable areas through aerial-photo reconnaissance (most recent photos at least 1:24,000 or larger scale) and a landslide hazard map where available. These features are then assessed on the ground as deemed necessary by the IDT. Where unstable lands are presently classified as suitable forest lands, the classification is changed to unsuitable forest lands. Unsuitable forest lands will not be harvested until they can be harvested without irreversible or unmitigable resource effects. If the IDT determines that current, or prospective logging methods would result in irreversible or unmitigable watershed effects, then the line officer should reclassify the area to unsuitable forest land and defer harvesting.

7. Prescribing the Size and Shape of Regeneration Harvest Units (PRACTICE 1-7)

- a. Objective: To control the physical size and shape of regeneration harvest units as a means of preventing erosion and sedimentation.
- b. Explanation: This is an administrative and preventive practice. 36 CFR 219.27 (d)(2) limits the size of openings created by the application of even-aged silviculture in California in a single entry (a clearcut) to 60 acres for Douglas Fir forest type and 40 acres for all other forest types with certain exceptions. Exceptions can be made in the case of salvage harvesting or with Regional Forester approval. The NFMA, section 6, contains the following:

“(F) insure that clearcutting, seed tree cutting, shelterwood cutting and other cuts designed to regenerate an even aged stand of timber will be used...only where...(iv) there are established according to geographic areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal: *Provided*, That such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm; and (v)

such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource."

- c. Implementation: The size and the shape of the proposed regeneration units are reviewed on the ground in the pre-sale planning process. A map showing proposed units is included in the contract, which is reviewed and approved by the appropriate line officer. The timber sale should be and normally is delineated on the ground (roads staked, timber marked) after the environmental analysis is complete and a formal decision is made.

8. Streamside Management Zone Designation (PRACTICE: 1-8)

- a. Objective: To designate a zone along riparian areas, streams and wetlands that will minimize potential for adverse effects from adjacent management activities. Management activities within these zones are designed to improve riparian values.
- b. Explanation: As a preventive measure, roads, skid trails landings and other timber harvesting facilities will be kept at a prescribed distance from designated stream courses.

Factors such as stream class, channel aspect, channel stability, sideslope steepness, and slope stability are considered in determining the limitations on activities within the width of SMZs. Aquatic and riparian habitat, beneficial riparian zone functions, their condition and their estimated response to the proposed timber sale are also evaluated in determining the need for and width of the SMZ.

The SMZ will be a zone of total exclusion of activity, or a zone of closely managed activity as described in the "Glossary of Terms". It is a zone, which acts as an effective filter and absorptive zone for sediment; maintains shade; protects aquatic and terrestrial riparian habitats; protects channel and streambanks; and promotes floodplain stability.

- c. Implementation: Identify the streamside management zone requirements during the environmental documentation process. Each Forest's LRMP identifies specific measures to protect these zones. As a minimum, forest requirements must be identified and implemented. The timber sale project is designed to include site-specific prescriptions for the prevention of sedimentation and other stream damage from logging debris. The TSC will be designed to ensure retention of streamside vegetation and improve the condition and beneficial functions if the riparian area.

As appropriate, water quality monitoring is identified in the environmental document. The Timber Sale Preparation Forester is responsible for the inclusion of the zones in the TSC and on the SAM as identified by the environmental document. The SA is responsible for contract compliance during harvest operations.

9. Determining Tractor Loggable Ground (PRACTICE: 1-9)

- a. Objective: To minimize erosion and sedimentation resulting from ground disturbance of tractor logging systems.

- b. Explanation: This preventative practice is intended to minimize accelerated soil erosion and sedimentation, and water quality degradation. To determine tractor loggable ground, consider physical site characteristics such as steepness of slopes landslide prone areas and soil properties. The Erosion Hazard rating is one method. For example: where the post-tractor logging EHR is predicted to be 'moderate,' an onsite evaluation is conducted to determine the need for erosion control measures. Where the post-tractor logging EHR is predicted to be "high", or "very high", erosion control measures are required to reduce the risk of accelerated erosion.

Avoid tractor logging where the predicted, post-logging erosion hazard cannot be reduced to either "low", or "moderate".

- c. Implementation: a trained and qualified Forest Service employee will evaluate The EHR during the on-the-ground planning phase of the timber sale. This work is done within each sale area by evaluating representative sites. The resulting EHRs are considered during the selection of logging methods and silvicultural prescriptions, of erosion control measures to reduce risk and in determining the intensity of and controls for land disturbing activities.

Interpretations of the considerations are described in the environmental document. Provisions in the TSC specify the areas determined by the EHR upon which tractors can operate.

10. Tractor Skidding Design (PRACTICE: 1-10)

- a. Objective: By designing skidding patterns to best fit the terrain, the volume, velocity, concentration, and direction of runoff water can be controlled in a manner that will minimize erosion and sedimentation.
- b. Explanation: This is a preventative practice. The watershed factors that are considered include slope, soil stability, exposure, SMZs, meadows, and other factors that may affect the surface water runoff and sediment yield potential of the land. The careful control of skidding patterns serves to avoid onsite and downstream channel instability, build-up of destructive runoff flows and erosion in sensitive watershed areas such as meadows and SMZs.

Methods for protecting water quality while utilizing tractor skid trail systems are:

- 1) *End-Lining*. This method involves winching the log directly out of the sensitive areas (such as SMZs and meadows) 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 adverse environmental effects.
- 2) *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 damage is minimized.

3) *Specialized Equipment Access.* Specialized equipment (harvesters, feller bunchers) having low ground pressures can move in and out of selected SMZs without turning and leaving disturbed ground.

c. Implementation: For skid trail design, sensitive areas will be identified and evaluated in the environmental documentation process during the TSPP. When needed to protect water quality, prescriptions must be included in the basic TSC by the use of special contract provisions (C-clauses). The SA 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. Guidelines for skid trail locations are referenced in the SA Handbook, and will be in the environmental documentation and the TSC.

11. Suspended Log Yarding in Timber Harvesting (PRACTICE: 1-11)

a. Objective:

- 1) To protect the soil mantle from excessive disturbance.
- 2) To maintain the integrity of the SMZ and other sensitive watershed areas.
- 3) To control erosion on cable corridors.

b. Explanation: Suspended log yarding includes all yarding systems, which suspend logs either partially or completely off the ground. These systems include, but are not limited to, skyline, helicopter, and balloon yarders. The systems are used on steep slopes where tractors cannot operate. All of the systems result in less soil disturbance since heavy machinery is not used over the sale area. Erosion control measures are applied as necessary in cable corridors to control erosion and runoff.

c. Implementation: The areas where suspended log yarding is required will be determined during the pre-sale planning process, and they will be included in the sale plan. The specific systems must be included in the TSC, and designated on the SAM by the Sale Preparation Forester. The SA will oversee the project operation using the guidelines and standards established in the TSC and SA Handbook with reference to the sale plan.

12. Log Landing Location (PRACTICE: 1-12)

a. Objective: To locate new landings or reuse old landings in such a way as to avoid watershed impacts and associated water quality degradation.

b. Explanation: This practice is both administrative and preventive. The location of and clearing limits for log landings are commonly evaluated by the IDT and are agreed to by the SA and purchaser prior to construction. The following criteria are used by the SA in evaluating landings:

- 1) The cleared or excavated size of landings should not exceed that needed for safe and efficient skidding and loading operations. Trees considered dangerous will be removed around landings to meet the safety requirements of OSHA.

- 2) To the extent feasible, landing locations will be selected which involve the least amount of excavation and the least erosion potential and are well outside of the SMZ.
 - 3) Where feasible, locate landings near ridges away from headwater swales in areas that will allow skidding without crossing channels, violating the SMZ, or causing direct deposit of soil and debris to the stream.
 - 4) Locate landings where the least number of skid roads will be required, and sidecast can be stabilized without entering drainages, or affecting other sensitive areas.
 - 5) Position landings such that the skid road approach will be as nearly level as feasible, to promote safety, and protect the soil from erosion.
 - 6) Keep the number of skid trails entering a landing to a minimum.
 - 7) Avoid excessive fills associated with landings constructed on old landslide benches. Do not change the mass balance to point to destabilize the landslide.
 - 8) Construct stable landing fills or improve existing landings by using appropriate compaction and drainage specifications. Engineered fills will be needed under certain conditions.
- c. Implementation: Landing locations proposed by the purchaser or their representatives must be agreed to by the SA. Relying on IDT input and the stated criteria the SA can negotiate to select mutually acceptable landing locations—other than those identified in the NEPA document. To be an acceptable landing, it must meet the above criteria. Should agreement not be reached, the decision of the Forest Service will prevail within the limitations of contract.

13. Erosion Prevention and Control Measures During Timber Sale Operations (PRACTICE: 1-13)

- a. Objective: To ensure that the purchasers' operations will be conducted reasonably to minimize soil erosion.
- b. Explanation: Timber is purchased by individuals, or companies who either harvest the timber themselves, or sub-contract to other parties. Therefore, it is necessary to ensure that purchasers and their sub-contractors understand and adhere to water quality BMP prescriptions formulated during the TSPP. This is accomplished by setting forth the purchaser's responsibilities in the TSC, and holding the purchaser accountable for actions of their sub-contractor.
- c. Implementation: Equipment will not be operated when ground conditions are such that excessive damage will result. The kinds and intensity of control work required of the purchaser will be adjusted to ground and weather conditions with emphasis on the need to control overland runoff, erosion, and sedimentation. Erosion control work required by the contract will be kept current. At certain times of the year this means daily, if precipitation is likely, or at least weekly when precipitation is predicted for the weekend.

If the purchaser fails to perform seasonal erosion control work prior to any seasonal period of precipitation, or runoff, the Forest Service may temporarily assume responsibility, complete the work, and use any unencumbered deposits as payment for the work.

14. Special Erosion Prevention Measures on Disturbed Land (PRACTICE: 1-14)

- a. Objective: To provide appropriate erosion and sedimentation protection for disturbed areas.
- b. Explanation: This is an administrative and preventive treatment. When required by the contract, the purchaser will give adequate treatment by spreading slash, mulch or wood chips (or, by agreement, some other treatment) on portions of tractor roads, skid trails, landings, cable corridors or temporary road fills. This provision is to be used only for sales which contain identified special soil stabilization problems which are not expected to be adequately treated by normal methods prescribed under other contract provisions.
- c. Implementation: During the timber sale planning process and/or during sale appraisal the IDT will identify criteria for selecting treatment areas or classes of areas for special treatment and document them in the environmental assessment. The Sale Preparation Forester will identify the acreage to be treated in the legend of the SAM. The specific areas to be treated will be designated on the ground by the SA.

15. Revegetation of Areas Disturbed by Harvest Activities (PRACTICE: 1-15)

- a. Objective: To establish a vegetative ground cover on disturbed sites to prevent erosion and sedimentation.
- b. Explanation: Where soil has been severely disturbed by the purchaser's operations, and the establishment of vegetation is needed to control accelerated erosion, the purchaser will be required to take appropriate measures normally used to establish an adequate ground cover of grass or other vegetative stabilization measures acceptable to the Forest Service. The type and intensity of treatment to establish ground cover is prescribed by the SA, with assistance from earth scientists and botanists as needed.

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 other contract provisions will not mitigate problems.

- c. Implementation: The Forest Service will include an estimate of the need for revegetation in the timber sale appraisal and sale contract. Where revegetation is prescribed, the prescription must be included in the TSC. The SA will designate the areas of disturbed soils, such as logging areas and temporary roads that must be treated.

The Forest Service will 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 SA to make sure that revegetation work is done correctly and in a timely manner.

16. Log Landing Erosion Control (PRACTICE: 1-16)

- a. Objective: To reduce the impacts of erosion and subsequent sedimentation associated with log landings by use of mitigating measures.
- b. Explanation: This practice employs administrative, preventive, and corrective controls to meet the objective. The Sale Planning Forester and SA assess the need for stabilization, with the assistance of earth scientists as needed.
- c. Implementation: Timber Sale Contract requirements provide for erosion prevention and control measures on all landings. The Timber Sale Preparation Forester will include provisions in the TSC for landings to have proper drainage. After landings have served the purchaser's purpose, the purchaser will ditch, or slope the landings and may be required to rip or subsoil and make provisions for revegetation to permit the drainage and dispersion of water. Erosion prevention measures such as waterbars will be constructed in such a manner as to divert water away from landings.

Other provisions may include aggregate surfacing, scarifying, smoothing and sloping, construction of drainage ditches, spreading slash, covering with mulch, wood chips, or applying straw mulch. Prevent road drainage from reaching landings. Unless agreed otherwise, cut and fill banks around landings will be reshaped to stabilize the area.

The specific work needed on each landing will depend on the actual onsite conditions. It is the responsibility of the SA to ensure that this practice is properly implemented on the ground. The SA will agree upon the location and size of log landings proposed by the purchaser before clearing and construction begins.

17. Erosion Control on Skid Trails (PRACTICE: 1-17)

- a. Objective: To protect water quality by minimizing erosion and sedimentation derived from skid trails.
- b. Explanation: This practice employs preventive controls to reach the objective.

The TSC 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 will be agreed to in lieu of cross drains. Grass seeding or other erosion control and compaction remediation measures may also be required by a "C" provision, which will be added to the TSC. Areas to be treated are shown on the Sale Area Map legend. During

the life of the contract these areas are designated on the ground annually as logging and temporary access construction progresses.

- c. Implementation: Location of all erosion control measures are designated and agreed to on-the-ground by the SA. The SA handbook section on Skid Trails and Firelines contains guidelines for spacing of cross drains, construction techniques, and cross drain heights. The SA should use these guidelines on the ground to identify site-specific preventive work that is required of the purchaser. The purchaser is obligated to complete and maintain erosion control work specified in contract provisions during the life of the contract.

18. Meadow Protection During Timber Harvesting (Practice 1-18)

- a. Objective: To avoid damage to the ground cover, soil, and the hydrologic function of meadows.
- b. Explanation: This is an administrative and preventive action.

These sensitive environments are identified by the IDT during the scoping and onsite evaluation portion of the environmental document preparation process. As a minimum meadow protection requirements contained in Forest Land and Resource Management Plans must be identified and implemented. Trained and qualified Forest Service employees will assess these areas. Protection zones and tree directional falling are prescribed according to site conditions and within guidelines provided by the Forest Service Directive System and the LRMP guidelines.

Unauthorized operation of vehicular or skidding equipment in meadows or in protection zones designated on Sale Area Maps and marked on the ground is prohibited by the TSC. Vehicular or skidding equipment is not to be used on meadows except when specifically approved by the SA. Where feasible directional falling will be used to avoid falling trees into meadows. Unless otherwise agreed, trees felled into meadows will be removed by end-lining, slash removed and resulting disturbance will be repaired where necessary to protect vegetative cover, soil, and water quality.

- c. Implementation: The concerns and requirements will be set forth in TSC requirements for sale areas with meadow land. The contract may also specify that a purchaser is subject to liquidated damage charges each time equipment enters a designated meadow. Damage to these designated areas and/or their associated protection zones will be repaired by the purchaser in a timely manner, as agreed to by the SA.

Damage to a streamcourse, or SMZs caused by unauthorized purchasers' operations will be repaired by the purchaser in a timely and agreed upon manner.

19. Streamcourse and Aquatic Protection (PRACTICE: 1-19)

- a. Objective:
 - 1) To conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values.

- 2) To provide unobstructed passage of stormflows.
 - 3) To control sediment and other pollutants entering streamcourses.
 - 4) To restore the natural course of any stream as soon as practicable, where diversion of the stream has resulted from timber management activities.
- b. Explanation: This management practice employs administrative, preventive, and corrective measures to meet the objectives.

Streams within proposed timber sale areas are surveyed and protection zones are prescribed during TSPP. The IDT formulates stream protection requirements, and includes the prescription in the decision document. The requirements are then included in the TSC and identified on the SAM.

The following principles are fundamental to protecting streamcourses:

- 1) Location and method of streamcourse crossings must be agreed to by the SA prior to construction. This is done at the same time as agreements are made with the purchaser or purchaser representative for the locations of landings, skid trails, tractor roads, and temporary roads.
- 2) Repair of all damage to a streamcourse, including damage to banks and channels, to the extent practicable.
- 3) All sale-generated debris is removed from streamcourses, unless otherwise agreed to by the SA and in an agreed upon manner that will cause the least disturbance.
- 4) Limit, or exclude equipment use in designated SMZs. Widths of SMZ and restrictions pertaining to equipment use are defined by onsite project investigation and are included in the TSC. These areas are identified by the Forest Service on the Sale Area Map prior to advertising. Boundaries of zones will be modified by agreement between the contractor and SA, to compensate for unforeseen operation conditions.
- 5) Methods for protecting water quality while utilizing tractor skid trail design in stream course areas where harvest is approved include: 1) end lining 2) falling to the lead and 3) utilizing specialized equipment with low ground pressure such as a feller buncher harvester. Permit equipment to enter streamside areas only at locations agreed to by the SA and the purchaser.
- 6) Water bars and other erosion control structures will be located so as to disperse concentrated flows and filter out suspended sediments prior to entry into streamcourse.
- 7) Material from temporary road and skid trail streamcourse crossings is removed and streambanks restored to the extent practicable.
- 8) In cable log yarding operations logs will be fully airborne within the SMZ, when required by the TSC.

9) Special slash treatment site preparation activities will be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment.

- c. Implementation: The SA works with the purchaser's representative to ensure that the TSC clauses covering the above items are carried out on the ground. Specialists can be called upon to help the SA with decisions. In the event the purchaser causes debris to enter streamcourses in amounts which may adversely affect the natural flow of the stream, water quality, or fishery resource. Purchaser will remove such debris as soon as practicable, but not to exceed 48 hours and in an agreed upon manner that will cause the least disturbance to streamcourses.

20. Erosion Control Structure Maintenance (PRACTICE: 1-20)

- a. Objective: To ensure that constructed erosion control structures are stabilized and working.
- b. Explanation: Erosion control structures are only effective when they are in good repair and function as designed. Once the erosion control structures are constructed there is a possibility that they may not become adequately effective, or they will become damaged from subsequent harvest activities. It is necessary to provide follow-up inspection and structural maintenance in order to avoid these problems and ensure adequate erosion control.
- c. Implementation: During the period of the TSC, the purchaser will 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 one year, accomplish needed erosion control maintenance work using other funding sources under TSC provisions B6.6 and B6.66.

The Forest Service may agree to perform such structure maintenance under TSC provision B4.225 (Cooperative Deposits), if requested by the purchaser, subject to agreement on rates. If the purchaser fails to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the purchaser accordingly.

21. Acceptance of Timber Sale Erosion Control Measures Before Sale Closure (PRACTICE: 1-21)

- a. Objective: To ensure the adequacy of required erosion control work on timber sales.
- b. Explanation: The effectiveness of soil erosion prevention and control measures is determined by the conditions found after sale areas have been exposed for one, or more years to the elements. The evaluation is to ensure that erosion control treatments are in good repair and functioning as designed before releasing the purchaser from the contract responsibility.

Although a careful check is required before a timber sale is closed to ensure that planned erosion work has been completed to the standard prescribed, the erosion prevention work done in previous years must also be 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.

- c. Implementation: "Acceptable" erosion control means only minor deviation from established objectives, provided no major, or lasting damage is caused to soil, or water. SAs will not accept erosion control measures, which fail to meet these criteria. Specific requirements for erosion control are included in each Timber Sale Contract and the SA Handbook.

22. Slash Treatment in Sensitive Areas (PRACTICE: 1-22)

- a. Objective: To maintain or improve water quality by protecting sensitive areas from degradation which would likely result from using mechanized equipment for slash disposal.
- b. Explanation: Special slash treatment site preparation will be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment. Meadows, wetlands, SMZs, and landslide areas are typically sensitive areas where equipment use is normally prohibited. Slash treatment and site preparation methods are specified in environmental documents both are indicated, where applicable, for each cut unit in project/contract documents such as a TSC, project map or SAM.
- c. Implementation: An assessment of the sale area will be made in the TSPP. Sensitive areas needing protection are identified. Assessment results will be documented in the environmental document, and identified in the TSC and on the SAM. The SA, contract inspector or Forest Service Specialist will inspect the treatment for correct and satisfactory slash disposal accomplishment.

23. Five-Year Reforestation Requirement (PRACTICE: 1-23)

- a. Objective: To assure a continuous forest cover and to limit disturbance on areas with limited regeneration potential where there is no assurance that the site can be reforested within 5 years.
- b. Explanation: When trees are cut to achieve timber production objectives the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within 5 years after harvest. Adequate stocking means that the cut area will contain the minimum number, size, distribution and species composition of regeneration as specified in regional silvicultural guides for each forest type. Five years after final harvest means 5 years after clear cutting, 5 years after final overstory removal in shelterwood cutting, 5 years after seed tree removal cut in seed tree cutting, or 5 years after selection cutting. (36 CFR Part 219.27 (c) (3)).

The implementation of this practice protects water quality by helping to stabilize soils, increasing ground cover, and providing improved infiltration.

- c. Implementation: During the timber sale planning process, the IDT assesses the capability of proposed areas to achieve reforestation within the prescribed period. The Silviculturist uses information collected by the IDT including soil productivity, soil

depth, and available moisture holding capacity to determine harvesting and regeneration methods.

24. Non-recurring "C" Provisions That Can Be Used For water Quality Protection (PRACTICE: 1-24)

- a. Objective: To use the option of inserting Special "C" provisions into the TSC to protect water quality where standard "B," or "C" provisions do not apply or are inadequate to protect watershed values.
- b. Explanation: Special "C" provisions are sometimes needed to meet management objectives for a particular sale area. They will be proposed by District Rangers, or Forest Supervisors. They must, however, be approved by the Regional Forester. Such authorization will apply only to the sale for which approval was given.

An example of a Special "C" provision which is commonly used for water quality protection is the provision concerning the directional felling of timber. This provision is used for SMZs where it is important to avoid felling trees into streams, or into important areas of riparian vegetation, or residual timber.

Another example is the use of a "swing yarding" special provision in situations where such a method would help protect water quality. Swing yarding refers to the use of more than one yarding system to accomplish a difficult yarding problem. In one situation, it might be possible to avoid building a stream crossing by using a tractor to yard logs to a point where they could be lifted across the stream to a landing by a skyline yarder.

This practice can be used for a variety of special situations, which may occur on any timber sale. There are no standards, or set provisions that can be referenced, since each Special "C" provision is unique and specific to one sale.

- c. Implementation: The need for Special "C" provisions will be identified and recommended during the TSPP by the IDT. The Sale Preparation Forester will prepare Special "C" provision needed and submit it through line officers to the Regional Forester for approval. The Regional Forester will prepare the appropriate contract wording of the provision and return it approved. The Special "C" provision will be applied by the SA in the same manner as the standard contract provisions.

25. Modification of the Timber Sale Contract (PRACTICE: 1-25)

- a. Objective: To modify the TSC if new circumstances, or conditions indicate that the timber sale will damage soil, water, or watershed values.
- b. Explanation: Once timber sales are sold, they are harvested as planned via the TSC. At times, however, it will be necessary to modify a TSC because of new concerns about the potential affects of land disturbance on the water resource. If new evidence raises serious concerns to the Forest Service Representative, an IDT will be assigned to assess the evidence and implications.

The team will report to the appropriate Line Officer on whether the timber sale as currently planned will (1) damage soil, water, or watershed conditions or (2)

inadequately protect stream courses, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water quality, and/or blockages of watercourses. The IDT will also make recommendations of mitigation and corrective actions. The environmental document prepared for the timber sale will then be amended to reflect the findings of the IDT.

- c. Implementation: Where the project is determined to unacceptably affect watershed values, the appropriate Line Officer will take corrective actions, which may include contract modification. The Timber sale modification can be accomplished by agreement with the timber sale purchaser, or unilaterally by the Forest Service (with suitable compensation to the purchaser) using the amended environmental document prepared by and IDT.

12.2 Synopsis for Road and Building Site Construction

NFS road planning, construction, reconstruction, maintenance and/or removal is a complex process. The process involves roads analysis, Access and Travel Management Planning as well as NEPA procedures. Though complex, it assures roads are located, designed and maintained to meet Forest management objectives. General objectives are set by legislation, policy, directives, and Forest and District plans.

Project-specific resource objectives and alternatives will be formulated by an IDT selected and convened by the line officer responsible for the road or building activity. Team members represent as needed; timber, engineering, geology, archaeology, land right-of-way or easements, hydrology, soil science, botany, landscape architecture, recreation, fisheries, wildlife, range, fire, fuels and minerals.

Most of the NFS roads in California were built under the timber harvest program as a requirement of the TSC. Other roads were constructed under Public Works Contracts for range, recreation, fire, or silvicultural purposes, or under special use purpose they serve.

Transportation planning is normally conducted on a Forest-wide basis with the objective of locating roads both to service the individual timber sale areas and to meet a Forest's other long-range transportation needs. Road reconnaissance personnel flag proposed road corridors on-the-ground using road management objectives, the Forest Transportation Plan, topographic maps, aerial photographs, and any preliminary soils, logging, engineering, or geology data.

These corridors are reviewed by an IDT. Modifications in design and/or alignment, or new alternative corridors are proposed based on multiple resource management objectives, and recommendations are made for road design criteria. Existing roads that are to be improved or removed go through the same interdisciplinary review. Inadequate roads that are retained as part of the transportation system are upgraded to current LRMP standards and guidelines to reduce adverse environmental effects and improve user safety.

Interdisciplinary team roads analysis information and recommendations, along with an economic analysis of alternatives, are used to generate a transportation study report. The report is used to help assess the environmental effects and costs of roads for each alternative in the resource project environmental documentation.

Once an alternative has been chosen through the NEPA process, work begins on the road survey. The transportation study report is used to establish design criteria from which a

transportation engineer selects road design standards. The road design standards selected depend on the type and amount of traffic, topography, geology, soils, requirements of the environmental document and the Access Travel Management Plan. Most new roads today, however, are only short segments constructed for local access needs.

Engineers design the road according to the selected design standards, which may include, but are not limited to, road widths, road drainage, maximum road grades, radii, and road surfacing. Members of the IDT are usually involved in the road design phase, to assist in meeting the selected resource objectives. Road planning and implementation includes road design, construction staking and construction inspection. Road design includes selection of construction specifications, which help protect environmental concerns addressed in the environmental document and preparation of the construction contract. Road design and construction use Forest Service Standard Specifications for Roads and Bridges, Special Project Specifications, Timber Sale B and C provisions, General Provisions and applicable American association of State Highway and Transportation Officials (AASHTO) and American Society for Testing and Materials (ASTM) specifications.

While road construction is in progress, the Engineering Representative (ER), Contracting Officers Representatives (COR), SA, FSR and Construction Inspector (CI), are frequently on the project site. These inspectors, along with a purchaser's or contractor's field representative, assure that the project is carried out according to the specifications in the contract. Various IDT members will be called upon to review proposed design modifications during construction.

As part of the project plan, a road management objectives are developed which detail the level of maintenance for each road. There are five levels of maintenance for permanent roads varying from Level 1 (custodial care of the road and assuring functional road drainage) to Level 5 (the maintenance of two-laned, paved roads). Maintenance generally consists of, but is not limited to, cleaning, ditches and culverts, road surface grading, pothole patching and surface replacement.

Closed system roads (Level 1) are barricaded to preclude use for a year or longer. Water bars are installed where necessary. All open permanent roads will be inspected periodically and maintained as needed. Temporary roads are built for short-term use, principally under a TSC or for emergency wildfire access. When the temporary road is no longer needed, temporary drainage structures are removed, and the roads are decommissioned as required by the provisions of the applicable contract.

Environmental documents based on the work of IDT are also prepared for proposed building sites. Facilities normally encountered on National Forests are administrative sites, such as fire stations, work centers, ranger stations, campgrounds or VIS centers. Other proposals come from the private sector to build such facilities as: ski areas, marinas, concession building, waste disposal areas or access to private land inholdings.

Facility locations will be evaluated in much the same way as timber sale areas. An IDT is formed to develop resource objectives, formulate alternatives, and analyze the various sites for environmental effects. The IDT prepares environmental analysis, recommends alternatives, design criteria, and mitigation measures to meet Forest resource objectives at each site.

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12.22 Road and Building Site Construction Best Management Practices

The following are the BMPs for the control of non-point source pollution associated with road and building site construction activities. Each BMP was formulated based on the administrative directives that guide and direct the Forest Services' construction and maintenance of roads, buildings, and administrative facilities on NFS land.

The line officer on each administrative subunit is responsible for fully implementing the directives that require water quality protection and improvement during road and facilities construction and maintenance. The directives referenced in Section 13, provide details on methods to incorporate water quality controls into each phase of the road and facility construction and maintenance program. The BMPs synthesize the direction into a "process" to be followed.

Trained and qualified earth scientists, and other professional employees, are available to provide the engineering work force with technical assistance to identify beneficial uses and the most recent state-of-the-art water quality control methods and techniques; and to evaluate results. Publications and training sessions provide road construction and maintenance engineers with knowledge of the latest proven water quality protection methods.

1. **General Guidelines for the Location and Design of Roads (PRACTICE: 2-1)**

- a. Objective: To locate and design roads with minimal resource damage.
- b. Explanation: The following are some general considerations, which must be incorporated into the planning process of road location and design. These measures are preventive, apply to all transportation activities, and indirectly protect water quality.
 - 1) A basic requirement for transportation facility development and operation is the formulation and evaluation of alternatives that will best meet the resource management objectives with the least adverse effect on environmental values.
 - 2) The location, design, and construction of roads include the use of IDTs. These teams include professional personnel with skills in road, resources and water quality management. The team evaluates the effects of road system development or modification proposals on the environment, and formulates alternative.
 - 3) All resource-coordinating instructions for the protection and prevention of damage to NFS lands, resources, and ecological systems, including wetlands and floodplains will apply to the planning, development, and operation of transportation facilities. The following instructions apply to permanent roads:
 - a) Locate roads to complete the area transportation system, to fit the terrain, and to minimize damage to improvements and resources. Avoid sensitive areas such as wetlands, inner gorges and unstable ground to the extent practical.
 - b) Base road design standards on design criteria such as traffic requirements of a timber sale, or the overall transportation plan, road management objectives or resource objectives, and minimize the effects on Forest resources including water quality.
 - c) Design stream crossing structures to provide the most cost efficient drainage facility consistent with resource protection, facility needs, and legal obligations. The design involves a hydrologic analysis to determine runoff volumes, flood conditions, velocities, scour, and open channel shapes. An economic comparison of various flood frequencies versus structure sizes and types is also done to meet resource and legal requirements and cost/benefit comparisons. All crossings will be designed to provide for unobstructed flows and fish passage, and to minimize diversion potential and alteration of stream channels.

- c. Implementation: The IDT is selected by the line officer to assist in locating the road to best fit resource objectives, and to develop detailed mitigation measures. For force account projects, Forest engineers will be responsible for developing and meeting design specifications.

For some timber sales awarded to small businesses, the purchaser may request that the Forest Service construct the roads. Under present guidelines, such work is normally done by contracting with a road construction contractor.

The COR, ER or FSR ensures compliance with project plan requirements and the operating plan.

2. Erosion Control Plan (PRACTICE: 2-2)

- a. Objective: To limit and mitigate erosion and sedimentation through effective planning prior to initiation of construction activities and through effective contract administration during construction.
- b. Explanation: Land disturbing activities can result in short term erosion. By effectively planning for erosion control, sedimentation can be controlled or prevented. Within a specified period after award of a contract (presently 60 days prior to the first operating season in Timber Sale Contracts, per C6.3) the purchaser will submit a general plan which, among other things, sets forth erosion control measures. Operations cannot begin until the Forest Service has given written approval of the plan. The plan recognizes the mitigation required in the contract. A similar plan is required of miners and special use permittees.
- c. Implementation: Design engineers develop detailed mitigation using an IDT. The detailed mitigations are reflected in the contract specifications and provisions. The intent of mitigation is to prevent construction-generated erosion, as well as that generated from the completed road, from entering watercourses. Contracted projects are implemented by the contractor or operator. Compliance with contract specifications and operating plans is ensured by the COR, ER, or FSR through inspection.

This practice is commonly applied to all road construction through contract clauses and specifications and will apply to road construction for timber sales, mining, recreation, special uses and other roadwork on NFS lands.

3. Timing of Construction Activities (PRACTICE: 2-3)

- a. Objective: To minimize erosion by conducting operations during minimal runoff periods.
- b. Explanation: The amount of erosion and sedimentation from road construction are affected by the magnitude of water runoff. An essential element of effective erosion control is to schedule operations during the dry season or when rain and runoff are unlikely. Purchasers will be required to schedule and conduct operations during the dry season or when rain and runoff are unlikely. Purchasers will be required to schedule and conduct operations to minimize erosion and sedimentation. Equipment will not be allowed to operate when ground conditions are such that

excessive rutting and soil compaction could result. Such conditions will be identified by the COR or ER with the assistance of an earth scientist or other specialists as needed.

Erosion control work will be kept as current as practicable on active road construction projects. Construction of drainage facilities and performance of other contract work to control erosion and sedimentation will be required in conjunction with earthwork projects. The operator should limit the amount of area being graded at a site at any one time, and should minimize the time that an area is laid bare. Erosion control work must be kept current when road construction occurs outside of the normal operating season.

- c. Implementation: Detailed mitigations developed by design engineers and an IDT will be included in the environmental analysis and in subsequent project plans and contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and as specified in the project plan. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and the operating plan will be achieved by the COR or ER through inspection.

4. **Stabilization of Road Slope Surfaces and Spoil Disposal Areas (PRACTICE: 2-4)**

- a. Objective: To minimize erosion from exposed cut slopes, fill slopes, and spoil disposal areas.
- b. Explanation: This is a preventive practice using bioengineering and other techniques to prevent or minimize erosion. Depending on site factors such as slope angle, soil type, climate, and proximity to waterways, many fill slopes, some cut slopes, and some spoil disposal areas will require vegetative and/or mechanical measures to provide surface soil stability. The level of stabilization effort needed is determined on a case-by-case basis by trained and qualified employees.

Revegetation includes the seeding of plant species grass, legumes, or browse species--or the planting of brush, or trees. Revegetation may also include fertilizer, soil amendments, and mulching or even watering to ensure success. A combination of plant types with both woody root systems and fibrous root systems usually produce better results than a single plant type such as grass. Native species are preferred and used wherever feasible. Where local native seed is not available, not economically feasible or native plants would be ineffective in controlling erosion sterilized grass or cereal grain seed is applied.

Mechanical measures may include, but are not limited to: wattles, erosion nets, terraces, side drains, blankets, mats, riprapping, mulch, tackifiers, pavement, soil seals, and windrowing construction slash at the toe of fill slopes.

- c. Implementation: Vegetative measures are generally a supplementary device, used to improve the effectiveness of mechanical measures, but can be effective and complete by themselves. They may not take effect for several seasons, depending on the timing of project completion in relation to the growing season.

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

Initial project location, mitigation measures and management requirements are developed during the environmental analysis process. These are translated into project plans, contract provisions and specifications.

Project road inspectors, and their supervisors monitor work accomplishment and effectiveness, to ensure that design standards, project plan management requirements, and mitigation measures are met.

5. Road Slope Stabilization Construction Practices (PRACTICE: 2-5)

- a. Objective: To reduce sedimentation by minimizing erosion from road slopes and slope failure along roads.
- b. Explanation: This is an administrative and construction practice. It is prohibitively expensive to immediately and completely prevent erosion from road cut and fill slopes. However, plan all road construction considering adequate stabilization needs. The first planning requirement is an adequate soils and geologic investigation, to provide data necessary for proper cut and fill design such as:
 - 1) The correct cut and fill slope steepness according to the stable angle of repose for the type of material.
 - 2) Methods to handle surface and subsurface runoff.
 - 3) Necessary compaction standards and surfacing needs.

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

- c. Implementation: Include erosion prevention considerations in planning for all road construction contracts. Application is commonly in conjunction with practice 2-4. Complete most, if not all, of the stabilization measures prior to the first winter rains. At especially critical locations, with a high erosion and/or sedimentation potential, extensive and reliable remedies will be necessary. Determine a project location and detailed mitigation measures during the environmental analysis and included them in the project plan.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet design standards and project criteria. Contracted projects are implemented by the contractor or operator. Compliance with project plan requirements and the operating plan is ensured by the COR, or ER through inspection.

6. Dispersion of Subsurface Drainage From Cut and Fill slopes (PRACTICE: 2-6)

- a. Objective: To minimize the possibilities of cut or fill slope failure and the subsequent production of sediment.
- b. Explanation: This is a preventive practice. Roadways may change the sub-surface drainage characteristics of a slope. Since the angle and height of cut and fill slopes can increase the risk of instability, it is often necessary to provide subsurface drainage to avoid moisture saturation and subsequent slope failure. Where ground water dispersion is necessary because of slopes, soil, aspect, precipitation amounts, inherent instability, or other related characteristics, dispersion methods would include:

- 1) Underdrains or subdrains (e.g. pipes, geotextiles)
- 2) Horizontal drains or chimney drains

Dispersal of collected water will be accomplished in an area capable of withstanding increased flows. On erosive soils, energy dissipaters or other slope stabilization treatments or conveyance devices need to be placed below pipes carrying large volumes of water. Road surface may be designed to dissipate the intercepted water in a uniform manner along the road.

- c. Implementation: Project location and detailed mitigation will be determined by design engineers and the IDT, documented and incorporated into subsequent project plans and contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications as specified in the environmental analysis. Contracted projects are implemented by the contractor or timber sale operator. Compliance with project plan requirements and operating plans is ensured by the COR, FSR, or ER.

7. Control of Road Drainage (PRACTICE: 2-7)

- a. Objective: Is to minimize the erosive effects of water concentrated by road drainage features; to disperse runoff from disturbances within the road clearing limits; to lessen the sediment yield from roaded areas; to minimize erosion of the road prism by runoff from road surfaces and from uphill areas.
- b. Explanation: This is a preventive practice. A number of treatments can be used, alone, or in combination, to control unacceptable effects of road drainage. Methods used to reduce erosion include but are not limited to such controls as construction of properly spaced cross drains, water bars or rolling dips; installing energy dissipaters, apron, downspouts, gabions, flumes, overside drains and debris racks; armoring of ditches, drain inlets and outlets and removing or adding berms to control runoff. Accomplish dispersal of runoff on the road surface by such means as rolling the grade, outsloping or crowning. Installing water spreading ditches or contour trenching can disperse road water after the water leaves the road surface.

Dispersal of runoff reduces downstream peak flows and associated scouring of the channels and sediment transport.

Reduce sediment loads from road surfaces by adding aggregate or paving surfaces or by installing such controls as: sediment filters, settling ponds, and contour trenches. Soil stabilization can reduce sedimentation by lessening erosion on borrow and waste areas, on cut and fill slopes, and on road shoulders.

- c. Implementation: Project location, design criteria and detailed mitigation are determined and documented during the environmental analysis process. These are then incorporated into the project plan.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications, and project criteria. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, ER, or FSR.

This practice is required in contracts when the need is identified in the project planning process.

8. Constraints Related to Pioneer Road Construction (PRACTICE: 2-8)

- a. Objective: To minimize sediment production and mass wasting from pioneer road construction.
- b. Explanation: Pioneer roads are built to allow equipment access for construction of planned roadways. Pioneering is usually done within the roadway construction corridor of the planned road. To meet the objective of minimizing sediment the following constraints will be followed:
 - 1) Confine construction of pioneer roads to the planned roadway construction limits unless otherwise specified or approved by the ER or COR.
 - 2) Locate and construct pioneering roads to prevent undercutting of the designated final cut slope, avoid deposition of materials outside the designated roadway limits, and accommodate drainage with temporary culverts or log crossings.
 - 3) Complete erosion control work prior to the rainy season and in accordance with contract, or project plan requirements.
 - 4) Dewater sites on live streams crossed by pioneer roads with diversion devices (see Practice 2-15).
- c. Implementation: Determine and document project location and describe mitigations set forth during the environmental analysis process. Incorporate them into subsequent project plans and/or contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects according to construction specifications and as specified in the project plan.

Contracted projects are implemented by the contractor, or timber sale operator. Compliance with plans, specifications, and operating plans is ensured by the COR, FSR, or ER.

9. Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects (PRACTICE: 2-9)

- a. Objective: To minimize erosion and sedimentation from disturbed ground on incomplete projects.
- b. Explanation: The best drainage design can be ineffective if erosion control has not been completed by the end of the normal operating season. Affected areas can include roads, road fills, tractor trails, skid trails, landings, stream crossings, bridge excavations, and firelines.

Preventive measures include:

- 1) Removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossings.
 - 2) 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.
 - 3) Removal of debris, obstructions and spoil material from channels and floodplains.
 - 4) Planting vegetation, mulching, and/or covering exposed surfaces with jute mats or other protective material.
- c. Implementation: Apply protective measures 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 of the normal operating season, update the operating plan as necessary and keep erosion control measures sufficiently current with ground disturbance to allow rapid closure when weather conditions deteriorate. Do not leave project areas for the winter with remedial measures incomplete.

Develop project mitigation measures and layout requirements during the environmental analysis process. Incorporate them into subsequent project plans and/or contracts.

Project crew leaders and supervisors are responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with project plan criteria, contract specifications and operating plans is ensured by the COR, ER, or FSR.

10. Construction of Stable Embankments (Fills) (PRACTICE: 2-10)

- a. Objective: To construct embankments with materials and methods, which minimize the possibility of failure and subsequent water quality degradation.
- b. Explanation. The failure of road embankments and the subsequent deposition of material into waterways may result from the incorporation of slash, or other organic matter into fills, from a lack of compaction during the construction of the embankment, or use of inappropriate placement methods.

To minimize fill failures, design and construct the roadway as a stable and durable earthwork structure with adequate strength to support the treadway, shoulders, subgrade and the roads traffic loads. Proper slope ratio design will promote stable embankments. Adjacent to SMZs construct and place embankments of inorganic material by methods 2 to 6 below. Construct or place other embankments of inorganic material by one, or more of the following methods:

- 1) Sidecasting and end dumping
- 2) Layer placement
- 3) Layer placement (roller compaction)
- 4) Controlled compaction
- 5) Special project controlled compaction
- 6) In some situations it will be necessary to minimize fill volumes and/or strengthen fills using retaining walls, confinement systems, plantings or a combination of techniques.

On projects, where required densities are specified, some type of moisture compaction control will be necessary. Where outer faces of embankments are not stabilized, due to equipment access difficulty, unfinished slopes subject to erosion and slipping will be stabilized following Practice 2-4.

- c. Implementation: Project requirements and mitigation measures are developed and documented during the environmental analysis and road design process, by the IDT. The appropriate method of embankment placement is chosen during this process.

Project crew leaders and supervisors will be responsible for implementing force account projects, to construction specifications and project criteria. Contracted projects are implemented by the contractor, or operator. Compliance with project plan specifications, and the operating plan is ensured by the COR, CI and ER through inspection.

11. Control of Sidecast Material During Construction and Maintenance (PRACTICE: 2-11)

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

- b. Explanation: Unconsolidated materials including rocks and boulders that are cast over the side of the road shoulder can roll directly into streams, damage downslope vegetation and create bare areas that are difficult to stabilize with vegetation. Where spoil does not directly reach a stream, it is still highly susceptible to erosion, dry ravel and mass instability, and subsequently can directly deliver sediment to a nearby stream. Site-specific limits and controls for side casting or end hauling are developed and documented during environmental analysis. Loose, unconsolidated sidecast material must not be permitted to enter SMZs, (see Practice 2-17).

Sidecasting is an unacceptable construction alternative in areas where it can adversely impact water quality. Prior to the start of construction, or maintenance activities, waste areas must be located where excess material can be deposited and stabilized. During road maintenance operations, potential sidecast and other waste material will be utilized on the road surface or removed to designated disposal sites.

The roadway will be constructed within reasonable limits of the lines, grades, and dimensions given in the engineering drawings and designated on the ground. Provisions for waste material disposal are included in every road construction and maintenance contract.

- c. Implementation: Project location, selected disposal areas, and mitigation will be developed and documented during the environmental analysis.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria. Road maintenance plans are developed for each forest and include slide and slump repairs and disposal site locations for excess material.

Contracted projects are implemented by the contractor or timber sale operator. Compliance with project criteria, contract specifications, and operating plans will be enforced by the COR, ER, or FSR. Standard maintenance specifications have been prepared which include disposal area operation, disposal methods, and surface treatment.

Timber sale contracts include clause C5.4 to address temporary road maintenance specifications, which includes slide and slump repair, surface blading, and side casting during road maintenance.

12. Servicing and Refueling of Equipment (PRACTICE: 2-12)

- a. Objective: To prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams and impoundments, or into natural or man-made channels.
- b. Explanation: During servicing and refueling of logging and road construction equipment, any spilled pollutants can be transported by runoff to surface waters. If the volume of fuel exceeds 660 gallons in a single container, or if total storage at a site exceeds 1,320 gallons, project Spill Prevention, Containment and Counter Measures (SPCC) plans are required. Contaminated upland soils can be a long-term threat to surface and ground water quality. This threat must be managed by disposing of waste material properly, selecting service and refueling areas well

away from wet areas and surface water; by using berms around such sites and by utilizing impermeable liners or other techniques to contain spills according to the Forest SPCC plan.

- c. Implementation: The COR, ER, CI, or TSA are authorized to designate the location, size and allowable uses of service and refueling areas. Operators are required to remove service residues, waste oil and other materials from National Forest land. They must also be prepared to take responsive actions in case of a hazardous substance spill, according to the Forest SPCC plan.

12. Control of Construction and Maintenance Activities Adjacent to SMZs (PRACTICE: 2-13)

- a. Objective: To protect water quality by controlling construction and maintenance actions within and adjacent to any streamside management zone so that the following SMZ functions are not impaired:
 - 1) Acting as an effective filter for sediment generated by erosion from bare surfaces, road fills, dust drift, and oil traces;
 - 2) Maintaining shade, riparian habitat (aquatic and terrestrial), and channel stabilizing effects;
 - 3) Keeping the floodplain surface in a resistant, undisturbed condition to slow water velocities and limit erosion by flood flows.
- b. Explanation: Construction and maintenance fills, sidecast, and end-hauled materials are kept out of SMZs except at designated sites to minimize effects on the aquatic environment. Factors such as stream class, channel stability, sideslope steepness, ground cover, and sideslope stability are taken into account in developing zone widths. In some situations, SMZ widths are established by records of decision and by EIS standards and guidelines (e.g. PACFISH EA, Northwest Forest Plan ROD). It is also necessary to stabilize fill slopes to prevent sediment accumulations in the streamside zone.

SMZs are determined and documented during the environmental analysis process by the IDT, which includes hydrologists, fishery biologists, and other specialists as required.

- c. Implementation: Project location alternatives are formulated, and mitigation measures developed by the IDT are included into the contract by design engineers. Project crew leaders and supervisors are responsible for ensuring that force account projects meet maintenance and construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with mitigation measures, contract specifications, and operating plans is ensured by the COR, FSR, or ER.

14. Controlling In-Channel Excavation (PRACTICE: 2-14)

- a. Objective: To minimize stream channel disturbances and related sediment production.
- b. Explanation: During construction, heavy equipment may need to cross, or work in and near streams or lakes. This is permitted only as necessary in the construction, or removal of culverts and bridges and other facilities (e.g. water sources, boat ramp/launching sites, etc.) and only under specific protection requirements. The Engineering Representative (ER) is authorized to designate the location of crossings or work sites and coordinate with the contractor to manage heavy equipment.

Excavation during the installation of instream structures must follow all of the following minimum water quality protection requirements.

- 1) Unless otherwise approved, no excavation will be made outside of caissons, cribs, cofferdams, or sheet piling.
 - 2) The natural streambed or lake bottom adjacent to the structure will not be disturbed without prior approval of the ER or COR.
 - 3) If any excavation, or dredging is made at the site of the structure before caissons, cribs, or cofferdams are sunk in place, all such excavations will be restored to the original surface and the streambed or lake bottom must be protected with suitable stable material.
 - 4) Material deposited within the stream or lake area from foundation, or other excavation will not be discharged directly into live streams or lakes, but will be put into settling areas as shown on the engineering drawings or as approved by the ER, or COR. (See Practice 2-15)
 - 5) If the channel or lake bottom is disturbed during construction, it must be restored to its original configuration while minimizing any additional disturbance.
 - 6) Disturbances of stream or lake banks are kept to a minimum. Disturbed banks are stabilized.
- c. Implementation. Mitigation measures developed by the IDT are set forth in the environmental documentation and incorporated into the contract by design engineers. Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with mitigation measures, contract specifications, and operating plans is enforced by the CI, COR, FSR or ER.

15. Diversion of Flows Around Construction Sites (PRACTICE: 2-15)

- a. Objective: To ensure that all stream diversions are carefully planned, to minimize downstream sedimentation, and to restore stream channels to their natural grade, condition, and alignment as soon as possible.
- b. Explanation: Streamflow must be diverted around construction sites such as bridges, culverts and dams. The streamflow will be diverted for all live streams according to the instructions of the ER. The diverted flows are returned to their natural streamcourse as soon as possible after construction or at least prior to the rainy season. All disturbed areas are stabilized prior to the rainy season or as needed.
- c. Implementation: This practice is required by contract clauses. The NEPA and design process will identify where diversions are required, and the design will include mitigation necessary to protect instream values and downstream beneficial uses of the water. Planning must include environmental analysis to identify and prevent unacceptable effects to the beneficial uses of the water. The planning process may require project review and/or issuance of permits or certifications by other Federal, State, or local agencies and, where appropriate, private parties. Case by case determinations must be made during project planning as to out-service review and consultation needs. Coordination with California Department of Fish and Game (CDFG) is initiated in most all cases.

Project location, bypass design, and detailed mitigation will be developed in the design and planning process to meet project criteria. Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and to meet project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, contract specifications and operating plans is enforced by the CI, COR, ER, or SA.

16. Stream Crossings on Temporary Roads (PRACTICE: 2-16)

- a. Objective: To ensure that temporary roads do not unduly damage stream channels and to ensure that fish passage is unimpeded by stream crossing structures.
- b. Explanation: Stream crossing structures (e.g. culverts, bridges) are required on all temporary roads where it is necessary to cross designated channels. Means of crossing will include but not be limited to, culverts, bridges, coarse rock fills, hardened fords, (using such features as rocked approaches), and low water crossings. Identifying locations to cross streams will be accomplished using an IDT. Such crossings are designed to provide for unobstructed flows and the passage of fish, and to minimize damages to stream channels and water quality.

The number of crossings is kept to the minimum needed for access. Channel crossings will be as perpendicular to stream courses as possible. Streambank excavation will be kept to the minimum needed for use of the crossings, and entry and exit ramps may need to be rocked. Fords and turnpike crossings hardened with

washed rock, concrete planks, slabs or geogrid are sometimes an acceptable alternative, depending on water quality, fishery and hydrological considerations.

Temporary crossing facilities will be removed and the site stabilized prior to the rainy season each year or when the facility is no longer needed, which ever is earliest.

- c. **Implementation:** This practice is required when documented in the project plan. In timber sales, stream crossing are located, and mitigation is implemented by the SA, using instructions in the TSA Handbook, supplemental Forest guidelines, and considering IDT recommendations. Mitigation at sensitive stream crossings must be assessed, and controls prescribed during the environmental analysis by the IDT.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with the requirements in the project plan, contract and/or operating plan is ensured by the CI, COR, FSR, SA, or ER.

17. **Bridge and Culvert Installation (PRACTICE: 2-17)**

- a. **Objective:** To minimize sedimentation and turbidity resulting from excavation for in-channel structures.
- b. **Explanation:** Excavation is a common requirement for the installation of bridges, culverts, weirs, check dam, riprapping and other structures. Spoil material generated during construction should neither obstruct the stream course (including natural floodplains) nor impair the efficiency of the associated structures. Preventive measures include:
 - 1) Keep excavated materials out of channels.
 - 2) Remove any materials stacked, or stockpiled on floodplains prior to the rainy season.
 - 3) Divert flowing water around work sites to minimize erosion and sedimentation.
 - 4) Suitably locate bypass roads and develop plans for their subsequent obliteration and stabilization.
 - 5) In some cases, fill material may have to be imported for better soil compaction. Original fill may have to be exported to a disposal site.

Streams identified as important for fisheries or other aquatic resources may require that the channel not be disturbed except during flow periods specified in the project plan. Normally, this work would occur during low flow periods. Work would not be allowed during spawning periods, or other periods critical to aquatic resources. Downstream sediment basins or other sediment reduction facilities or techniques will be necessary to mitigate impacts.

- c. Implementation: Project location and detailed mitigation measures will be developed during the design process to meet project criteria, using an interdisciplinary process.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

18. Regulation of Streamside Gravel Borrow Areas (PRACTICE: 2-18)

- a. Objective: To limit channel disturbances and sediment production associated with gravel source development.
- b. Explanation: Materials deposited along channels by storm runoff often provide a source of gravel. With adequate planning gravel can be removed with minimal impact on water resources and channel stability. Gravel removal can alter streamflow characteristics and consequently effect channel stability and create a new sediment source. Borrowing will be limited to material deposited above the bankfull line. Borrow area shaping or other special drainage re-configuration actions are taken to maintain channel function.

Excavation will not take place below the water table unless sediment basins are built to contain, or catch the resulting sediment. Sediment basins should not be subject to washouts. If excess sediment accumulates in basins, the basin will be cleaned and the sediment deposited and stabilized at approved sites outside the area where it could re-enter the stream.

Wash water or waste from concrete batching, or aggregate operations will not be allowed to enter streams prior to treatment by filtration, flocculation, settling, and/or other means. (See also Practice 3-3)

- c. Implementation: Project location, stability and the limits for disturbance and sediment production will be developed through the environmental analysis and the IDT and in consultation with State Fish and Game or other pertinent agency. Detailed mitigation measures will be developed by the design engineer to meet project criteria.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with project criteria, contract specifications, and operating plans is ensured by the CI, FSR, COR, or ER.

Special us permits issued for gravel bar excavation will include the above requirements, an operating plan and reclamation plan if warranted. District Rangers or their representatives will be responsible for ensuring compliance.

19. Disposal of Right-of-Way and Roadside Debris (PRACTICE: 2-19)

- a. Objective:

- 1) To ensure that organic debris generated during road construction is kept out of streams so that channels and downstream facilities are not obstructed.
 - 2) To ensure debris dams are not formed which obstruct fish passage, or which could result in downstream damage from high water flow surges after dam failure.
- b. Explanation: As a preventive measure, construction debris and other newly generated roadside slash developed along roads in the streamside management zone is disposed of by the following means as applicable: (See also Practice 2-11)
- 1) On Site:

a) Piling and burning	e) Disposal in cutting units
b) Burying	f) Windrowing at the base of fill slopes
c) Chipping	g) Incorporation {only in temporary roads}
d) Scattering	
 - 2) Removal to agreed upon locations (especially stumps from the road prism).
 - 3) A combination of the above.
 - 4) Large limbs and cull logs are removed to designated sites outside the SMZ or relocated within the zone to meet aquatic resource management objectives.
- c. Implementation: Criteria for the disposal of right-of-way and roadside debris will be established during onsite evaluation by an IDT. Project location and detailed mitigation measures are also developed and set forth in the environmental analysis and incorporated into project plans and/or contracts.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications.

Contracted projects are implemented by the contractor or operator. Compliance with plans, specifications, and operating plans is ensured by the CI, COR, or ER.

20. Specifying Riprap Composition (PRACTICE: 2-20)

- a. Objective: To minimize sediment production associated with the installation and utilization of riprap material.
- b. Explanation: Riprap is commonly used to armor streambanks and drainage ways from the erosive forces of flowing water. Riprap must be sized and installed in such a way that it effectively resists erosive water velocities. On occasion, this may require the use of filter blankets, or other methods to prevent undermining. Stone used for riprap will be free of weakly structured rock, soil, organic material and other material not resistant to streamflow that would only serve as sediment sources. Outlets of drainage facilities on erodible soils commonly require riprapping for energy dissipation. The Corps of Engineers and Federal Highway Administration procedures are commonly used for designing riprap structures.
- c. Implementation: Project location and detailed mitigation will be developed through the planning and design process to meet the mitigation measures and requirements of the project plan.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with project criteria and operating plans is ensured by the COR, or ER.

21. Water Source Development Consistent with Water Quality Protection (PRACTICE: 2-21)

- a. Objective: To supply water for roads and fire protection while maintaining existing water quality.
- b. Explanation: Water source development is normally needed to supply water for road construction and maintenance, dust control, and fire control. Problems may arise when cofferdams or water holes are built in streams. Use of earth fill for dam construction will be avoided as it creates sediment problems during installation and removal. Cofferdams and water holes will be built out of sandbags filled with clean sand, or gravel, or other methods that will not contribute to nonpoint source pollution. At no time will downstream water flow be reduced to a level that will be detrimental to aquatic resources, fish passage, other established uses. The structure is not allowed to create a situation where dam failure would occur due to excessive impoundment flow.

Water source developments are aimed toward the construction of a limited number of durable, long-term water sources rather than the construction of a succession of hasty, expedient developments that are rapidly abandoned. Permanently designed sources, such as small piped diversions to off-site storage tanks or ponds will result in the lowest, long-term effects. Water rights applications are filed or if riparian or reserved water right, a notification of Diversion and Use is filed with the State.

Damage to resources at such locations caused by purchaser's, or contractor's operations, or fire suppression activities will be repaired by purchaser, contractor, or fire suppression crews in a timely and agreed upon manner to the extent practical to restore and prevent further resource damage.

Overflow from water holding developments will be returned to the stream.

Access approaches will be as near perpendicular to the stream as possible and will be gravel surfaced or otherwise stabilized as appropriate. Streambank excavation will be kept to a minimum needed for entry and exit.

- c. Implementation: Engineering representatives and the TSA working with hydrologists and fishery biologists should evaluate streams in which water developments are proposed. Water holes and other improvements will be restored to a stable condition, prior to the end of the normal operating season. Project location and detailed mitigation will be developed by the design engineer, using the interdisciplinary approach to meet project criteria.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, and the operating plan is ensured by the CI, COR, or ER.

22. Maintenance of Roads (PRACTICE: 2-22)

- a. Objective: To maintain roads in a manner which provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities all of which can cause erosion and sedimentation, and deteriorating watershed conditions.
- b. Explanation: Roads normally deteriorate because of use and weather. This deterioration can be corrected by adequate maintenance and/or restriction of use occasionally new groundwater springs and seeps appear after a wildfire or unusually wet periods and saturate road surfaces. All roads are maintained to at least the following level:
 - 1) Provide the basic maintenance required to protect the road investment and to ensure that damage to adjacent land and resources is prevented. This level of maintenance often requires an annual inspection to determine what work, if any is needed to keep ditches, culverts and other drainage facilities functional and the road stable. This level is the normal prescription for roads closed to traffic.
 - 2) As a minimum measure, maintenance must protect drainage facilities and runoff patterns. Higher levels of maintenance will be chosen to respond to greater use or resource administrative needs.
 - 3) Additional maintenance measures include surfacing and resurfacing, outsloping, clearing debris from dips and cross drains, armoring of ditches, spot rocking, culvert replacement and installing new drainage features.

For maintenance of all roads on active timber sales and other projects the responsible FSR and the purchaser or user agree on an Annual Road Maintenance Plan outlining responsibilities and timing of maintenance, before the beginning of the operating season. If the road is subjected to other commercial use, the Forest Service may collect deposits of facilitate road maintenance and to equitably assess maintenance cost of each user.

- c. Implementation: Work is managed by the Forest Engineer who develops a road condition survey and a maintenance plan. Maintenance levels are designated for each road in a timber sale area, as part of the TSPP, with road maintenance levels documented in the sale plan. Maintenance is a timber purchaser or user responsibility, and compliance is administered by the ER and SA.

On system roads outside of active timber sales, project crews, or contract crews perform road maintenance under supervision of a crew leader.

23. Road Surface Treatment to Prevent Loss of Materials (PRACTICE: 2-23)

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

- b. Explanation: Unconsolidated road surface material is susceptible to erosion during precipitation events. Likewise, dust derived from road use may settle onto adjacent water bodies and streamcourses. Contractors, purchasers, special users and Forest Service project Leaders undertake measures to minimize loss of road material when the need for such action is identified.

Road surface treatments include watering, dust oiling, penetration oiling, sealing, aggregate surfacing, chip-sealing, or paving, depending on traffic, soils, geology, and road design specifications.

- c. Implementation: Project location and detailed mitigation will be developed by the design engineer, using an interdisciplinary approach, to meet project criteria.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, contract specifications, and operating plans is ensured by the COR, CI, ER, or FSR.

24. Traffic Control During Wet Periods (PRACTICE: 2-24)

- a. Objective:

- 1) To reduce road surface disturbance and rutting of roads.
- 2) To minimize sediment washing from disturbed road surfaces.

- b. Explanation: The unrestricted use of many NFS roads during the rainy season often results in rutting and churning of the road surfaces. Runoff from such disturbed road surfaces often carries a high sediment load. The damage and maintenance cycle for roads that are frequently used during wet periods can create a disturbed road surface that is a continuing sediment source.

Roads that must be used during wet periods should have a stable surface and sufficient drainage provided to allow such use while at the same time maintaining water quality. Rocking, oiling, paving, and armoring are measures that will be necessary to protect the road surface and reduce soil loss. Where wet season field operations are planned, roads may need to be upgraded, use restricted to low ground pressure vehicles or frozen ground conditions, or maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surface.

Roads not needed for wet weather access are closed to use during the wet season.

- c. Implementation: Road closures and traffic control measures will be used outside of active timber sale areas. Timber sale implementation procedures can be enforced by District personnel. Hauling activity can be controlled by the FSR, ER, or TSA within active timber sales. The decision by the TSA for closure is based on local soil moisture conditions and other criteria.

Detailed mitigation is developed by design engineers, using an interdisciplinary approach as necessary. Project crew leaders and supervisors will be responsible for implementing force account projects according to construction specifications. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, or ER.

25. Snow Removal Controls to Avoid Resource Damage (PRACTICE: 2-25)

- a. Objective: To minimize the impact of snowmelt runoff on road surfaces and embankments and to consequently reduce the probability of sediment production resulting from snow removal operations.
- b. 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:
 1. The contractor will be responsible for snow removal in a manner, which will protect roads and adjacent resources.
 2. Rocking or other special surfacing and drainage measures will be necessary, before the operator is allowed to use the roads.
 3. Snow berms will be removed where they result in accumulation or concentration of snowmelt runoff on the road and erosive fill slopes.
 4. Snow berms will be installed where such placement will preclude concentration of snowmelt runoff and serve to rapidly dissipate melt water. If the road surface is damaged during snow removal, the purchaser, or contractor will be required to replace lost surface material with similar quality material and repair structures damaged in removal operations as soon as practicable, or unless otherwise agreed to in writing
- c. Implementation: Project location and detailed mitigation will be developed by the IDT during the environmental analysis and incorporate into the project plan and/or contracts. Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria. (See also Practice 2-24)

Contracted projects are implemented by the contractor, or operator. Compliance with criteria in the project plan specifications, and the operating plan is ensured by the COR, ER and FSR.

26. Obliteration or Decommissioning of Roads (PRACTICE: 2-26)

- a. Objective: To reduce sediment generated from temporary roads or unneeded system roads by obliterating or decommissioning them at the completion of their intended use.
- b. Explanation: System roads will be identified during transportation planning for decommissioning/obliteration. These roads will be analyzed under the NEPA

process for removal from the transportation system or downgraded in maintenance level. Temporary roads are constructed for a specific short-term purpose and other roads will be found to no longer be necessary. For example, ski area development roads and logging spurs on a timber sale. In order to prevent continued low level casual use, such roads will be obliterated at the completion of their intended use. Use of any roads beyond its prescribed time should not be permitted, as the road would be subject to continued, uncorrected damage, and could become a chronic sediment source.

Effective decommissioning and obliteration is generally achieved through a combination of these measures:

1. Road is effectively drained (e.g. waterbars, rolling dips, outsloping and treated to return the road prism to near natural hydrologic function).
 2. Road is effectively blocked to vehicle access.
 3. Crossings are removed and natural drainage restored. (See also Practice 2-16)
 4. Treated surfaces are stabilized through tillage, ripping, fertilization and/or revegetation.
 5. Slideslopes are reshaped and stabilized.
- c. Implementation: For timber sales, temporary road closure stabilization and removal of temporary structures are accomplished by the timber purchaser. Compliance with plans and TSC will be enforced by the SA.

Obliteration or decommissioning of the road to the level that it is blocked to vehicular traffic, culverts and bridges removed, and the roadway stabilized as required by the TSC. Further revegetation needs are addressed in sale area improvement plans to achieve resource production above that required for stabilization of the road bed surface.

Temporary road location and stabilization measures are determined by the SA by agreement with the purchaser. The SA may request the advice of an earth scientist in determining the most appropriate location for stabilization measures and which measures are required.

Project crew leaders and supervisors will be responsible for ensuring that other temporary roads, developed by force account, meet construction, specifications and project criteria. Temporary roads on NFS lands that are allowed through special use permits, or easements will be subject to the same obliteration or decommissioning requirements as temporary roads on timber sales. District Rangers or their representatives will be responsible for assuring the obliteration or decommissioning of such roads is accomplished.

27. Restoration of Borrow Pits and Quarries (PRACTICE: 2-27)

- a. Objective: To minimize sediment production from borrow pits and quarry sites.

- b. Explanation: Borrow pits and quarries are often susceptible to erosion due to steep sideslopes and lack of vegetation. When required for site revegetation and prior to excavation of the site, topsoil will be removed and stockpiled for surface dressing in the post-operation, rehabilitation period. Once excavation has been completed on all or part of the area, the sides will be sloped and graded to ensure proper drainage, and the general pit area smoothed and stabilized. Finer material will be spread over the bottom of the pit prior to spreading stockpiled or imported topsoil.

Seeding, soil amendments and mulching may be required and will be carried on as referenced in Standard Specification Section 625. Installation of sediment basins and/or upslope diversions and berms or other sediment reduction measures will be considered. Temporary access roads to the site will be obliterated or decommissioned according to Practice 2-26 unless other treatment is required by design. System roads to quarries or borrow pits are maintained in accordance with Practice 2-22.

- c. Implementation: Project location and mitigation will be developed through environmental analysis. Project crew leaders and supervisors will be responsible for conducting force account projects according to construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, contract specifications, and operating plans is ensured by the CI, COR, FSR, or ER.

28. Surface Erosion Control at Facility Sites (PRACTICE: 2-28)

- a. Objective: Reduce the amount of surface erosion taking place on developed sites and the amount of soil entering streams.
- b. Explanation: On lands developed for administrative sites, ski areas, campgrounds, parking areas, or waste disposal sites, substantial acreage may be cleared of vegetation. Erosion control methods must be implemented to keep the soil in place, and to minimize suspended sediment delivery to streams. Some examples of erosion control methods that could be applied at a site for keeping the soil in place would be applying grass seed, erosion blankets, tackifiers, hydromulch, paving, or rocking of roads, water bars, cross drains, or retaining walls.

To control the amount of soil entering streams, the natural drainage pattern of the area should not be changed; sediment basins and sediment filters will be established to filter surface runoff; and diversion ditches, and berms will be built to divert surface runoff around bare areas. Construction activities will be scheduled to avoid periods of the year when heavy runoff is likely to occur.

- c. Implementation: This management practice is used as a preventative and remedial measure for any site development project that will remove the existing vegetation and ground cover and leave exposed soil. This practice is applied during the planning phase for NFS projects, or by special use permit requirements for private development on public land.

Mitigation measures will be developed by the IDT and incorporated in the project by the design engineer. Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, ER, and FSR.

12.3 Synopsis for Mining

Mineral exploration and extraction activities on NFS land including oil, gas, and geothermal resources, fall into the following categories:

1. **Locatable Mineral Activities** - Administered under the U.S. Mining Laws, Act of May 10, 1872 as amended. This Law applies to most hard rock and placer mineral deposits on NFS lands reserved from the public domain. The Law generally allows "...that all valuable mineral deposits in lands belonging to the United States...are free and open to exploration and purchase...by citizens of the United States..."
2. **Leasable Mineral Activities** - Minerals such as coal, oil and gas, phosphate, potash, sodium, geothermal steam and other minerals that will be acquired under the Mineral Leasing Act of 1920 as amended. This also applies to all minerals on lands that have been acquired by the Forest Service under authority of the Weeks Act.
3. **Saleable Mineral Activities** - Administered under the Materials Act of July 31, 1947, as amended. Common varieties of sand, stone, gravel, pumice, cinders and clay located on NFS land may be disposed of by sale, or given free to other units of government and non-profit entities when consistent with good public land management and the public interest.

12.31 Index for Mining Practices

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2.	Administering Terms of BLM Issued Permits or Leases for Mineral Exploration and Extraction on NFS Land.	3-2
3.	Administering Common Variety Mineral Removal Permits.	3-3

12.32 Mining Best Management Practices

The following are the BMPs for the control of nonpoint source pollution associated with mining activities. Each BMP synthesizes the referenced administrative directives into a process to be followed by the Forest Service to permit and administer mining activity on NFS land.

The line officer on each administrative subunit will be responsible for fully implementing the directives that provide water quality protection and improvement during mining activities. The directives referenced in Section 13, provide details on methods to incorporate water quality controls into each phase of mining activities.

Trained and qualified earth scientists, and other professional employees, are available to assist the minerals program management work force with technical assistance to identify beneficial uses, the most recent state-of-the-art water quality control methods and techniques, and help evaluate results.

Mining operations usually involve activities such as site clearing, road construction, and use of heavy equipment. The BMP for those types of activities are described in other sections of this guidance, and though applicable to mining related actions, are not repeated here. The appropriate BMP for other activities associated with mining must also be implemented along with the following BMP.

1. **Water Resources Protection On Locatable Mineral Operations (PRACTICE: 3-1)**

- a. Objective: To protect water quality from degradation by physical and chemical constituents resulting from locatable mineral exploration, development, production, and associated activities.

To ensure that all mineral activities are conducted in an environmentally sound manner, and that lands disturbed by mineral activities are reclaimed for other productive uses.

- b. Explanation: The authority for the occupancy and use of NFS land for mineral development is granted under the General Mining Law, as amended (30 USC 21-54 et seq.), and other statutes. In addition, regulations (36 CFR 228, subpart A, and 36 CFR 261) promulgated under the Organic Act (16 USC 551) obligate both the mineral operator and the Forest Service to minimize adverse environmental impacts to the surface resources of NFS administered land (36 CFR 228.1).

- c. Implementation: Seven instruments will be used to control the impact on surface resources, including the water quality, of locatable mineral activities on NFS lands. It is seldom necessary to use all of these in every case. The seven instruments are listed below:

- 1) Notice of Intent to Operate

A Notice of Intent to Operate (NOI) is required from persons who intend to conduct mining activities which may have the potential to cause disturbance of surface resources, including surface waters, on NFS lands. The NOI must include sufficient information concerning the proposed activities to allow for the determination of need for a Plan of Operation.

- 2) Plan of Operation

A Plan of Operation is required from operators when mining activity is likely to cause a significant disturbance of surface resources, including surface waters. A Plan of Operation must be approved prior to start of any work, which might result in significant disturbance to surface resources. The approved Plan of Operation will incorporate the mitigation measures set forth in the environmental document.

Where prospecting, or mining related actions discharge, or have the potential to discharge waste(s) into surface waters of the State, the operator is required by state law to file a Report of Waste Discharge with the appropriate RWQCB. Such filing can result in the issuance of a Waste Discharge Requirement Permit, to the operator by the RWQCB. The discharge requirements become a mandatory provision in the Plan of Operation for the mining activity, which is approved and administered by the Forest Service. The Forest Service acting within its administrative authorities ensures that the provisions of the Plan of Operation are attained.

Where no permit is issued, but comments are provided by the RWQCB, the comments will then be considered during the District Rangers' evaluation of the adequacy of the proposed projects' water quality protection mitigation measures included in the Plan of Operation.

Mineral operations must comply with all Federal and State laws related to the Clean Water Act (CWA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the Resource Conservation and Recovery Act (RCRA).

3) Environmental Document

The processes required in NEPA and its implementing regulations (43 CR 1500--1508) must be followed to evaluate a Plan of Operation. The appropriate line officer will convene an IDT to assess the impacts of a project on the environment, formulate alternatives, and prescribe mitigation measures. An environmental impact statement will be prepared if projects have the potential to result in significant adverse impact on the environment. The environmental document will set forth the mitigation measures for the proposed operation.

4) Reclamation Performance Bond

Prior to approval of the Plan of Operation, the operator may be required to furnish a financial guarantee to perform reclamation work. This will be in the form of an approved surety bond, cash, or other security to cover the estimated cost of reclamation work. When a financial guarantee is required, the Plan of Operation and reclamation plan are not approved until the required finances are on deposit. Hence, mining activity is postponed pending deposit of funds assuring reclamation.

5) Special use permit

Special use permits may be required for off-claim facilities on NFS land that are needed to conduct mining. These include such things as water diversion and transmission facilities, power lines, road construction and/or reconstruction, tailings disposal areas, and other surface-disturbing or resource-impacting activities. In some cases, these facilities can be included, and administered in the Plan of Operation.

6) Road use permit

Road use permits will be issued for commercial use of certain NFS roads. In this case the appropriate BMP in Section 12.2 will apply. When a Plan of Operation is required, it must be approved prior to the issuance of and additional permits.

7) Notice of noncompliance

When an operator fails to comply with regulations, or approved Plan of Operation requirements, and the noncompliance is causing loss of, or damage to surface resource, the authorized Forest Service Official will issue the operator a "Notice of Noncompliance". It will describe the noncompliance and specify the actions and time frames (generally not to exceed 30 days) for bringing the action into compliance. Administrative and legal remedies are available to the Forest Service through the Clean Water Act and to the State through the Porter Cologne Water Quality control Act. As a result of the operators' failing to comply, courts may grant injunctive, or mandatory damage recovery relief.

2. Administering Terms of BLM-Issued Permits or Leases for Mineral Exploration and Extraction on NFS Lands (PRACTICE: 3-2)

- a. Objective: To ensure that other resource values, including water quality, are protected during mineral exploration, extraction processing and that reclamation activities carried out are under the terms of prospecting permits and mineral leases on NFS land.
- b. Explanation: The Department of the Interior (USDI) has the major role in issuing and supervising operations on mineral licenses, permits and leases. The Forest Service coordinates with the USDI agencies to ensure that Forest Service resource management goals and objectives are achieved, that impacts to the land surface resources are minimized, and that the affected land is promptly rehabilitated.

Through the NEPA process the Forest Service and BLM make a determination as to whether a prospecting permit or lease will be issued to an applicant. The decision is based primarily on whether the mineral operation, including the construction and maintenance of access roads and other associated facilities, can be done in a manner, which adequately protects other resource values. The Forest Service and BLM develop the lease stipulations needed to protect water quality and other resources.

All prospecting permits and leases require that an operating plan be prepared by the applicant and approved by the Forest Service prior to any land disturbing activities.

- c. Implementation: Detailed mitigation will be developed by an IDT and written into the special stipulations section of prospecting permits and leases. These special stipulations are also required in the Operating Plan. On-the-ground checks for compliance with the stipulations of the lease, or operating plan will be the responsibility of the Forest Service official designated "Authorized Officer" who is usually the District Ranger, or Forest Supervisor.

The BLM is primarily responsible for activities taking place on a lease site. By interdepartmental agreement, all applications to lease lands under USDA, Forest Service jurisdiction are referred to the Forest Service for review, recommendation,

and the development of special stipulations to prevent adverse impacts on the surface resources.

3. Administering Common Variety Mineral Removal Permits (PRACTICE: 3-3)

- a. Objective: To ensure that resource values, including water quality, are protected to the maximum extent possible.
- b. Explanation: Mineral materials such as sand, stone, gravel, pumice, cinders, and clay will be sold when consistent with good public-land management and when the sale is in the public interest. Permits and mineral material sale contracts will include reasonable erosion control measures, reclamation of the surface to a predetermined productive second use of the land, and revegetation. Material sales will be approved if adequate measures can be implemented which will minimize erosion and stream pollution, and if satisfactory arrangements can be made for restoration. If a choice of mineral deposit locations exists, extraction will be directed to those where the adverse effects of removal can be most readily controlled, or minimized. (See also Practice 2-18)
- c. Implementation: Removal is authorized by a Forest Service issued mineral material permit or contract. Project location and detailed mitigation to prevent adverse effects to land surface resources will be developed through the environmental documentation process using an IDT. These mitigation are then incorporated into the permit.

Projects are implemented by the permittee following approval of an operating plan and reclamation plan , if warranted, and issuance of a mineral material permit. Compliance with terms of the permit will be ensured by the District Ranger or their representative.

12.4 Synopsis for Recreation

Recreation on NFS lands occurs in developed sites, as well as dispersed areas such as trails, on rivers or lakes and in wilderness and general forest areas.

Developed recreation sites are those that have been designed and built to provide facilities for the user and commonly require a fee payment for use. An example is a constructed campground where tables, fireplaces and toilets are provided. Developed recreation sites also include recreation residences, resorts, ski areas and similar facilities. Dispersed sites are not specifically designed and constructed.

Some structures or facilities will be installed in dispersed recreation areas also for the health and safety of the users, to protect resources, and to enhance the quality of visitor experience. Access roads and parking areas at recreation sites are address through appropriate BMP in Section 12.2.

12.41 Index for Recreation Practices

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12.42 Recreation Best management Practices

The following are the BMPs for the control of nonpoint source pollution associated with recreation activities. BMPs were formulated to reflect the administrative directives that guide and direct the Forest Services' development and administration of recreation resources on NFS land.

The line officer on each administrative unit is responsible for fully implementing the directives that provide for water quality protection and improvement during recreation management activities. Forest Service Manuals, Handbook and directives provide details on methods to incorporate water quality controls into each phase of the recreation management program.

Trained and qualified earth scientists, and other professional employees are available to assist the recreation management work force with technical assistance in identifying beneficial uses, the most recent state-of-the-art water quality control methods and techniques, and to help evaluate results of BMP implementation.

1. **Sampling, Surveillance and Sanitary Surveys of Primary Contact Recreation Waters (PRACTICE: 4-1)**
 - a. Objective: To ensure the health and safety of recreationists in primary contact waters, (e.g. hot springs, designated NFS Swimming Sites).
 - b. Explanation: Sampling and testing for bacterial water quality (fecal coliform), pH, and clarity will be conducted at all developed, designated primary contact recreation water sites. A prescribed minimum number of tests for fecal coliform, pH, and clarity will be made during the site use season. Tests for other biological pollutants and for

chemical and physical character of the water will be made when there is reason to believe that water quality is not satisfactory for primary contact.

Adjacent areas and the aquatic environment are surveyed to detect potential, or existing hazards which may, or may not be demonstrated through water sample analysis from a single sample or short series of samples. The survey provides information needed in defining the cause (s) of contamination of primary contact recreation waters.

Fecal coliform is used as the indicator for the potential presence of pathogens in the water because of the relative ease of detection and measurement. Analysis values are tested against standards for primary contact recreation as stated by the County Health Departments, California RWQCB, and EPA ("Water Quality Criteria") swimming water quality standards.

- c. Implementation: Each forest with designated primary contact recreation water sites will develop a water quality monitoring plan for that site. This plan will identify water monitoring locations, data requirements, monitoring frequency, procedures, data analysis and interpretations, and reporting. If standards are exceeded, the area will be closed to all contact recreation use until the cause, or causes have been identified and remedied. Closure will be the responsibility of the Forest Supervisor.

A sanitary survey will be made prior to the development of plans for each new primary contact recreation facility. All areas where contact is specifically encouraged or permitted should have a sanitary survey conducted as soon as practical prior to use. Subsequent surveys will be repeated periodically in accordance with a prescribed schedule, usually annually, prior to the use season or following a change in the watershed condition; fire, flood, etc. All sanitary surveys must be conducted by a person trained in environmental sanitation and experienced in making such surveys. Results of the surveys are documented and provided to the Forest Supervisor and District Ranger for evaluation and action as appropriate.

2. Provide Safe Drinking Water Supplies (PRACTICE: 4-2)

- a. Objective: To provide safe drinking water to Forest Service facilities such as campgrounds, picnic grounds, trailheads, visitor centers, winter sport areas, and developed roadside facilities.
- b. Explanation: Administrative guidelines for water source location and development; testing frequency and maximum contaminant levels for bacteriological, chemical, and physical contaminants; performance of sanitary surveys; closing correction, and reopening of defective water systems; and documentation of data are provided in the EPA Drinking Water Standards, and State and local Health Department standards. The strictest standards will be followed for each individual item.

When test results indicate that prescribed limits are exceeded, the water supply will be closed until the problem is corrected and satisfactory results are obtained. Seasonal systems will be tested and proven to be satisfactory prior to opening.

Preventive measures will be taken in the location, construction, operation, and maintenance of water supply systems to minimize possibilities of contamination.

- c. Implementation: Location, design, sampling and sanitary surveys will be performed by qualified individuals who are familiar with drinking water supply systems and guidelines. Coordination and cooperation will be pursued with State or local Health Department representatives in all phases of drinking water system management.

Sampling and testing frequencies vary depending on the water source, the number and type of user, and the type of test.

If State, or local Health Departments do not perform the water sample analysis, State certified laboratories must be used.

3. Documentation of Water Quality Data (PRACTICE: 4-3)

- a. Objective: To assure the availability of water quality data and related information when making analysis and interpretations with respect to water quality management.
- b. Explanation: An inventory of the location of all designated potable water supplies and primary contact recreation water sites will be prepared documenting certain pertinent site information such as; times, dates, and results of all water quality tests and surveys. This is an administrative practice of record keeping establishing a record of cause and effect to aid in identifying any sources of contamination.
- c. Implementation: The EPA, STORET system will be the repository for water quality data collected to monitor designated primary contact recreation water sites. Forests will use the computer-based "potable Water Supply Inventory" for site documentation of potable water supplies. Bacteriological test data will also be placed in a Forest Service computer for storage and review. All laboratory tests results will be filed on the Forest for a minimum of five years. (See also Practice 7-6)

4. Control of Sanitation facilities (PRACTICE: 4-4)

- a. Objective: The objective is to protect surface and subsurface water from bacteria, nutrients, and chemical pollutants resulting from the collection, transmission, treatment, and disposal of sewage at Forest Service sites.
- b. Explanation: Toilet facilities are provided at developed recreation sites. The type and number depends on the capacity of a given site. Sanitation facilities (which may vary from a portable toilet to a sophisticated treatment plant) will be planned, located, designed, constructed, operated, inspected and maintained to minimize the possibility of water contamination. Toilet facilities may also be made available at dispersed sites with the same goal of preventing water contamination.
- c. Implementation: The appropriate disciplines will perform field investigations to evaluate soil, geological, vegetative, climatic, and hydrological conditions. The location, design, inspection, operation and maintenance must be performed, or controlled by qualified personnel who are trained and familiar with the sanitation system and operational guidelines. Proximity of toilets to open water and other sensitive areas will follow guidelines.

State and local authorities will be consulted prior to the installation of new sanitation facilities, or modifications of existing facilities to assure compliance with all applicable State and local regulations. All phases of sanitation management (planning, design, inspection, operation, and maintenance) will be coordinated with State and local Health Departments and RWQCB representatives.

5. **Control of Solid Waste Disposal (PRACTICE: 4-5)**

- a. Objective: The objective is to protect water from nutrients, bacteria, and chemicals associated with solid waste disposal.
- b. Explanation: Encourage the users of NFS recreation facilities to cooperate in the proper disposal of solid waste, and to burn their combustible trash in fireplaces, or stoves. Receptacles are provided for unburnables at most developed sites. Garbage and trash must be "packed out" by those who use dispersed sites and wilderness areas where receptacles are not available.

The final disposal of collected garbage will be at a properly designed and operated county, or state sanitary landfill. Each landfill site will be located where groundwater and surface waters are at a safe depth and distance from the site, as prescribed in the provisions of the California Administrative Code, Title 23, chapter 3, Subchapter 15, and the State, or local regulations.

- c. Implementation: A public education effort to control refuse disposal will be a continuing process accomplished through the use of signs, printed information, mass media, and personal contact. Public cooperation is vital.

Solid waste disposal plans, which define and describe collection, removal, and final disposal methods, will be maintained on each Forest. Garbage containers will be placed in areas that are convenient for recreationists, and are easily maintained. Authorized Forest Officers may issue citations to violators.

6. **Assuring That Organizational Camps Have Proper Sanitation and Water Supply Facilities (PRACTICE: 4-6)**

- a. Objective: To protect the quality of water that is consumed by, and discharged from organizational camps under special use permit.
- b. Explanation: Organizational camps are required to comply with local public health and sanitation ordinances. Camp buildings and grounds must be supplied with at least the minimum sanitary facilities required by local codes. Water Systems must provide an adequate volume of acceptably clean water for drinking, cooking, and general sanitation. Structures designed with toilets, showers, and washbasins will be planned and constructed to serve the camps' needs and meet sanitation and water quality requirements.
- c. Implementation: Management requirements and controls to protect water quality through installation and maintenance of proper sanitation and water supply facilities must be incorporated into the special use permit for each organizational camp. Permittees are required to inspect their facilities and to test their drinking water according to local codes and regulations to ensure a safe water supply and proper

sanitation. Reports of these test results must be provided periodically to the Forest Service.

Periodic inspection and monitoring of the camp by the authorized Forest Officer and County and State health officers is necessary to assure compliance.

7. Water Quality Monitoring of Off-Highway Vehicle (OHV) Use According To a Developed Plan (PRACTICE: 4-7)

- a. Objective: To provide a systematic process to determine when and to what extent OHV use will cause, or is causing adverse effects on water quality.
- b. Explanation: Each Forest's OHV plan will:
 - 1) Identify areas, or routes where OHV use could cause degradation of water quality.
 - 2) Establish baseline water quality data for normal conditions as a basis from which to measure change.
 - 3) Identify water quality standards and the amount of change acceptable.
 - 4) Establish monitoring methods and frequency.
 - 5) Identify controls and mitigation appropriate in management of OHV's.
 - 6) Restrict OHV use to designated routes.
- c. Implementation: Monitoring results are evaluated against the OHV plan objectives for water quality and the LRMP objectives for the area. These results are documented, along with the actions necessary to correct identified problems.

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

Closure is accomplished through authority of the Forest supervisor.

8. Sanitation at Hydrants and Water Faucets Within Developed Recreation Sites (PRACTICE: 4-8)

- a. Objective: To maintain high water quality standards around hydrants and faucets, which provide water for consumptive use in developed recreation site.
- b. Explanation: The regulations prohibit the cleaning, or washing of any personal property, fish, animal, or food at a hydrant, or at a water faucet not provided for that purpose. The public must be informed of their responsibilities concerning sanitary regulations. Acceptable designated cleaning areas are located away from consumptive water sources and where effluent from the washing operation can be disposed of properly.
- c. Implementation: The Forest Officer authorized to administer developed recreation site regulations will inform the public of their sanitary responsibilities by posting

signs, on recreation site bulletin boards and at hydrants or faucets, by notices in newspapers and by personal contact. Authorized Forest Officers may issue citations to violators.

9. Protection of Water Quality Within Developed and Dispersed Recreation Areas (PRACTICE: 4-9)

- a. Objective: To protect water quality by regulating the discharge and disposal of potential pollutants.
- b. Explanation: This practice prohibits placing in, or near a stream, lake, or other water body, substances, which may degrade, water quality. This includes, but is not limited to, human and animal waste, petroleum products, other hazardous substances and sediment eroded from the site. Areas will be closed in order to restrict use or until the problem is mitigated.

- c. Implementation: Encourage the public through the use of signs, pamphlets, and public contact to conduct their activities in a manner that will not degrade water quality. Forest officers may accept and act on violations observed and reported by private citizens. Forest Officers may issue citations to violators.

10. Location of Pack and Riding Stock Facilities and Use Areas in Wilderness, Primitive, and Wilderness Study Areas (PRACTICE: 4-10)

- a. Objective: To avoid degradation of water quality from pack, riding stock facilities and heavy use areas.
- b. Explanation: This practice directs the location of pack and riding stock facilities to locations away from springs, streams, lakes, wet meadows, and other surface waters where pollution is likely to occur. This includes large camp sites and trails used repeatedly by customers of commercial stock operators and other recreational uses.
- c. Implementation: Forest Supervisors may authorize the construction and installation of simple temporary facilities when approved in the wilderness implementation plan, including corrals in connection with pack stock operation. Forest Supervisors may authorize the locations and use of large campsites for pack stock users and recreational users. If approved, they will not be located immediately adjacent to streams, or lakes, and should generally be in place for no more than one season of use.

The wilderness patrol will check the temporary livestock facilities authorized by the Forest Supervisor for compliance with the terms of the authorization.

12.5 Synopsis for Vegetation Manipulation

Vegetation manipulation on NFS lands is conducted in the course of reforestation, brushland treatment for hazard reduction, brushland conversion to forest, fire/fuels treatment, forest health and range land improvement, and wildlife habitat improvement. The most common means of treatment are chemical, mechanical, burning, and biological (such as grazing). Program environmental impact statements covering these activities are the "Vegetation Management for Reforestation" and "Brushland Management" documents. Individual projects are, however, evaluated by an IDT through the environmental analysis process.

The environmental analysis process is the mechanism whereby applicable Federal, State, and local water quality laws are considered, as well as National, Regional, Forest, and District goals, objectives, management requirements, and management direction. The document specifies where, when, and in most cases, how management practices will be applied to meet project, administrative, and environmental objectives.

12.51 Index for Vegetation Manipulation Practices

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12.52 Vegetation Manipulation Best Management Practices

The following are the BMPs for the control of nonpoint source pollution associated with vegetation manipulation activities. Each BMP was formulated based on the administrative directives that guide and direct the Forest Service to plan and implement vegetation management activities on NFS land.

The line officer on each administrative unit is responsible for fully implementing the manuals, handbooks and directives that require water quality protection and improvement during vegetation manipulation activities. The directives provide details on methods to incorporate water quality controls into each phase of the vegetation manipulation program.

Trained and qualified personnel will be available to assist the vegetation manipulation work force with technical assistance to identify beneficial uses, the most recent state-of-the-art water quality control methods and techniques, and help evaluate results of BMP application.

Vegetation manipulation can involve activities such as road construction, and use of heavy equipment. The BMPs for those types of activities are described in other sections of this text and are not repeated here. The appropriate BMPs for those activities must also be implemented along with the following vegetation manipulation BMPs.

1. Soil Disturbing Treatments on the Contour (PRACTICE: 5-1)

- a. Objective: To decrease sediment production and stream turbidity while mechanically treating slopes.
- b. Explanation: This is a preventive measure that limits surface disturbance activities, such as but not limited to disking, seed drilling and windrowing, to preclude water from concentrating by providing means of adequate infiltration and by decreasing the velocity of surface runoff so that infiltration is enhanced.

The factors evaluated are slope, infiltration rate, permeability, and water-holding capacity of the soil. These factors are field evaluations made by trained and qualified personnel as input to project planning. Due to mechanical limitation of the equipment, slopes greater than 30 percent are usually not considered for this type of treatments.

- c. Implementation: Following NEPA procedures and using IDT input project planners will be responsible for formulating the appropriate contract provisions and/or mitigation measures for the contract, or project plans.

The project leader will be responsible for enforcing management requirements and mitigation measures that deal with soil disturbing treatments through force account projects.

The COR will be responsible for enforcing provisions of the contract.

2. Slope Limitations for Mechanical Equipment Operation (PRACTICE: 5-2)

- a. Objective: To reduce gully and sheet erosion and associated sediment production by limiting tractor use.
- b. Explanation: This is a preventive measure that limits excessive surface disturbance and keeps surface water from concentrating. This measure facilitates making allowances for proper drainage of disturbed areas by limiting tractor operation to slopes where corrective measures such as water bars can be effectively installed.

Evaluation criteria used to determine slope restrictions are onsite evaluations of soil stability, mass stability and geology, climate conditions, and soil water holding capacity. These field determinations will be made as part of the environmental documentation process during project planning.

- c. Implementation: The project planners will be responsible for insuring that appropriate tractor operations provisions are included in the decision and activity controlling documents. This practice will be implemented on vegetative manipulation projects where determined to be appropriate by the IDT.

The project leader will be responsible for application of the management requirements and mitigation measures on site-specific areas, with the assistance of selected IDT members.

The COR will be responsible for ensuring implementation of the contract provisions that pertain to tractor operation on steep slopes.

3. **Tractor Operation Limitation in Wetlands and Meadows (PRACTICE: 5.3)**

- a. Objective: . To limit turbidity and sediment production resulting from compaction, rutting, runoff concentration, and subsequent erosion by excluding the use of mechanical equipment in wetland and meadows except for the purpose of restoring wetland and meadow function.
- b. Explanation: This is a preventative practice designed to preclude the concentration of surface runoff and soil compaction, which can lead to rill and gully erosion with associated turbidity and sedimentation. This measure precludes, or reduces the need to take corrective measures to dissipate concentrated surface water runoff.

The target areas will be protected from mechanical operations except when the areas are identified for treatment by trained and qualified personnel on the IDT. Specific protection measures will be established for each area that could incur adverse water quality impacts. (See also Practice 1-18)

- c. Implementation: The application of this BMP will be mandatory on all vegetation manipulation projects as prescribed in the environmental documentation.

The project planners will be responsible for including appropriate contract specifications and identifying management requirements and mitigation measures in the project decision and implementation documents.

The project leader will be responsible for identifying wet area and meadows not previously identified by the project planner during the implementation of Forest Service force account projects. The project leader will also be responsible for following project management requirements pertaining to wet areas and meadows.

The COR will be responsible on contracted projects, for identifying additional wet areas and meadows not previously identified by the project planners.

4. **Revegetation of Surface Disturbed Areas (PRACTICE: 5-4)**

- a. Objective: To protect water quality by minimizing soil erosion through the stabilizing influence of vegetation foliage and root network.
- b. Explanation: This is a corrective practice to stabilize an otherwise unstable soil surface during vegetation manipulation projects. The plant species selected will be a mix best suited for site conditions and attainment of multiple management objectives for the area. Native plant species will be used to the fullest extent feasible. Soil amendments and irrigation, along with application of mulch with tackifier, jute netting, or other supplement treatments may be necessary to ensure revegetation.

Grass, or browse species will be seeded between previously planted trees where deemed appropriate for control of overland runoff, and to meet wildlife needs. The onsite factors evaluated include soil productivity, topography, EHR, soil water holding capacity, target species, environmentally associated species, and climatic variables.

Evaluation includes the collection of onsite data, and office interpretation by the IDT. (See also Practice 1-15)

- c. Implementation: During the environmental documentation process, trained and qualified employees will assess the need for treatment, and prescribe the vegetative species mix for each project.

The BMP will be implemented on the project by the project leader, under supervision of the responsible line officer.

5. Disposal of Organic Debris (PRACTICE: 5-5)

- a. Objective: To prevent gully and surface erosion with associated reduction in sediment production and turbidity during and after treatment.
- b. Explanation: This is a preventive practice to reduce excessive volumes and velocities of overland flow, promote infiltration and prevent wildfires from consuming excessive amounts of surface and soil organic matter and creating hydrophobic soil conditions.

The IDT will identify project controls and mitigation measures after evaluating such onsite factors as soil water holding capacity, EHR, slope and topographic limitations, the quantity of debris: density and ratio of rearranged debris, residual ground cover density objectives, climatic variables, and the probability of creating water repellant soils.

- c. Implementation: The District Ranger will be responsible for debris treatment following timber sales and other projects such as chaparral manipulation.

Project planners will be responsible for determining the method(s) of debris disposal and/or placement of debris after treatment. Methods of disposal include but are not limited to; prescribed burning, chipping and mulching, lop and scatter, and mechanical harvesting/collection.

The COR will be responsible for enforcing the contract clauses that provide for debris disposal in contracted projects.

The project leader will implement the water quality protection measures either through the contract provisions, or by use of force account crews.

6. Soil Moisture Limitations for Mechanical Equipment Operations (PRACTICE: 5-6)

- a. Objective: The objective of this measure is to prevent compaction, rutting, and gulying, with resultant sediment production and turbidity.
- b. Explanation: This is a preventive practice that reduces surface disturbance during wet soil conditions, which would result in compaction, rutting and gulying. Soil moisture guidelines will be developed for each site based on the characteristics of the soil.

The project should then be conducted as guided by soil erodibility, climate factors, soil and water relationships, and mass stability hazards identified by trained and qualified earth scientists. (See also Practice 1-5)

- c. Implementation: Soil conditions will be evaluated during the environmental documentation process and operating limitations developed by the IDT as the alternatives are formulated. Project planners will also be responsible for including appropriate contract provisions and management requirements in project work plans and environmental documentation.

For force account projects, the project leader will be responsible for determining when the soil surface is unstable and susceptible to damage, and will be responsible for terminating operations.

The COR will determine when optimum soil conditions exist, and administer the operation to prevent adverse soil effects. The COR will be responsible for suspending, or terminating operations for contracted projects as soil moisture conditions warrant.

7. Pesticide Use Planning Process (PRACTICE: 5-7)

- a. Objective: To introduce water quality and hydrologic considerations into the pesticide use planning process.
- b. Explanation: The Pesticide Use Planning Process is the framework for incorporation of water quality protection requirements contained in BMPs 5-8 through 5-14 into project design and management. The project environmental document will incorporate these considerations in discussion of environmental effects and mitigation measures.
- c. Implementation: The IDT will evaluate the project in terms of site response, social and environmental impacts and the intensity of monitoring needed.

The responsible line officer will prepare environmental documentation, Project Plan, and the Safety Plan. Project plans and safety plans will specify management direction.

Approval or for proposed pesticide projects will proceed according to direction established in region 5 supplement No. 2100-95-1 to 2150.

8. Pesticide Application According to Label Directions and Applicable Legal Requirements (PRACTICE: 5-8)

- a. Objective: To avoid water contamination by complying with all label instructions and restrictions for use.
- b. Explanation: Directions found on the label of each pesticide are detailed and specific, and include legal requirements for use.
- c. Implementation: Constraints identified on the label and other legal requirements of application must be incorporated into project plans and contracts

For force account projects, responsibility for ensuring that label directions and other applicable legal requirements are followed will be the responsibility of the Forest Service project supervisor who will have a Qualified Applicator Certificate.

For contracted projects, it will be the responsibility of the contracting officer, or the COR to ensure that label directions and other applicable legal requirements are followed.

9. Pesticide Application Monitoring and Evaluation (PRACTICE: 5-9)

a. Objective:

- 1) To determine whether pesticides have been applied safely, restricted to intended target areas, and have not resulted in unexpected non-target effects.
- 2) To document and provide early warning of possible hazardous conditions resulting from possible contamination of water or other non-target areas by pesticides.
- 3) To determine the extent, severity and possible duration of any potential hazard that might exist.

b. Explanation: This practice documents the accuracy of application, amount applied, and any water quality effects so as to reduce, or eliminate hazards to non-target species. Monitoring methods include spray cards, dye tracing (Fluorometry), and direct measurement of particles in, or near water. Type of pesticide, type of equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of laboratory analysis, and applicable Federal, State and local laws and regulations are all factors considered when developing the monitoring plan.

c. Implementation: The need for a monitoring plan will be identified during the pesticide use planning process as part of the project environmental evaluation and documentation.

The water quality monitoring plan will specify:

- 1) Who will be involved and their roles and responsibilities;
- 2) What parameters will be monitored and analyzed;
- 3) When and where monitoring will take place;
- 4) What methodologies will be used for sampling and analysis, and the rationale behind each of the preceding specifications.

A water quality specialist and the project leader will evaluate and interpret the water quality monitoring results in terms of compliance with and adequacy of project specifications.

10. Pesticide Spill Contingency Planning (PRACTICE 5-10)

- a. Objective: To reduce contamination of water by accidental pesticide spills.
- b. Explanation: This is a preventative and corrective practice. The Pesticide Spill Contingency Plan prepared by each Forest consists of predetermined actions to be implemented in the event of a pesticide spill. The plan lists who will notify whom and how, time requirements for the notification, guidelines for spill containment, and who will be responsible for cleanup.

Site-specific planning will be included in the project safety plan.

- c. Implementation: Pesticide spill contingency planning will be incorporated into the Project Safety Plan.

The site-specific environmental evaluation and resulting documentation will include public and other agency involvement in plan preparation. The plan will list the responsible authorities.

11. Cleaning and Disposal of Pesticide Containers and Equipment (PRACTICE 5-11)

- a. Objective: To prevent water contamination resulting from cleaning, or disposal of pesticide containers.
- b. Explanation: The cleaning and disposal of pesticide containers must be done in accordance with Federal, State, and local laws, regulations, and directives. Specific procedures for the cleaning and disposal of pesticide containers are documented in the Forest Service Pesticide Use Management and Coordination Handbook (FSH 2109.114), and State and local laws.
- c. Implementation: The Forest, or district Pesticide Use Coordinator (Qualified Applicator) will approve proper rinsing procedures in accordance with State and local laws and regulations, and arrange for disposal of pesticide containers when the pesticide is applied by Forest Service personnel.

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

12. Streamside Wet Area Protection During Pesticide Spraying (PRACTICE: 5-12)

- a. Objective: To minimize the risk of pesticide inadvertently entering waters, or unintentionally altering the riparian area, SMZ, or wetland.
- b. Explanation: When spraying pesticides for the purpose of meeting non-riparian area land management objectives, an untreated strip of land and vegetation will be left alongside surface waters, wetlands, riparian areas, or SMZ. Strip width will be established by the IDT, and when county permits are required, in consultation with the county agricultural commissioner. When spraying pesticides for purposes of meeting within riparian area land management objectives localized buffers around target species will be established and only hand application will be used.

Factors considered in establishing buffer strip widths are beneficial water uses, adjacent land uses, rainfall, wind speed, wind direction, terrain, slope, soils and geology. The persistence, mobility, acute toxicity, bio-accumulation, and formulation of the pesticide are also considered. Equipment used, spray pattern, droplet size, and application height and past experience are other important factors.

- c. Implementation: The IDT will identify the perennial and intermittent surface waters, wetlands, riparian areas, and SMZ from onsite observation, and map them during project planning.

When included as part of the environmental evaluation and documentation, the Project Work Plan, the protection of surface waters, wetlands, riparian areas, or the SMZ will be the responsibility of the project supervisor for force account projects, and the COR will be responsible on contracted projects.

The certified applicators must be briefed about the location of surface waters, wetlands, riparian areas, or SMZ. Buffer strip boundaries will be flagged, or otherwise marked when necessary to aid identification from the air.

13. Controlling Pesticide Drift During Spray Application (PRACTICE: 5-13)

- a. Objective: To minimize the risk of pesticide falling directly into water, or non-target areas.
- b. Explanation: The spray application of pesticide is accomplished according to prescription which accounts for terrain, and specifies the following: spray exclusion areas, buffer areas, and factors such as formulation, equipment, droplet size, spray height, application pattern, flow rate, and the limiting factors of wind speed and direction, temperature, and relative humidity.
- c. Implementation: The prescription will be prepared by an IDT working with the Forest or District Pesticide Use Coordinator during project planning.

For force account projects, the Forest Service project supervisor will be responsible for ensuring that the prescription is followed during application and for closing down application when specifications are exceeded.

These will also be the responsibility of the Contracting Officer, of the COR, on contracted projects.

12.6 Synopsis for Fire Suppression and Fuels Management

Emergency fire suppression rehabilitation activities on NFS lands are conducted to reduce erosion and the loss of soil productivity, degradation of water quality, and threats to life and property both onsite, and off site. Suppression activities include fireline construction, construction of temporary access roads, back-firing operations and aerial, or ground application of short term and long-term fire retardants.

Water quality objectives are weighed along with the need for rapid suppression during the development of fire attack plans. Objectives of the fire suppression program are to preclude catastrophic watershed damage and rehabilitate suppression related damage.

Burned area rehabilitation surveys are conducted by and IDT on all fires that exceed 300 acres to assess actual fire damages. The District Ranger may request an IDT for smaller fires where it is believed that significant resource damage has, or could occur.

An emergency rehabilitation proposal must be submitted to the Regional Office, Ecosystem Conservation Staff for approval and funding, no later than three days after the fire is controlled. Rehabilitation work is accomplished both by the Forest Service force account crews and through contracts.

Fuels management activities are intended to reduce the size, cost, and damage from wildfire. Fuel biomass is altered by changing fuel type, creating fuel breaks, or by reducing, or altering fuels over extensive areas.

Fuels management is also concerned with the control of dead biomass such as cull logs and slash. These materials will be rearranged, removed, or burned to reduce fuel loading.

12.61 Index for Fire Suppression and Fuels Management Practices

1.	Fire and Fuel Management Activities	6-1
2.	Consideration of Water Quality in Formulating Fire Prescriptions	6-2
3.	Protection of Water Quality from Prescribed Burning Effects	6-3
4.	Minimizing Watershed Damage from Fire Suppression Efforts	6-4
5.	Repair, or Stabilization of Fire Suppression Related Watershed Damage	6-5
6.	Emergency Rehabilitation of Watersheds Following Wildfires	6-6

12.62 Fire Suppression and Fuels Best Management Practices

The following are the BMPs for the control of nonpoint source pollution associated with fire suppression and fuel management activities. Each BMP is based on the administrative directives that guide and direct the Forest Service permitting and administering suppression and fuels management activities on NFS land.

The line officer on each administrative subunit is responsible for fully implementing the directives that require water quality protection and improvement during fire suppression and fuel management activities. The directives provide details on methods and techniques to effectively incorporate water quality controls into each phase of the fire suppression and fuels program.

Trained and qualified earth scientists, and other professional employees, are available to assist the fire suppression and fuels management work force with technical assistance in identifying beneficial uses, the most recent state-of-the-art water quality control methods and techniques, and help evaluate results.

1. Fire and Fuel Management Activities (PRACTICE 6-1)

- a. Objective: To reduce public and private losses and environmental impacts which result from wildfires and/or subsequent flooding and erosion by reducing or managing the frequency, intensity and extent of wildfire.
- b. Explanation: These administrative, corrective and preventive measures include the use of prescribed fire, or mechanical methods to achieve:
 - 1) Defensive fuel profile zones,
 - 2) Type conversions,
 - 3) Greenbelt establishment to separate urban areas from wildlands,
 - 4) Fuel reduction units,
 - 5) Access roads and trails for rapid ingress and egress,
 - 6) Fire suppression activities,
 - 7) Fuel utilization and modification programs, and
 - 8) Public information and education programs.
- c. Implementation: Fuel Management will be implemented through normal program planning and budgeting and NEPA processes, predominantly, but not exclusively, by personnel in the Forest Service fire management organization.

Other resource managers, such as timber, range; watershed and wildlife may initiate fuel modification projects that also benefit fire management. Fuel management projects will be evaluated by the IDT. The management requirements, mitigation measures and multiple resource protection prescriptions are documented in the project specific decision and implementation documents.

Application of mitigation measures and prescriptions are the responsibility of the project planners and supervisor.

2. Consideration of Water Quality in Formulating Fire Prescriptions (PRACTICE: 6-2)

- a. Objective: To provide for water quality protection while achieving the management objectives through the use of prescribed fire.
- b. Explanation: Prescription elements will include, but not be limited to, such factors as fire weather, slope, aspect, soil moisture, and fuel moisture. These elements influence the fire intensity and thus have a direct effect on whether or not a desired ground cover remains after burning, and whether or not a water-repellent layer is

formed. The prescription will include at the watershed and subwatershed scale the optimum and maximum burn block size, aggregate burned area, acceptable disturbance for contiguous and aggregate length for the riparian/SMZ; and expected fire return intervals and maximum expected area covered by water repellent soils.

- c. Implementation: Field investigations will be conducted as required to identify site-specific conditions, which may affect the prescription. Both the optimum and allowable limits for the burn to insure water quality protection will be established prior to preparation of the burn plan. The prescription elements and the optimum and maximum acceptable disturbance will be assessed by an IDT and the fire prescription will be prepared by the fire management officer or fuel management specialist. The fire prescription will be reviewed by the IDT and will be approved by the appropriate line officer.

3. Protection of Water Quality from Prescribed Burning Effects (PRACTICE: 6-3)

- a. Objective: To maintain soil productivity, minimize erosion, and minimize ash, sediment, nutrients, and debris from entering water bodies.
- b. Explanation: Some of the techniques used to prevent water quality degradation are:
 - 1) Construct water bars in fire lines,
 - 2) Reduce fuel loadings in drainage channels,
 - 3) Maintain the integrity of the SMZ within the limits of the burn plan.
 - 4) Plan prescribed fires for burn intensities that when water repellent soils are formed they are within the limits and at locations described in the burn plan.
 - 5) Retain, or re-establish ground cover as needed to keep erosion of the burned site within the limits of the burn plan.
- c. Implementation: Forest Service and other crews will be used to prepare the units for burning. This will include, but not be limited to, water barring firelines, reducing fuel concentrations, and moving fuel to designated disposal and burning areas.

The IDT will identify SMZ and soils with high risk of becoming water repellent as part of project planning.

4. Minimizing Watershed Damage from Fire Suppression Efforts (PRACTICE: 6-4)

- a. Objective: To avoid watershed damage in excess of that already caused by the wild fire.
- b. Explanation: Avoid heavy equipment operation on fragile soils and steep slopes whenever possible.

Major project fires will utilize a Resource Advisor to assist the Incident Commander in the protection of resource values during the suppression effort. National fire management policies provide in part that a wildland fire situation analysis will be

prepared for all fires where containment of the fire is not expected prior to the second burning period. The analysis will be prepared by a line officer with Incident Management Team input. Watershed considerations must be part of the analysis.

- c. **Implementation:** A Resource Advisor will be assigned by the Forest Supervisor and work for the Incident management Team, specifically for the Planning Section chief.

An earth scientist will be available to identify fragile soils and unstable areas and will be assigned to the fire as a Resource Advisor.

5. Repair or Stabilization of Fire Suppression Related Watershed Damage (PRACTICE: 6-5)

- a. **Objective:** To stabilize all areas that have had their erosion potential significantly increased, or their drainage pattern altered by suppression related activities.
- b. **Explanation:** Treatments for fire-suppression damages include, but are not limited to, installing water bars and other drainage diversions in fire roads, firelines, and other cleared areas; seeding, planting and fertilizing to provide vegetative cover; spreading slash, or mulch to protect bare soil; repairing damaged road drainage facilities; clearing stream channels or structures and removing debris deposited by suppression activities which can have adverse life, property and environmental impacts.
- c. **Implementation:** This work will be done by the fire fighting forces either as a part of the suppression effort, or before personnel and equipment are released from the fire lines. The Incident commander will be responsible under the direction of the local line officer for repair of suppression related resource damage.

6. Emergency Rehabilitation of Watersheds Following Wildfires (PRACTICE: 6-6)

- a. **Objective:** To minimize as far as practicable:
 - 1) Loss of soil and onsite productivity,
 - 2) Overland flow, channel obstruction and instability
 - 3) Threats to life and property, both on-site and off-site.
- c. **Explanation:** Emergency rehabilitation is a corrective measure that involves a variety of treatments. Treatments may include, but are not limited to:
 - 1) Providing a protective soil cover, prior to the rainy season, such as seeding, mulching, or installing log erosion barriers.
 - 2) Log or straw bale check dam installation.
 - 3) Clearing hazardous debris from stream channels.
 - 4) Constructing trash racks, channel stabilization structures, and debris retention structures.

Treatments are selected on the basis of onsite values, downstream values, probability of successful implementation, social, and environmental considerations, and cost as compared to benefits.

- c. Implementation: Burned-area surveys will be made promptly on all burned over areas to determine if watershed emergency rehabilitation treatment is needed. Burned-area surveys of all class E (300 acres) and larger fires will be conducted by an IDT. Team members normally include a hydrologist, a soil scientist, and representatives of other disciplines as needed.

The burned-area survey and proposed rehabilitation treatment measures will be transmitted to the Regional Office, within three days of control of the fire for approval. Upon approval of the rehabilitation project, a project supervisor and restoration team will begin work with the objective of project completion before damaging storms occur.

Rehabilitation projects will be evaluated following major storms and runoff events and at least annually until the watershed is stabilized. The evaluation will determine the effectiveness of the rehabilitation measures and indicate if follow-up actions are warranted.

12.7 Synopsis for Watershed Management

Watershed management is the art and science of protecting, maintaining, and enhancing soil, water, and geologic resources.

Management is oriented toward maintaining, or improving watershed conditions for optimum water yield and timing, water quality, and soil productivity. It also includes the rehabilitation and restoration of NFS lands damaged by catastrophic events (e.g. fire, flood, earth quake), or degraded by past use.

12.71 Index for Watershed Management Practices

1.	Watershed Restoration	7-1
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4.	Forest Hazardous Substance Spill Prevention Control and Countermeasures (SPCC) Plan	7-4
5.	Control of Activities Under special Use Permit	7-5
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7.	Management by Closure to Use (Seasonal, Temporary, and Permanent)	7-7
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12.72 Watershed Management Best management Practices

The following are the BMPs for the control of nonpoint source pollution associated with watershed management activities. Each BMP is based on administrative directives that guide and direct the Forest Service management of the watershed resources on NFS lands.

The line officer on each administrative subunit is responsible for fully implementing the directives that require water quality protection and improvement during watershed management activities. The directives provide details on methods and techniques to incorporate water quality controls into each phase of the watershed management program.

Trained and qualified earth scientists and other professional employees are available to provide technical assistance and identify beneficial uses, the most recent state-of-the-art water quality control methods and techniques, and help evaluate results.

The full implementation of BMPs in watershed management activities may require the application of other BMPs as well as those listed in this section. The BMPs listed in this section may also be applicable to many other resource management activities. Coordination of these BMPs with other resource issues and concerns is an essential part of project planning.

1. **Watershed Restoration (PRACTICE: 7-1)**

- a. Objective: To repair degraded watershed conditions and improve water quality and soil stability.
- b. Explanation: Watershed restoration is a corrective measure to:
 - 1) Improve ground cover density.
 - 2) Improve infiltration.
 - 3) Prevent excessive overland runoff and conserve the soil resource.
 - 4) Stabilize stream banks and stream channels.
 - 5) Improve soil productivity.
 - 6) Reduce flood occurrence and flood damage.
 - 7) Enhance economic, social and/or aesthetic values of the watershed.
 - 8) Improve overall watershed function.

The following factors will be considered during development of restoration projects: predicted changes in water quality and any direct or indirect impacts on the beneficial uses of water, downstream values, site productivity, and threats to life and property.

Watershed restoration measures will reflect the state-of-the-art and must be chosen to custom fit the unique hydrologic, physical, biologic and climatic characteristics of each watershed. Examples of watershed restoration measures are check dam installation, streambank and channel stabilization structures, soil scarification, and seeding and planting.

- c. **Implementation:** This management practice is implemented through the development of a Watershed Improvement Needs (WIN) inventory, identification of projects, preparation and approval of restoration plans and related environmental documentation and the funding and implementation of the restoration actions.

The Forest Supervisor ensures that a WIN inventory is completed and identified restoration projects prioritized.

Planning will be through an IDT effort. Multifunctional funding of projects will be pursued where improvement of watershed conditions will benefit multiple resource areas and/or where causal actions of deteriorated conditions can be identified.

The actual work will be done by force account or through contract. Effectiveness of the restoration measures used will be monitored by project proponents. Physical, hydrologic, biological or aquatic indicators of deteriorated conditions will be the focus of the monitoring effort.

2. Conduct Floodplain Hazard Analysis and Evaluation (PRACTICE: 7-2)

- a. **Objective:** To avoid, where possible, the long- and short-term adverse impacts to water quality associated with the occupancy and modification of floodplains.
- b. **Explanation:** Floodplain analysis and evaluation are part of the environmental documentation process. Analysis must be made prior to acquisition, or exchange of land within floodplains and must be made when sites within floodplains are being considered for structures, or developments.

Environmental quality, ecological effects, and individual safety and health must be considered as well as flood frequencies, watershed conditions, climatic and environmental factors associated with past flood events, flood flow quantities and specific flood boundaries.

- c. **Implementation:** The Regional Forester will be responsible for ensuring consideration of floodplain hazards and values in all NEPA environmental analysis.
 - 1) Ensure that flood hazards, floodplain and wetland values, and all alternatives that affect floodplain or that involves new construction in wetlands are fully considered in the Forest service planning and decision-making process.
 - 2) Coordinate activities and interchange of floodplain and wetlands information with other concerned Federal and State agencies.
 - 3) Ensure that cooperative technical and financial assistance programs include an evaluation of floodplain and wetland values.

- 4) Ensure that all documents conveying interest in or authorizing use of floodplains and wetlands on National Forest System lands contain disclosure of and/or restrictions as warranted which will reduce the risk of loss and preserve the national and beneficial values served by floodplains and wetlands.

The Forest Supervisor, through use of earth scientists, will:

- 1) Analyze proposed actions affecting floodplains or involving new construction in wetlands to assess the specific flood hazards, quantify floodplain or wetland values of the areas; determine the impacts of the proposal on those hazards and values; formulate and evaluate land and resource management options; develop a practicable alternative actions or locations for evaluation and decision making.
- 2) In actions where an alternative effecting the floodplain or new construction in a wetland is not practicable, modify plans, activities and designs to minimize impacts of the action and to mitigate its effects on the national and beneficial values of the floodplain or wetland.
- 3) Ensure that all practicable and necessary mitigation measures are incorporated in specifications for the proposed action, and that the implementation of the selected action is accomplished in a manner that to the extent practicable, restores and preserves the natural and beneficial values served by the floodplains and preserves and enhances the natural and beneficial values of wetlands.
- 4) Require flood hazard and wetland evaluations prior to issuing of licenses, permits, loans, or grants-in-aid. Provide assistance to applicants in obtaining help to make such evaluations in their proposals.
- 5) Ensure that design, construction or rehabilitation of Forest Service real property is in accordance with standards and criteria outlined in the National Flood Insurance Program (42 U.S.C. 4001 and following) using flood proofing measures and structural elevation where practicable.
- 6) Provide for the placement of appropriate signs to enhance public awareness and knowledge of flood hazards.
- 7) Establish specific management standards and guidelines for floodplains and wetlands as part of forest planning actions.
- 8) Cooperate with State and County governments in the development and implementation of appropriate early flood warning and evacuation plans.

3. Protection of Wetlands (PRACTICE: 7-3)

- a. Objective: To avoid adverse water quality impacts associated with destruction, disturbance, or modification of wetlands.
- b. Explanation: The Forest Service will not permit the implementation of activities and new construction in wetlands whenever there is a practical alternative. Factors relevant to the effect of the proposal on the survival and quality of the wetlands will

be considered when evaluating proposed actions in wetlands. Factors to be evaluated include, but are not limited to water supply, water quality, recharge areas, functioning of the wetland during flood and storm events, flora and fauna, habitat diversity and stability, and hydrologic function of riparian areas.

- c. **Implementation:** The Regional Forester will be responsible for ensuring that wetland values are considered and documented as an integral part of all planning processes.

The Forest Supervisor, through the use of earth scientists, will determine whether proposed actions will be located in wetlands and, if so, whether there is a viable alternative. Replacement in kind of lost wetlands should be evaluated to apply a 'no net loss' perspective to wetland preservation. During project planning, the Forest Supervisor will establish communications with other agencies legislatively responsible for the protection of wetlands, Corps of Engineers and EPA at the minimum, to ensure that local requirements are identified and incorporated into the project plan.

The Forest Supervisor must ensure that all mitigating measures are incorporated into project plans and designs and that the actions maintain the hydrologic and biologic function of the wetlands. All potentially impacted wetlands will be identified on maps as part of project development.

Identification and mapping of wetlands will be a part of the LRMP data inventory process.

4. Forest and Hazardous Substance Spill Prevention Control and Countermeasure (SPCC) Plan (PRACTICE: 7-4)

- a. **Objective:** To prevent contamination of waters from accidental spills.
- b. **Explanation:** This is a preventive and corrective practice. The Forest SPCC Plan is a document designed to guide the emergency response to spills, or discovery of hazardous materials (HazMat) within the boundaries of each National Forest. Spills are defined as either a intentional or accidental release known, or unknown substance; or the incidental discovery of a known, or unknown substance. Each Forest SPCC Plan must be compatible with appropriate County SPCC Plans that also guide emergency responses to spills and discoveries of HazMat. Forest SPCC Plans are prepared according to references and County SPCC Plans are prepared according to State guidelines.

The composite of Forest and County SPCC Plans provide a process to coordinate the various local, State and Federal agencies that have emergency response capabilities, into a unified force that can effectively react to actual, or threatened releases or HazMat within the Forest boundary. Factors considered for each spill include, but are not limited to, the specific substance spilled, the quantity, its toxicity, proximity of the spill to waters, and the hazard to life and property.

A Spill Prevention Containment and Counter Measures Plan must be prepared if the total oil products on site in above-ground storage exceed 1320 gallons, or if a single container exceeds a capacity of 660 gallons. Other HazMat (pesticides, raw

sewage, road oils) also have specific criteria that determine when a SPCC Plan must be prepared and implemented.

- c. **Implementation:** Each Forest Supervisor will be responsible for designating emergency spill response coordinators and documenting names with telephone numbers of agencies to call regarding response to emergency incidents. Individual Forests should maintain an inventory of materials to use during the emergency response phase of HazMat within their capability. Disposal methods and sites must be coordinated with EPA, State, and local officials responsible for safe disposal.

All Forests will maintain a SPCC plan, which meets the criteria of the referenced directives in Section 13, and require appropriate special use permittees, timber sale operators, other contractors, and Forest users to develop companion SPCC Plans before operating within the National Forest boundary. Forest SPCC Plans and Forest users SPCC Plans must be approved by the Forest Supervisor. Timber sale SPCC Plans must be approved by a licensed, professional engineer.

5. Control of Activities Under Special Use Permit (PRACTICE: 7-5)

- a. **Objective:** To protect surface and subsurface water quality from physical, chemical, and biological pollutants resulting from activities that are under special use permit.
- b. **Explanation:** Some activities and uses by others take place on NFS lands, which are not directly related to Forest Service management activities. (Some examples, electronic sites, highway, road and railroad rights-of-way, waste water treatment and disposal, and power transmission lines)

There are also uses by others on NFS land, which are related to NFS management activities. (Examples of these types of uses are organization camps, recreation residence tracts, and ski areas) Both the related and non-related uses of NFS lands by others are administered through permits issued by the Forest Service to public, or private agencies, a group, or an individual.

Activities on lands withdrawn under authority of the Federal Energy Regulatory commission (FERC) will be exempt from Forest Service administrative control through the NFS permit system. When a FERC permit is issued, or renewed, the Forest Service makes a complete study of water quality and quantity needs, and provides FERC with recommended requirements and mitigation measures under which the permittee should operate to protect natural resources.

- c. **Implementation:** The Forest Service Official responsible for permit issuance and administration will include in the special use permit, under which permittee must operate, details of the conditions that must be met including management requirements and mitigation measures necessary to protect water quality. The permittee will be required to conform to all applicable State and Local regulations governing water quality and sanitation.

State Water Quality law may require that the permittee obtain a waste discharge requirement from a RWQCB. Failure on the part of the permittee to meet the conditions of the special use permit may result in the permit being revoked.

6. Water Quality Monitoring (PRACTICE: 7-6)

- a. Objective: To collect representative water data to determine base line conditions for comparison to established water quality standards which are related to beneficial uses for that particular watershed.
- b. Explanation: Water quality monitoring is a mechanism, which evaluates the implementation and effectiveness of a management prescription in protecting water quality (beneficial uses identified in the environmental analysis.) A water quality monitoring plan will be part of an environmental document, a management plan, or a special use permit or it will be developed in response to other needs.
- c. Implementation: A water quality monitoring plan will be written, or reviewed by a hydrologist and will be implemented by the hydrologist, or by other qualified Forest personnel. The actual analysis of the data will be performed by the hydrologist; State certified laboratory, or other trained Forest personnel, or combinations of these as appropriate. (See also Practices 4-2 and 4-3)

Interpretation of the data and any reporting will be accomplished by the hydrologist, or trained personnel. The EPA STORET system will be used for computer storage of all water quality data collected.

7. Management by Closure to Use (Seasonal, Temporary, and Permanent) (PRACTICE: 7-7)

- a. Objective: To exclude activities that could result in damages to either resources or improvements, such as roads and trails, resulting in impaired water quality.
- b. Explanation: A watershed may be in such a sensitive condition that any use during a given portion of the year, usually the rainy season, could result in soil and/or land stability problems and associated adverse effects to water quality. In other cases, water quality may already be impaired and improvement not considered to be practical without substantially reducing, or eliminating further use.

These conditions could have resulted from past land use, or from natural disasters. Closure to use will be used when the condition of the watershed must be protected to preclude adverse water quality effects. (See also Practices 1-5 and 2-9)

- c. Implementation: Closures will be made when the Forest Supervisor, District Ranger, or Forest Service Officer responsible for resource protection, determines that a particular resource, or improvement needs protection from use. An IDT or resource specialist normally recommends closure. The decision will be made to close an area after an evaluation of alternative methods of protection dictates that closure is a required action. This is usually a last step protective measure.

8. Cumulative Off-Site Watershed Effects (Practice Needs Improvement) (PRACTICE: 7-8)

- a. Objective: To protect the identified beneficial uses of water from the combined effects of multiple management activities which individually may not create unacceptable effects but collectively may result in degraded water quality conditions.

- b. Explanation: Cumulative off-site watershed effects (CWE) include all effects on beneficial uses that occur away from the sites of actual land use activities and which are transmitted through the drainage system. Effects can be either beneficial or adverse and result from the synergistic or additive effects of multiple management activities within a watershed.

Professional judgment is used to evaluate CWE susceptibility, on a watershed basis, as part of the decision-making process. These assessments are made utilizing known information about beneficial uses, climate, watershed characteristics, land use history, and present and reasonably foreseeable future land use activities. Initial evaluation of CWE susceptibility is based on what is known about the study watershed and other watersheds with similar physical and climatic characteristics. Comparison of land disturbance history and resulting impacts to beneficial uses in these watersheds results in an estimate of the upper limit of watershed tolerance to land disturbance.

- c. Implementation: CWE susceptibility evaluations and development of mitigative measures are done through the environmental documentation process, using an IDT approach, guided by the Regional methodology. Forests having similar climatic, watershed and land use characteristics will work together to refine CWE assessments to be responsive to local conditions. Each Forest will monitor to determine the effectiveness of CWE analysis in reducing the risk of adverse CWE and obtaining desired results from CWE mitigation measures and management requirements. Monitoring results will also be used to refine the analysis and, where necessary, modify the analysis process.

12.8 Synopsis for Range Management

The lands that are now NFS were, for the most part, being used by domestic livestock prior to establishment of the National Forests in California. Grazing has continued as a recognized and compatible use of public lands. Grazing can be a means of managing vegetation to meet other resource management objectives, such as fuels management, and reducing competing vegetation in plantations.

In years past, grazing use was often uncontrolled and much heavier than it is today. Through the application of improved grazing systems, improved forage management technology, and adjustments of animal numbers to better fit the range capacity, the grazing use has been adjusted to a level more compatible with the resource capability. Range use includes grazing by cattle, sheep and goats, horses and saddle stock used to manage the range.

Designated grazing allotments are managed to accommodate livestock grazing and are typically 4 to 40 square miles in size. Livestock are owned by local ranchers, and graze on NFS land authorized by both term and temporary permits administered by the Forest Service.

Range management involves range analysis, allotment management planning and improvement, and the grazing permit system. It includes controlling overall livestock numbers and season of use, controlling livestock distribution, structural and non-structural improvements, providing for other uses, and restoration of deteriorated range land.

12.81 Index for Range Best Management Practices:

1.	Range Analysis and Planning	8-1
2.	Grazing Permit System	8-2
3.	Rangeland Improvements	8-3

12.82 Range Best Management Practices

The following are the BMPs for the control of nonpoint source pollution associated with livestock grazing activities on NFS land. Each BMP is based on administrative directives that guide and direct the Forest Service planning and permitting of livestock grazing activities on NFS land.

The line officer on each administrative subunit is responsible for fully implementing the directives that require water quality protection and improvement during livestock grazing activities. The directives referenced in Section 13 provide details on methods to incorporate water quality controls into each phase of the range management program.

Trained and qualified earth scientists and other professional employees are available to work with the range management work force to provide technical assistance to identify beneficial water uses, the most recent state-of-the-art water quality control methods and techniques, and help evaluate results.

The full implementation of BMPs in livestock grazing activities requires the application of other BMP as well as those listed in this section. For example, if burning is a means of range improvement, appropriate BMPs in Section 12.6 will be implemented, and if system roads are involved, appropriate BMPs in Section 12.2 will be implemented.

1. Range Analysis and Planning (PRACTICE: 8-1)

- a. **Objective:** Safeguard water quality potentially effected by livestock grazing activities.
- b. **Explanation:** An analysis of existing range condition and other resource values will be conducted by an IDT to evaluate the potential grazing capability on an allotment. Based on this Environmental Assessment and the Forest Land and Resource management Plan (LRMP), the responsible Forest Officer in coordination with the permittee prepares a written Allotment Management Plan.

Allotment Management Plans include measures to protect other resource values, such as water quality, and to coordinate livestock grazing with other resource uses. Structural and non-structural range improvements will be specified in the plan when needed to improve the range resource or protect other resource values, such as water quality. Monitoring practices and locations are outlined in the plan to determine the effectiveness of LRMP standards and guidelines and trend toward desired conditions.

Annual operating instructions are issued to the permittee each year to implement the Allotment management Plan and to account for current allotment conditions and trends. The amount of livestock use is determined primarily by annual monitoring of

compliance with LRMP standards and guidelines and other requirements developed through the environmental assessment. Allowable use is considered to be the use, which maintains range productivity, and soil and watershed stability.

- c. Implementation: The District Ranger will be responsible for analysis of range allotments, determining the need for environmental evaluation and documentation and the preparation of Allotment Management plans.

The Forest Supervisor or District Ranger will approve the Allotment Management Plans. Allotment Management plans will be revised as outlined in the allotment schedule required under the Rescission Act of 1995 (PL 104-19, Section 504(A)).

Annual operating instructions will be prepared, or revised annually to allow for current allotment conditions and trends, and to incorporate direction in allotment management plans. The permittee carries out the plans under the immediate direction and supervision of the District Ranger, or the District Range Officer. Enforcement action will be taken where a permittee does not comply with grazing permit requirements and conditions, and has not received approval to deviate from permit provisions.

2. **Grazing Permit System (PRACTICE: 8-2)**

- a. Objective: Safeguard water quality potentially effected by livestock grazing activities.
- b. Explanation: A grazing permit is used to authorize livestock grazing on NFS lands. The LRMP standards and guidelines, Allotment Management Plan and annual operating instructions are apart of the permit terms and conditions. Administration of the permit includes monitoring and enforcement of the permit terms and conditions. Routine field checks include:
 - 1) Range readiness evaluations to assure that the soil is not too wet and that sufficient forage growth has occurred.
 - 2) Stock checks to assure that only permitted livestock enter the allotment, the allotment is occupied only within the permitted time period and use occurs only within the approved areas within the allotment.
 - 3) Monitoring of standards and guideline attainment which includes measuring forage utilization, riparian vegetation impacts, and condition of streambanks.

If during the course of monitoring and periodic assessments a problem is found in meeting the standards and guidelines on a consistent basis, a range of actions are available to solve the problem. Actions might include adjusting livestock numbers and/or season of use, installing fences and water developments, etc.

When there is intentional noncompliance with the terms and conditions of the permit enforcement is necessary and will be applied as outlined in our Forest Service Handbooks. Enforcement actions will be commensurate with the severity of violation. Actions can vary from a letter of warning, permit suspension or permit cancellation.

- c. Implementation: Allotments will be administered by the District Ranger assuring that permit provisions are carried out by the grazing permittee as required.

The Forest Supervisor or District Ranger will approve grazing permits and allotment management plans. Field checks and measurements will be made annually by the Forest Service. The permit will be modified, cancelled or suspended in whole or in part as needed to ensure proper use of the range resource and protection of other resources, such as water quality.

3. **Rangeland Improvements (PRACTICE: 8-3)**

- a. Objective: Safeguard water quality potentially effected by livestock grazing activities.
- b. Explanation: Rangeland improvements are generally designed to improve on the use of the range vegetation by livestock or provide protection to sensitive areas. They may consist of simply providing protection to sensitive areas. They may consist of simply providing rest through rotation grazing, or fencing, or lighter grazing use by changing the season of use, or by adjusting the kind, class, or number of permitted livestock.

Other measures may include stream channel stabilization efforts such as riprapping, gully plugging, and planting, or mechanical treatments such as pitting, chiseling, or furrowing. Reseeding and/or fertilization will be done alone, or in conjunction with any of these measures.

Water developments are often included in rangeland improvement projects. Improvement efforts will be designed to induce range resources to produce at or near optimum potential for sustained forage production for livestock and to provide protection to the other resources. (See also Practices 7-1 and 7-7)

- c. Implementation: The District Ranger will assure that the permittee is involved as a cooperator in rangeland improvements and as appropriate, completes the work under Forest Service direction. This work includes both construction and maintenance of improvements. Implementation may also be done by Forest Service crews, or contractors.

Range improvement needs will be recognized to the fullest extent possible in the range allotment planning process and will be scheduled for implementation in the allotment plan.

Results of watershed condition assessments developed by an IDT will be used in development of range improvement treatments and programs.

This section lists the technical references for each of the Best Management Practices. The text of each Best Management Practice is based on material contained in each reference. Best Management Practices users are encouraged to become familiar with the references listed for each best management practice they wish to apply. Forests, Districts and Regional Staffs should report any necessary changes (errors additions, and so on) to the regional Office Watershed Management Staff, through your Forest or District hydrologist.

BEST MANAGEMENT PRACTICES REFERENCES BY BMP

BMP Number	References
1-1	FSH 1909.15
1-1	FSH 2409.13, Chap. 21.41
1-1	R5-FSH 2409.26 Section 13
1-1	FSH 2509.18
1-1	NFMA
1-1	NEPA
1-1	TSC
1-1	FSM 1950
1-1	FSM 2531
1-2	NFMA
1-2	FSM 2470.3
1-2	FSM 2471.2
1-2	TSC Prov. C6.601 - R5
1-2	TSC Prov. C6.602 - R5
1-2	TSC Prov. C6.63 - R5
1-2	R5 Soil Quality Standards
1-3	FSH 2509.18
1-4	TSC Prov. B1.1
1-4	TSC Prov. B6.5
1-4	TSC Prov. B6.6
1-4	TSC Prov. C6.5
1-4	TSC Prov. C6.6
1-4	TSC FS2400-3 Standard Provisions 1 & 11
1-4	R-5 FSM 2526
1-5	TSC Prov. B6.31-5
1-5	TSC Prov. B6.31
1-5	TSC Prov. B6.6
1-5	TSC Prov. B6.65
1-5	TSC Prov. C6.3
1-5	TSC Prov. C6.313
1-5	TSC FS2400-3 Standard Provisions 1 & 11

BMP Number	References
1-6	FSM 2404
1-6	R5 Stand Record System Users Guide
1-6	TSC 2400-3 Standard Provision 10
1-7	NFMA
1-7	R5-FSH 2409.26 Sec 12 & 13
1-7	FSM 2470.3
1-8	R5-FSH 2409.26 Section 12 & 13
1-8	R-5 FSH 2409.15, Sec. 61.51
1-8	FSM 1950
1-8	FSM 2526
1-8	R-5 FSH 2409.15, Sec. 15.21
1-8	NEPA
1-8	NFMA
1-8	TSC 2400-3 Standard Provision 11
1-8	TSC Prov. C5.421
1-8	TSC Prov. C6.411
1-8	TSC Prov. C6.5
1-9	FSM 2521
1-9	FSH 2509 18
1-9	FORM R5-2500-14
1-9	Timber Sale Area/Project Map, all contract forms
1-10	R-5 FSH 2409.15, Sec 61.42
1-10	R-5 FSH 2409.15, Sec. 51
1-10	TSC Prov. B6.42
1-10	TSC Prov. B6.424
1-10	TSC Prov. C6.41
1-10	TSC Prov. C6.422
1-10	TSC Prov. C6.424 Provisions
1-11	R-5 FSH 2409.15 Sec 61.41
1-11	TSC Prov. B6.42
1-11	TSC Prov. C6.425
1-11	TSC Prov. C6.427
1-11	TSC Prov. C6.429
1-11	TSC 2400-3 Standard Provision 1 and special provisions approved for specific sales
1-12	R-5 FSH 2409.15, Sec. 6.42
1-12	TSC Prov. B6.42
1-12	TSC Prov. C6.63
1-12	TSC Prov. C9.2
1-12	OSHA Regulations
1-12	TSC 2400-3 Special Provision 12
1-13	TSC Prov. B4.225

BMP Number	References
1-13	TSC Prov. C6.6
1-13	TSC Prov. C6.422
1-13	R-5 FSH 2409.15, Sec. 61.41 & 61.42
1-13	R-5 FSH 2409.15, Sec. 51.6
1-13	TSC 2400-3, Special Provision 10
1-14	TSC Prov. B6.6
1-14	TSC Prov. C6.6
1-14	TSC Prov. C6.602 - R5
1-14	R-5 FSH 2409.15, Sec. 6.42
1-14	FSH 2509.11
1-14	TSC 2400-3 Special Provision 9 & 10
1-15	R-5 FSH 2209.23, Cap. 50
1-15	R-5 FSH 2409.15, Sec. 6.42
1-15	TSC Prov. B6.6
1-15	TSC Prov. C6.6
1-15	TSC Prov. C6.601-R5
1-16	TSC Prov. B6.422
1-16	TSC Prov. B6.6
1-16	TSC Prov. B6.63
1-16	TSC prov. C6.428
1-16	TSC Prov. C6.6
1-16	TSC Prov. C.6.601-R5
1-16	TSC Prov. C6.602-R5
1-16	TSC prov. C6.63
1-16	R-5 FSH 2409.15, Sec. 51
1-16	TSC 2400-3, Special Provisions 10 & 12
1-17	TSC Prov. B6.6
1-17	TSC Prov. B6.66
1-17	TSC Prov. C6.601-R5
1-17	TSC Prov. C6.64
1-17	R-5 FSH 2409.15, Sec. 61.42
1-17	R-5 FSH 2409.15, Sec. 51.64
1-17	TSC 2400-3, Special Provision 10
1-18	TSC Prov. B6.61
1-18	TSC Prov. C6.5
1-18	TSC Prov. C6.61
1-18	TSC Prov. C6.62
1-18	R-5 FSM 2526
1-18	R-5 FSH 2409.15, Sec. 24.1
1-18	R-5 FSH 2409.15, Sec. 51.61
1-18	Executive Order 11990
1-18	TSC 2400-3, Special Provisions 9 & 12
1-19	FSH 2409.26, Sec. 13
1-19	R-5 FSH 2409.15, Sec. 15.54 and 61

BMP Number	References
1-19	R-5 FSH 2509.22, Cap. 30
1-19	R-5 FSM 2526
1-19	TSC Prov. B6.5
1-19	TSC Prov. B6.6
1-19	TSC Prov. C6.427
1-19	TSC Prov. C6.5
1-19	TSC Prov. C6.6
1-19	TSC 2400-3, Special Provision 11
1-20	TSC Prov. B4.225
1-20	TSC Prov. B6.6
1-20	TSC Prov. B6.66
1-20	TSC 2400-3, Special Provision 9
1-21	R-5 FSH 2409.15, Sec. 51, 54 & 61
1-21	R-5 FSH 2409.15, Sec. 15
1-21	TSC Prov. B6.6
1-21	TSC Prov. B6.63
1-21	TSC Prov. B6.64
1-21	TSC Prov. B6.65
1-21	TSC Prov. B6.66
1-21	TSC Prov. C6.601
1-21	TSC Prov. C6.602
1-21	TSC Prov. C6.603
1-21	TSC Prov. C6.6
1-21	TSC Prov. C6.63
1-21	TSC 2400-3 Provision 9
1-22	R-5 FSH 2409.15, Sec. 61.5
1-22	R-5 FSH 2409.15, Sec.15
1-22	FSM 1950
1-22	TSC Prov. C6.7
1-22	TSC Prov. C6.73
1-22	TSC Prov. C6.76
1-22	TSC Prov. C6.77
1-22	TSC Prov. C6.78
1-22	TSC 2400-3, Prov. 7 & 11
1-23	FSH 2409.13, Chap. 21, 42
1-23	FSH 2409.26, Sec 12 & 13
1-23	FSM 2470.3
1-23	NFMA
1-23	TSPP
1-24	FSH 2409.18, Sec. 42.2 & 53.23
1-24	TSPP
1-24	TSC 2400-3. [page 1
1-25	TSC Prov. B8.3
1-25	TSC Prov. C8.2

BMP Number	References
1-25	TSC Prov. C8.3
1-25	CFR 223.113
1-25	CFR 223.116
1-25	TSC 2400-3, Prov. 3, 18 & 41
2-1	SH 1909.15
2-1	R-5 FSH 2409.24Chap. 15.11, 22-24, 33, 34, 41, 51
2-1	FSM 7710
2-1	FSM 7720
2-1	FSH 7709.66, Chap. 2
2-1	TSC Prov. B5.2
2-1	TSC Prov. C5.2
2-2	Standard Spec. 204, 204.03
2-2	R-5 FSH 2409.15, Chap. 54.5
2-2	R-5 FSH 2409.24
2-2	FSH 7709.57, chap. 3.7
2-2	FSH 7709.56
2-2	FSH 6309.32, Part 52 (AGAR) 452.236-74
2-2	TSC Prov. B6.31
2-2	TSC Prov. C6.3
2-2	TSC Prov. C6.311, FSH 77.09.57 Chap. 3.7
2-3	FSH 7709.56
2-3	FSH 7709.57, Chap. 3
2-3	R-5 FSH 2409.15, Chap. 54.1
2-3	TSC Prov. C5.102
2-3	TSC Prov. B6.5
2-3	TSC Prov. B6.6
2-3	TSC Prov. C6.311
2-3	TSC Prov. C6.313
2-3	Practice 2.9
2-3	FSH 6309.32, Part 52 (AGAR) 52.211-3, 52.242-14
2-4	Standard Spec. 204, 625, 626, 629
2-4	Practice 2-5
2-4	R-5 FSH 2409.15; Chap. 54.91q
2-4	R-5 FSH 2409.24
2-4	FSH 7709.57
2-4	FSH 7709.56, Chap. 4.5
2-5	Standard Spec. 204.10, 203, 204.11, 625, 626, 629
2-5	FSM 1950
2-5	FSM 7170
2-5	FSM 7720
2-5	FSH 77.09.56, Chap. 4.4.5 and 4.7

BMP Number	References
2-5	FSH 2409.15; Chap. 54.91q
2-5	FSH 7709
2-5	FSH 7709.57, Chap. 3.4
2-5	TSC Prov. C6.621
2-6	Standard Spec. 605, 621
2-6	FSH 7709.56, Chap. 4
2-6	FSH 7709.56, Chap. 4.45
2-7	Standard Spec. 203, 204, 621, 622
2-7	R-5 FSH 2409.24, Chap. 24
2-7	R-5 FSH 2409.15, Chap. 54
2-7	FSH 7709.56, Chap. 4.4
2-7	FSM 1950
2-7	TSPP FSH 7709.58, Chap. 12.5
2-8	Standard Spec. 201, 203, 204, 299(NE), 621,622
2-8	R-5 FSH 2409.15
2-8	FSH 7709.57
2-8	TSC Prov. B6.65
2-8	TSC Prov. C6.621
2-9	Standard Spec. 203, 204, 299(NE), 625
2-9	FSH 7709.57
2-9	FSH 7709.56, Chap. 4
2-9	R-5 FSH 2409.15
2-9	TSC Prov. B6.6
2-9	TSC Prov. B6.65
2-10	Standard Spec. 201, 203, 212, 299(NE)
2-10	FSH 7709.57
2-10	FSH 7709.56, Chap. 4
2-10	Practice 2-11
2-10	TSC Prov. C6.621
2-11	R-5 FSH 2409.15
2-11	FSH 7709.58
2-11	FSH 7709.56, Chap. 4
2-11	Standard Spec. 203, 299N(NE)
2-11	TSC Prov. C5.4
2-11	Practice 2-10
2-11	Practice 2-13
2-12	TSC Prov. B6.34
2-12	TSC Prov. C6.341
2-12	36 CFT 261.11 (c)
2-12	40 CFR 112 Oil Pollution Prevention
2-12	FSH 6309.32, Part 52 (FAR), 522.223-74
2-12	AGAR 452.236, 236-74

BMP Number	References
2-12	Practice: 7-4, Hazmat Above Ground Petroleum Storage Act, Amended 1991
2-13	R-5 FSH 2409.15
2-13	FSM 2526
2-13	R-5 FSH 2409.24
2-13	FSH 7709.57
2-13	FSM 7721.12
2-13	FSH 7709.56, chap. 4
2-13	Practice 1-8
2-13	Forest LRMP
2-13	NW Forest LRMP ROD
2-13	Pacfish Decision Notice
2-13	TSC Prov. C6.621
2-13	Practice 2-11
2-13	Practice 4-12
2-13	Executive Prov. C6.5
2-14	Standard and Special Project Spec. 206, 206A, 618
2-14	TSC Prov. B6.5(c)
2-14	TSC Prov. C6.5
2-14	Corps of Engineers 404 Permit
2-14	FSH 7709.56 & 56b
2-14	FSH 7709.57
2-15	TSC Prov. B6.5 (d)
2-15	TSC Prov. C6.5
2-15	Standard Spec. 206
2-15	Standard Spec. 206A
2-15	FSH 7709.57; 7709.566; 2409.15, 60 AGAR
2-16	FSH 7709.56, 7709.57
2-16	FSM 2432.35b
2-16	R -5 FSH 2409.15, 60
2-16	TSC Prov. B6.5 (b)
2-16	TSC Prov. B6.65
2-16	TSC Prov. C5.124
2-16	TSC Prov. C6.5
2-16	TSC Prov. C6.621
2-17	Standard Spec. 206, 206A, 603, 617
2-17	FSH 6309.32, Part 52.223-1, 2 (FAR)
2-17	FSH 6309.32, Part 23 (FAR)
2-17	FSH 7709.56 & 56b
2-17	FSH 7709.57
2-17	FSH 2409.15, 60 AGAR 452.236-74
2-18	Standard Spec. 203, 249, 611

BMP Number	References
2-18	FSH 6309.32 (FAR) Parts 23, 52.223-1, -2
2-18	7709.56; 7709.57 AGAR 452.236-74
2-19	Standard Spec. 201, 249
2-19	FSH 7709.56, chap. 4; 7709.57
2-20	Standard Spec. 521
2-20	FSH 7709.56, Chap 4 & 56b
2-21	Standard Spec. 207
2-21	TSC Prov. C5.421
2-21	R-5 FSH 2409.15, 50; 7709.56, Chap. 7
2-22	Standard Spec. 306
2-22	R-5 FSH 2409.15
2-22	FSH 7709.15
2-22	TSC Prov. C5.4
2-22	R-5 Standard "T" spec.
2-22	Practice 2-23
2-22	Practice 2-24
2-22	Practice 2-25
2-23	Standard Spec. 300, 400
2-23	TSC Prov. C5.411
2-24	Standard Spec. 640
2-24	FSM 7731.4
2-24	TSC Prov. B5.12
2-24	TSC prov. B6.22
2-24	TSC prov. C5.12
2-24	36 CFR 261 for closure authority
2-24	Practice 2-25
2-24	Forest ORV plans
2-25	Standard Spec. 203, 640
2-25	TSC Prov. C5.414
2-25	Practice 203
2-25	Practice 2-9
2-25	Practice 2-24
2-26	Standard Spec. 204, 210
2-26	TSC Prov. B6.62
2-26	TSC Prov. C6.603
2-26	Practice 2.4
2-26	R-5 FSH 2409.15 and 50
2-27	Standard Spec. 204, 210, 611, 625
2-27	FSH 7709.56, chap. 4.6
2-28	FSH 7309.11

BMP Number	References
3-1	FSM 2817
3-1	FSM 2817.3
3-1	FSM 2810.1 & .4
3-1	FSM 2813.14 & .2
3-1	FSM 28.14.11 - .16
3-1	FSM 2509.15
3-1	FSH 2809.11
3-1	FSH 2809.12
3-1	30 CFR 212 Transportation regulations
3-1	30 USC 21-54 et. seq.
3-1	36 CFR 228.1; 228.4 (a), (e), (f) 228.8 (b), (c), (e), (f), (g); 228.5 (b)
3-1	36 CFR 261.10 (a)
3-1	16 USC 478
3-1	16 USC 551
3-1	16 USC 1151 et. seq.
3-1	NEPA
3-1	RCRA
3-1	CERCLA
3-1	30 USC 6112
3-2	FSM 1531.12d
3-2	FSM 2522.14
3-2	FSM 2822
3-2	FSH 2509.15
3-2	FSH 2809.11
3-2	FSH 2809.12
3-2	Mineral Leasing Act of February 25, 1920 (41 Stat. 437, as amended; 30 USC 181)
3-2	Federal Coal Leasing amendments Act of August 4, 1976 (90 Stat. 1083; 30 USC 201(a), 201(b), and 207; 17 USC 1276)
3-2	Act of March 4, 1917 (39 Stat. 1150, as supplemented; 16 USC 520)
3-2	Section 402 of Reorganization Plan No. 3, of July 16, 1946 (60 Stat. 1097, 1099; 5 USC Appendix)
3-2	Act of August 7, 1947 (61 Stat. 913; 30 USC 351, 352, 354, 359) as amended by PL 167 Geothermal steam Act
3-3	FSM 2522.14
3-3	FSM 2850
3-3	FSH 2509.15
3-3	FSH 2809.11
3-3	FSH 2809.12
3-3	36 CFR 228, Subpart c

BMP Number	References
3-3	Act of July 31, 1947 (61 Stat. 681), as amended by the Act of August 31, 1950 (64 Stat. 571), and the Act of July 23, 1955 (69 Stat. 367; 30 USC 601-603), and pursuant to the Act of June 11, 1960 (74 Stat. 205), and the Act of September 25, 1962 (76 Stat. 587)
4-1	FSM 2335.2
4-1	R-5 FSM 2335.2
4-1	EPA Water Quality criteria, 1976, pg. 44
4-2	Safe Drinking Water Act (PL 95-190)
4-2	State and Local Codes
4-2	National Interim Primary Drinking Water Regulations (40 CFR 141)
4-2	FSM 2332.2
4-2	FSM 2332.54
4-2	FSM 7420
4-2	R-5 FSM 7420
4-2	R-5 FSM 7421
4-2	FSM 7421
4-2	FSM 7422
4-2	R-5 FSM 7422
4-2	FSH 7409.11
4-3	FSM 7421.25
4-3	FSM 2335.2
4-3	R-5 FSM 2335.2
4-3	FSM 2532.03
4-3	R-5 FSM 7421
4-4	State and Local Codes such as; Regional Water Quality Control Board Basin Plans, Public Health Codes, and so on.
4-4	36 CFR 261.11(a)
4-4	FSM 2333.52
4-4	FSM 2332.3
4-4	FSM 7430.1
4-4	FSM 7441
4-4	FSM 7462
4-4	FSH 7409.11
4-5	36 CFR 261.11 (b,d,e)
4-5	Resource Conservation and Recovery Act (PL 94-580)
4-5	FSM 2332.41
4-5	FSM 2333.53
4-5	FSM 7462

BMP Number	References
4-6	FSM 2333.52 & .53
4-6	FSM 2332.3
4-6	FSM 2345
4-6	FSM 2334.28
4-6	FSM 7430.1
4-6	FSM 7441
4-6	FSH 7409.11
4-7	Executive Order 11644
4-7	FSM 2355
4-7	FSM 2355.5
4-7	FSM 2355.01
4-7	FSM 2532.5
4-7	36 CFR 261.13
4-7	36 CFR 261.56
4-7	36 CFR 295.5
4-8	36 CFR 261.14(c)
4-9	36 CFR 261.11 (b), (c)
4-9	36 CFR 261.14(q)
4-9	36 CFR 261.50
4-9	36 CFR 261.58
4-9	FSM 2323.4
4-9	SM 2333.35
4-9	FSM 2502
4-10	FSM 2323.138
5-1	R-5 FSH 2209.23, Sec. 234.3
5-1	Brushland Management ES, 1972 Forest Reestablishment on National Forest in California ES, 1974
5-2	FSH 2209.23, Sec. 322
5-2	FSH 2209.23, Sec. 332
5-2	FSH 2209.23, Sec. 331.1
5-2	FSH 2409.15, Sec. 51, Sec. 41, 42 & 43
5-2	"Brushland Management" EIS, 1972 "Vegetation Management for Reforestation" Draft 1987
5-3	FSH 2521
5-3	FSM 2526
5-3	R-5 FSH 2209.23, Sec. 221
5-3	R-5 FSH 2209.23, Sec. 234.7
5-3	R-5 FSH 2409.15, Sec. 51.43
5-3	R-5 FSH 2409.15, Sec. 51.61
5-3	"Brushland Management" EIS, 1972

BMP Number	References
5-3	"Vegetation Management for Reforestation" Draft 1987
5-4	R-5 FSH 2209.23, Sec. 500
5-4	FSH 7709.56, Sec. 4
5-4	FSH 7709.56, Sec. 5
5-4	FSM 2240.2
5-4	FSM 2240.3
5-4	FSM 2405.13
5-4	"Brushland Management" EIS, 1972
5-4	"Vegetation Management for Reforestation" Draft 1987
5-5	R-5 FSH 2209.23
5-5	R-5 FSH 2209.23, Sec. 232
5-5	-5 FSH 2209.23, Sec.322
5-5	R-5 FSH 2209.23, Sec. 331.1
5-5	"Brushland Management: EIS, 1972
5-5	"Vegetation Management for Reforestation" Draft 1987
5-6	FSM 2521
5-6	R-5 FSH 2209.23
5-6	"Brushland management EIS, 1972
5-6	"Vegetation Management for Reforestation" Draft 1987
5-7	R-5 FSH 2209.23
5-7	R-5 FSH 2209.23, Sec. 331.14
5-7	FSM 2472.31
5-7	"Brushland Management" EIS, 1972
5-7	"Vegetation Management for Reforestation" Draft 1987
5-8	FSH 1909.15
5-8	FSH 2109.11, Sec. 93
5-8	FSM 2150, 2151
5-8	FSM 2150.3
5-8	FSM 2151
5-8	FSM 2153.2, 2153.2, 2155
5-8	FSM 2155
5-8	FSM 2240.2, .1
5-8	FSM 2243.32 - 34
5-8	FSM 2243
5-8	FSM 2257-9
5-8	FSM 2501
5-8	FSM 2502
5-8	FSM 2503
5-8	FSM 2504

BMP Number	References
5-8	FSM 2520.3
5-8	FSM 2521.02. -03
5-8	FSM 2521
5-8	FSM 2525
5-8	FSM 2526
5-8	FSM 2527
5-8	FSM 2530, 2532
5-8	FSM 2542
5-8	FSM 2504.1, .2, & .3
5-8	FSM 2530.45
5-8	FSM 2510.41, .42 & .43
5-8	FSM 2521.04b, .04c
5-8	FSM 3403.1
5-8	FSM 3404
5-8	FSM 3421
5-8	FSM 3423
5-8	FSM 3431
5-8	FSM 3433
5-8	FSM 3403.1
5-8	FSM 7443
5-8	FSM 7462.52
5-8	FSH 2109.12
5-8	R-5 FSH 2109.21
5-8	R-5 FSH 2209.23, Sec. 221
5-8	R-5 FSH 2209.23, Sec. 231.15
5-8	R-5 FSH 2209.23, Sec. 231.17
5-8	Pesticide Background Statements Volume 1. Herbicides, August 1984, USDA Forest Service Agriculture Handbook, Number 633
5-8	NFMA
5-8	NEPA
5-9	FSM 2150.3.7
5-9	FSM 2150.3.10
5-9	FSM 2155
5-9	FSM 2243.34, .4, .5
5-9	FSM 2542
5-9	FSM 3403.1
5-9	FSM 3404
5-9	R-5 FSH 2109.21
5-9	R-5 FSH 2209.23, Sec. 231.12
5-9	R-5 FSH 2209.23, Sec. 231.13
5-10	FSH 1909.15
5-10	FSM 2150.3
5-10	FSM 2150.3.9
5-10	FSM 2153.2
5-10	FSM 2155
5-10	FSM 2158
5-10	FSM 2525
5-10	FSM 2530, 2532

BMP Number	References
5-10	FSM 2542
5-10	FSM 3403.1
5-10	FSM 3404
5-10	FSM 3421
5-10	FSM 7443
5-10	R-5 FSH 2109.21
5-10	R-5 FSH 2209.23, Sec. 231.17
5-10	Practice 7 - 6
5-11	FSM 2150.3.4
5-11	FSM 2153.3
5-11	FSM 2155
5-11	FSM 2157
5-11	FSM 2158
5-11	FSM 2542
5-11	FSM 3403.1
5-11	FSM 7443
5-11	FSM 7462.52
5-11	FSH 2109.12
5-11	R-5 FSH 2109.21
5-11	USDA - FS Agriculture Handbook Number 633
5-11	Practice 7 - 4
5-12	FSM 2150-3.7
5-12	FSM 2153.3
5-12	FSM 2155
5-12	FSM 2157
5-12	FSM 2542
5-12	FSM 3403.1
5-12	FSM 3404
5-12	FSM 7462.52
5-12	FSH 2109.12
5-12	R-5 FSH 2109.21
5-12	R-5 FSH 2209.23, Sec. 231.15
5-12	40 CFR 165
5-13	FSM 2153.2
5-13	FSM 2153.20
5-13	FSM 2153.3
5-13	FSM 2155
5-13	FSM 2521
5-13	FSM 2526
5-13	FSM 2527
5-13	FSM 2542
5-13	FSM 3403.1
5-13	FSM 3404
5-13	R-5 FSH 2109.21
5-13	R-5 FSH 2209.23, Sec. 221 & 222.2

BMP Number	References
5-13	USDA-FS Agriculture Handbook Number 633
5-14	FSM 2155
5-14	FSM 3403.1
5-14	FSM 3404
5-14	R-5 FSH 2109.21
5-14	R-5 FSH 2209.23, Sec. 231.11
5-14	R-5 FSH 2209.23, Sec. 231.14
5-14	R-5 FSH 2209.23, Sec. 231.15
5-14	R-5 FSH 2209.23, Sec. 231.17
6-1	"Brushland management" EIS, 1972
6-1	FSH 1909.15
6-1	FSM 1950
6-1	FSM 5100
6-1	FSM 5102
6-1	FSM 5103
6-1	FSM 5140
6-1	FSM 5150
6-1	FSM 5194
6-2	FSM 5140
6-3	FSM 5140
6-4	FSH 5109.32
6-4	FSM 5130
6-4	FSM 5130.3
6-5	FSH 2509.13
6-5	FSM 2523.1
6-5	FSM 5130.3
6-5	FSM 5194
6-6	FSH 2509.13
6-6	FSM 2523
7-1	FSM 2510.43
7-1	FSM 2512
7-1	FSM 2522.2
7-1	FSM 2522.04b
7-1	NFMA Sec. 219.23e
7-2	Executive Order 11988
7-2	FSH 1909.15
7-2	R-5 FSH 2509.22, Chap. 30
7-2	FSM 2526
7-2	R-5 FSM 2526
7-2	FSM 2527.04b, 04c

BMP Number	References
7-2	FSM 7721.16
7-3	Executive order 11990
7-3	FSM 2471.2
7-3	FSM 2526
7-3	R-5 FSM 2526
7-3	FSM 2527.04b, 04c
7-3	R-5 FSM 2532
7-3	R-5 FSH 2509.22, Chaps. 30 & 40
7-4	TSC B6.34
7-4	FSM 7442
7-4	FSM 7440 R5 SUPP 7400-92-4
7-4	R-5 FSM 7443
7-4	TSC C6.341
7-4	Practice 5-11 & 2-12
7-4	40 CFR 112
7-4	FSH 6309.32 (FAR), Landscape Preservation
7-4	Executive Order 12856
7-4	State Above Ground Petroleum Storage Act of 1995, Chap 6.67, California State Health and Safety Code
7-5	FSH 2709.11
7-5	FSM 2703
7-5	FSM 2716.3
7-5	FSM 2713.3
7-5	FSM 2772.1
7-5	FSM 2709.11, Chap. 50
7-5	FSM 2721.61c
7-6	FSM 1922.7
7-6	FSM 2532
7-6	R-5 FSM 2532
7-6	FSM 2355.05
7-6	36 CFR 261.9e, .52, .53e, .58 & .56
7-7	Executive Order 11644
7-7	Executive Order 11989
7-7	36 CFR 261
7-7	FSM 2542.2
7-7	R-5 FSM 7731.4
7-8	FSM 2431
7-8	R-5 FSH 2509.22, Chap. 20
7-8	NEPA Sec. 1508.25 (a) & (c)
8-1	FSM 2210
8-1	FSM 2250
8-1	R-5 FSM 2526

BMP Number	References
8-1	36 CFR 222
8-1	FSH ID 2209.13-96-1
8-1	R5-EM-TP-004
8-2	FSM 2230
8-2	FSM 2240
8-2	FSM 2250
8-2	FSH 2209.13
8-2	36 CFR 222
8-2	R5-EM-TP-004
8-3	R-5 FSM 2526
8-3	FSM 2230
8-3	FSM 2240
8-3	FSM 2250
8-3	R5-EM-TP-004

14 MANAGEMENT AGENCY AGREEMENT BETWEEN THE STATE WATER RESOURCES CONTROL BOARD, STATE OF CALIFORNIA AND THE FOREST SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE.

This Management Agency Agreement is entered into by and between the State Water Resources Control Board, State of California (State Board), and the Forest Service, United States Department of Agriculture (Forest Service), acting through the Regional Forester of the Pacific Southwest Region, for the purpose of carrying out portions of the State's Water Quality Management Plan related to activities on National Forest System (NFS) lands.

WHEREAS:

1. The Forest Service and the State Board mutually desire:
 - a. To achieve the goals in the Federal Water Pollution Control Act, as amended;
 - b. To minimize duplication of effort and accomplish complementary pollution control programs;
 - c. To implement Forest Service legislative mandates for multiple use and sustained yield to meet both long- and short-term local, state, regional, and national needs consistent with the requirement for environmental protection and/or enhancement; and
 - d. To assure control of water pollution through implementation of Best Management Practices (BMPs).
2. The State Board and the Regional Water Quality Control Boards are responsible for promulgating a Water Quality Management Plan pursuant to the Federal Water Pollution Control Act, Section 208, and for approving water quality control plans promulgated by the regional Water Quality Control Boards pursuant to state law. Both types of plans provide for attainment of water quality objectives and for protection of beneficial uses.
3. The State Board and the regional Water Quality Control Boards are responsible for protecting water quality and for ensuring that land management activities do not adversely affect beneficial water uses.
4. Under Section 208 of the Federal Water Pollution Control Act, the State Board is required to designate management agencies to implement provisions of water quality management plans.
5. The Forest Service has the authority and responsibility to manage and protect the lands, which it administers, including protection of water quality thereon.
6. The Forest Service has prepared a document entitled "Water Quality Management for National Forest System Lands in California" (hereafter referred to as the Forest Service 208 Report), which describes current Forest Service practices and procedures for protection of water quality.

7. On August 16, 1979, the State Board designated the Forest Service as the management agency for all activities on NFS lands effective upon execution of a management agency agreement.

NOW, THEREFORE, the parties hereto agree as follows:

1. The Forest Service agrees:
 - a. To accept responsibility of the Water Quality Management Agency designation for NFS lands in the State of California.
 - b. To implement on NFS lands statewide the practices and procedures in the Forest Service 208 Report.
 - c. To facilitate early State involvement in the project planning process by developing a procedure which will provide the State with notification of and communications concerning scheduled, in-process, and completed project Environmental Assessments (EAs) for project that have potential to impact water quality.
 - d. To provide periodic project site reviews to ascertain implementation of management practices and environmental constraints identified in the environmental document and/or contract and permit documents.
 - e. To review annually and update the Forest Service documents as necessary to reflect changes in institutional direction, laws and implementation accomplishment as described in Section IV of the Forest Service 208 Report. A prioritization and schedule for this updating is provided in Attachment A to this agreement.
 - f. That in cases where two, or more BMPs are conflicting, the responsible Forest Service official will assure that the practice selected meets water quality standards and protects beneficial uses.
 - g. That those issues in Attachment B to this agreement have been identified by the State and/or regional Boards as needing further refinement before they are mutually acceptable to the Forest Service and the State Board as BMPs.
2. The State Board Agrees:
 - a. The practices and procedures set forth in the Forest Service 208 Report constitute sound water quality protection and improvement on NFS lands, except with respect to those issues in Attachment B. The State and Regional Boards will work with the Forest Service to resolve those issues according to the time schedule in Attachment B.
 - b. That Section 313 of the Federal Water Pollution Control Act mandates federal agency compliance with the substantive and procedural requirements of state and local water pollution control law. It is contemplated by this agreement that Forest Service reasonable implementation of those practices and procedures and of this agreement will constitute compliance with Section 13260, subdivision (a) of Section 13263, and subdivision (b) of Section 13264, Water Code. It is further contemplated that these provisions requiring a report of proposed discharge and issuance of waste discharge requirements for nonpoint source discharges will be waived by the Regional Board

pursuant to Section 13269, Water Code, provided that the Forest Service reasonably implements those practices and procedures and the provisions of this agreement. However, waste discharges from land management activities resulting in point source discharges, as defined by the Federal Water Pollution Act, will be subject to NPDES permit requirements, since neither the State Board nor the Regional Board has authority to waive such permits.

- c. That implementation will constitute following the Implementation Statement, Section I of the Forest Service 208 Report.

3. It is mutually agreed:

- a. To meet no less than annually to maintain coordination/communication, report on water quality management progress, review proceeding under this agreement, and to consider revisions as requested by either party.
- b. To authorize the respective Regional Boards and National Forests to meet periodically, as necessary, to discuss water quality policy, goals, progress, and to resolve conflicts/concerns.
- c. That the development and improvement of BMPs will be through a coordinated effort with federal and state agencies for adjacent lands and areas of comparable concern.
- d. To meet periodically, as necessary, to resolve conflicts, or concerns that arise from and are not resolved at the Forest and Regional Board meetings. Meetings will be initiated at the request of either party, a National Forest, or a Regional Board.
- e. To coordinate present and proposed water quality monitoring activities within, or adjacent to the National Forests and to routinely make available to the other party any unrestricted water quality data and information; and to coordinate and involve one another in subsequent/continuing water quality management planning and standard development where appropriate.
- f. That nothing herein will be construed in any way as limiting the authority of the State Board, or the Regional Boards in carrying out their legal responsibilities for management, or regulation of water quality.
- g. That nothing herein will be construed as limiting, or affecting in any way the legal authority of the Forest Service in connection with the proper administration and protection of NFS lands in accordance with federal laws and regulations.
- h. That this Agreement will become effective as soon as it is signed by the parties hereto and will continue in force unless terminated by either party upon ninety (90) days notice in writing to the other of intention to terminate upon a date indicated.

IN WITNESS WHEREOF, the parties hereto, by their respective duly authorized officers, have executed this Agreement in duplicate on the respective dates indicated below.

*FOREST SERVICE
U.S. DEPARTMENT OF
AGRICULTURE*

*STATE WATER RESOURCES
CONTROL BOARD
STATE OF CALIFORNIA*

By: Zane G. Smith
Regional Forester
Pacific Southwest Region
Date: March 17, 1981

By: C. Whitney
Executive Director
Date: February 26, 1981

By: Jeff M. Sirmon
Regional Forester
Intermountain Region
Date: April 01, 1981

By: James F. Torrence
Regional Forester
Pacific Northwest Region
Date: May 26, 1981

Attachment A

Schedule for Completing the BMPs
Revised DD/DD/YY at Annual Meeting

Priority Date (FY)

Best Management Practice

Completion

(Practices to be revised, updated and or developed are identified each year at annual meetings and added to the Management Agency Agreement with a priority and expected date of completion)

Attachment B

Schedule for Resolving Regional Board Issues
Revised DD/DD/YY at the Annual Meeting

Regional Board

Issue

Completion Date (FY)

(Regional Board issues that require time, actions and or subsequent meetings beyond the annual meeting discussions are identified here at each annual meeting. The Regional Board is identified, the issue to be worked on is described, and on the expected completion date is documented.)

15 BEST MANAGEMENT PRACTICE EVALUATION PROCESS

This section identifies the process for evaluating implementation and effectiveness of BMPs in attaining water quality goals and objectives, the processes for data storage and retrieval, and the evaluation results reporting requirements. The section details the monitoring to be accomplished and establishes responsibility.

The objectives of the monitoring, evaluation and reporting actions are to:

1. Serve as an agency quality control medium to determine how well BMPs are being applied and how well the practices protect water quality.
2. Serve as the feedback loop for the region's water quality management program strategy to identify:
 - a. those BMPs that are in need of improvement
 - b. those practices that need to be developed
 - c. those water quality standards, goals and objectives that need to be revised and or developed
3. Fulfill Forest Land and Resource Management Planning water quality monitoring commitments.
4. Develop a record of performance, which demonstrates the ability to control nonpoint source pollution on NFS lands in the PSW Region.

15.1 Evaluation Process

The process for determining BMP effectiveness is comprised of three primary components:

- a. Administrative Evaluations
- b. On-Site Evaluations and
- c. In-Channel Evaluations.

15.11 Administrative Evaluations

Description: These evaluations are intended to be broad-scale assessments of multiple BMPs at the project level. Evaluations are used to assess those BMP that deal with administrative processes, such as the implementation and effectiveness of the timber sale planning process, as well as those that involve structural or physical measures. Administrative Evaluations are post-project assessments conducted within a project area by individuals or teams. They are a documentation of observed BMP implementation and effectiveness made in conjunction with normally scheduled (on-going) program or project reviews conducted by Forest personnel. These evaluations have subjective components and supplement information obtained from reviews conducted according to other FSM or FSH direction including but not limited to:

- a. FS forms 2400-100, 2400-147, 2400-181 for Timber Sales
- b. FS forms 6300-15, 6300-20 for Road Construction
- c. FS forms 2200-22 for Grazing Allotments
- d. FS form 2400-J for Reforestation
- e. Reports as per FSH R5-2109.21 for Herbicide Application
- f. Reports as per FSH 2509.13 for Emergency Rehabilitation following wildfire

The following lists Administrative Evaluation Forms and the "process" BMP they are used to evaluate. There are six Administrative Evaluation forms, an example is shown as Exhibit 1, Form AE4- Grazing Allotments.

FORM USED	RESOURCES ACTIVITY	BMP (S) EVALUATED BY FORM
AE1	Timber Sales and Roads	1.8, 1.10, 1.12, 1.14, 1.15, 1.17, 1.19, 1.21, 1.22, 2.1, 2.2, 2.3, 2.4,2.5, 2.7, 2.10, 2.16, 2.23, 2.24
AE2	Mining Operations	3.1 - 3.4
AE3	Prescribed Fire	6.2, 6.3
AE4	Range management	8.1, 8.2, 8.3, 8.4
AE5	Activities Under Special Use Permit	7.5
AE6	Watershed Restoration	7.1

Responsibility: Administrative Evaluations are completed by individuals or teams. The personnel conducting the evaluations are commonly the same individuals that participate in Forest program reviews, activity reviews, project reviews, or "plan-in-hand" reviews involving IDT and management team personnel. Selection of the personnel or teams conducting the evaluations will be by the individual(s) responsible for assembling review team cadres, normally the team leader.

Timing: Evaluations will be timed so that the implemented BMPs have been subjected to at least one winter. Optimum timing is the first or second year following implementation.

Location: Evaluations are conducted on the project area, site selection being discretionary. Evaluation sites can be pre-selected during the project planning, layout or implementation phases of a project. Sites can be selected randomly by specialists, project planners, administrators, and line or staff officers; or selected because they are representative examples of standard practices; or because they are representative of a new activity in need of evaluation for quality control purposes.

Evaluations are intended to be a broad scale assessment of multiple BMPs applied for an entire project. Therefore, the unit assessed in completing an evaluation form is the entire project area rather than a specific on-the-ground site within the project area. Observation points within the project area are discretionary on the part of the reviewers.

Methodology: Evaluations are based on the subjective assessment by team members while in the project area, as to how well the prescribed BMP were implemented, and how effective they were in meeting objectives. Form completion is based on field observation and discussion between review team members.

Administrative Evaluation Form AE-4: Grazing Allotments

(BMP 8.1-8.4)

Forest	District	Date	Names and Titles of Reviewers:
Allotment	Kind and Class of Livestock		
Type of Grazing System	Season of use		
Date of Review			
			Form Completed By:

Rating Criteria for Implementation

- 1) Activities exceed requirements of FSM/FSH/LMP/EA/BMP/Stewardship
- 2) Activities meet requirements of FSM/FSH/LMP/EA/BMP/Stewardship
- 3) Minor departure from intent of FSM/FSH/LMP/EA/BMP/Stewardship
- 4) Major departure from intent of FSM/FSH/LMP/EA/BMP/Stewardship

Rating Criteria for Effectiveness

- 1) Improved protection of beneficial uses of water over preproject conditions
- 2) Adequate protection of beneficial uses of water
- 3) Minor (short term or low magnitude negative effect on beneficial uses of water)
- 4) Major (long term or substantial negative effect on beneficial uses of water)

Overall Allotment Evaluation:

Rate Implementation and Effectiveness if "Yes" is marked.

	Yes	No	Implem 1-4	Effect 1-4	Notes/Comments
1) Adequacy of Range Environmental Analysis (REA), Allotment Management Plan (AMP), Grazing Permit, and Annual Operating Plan (AOP) in protecting beneficial uses					
a) Is there an REA? If so give					
B b) Does the REA reflect actual					
MP c) Is there an AMP effect?					
8.1 d) Is there an AOP in effect?					
e) Does the Permit reflect current					
2) Adequacy of control of livestock numbers, distribution and season of use in protecting beneficial uses of					
B a) Range readiness evaluations					
MP b) Stock counts conducted?					
8.2 c) Utilizations					

over

15.12 On-Site Evaluations

Description: On-Site Evaluations are intended to gather representative, objective data at the site of BMP implementation. The evaluations are based on ocular estimates and actual measurements. On-Site Evaluations assess both BMP implementation and BMP effectiveness.

On-Site Evaluations are conducted for only those BMPs to which objective criteria can be applied. Generally, BMPs which involve structural or physical practices lend themselves to this objective evaluation. On-Site Evaluation processes were not developed for BMPs that have monitoring requirements already specified as part of the BMP. The BMPs in this category include: 1.23 - Five Year Reforestation Requirement; 5.10 - Pesticide Application Monitoring and Evaluation; and 6.6 - Emergency Rehabilitation of Watersheds Following Wildfire.

Each On-Site Evaluation requires determination of BMP implementation as well as effectiveness. Evaluations are completed during field investigation. The top portion of each form evaluates implementation, and the lower portion evaluates effectiveness.

There are twenty-nine different On-Site Evaluations that assess individual or groups of closely related BMPs. Evaluation Forms 1 through 7 assess BMPs related to timber management activities and forms 8 through 20 assess engineering related BMPs. Evaluation Forms 21 through 23 assess Recreation BMPs. Form 24 assesses Range Management BMPs. Form 25 assesses Prescribed Fire. Forms 26 and 27 assess BMPs for Mineral Operations, and forms 28 and 29 assess BMPs for Vegetative Management Activities. The following list presents the On-Site forms and the BMPs they evaluate. An example of an On-Site evaluation form is shown as Exhibit 2, Form T2 - Skid Trails.

FORM USED	RESOURCE	BMPs EVALUATED BY
T1	SMZs	1.8, 1.19, 1.22
T2	Skid Trails	1.10, 1.17
T3	Suspended Yarding	1.11
T4	Landings	1.12, 1.16
T5	Timber Administration	1.13, 1.20, 1.25
T6	Special Erosion Control & Revegetation	1.14, 1.15
T7	Meadow Protection	1.18 1.22 5.3
E8	Road Surface, Drainage and Slope Protection	2.2, 2.4, 2.5, 2.10, 2.23
E9	Stream Crossings	2.1
E10	Construction in SMZ, ROW, & Practices on Incomplete Roads	2.9, 2.13, 2.19
E11	Control of Sidecast Material	2.11
E12	Servicing and Refueling	2.12
E13	In-Channel Construction Practices	2.14, 2.15, 2.17
E14	Temporary Roads	2.16, 2.26
E15	Rip-rap Composition	2.20
E16	Water Source Development	2.21
E17	Snow Removal	2.25

E18	Pioneer Road Construction	2.3, 2.8, 2.9, 2.19
E19	Restoration of Borrow Pits & Quarries	2.27
E20	Traffic Control During Wet Periods	2.24, 7.7 and Road Closure

FORM USED	RESOURCE	BMPs EVALUATED BY
R21	Designated Swimming Areas	4.1
R22	Developed Recreation sites	4.3, 4.4-6, 4.9, 4.10
R23	Location of Stock Facilities in Wilder.	4.11
G24	Range Management	8.1, 8.2, 8.4
F25	Prescribed Fire	6.3
M26	Mining Operations	3.1
M27	Common Variety Minerals	3.3
V28	Vegetation Manipulation	5.1, 5.2, 5.4, 5.5, 5.7
V29	Revegetation of Surface Disturbance	5.4

Responsibility: On-Site Evaluations are conducted by Forest personnel involved in the planning or administration of the indicated management activities, or by watershed specialists. For example a District Recreation Technician or Resource Officer would normally be responsible for completing On-Site Evaluation R22, which evaluates effectiveness of BMP employed at developed recreation sites. A design engineer or engineering technician would normally be responsible for conducting an evaluation of a road reconstruction project, using On-Site Evaluation E8, which evaluates Road Surface, Drainage and Slope Protection. The Forest Hydrologist is responsible for the selection of evaluation sites, program quality control, data storage and retrieval, and the analysis and reporting of results.

Timing: In all cases, implementation ratings are completed before the effectiveness observations and measurements are conducted.

The majority of the evaluations must be timed such that implemented practices have been exposed to seasonal hydrologic events, which frequently determine the effectiveness of BMPs, but before effectiveness might be masked by site recovery. On-Site evaluations are, therefore, generally conducted after the implemented BMPs have been subjected to at least one but normally not more than two winter seasons.

The exceptions are the BMPs that must be evaluated at the time of Implementation. The forms that must be completed during the conduct of the activity are:

- 1) T-5 - Timber Sale Administration,
- 2) R-13 - In-Channel Construction Practices,
- 3) R-12 - Servicing and Refueling, and
- 4) R-17 - Snow Removal.

In addition, the determination of hydrophobic soils for Evaluation F-25 - Prescribed Burning must be conducted prior to a winter. Proper timing for each Evaluation Form is discussed in the R-5 BMPEP User's Guide.

Frequency:

Each Forest is responsible for conducting prescribed number of On-Site evaluations each year. The number is set each year by the Regional Office. Evaluations will be conducted on projects

which are representative of the activities on each Forest, and activities where BMP implementation and effectiveness is of the greatest concern.

Additional evaluations for compliance with Forest Land and Resource Management Plan and activity or project requirements may also be undertaken.

Location:

- a. Random Sites: On-Site Evaluations are intended to produce objective, representative data from sites which are monitored, therefore, sampling points are selected in a systematic random manner to reduce sampler bias. The R-5 BMPEP Users Guide describes random methods for sample site location and describes methods for locating specific points for data collection. Data from randomly selected sites are the data consolidated to run statistical tests of BMP implementation and effectiveness.
- b. Selected Sites Used in Analysis: BMPs infrequently employed must be 100% sampled to obtain a sample population of sufficient size to conduct statistical analysis. Therefore, all applications of the following BMPs are evaluated.
 - 1) T7: Meadow Protection
 - 2) E13: In-Channel Construction Practices
 - 3) E18: Pioneer Road Construction
 - 4) E19: Restoration of Borrow Pits and Quarries
 - 5) M27: Common Variety Minerals
 - 6) R21: Designated Swimming Areas
- c. Selected Sites Not Used in Statistical Analysis: There are cases where non-random sample locations are selected to collect implementation or effectiveness data for purposes other than statistical analysis. They are:
 - 1) Pre-selection during project planning used to program On-Site Evaluations where the results are of special interest or concern to managers. Pre-selection may occur in, but is not limited to, situations where there is a need to respond to negotiated settlement requirements or where actions are occurring in sensitive areas where the need to protect water quality is critical. Sites selected in this manner are identified as non-random during data entry, and not included with randomly selected sites during data analysis. The data can be of great value in assessing BMP performance on projects or activities of particular concern or interest.
 - 2) Management review sites used to document On-Site evaluations during the normal conduct of on Forest reviews such as; "plan-in-hand," activity, program or project reviews. Such documentation may or may not include evaluating both implementation and effectiveness. Again, sites selected in this manner are identified as non-random during data entry, and are not included with randomly selected sites during data analysis. The use of On-Site forms and the data storage and retrieval system provide an excellent mechanism to capture information on BMP implementation and or effectiveness. It also affords the opportunity for Forests to expand their implementation and or effectiveness data population for subsequent on Forest analysis.
 - 3) In-Channel Evaluation Follow-Up Sites - used to document the cause of nonpoint problems where In-Channel Evaluation indicates that water quality objectives are not being met. Where the results of an In-Channel Evaluation indicate that beneficial uses

were not protected, On-Site evaluations are initiated at the problem site(s) in the upstream project area. Project area investigation and identification of nonpoint source origin define the location for up-stream On-Site Evaluations. This is another type of non-random site selection. Sites selected in this manner are identified as non-random during data entry and are not used during statistical analysis. They are extremely important in documenting the causes of nonpoint pollution in conjunction with In-Channel Evaluations. Further explanation of sample locations for In-Channel Follow-Up Evaluation sites is given in this handbook, and in the R-5 BMPEP Users' Guide.

Methodology:

Prior to completing the implementation portion of the form in the field, evaluators must become familiar with which BMPs were required for the activity being evaluated. This will require thorough office review of planning, contract and environmental documents prepared for the activity being evaluated before going to the field. Implementation is assessed by completing the top portion of each evaluation form at the project site.

Effectiveness is assessed by making measurements and or ocular estimates at the site of BMP implementation and completing the lower portion of each evaluation form at the activity site. The parameters used in each evaluation were selected to determine how well the objectives specified for each individual BMP are met (see Chapter 12). These criteria have been field tested, and developed to provide consistent and reproducible information.

Evaluators make observations or measurements for each criteria, compare them to a range of possible conditions or outcomes listed on each form and make the appropriate entry on the form. Measurement protocols and definitions of terms used in the evaluations are found in the R-5 BMPEP Users' Guide.

Best Management Practices Evaluation

UTM Coordinates Zone _____
 Easting _____
 Northing _____

FORM TO 2: SKID TRAILS
 (BMP 1.10 & 1.17)

ID# _____
 Selection Code _____

Reviewer(s) _____ Title(s) _____ Date _____ Forest _____ District _____
 Project _____ Unit # _____ Year Logging Occurred _____ T _____ R _____ S _____
 NFS Watershed _____

IMPLEMENTATION

Skid trails comply with FSH standards, and any special EA conditions as they relate to:

a) Location.....	Rating
b) Drainage and Erosion Control.....	_____
c) Width.....	_____
d) Drainage Crossings.....	_____
f) Utilizing endlining (if req. by TSC C.6.422) or other specialized equipment/harvesting methods.....	_____

1 = Exceeds contract/project requirements
2 = Meets contract/project requirements
3 = Minor departure from contract/project requirements
4 = Major departure from contract/project requirements
Rate as NA if criteria not applicable at this site

If any Implementation Rating is "3" or "4", complete the following:

Problem occurred in which phase(s) of the project site evaluation Plan Prescription EA/EIS Contract Layout Administration

Describe deficiencies and corrective actions:

EFFECTIVENESS

<p>1) GROUND DISTURBANCE <input type="checkbox"/> Skid trails disturb less than 10% of unit</p> <p>2) EROSION AND SKID TRAIL SURFACE <input type="checkbox"/> Little or no evidence of rills</p> <p>3) RUTTING <input type="checkbox"/> Little or no evidence of rutting</p> <p>4) WATERBARS</p> <p>A) DIVERSION OF RUNOFF <input type="checkbox"/> < 10% of waterbars fail to divert flow off of skid trail</p> <p>B) SEDIMENT BELOW OUTLET <input type="checkbox"/> Sediment deposition absent or does not extend beyond outlet control</p> <p>C) EROSION BELOW OUTLET <input type="checkbox"/> No evidence of rills or gullies</p> <p>D) SEDIMENT TO CHANNEL <input type="checkbox"/> No evidence of transport to SMZ</p>	<p><input type="checkbox"/> skid trails disturb > 10% but < 15% of unit</p> <p><input type="checkbox"/> Rills present, but occur on < 20% of skid trail surfaces</p> <p><input type="checkbox"/> Some rutting present, but < 10% of area has ruts >2" deep</p> <p><input type="checkbox"/> > 10% but < 20% of waterbars fail to divert flow off skid trails</p> <p><input type="checkbox"/> Sediment deposition evident but does not extend > 20' below waterbar outlet</p> <p><input type="checkbox"/> Rills present, but < 20' long or occur on <20% of waterbar outlets</p> <p><input type="checkbox"/> Sediment deposition in SMZ but not in channel</p>	<p><input type="checkbox"/> Skid trails disturb > 15% of unit</p> <p><input type="checkbox"/> > 20% of surface has rills, or rills present that are > 2" deep and > 10' long</p> <p><input type="checkbox"/> >10% of surface length has ruts >2" deep</p> <p><input type="checkbox"/> > 20% of waterbars fail to divert flow from skid trail</p> <p><input type="checkbox"/> Sediment deposition extends > 20' below waterbar outlets</p> <p><input type="checkbox"/> Rills > 20' long or occur on > 20% of waterbar outlets</p> <p><input type="checkbox"/> Evidence of sediment transport to or deposition in channel</p>
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over

Best Management Practices Evaluation

FORM TO 2: SKID TRAILS (Page 2)

(BMP 1.10 & 1.17)

EFFECTIVENESS *(continued)*

FOR SITES WITH STREAM CROSSINGS:

5) SEDIMENT TO CHANNEL: STREAM CROSSING RILLING

___ Rills may be evident, but are infrequent appear stable, with no evident sediment delivery to channel

___ Rills present, but average less than 1 per 5' lineal, rills not enlarging. Minimal evidence of deposition in channel. No gullies

___ Numerous rills present (> 1 per 5' lineal) apparently active or enlarging, evidence of delivery to channel, or gullies present

If poor effectiveness is evident, comment on:

(1) Possible causes *(e.g., site sensitivity, inadequate BMP prescription, major storm event, etc.)*:

(2) The degree and duration of effects on beneficial uses of water:

In-Channel Evaluations

Description:

The purpose of In-Channel Evaluations is to assess the cumulative result of multiple BMPs planned and implemented on a project. Measurement of parameters representative of beneficial uses of concern are the basis of the assessment.

These evaluations are objective in nature, and monitor condition or changes in parameters indicative of the physical, chemical or biological nature of a channel. Parameters that are indicative of the most sensitive beneficial use of concern are selected for measurement. A Monitoring Plan is developed for each In-Channel Evaluation that describes the evaluation objectives, data collection requirements and parameters, analytical techniques, and decision criteria (hypothesis) determining the result of the BMPs, in aggregate, in protecting the identified beneficial use. The In-Channel Monitoring Plan sets forth the hypothesis to be tested, specifying a confidence level, as well as acceptable limits of change in the parameter(s) selected. Requirements for Monitoring Plan development are provided in section **** of the R-5 BMPEP Users' Guide.

Where In-Channel data analysis indicates beneficial uses have not been protected, "Follow-up" investigation is initiated to assess the cause of water quality degradation. Follow-up investigations are conducted using the On-Site Evaluation forms. A survey is conducted of the entire upstream activity area and the nonpoint source problem site(s) is identified and an On-Site Evaluation form is completed at the identified site(s) to document the cause of the problem. Specifications for the survey, and responsibility for the evaluations, is described in the Monitoring Plan.

Responsibility:

In-Channel Monitoring Plans are typically developed by watershed specialists in consultation with other Forest resource specialists, approved by the appropriate line officer. The planned monitoring actions are carried out by specialists, technicians, or other personnel who have received technical training from the specialist coordinating the Plan.

Timing:

Each In-Channel Monitoring Plan will specify when data collection will begin and the duration of the sampling. During plan development, consideration will be given to the optimal timing of sampling for each parameter included in the plan. Access during periods of poor weather will be considered during selection of parameters to be measured.

Each plan will also specify the time frame for follow-up investigation to determine the site-specific causes of degradation in those cases where In-Channel Evaluation analysis shows selected beneficial use protection objectives have not been met.

Frequency:

The number of In-Channel Evaluations planned or ongoing at any one time is at the discretion of Forest personnel. As a minimum, at least one In-Channel Evaluation will be ongoing each year on each Forest.

The frequency and number of samples collected is specified in the Monitoring Plan. Determination of sampling frequency is based primarily on the methods selected to sample those parameters. This determination is based on the objectives of the plan, the monitoring strategy, and the parameters and watershed(s) selected for monitoring.

Follow-up investigations using On-Site Evaluation forms will be conducted in all cases where water quality protection objectives are not met.

Location:

Each Forest will determine which watersheds and projects are most suitable and desirable for in-channel monitoring. Normally Forests should concentrate In-Channel Evaluations on practices, activities or in watershed types that are of most concern to the forest. Selection of the activity or watershed for the In-Channel Evaluation will be the result of interaction between line officers, specialists, project planners and those implementing the projects. The activity or watershed selected should represent a key management or water resource concern(s) on the Forest.

Location of sample sites and sample points at those sites is a key element of each In-Channel Monitoring Plan. Sample units can range from watersheds, to streams, to stream reaches, to individual pools or riffles. The selection of the appropriate sampling unit must be carefully considered and will be a function of the plan objectives. Determination of sample point locations is site-specific, and is made during preparation of the In-Channel Monitoring Plan. Location of sampling sites will be the result of assessing the natural features and characteristics of the site, access during the period of sampling, specific requirements of the parameters measured, the sensitivity of the site to changes in the selected parameter(s), influences from other unrelated activities within the watershed and other factors. Selection of specific sample points at the sites is best done in a random fashion, and is based on the variability and characteristics of the parameter measured and the sample unit selected for analysis. Additional guidance on sample site and sample point selection is provided in the R-5 BMPEP Users' Guide.

Follow-up investigation to identify causes of nonpoint source degradation is conducted on two levels. The first is a general survey of the entire activity area. Emphasis is given to surveying areas considered most sensitive, and BMPs believed to have the highest risk of failure. The second step is to conduct On-Site Evaluations at all problem sites identified during the activity area survey.

Methodology:

In-Channel monitoring involves measurement of parameters selected as indicators of the condition of the selected beneficial uses(s) of concern. Selected parameters are generally compared using one of three strategies:

- 1) comparison between "treated" and "control" stations (above/below project or paired watershed methods);
- 2) comparison of parameters before, during and following the project, or
- 3) a combination of the two approaches.

Data is used to test the hypothesis that the compared stations, using the selected parameters, are not significantly different.

On-Site Follow-Up Investigation is conducted only when data from an In-Channel Evaluation indicates beneficial use protection objectives have not been met. Sample sites are located as described above. Evaluations are conducted using the On-Site Evaluation Forms and protocols described in this handbook, and the R-5 BMPEP Users' Guide. Sites evaluated in these cases are identified as non-random On-Site Evaluations during data entry.

15.2 Data Storage and Retrieval

A Best Management Practice Data Base (BMPDB) management program has been developed in the computer system for storage and retrieval of data collected during the conduct of On-Site Evaluations. Electronic data entry forms mimic the paper forms. Entered data will reside in a "Table" in Oracle. The table will be automatically created as Forests enter data and will contain all the On-Site Evaluation data collected that year. The Regional Office will create a table each year that will contain all data collected Regionwide. Sort routines and algorithms built into the program facilitate the analysis of stored data and determinations as to the extent of successful implementation and effectiveness of BMP. The R-5 BMPEP Users' Guide details the use of the BMPDB.

The type and structure of entered data are, of necessity, inflexible. Naming conventions and allowable entries are established, to enable meaningful comparisons between evaluations. Refer to the Users' Guide before and during collection and entry of data.

Responsibility:

The Regional Forester is responsible for updating and maintenance of the BMPDB systems commensurate with Computer system updates, incorporating the BMPDB into the Forest Service Integrated Database (IDB), and the consolidation and summarization of all forest data on a yearly basis.

The Forest Supervisor will be responsible for entry of all collected data in the ORACLE-Based BMPDB system; and for generating standard summary reports, and for electronic transfer of Forest level data to the regional Office.

- 1) All On-Site field data collected will be stored in the Forest Service Computer System in accordance with the R-5 BMPEP Users' Guide.
- 2) Evaluators will provide the completed evaluation forms and related information to Forest Hydrologist.

The Forest Hydrologist will be responsible for: electronic data entry into the BMPDB; generation of standard summary reports; interpreting data summary reports and preparing interpretive reports for the Forest Supervisor and management team; yearly transmittal of the Forest BMPDB file to the Regional Office; maintenance of paper records in a dedicated file that will allow for evaluated sites to be resurveyed and retain related information relevant to the evaluation (maps, photos, project documentation, and so forth); retain a continuing data record in storage on the Forest's Computer system.

15.3 REPORTING

15.31 Types of Reports

Forest reports - will be developed by each Forest to document the results of both BMP implementation and BMP effectiveness. Reports will be forwarded to the Regional Office Range and Watershed Management Staff by January of each year. At the minimum the report will include:

1. Administrative Evaluation A narrative which documents the number of reviews conducted, the types of activities evaluated, problems and successes identified, and actions to be undertaken to reaffirm successes and resolve problems.
2. On-Site evaluation
 - a. Computer generated reports developed utilizing the standard algorithms specified in the R-5 BMPEP Users' Guide for the analysis and tabulation of data.
 - b. Interpretive narrative that quantifies the results of implementation and effectiveness analysis and describes the causes for failures and or successes.
3. In-Channel evaluations
 - a. Ongoing Evaluations
 - 1) Specify the number of In-Channel Evaluations being conducted. For each one, describe its objective and hypothesis being tested, indicator parameters being assessed and their relevancy as an indicator of the selected beneficial use(s). Describe the intended duration of evaluation.
 - 2) Quantitatively and/or qualitatively describe the results/findings to date in regard to protecting the identified beneficial use(s). Describe any natural or man caused events that may influence the final results and any modifications made to the original monitoring plan to compensate for these influences.
 - 3) Reference previously concluded In-Channel evaluations and the relevancy of the on-going evaluations and preliminary results to the results from the concluded evaluations.
 - b. Evaluations Concluded
 - 1) For evaluations concluded during the reporting year, discuss results in terms of; natural or man caused events that influenced results, meeting objectives and accepting or rejecting the test hypothesis.
 - 2) Discuss the credibility of the selected parameters monitored as proxies for identified beneficial use(s) protection indicators.

c. Evaluations Planned

- 1) Identify Monitoring Plans to be developed for following year and the schedule for development and implementation.

Regional Report will be developed using Forest input that document the results of Administrative, On-Site and In-Channel evaluations on a Region-wide basis. The region-wide report will be distributed by March each year. At a minimum the report will include:

On-Site

1. Discussion and quantitative results for each of the BMP resource categories of the extent of successful BMP implementation region-wide, and the identification of those practices where implementation is in need of improvement. Rational will be presented as to why implementation is not being accomplished.
2. Discussion and quantitative results for each of the BMP resource categories of the extent of effective BMP and the identification of those practices found to be ineffective. Rational will be presented as to why the practices were not effective.

In-Channel

1. Summarize the ongoing evaluation input received from Forests identifying the number of ongoing In-Channel Evaluations being conducted Region-wide and describe the objectives and hypothesis being tested, types of indicator parameters being assessed and the rational for their use as beneficial use protection indicators.
2. Summarize and narratively describe the results/findings of completed in-channel Evaluations in regard to protecting the identified beneficial use(s) referencing previously concluded In-Channel Evaluations as a base of comparison.

15.32 Action Plan

Action plans will be prepared that respond to noted deficiencies with BMP implementation and effectiveness and/or beneficial use protection.

Forests

1. Forests will develop an action plan to respond to On-Site Evaluation identified deficiencies in either BMP implementation or BMP effectiveness where the cause for deficiency is within the Forest's ability to initiate corrective action.
2. An action plan will also be developed where In-Channel Evaluation results show objectives have not been met, and follow-up investigation applying On-Site Evaluations have identified problem causes.

Action Plans will include but not be limited to:

- a. Identification of the action(s) to be taken
 - b. Identification of the staff/individual responsible for taking the action(s)
 - c. Identification of the time frame within which action(s) are to be taken
 - d. Identification of funding needs and sources as appropriate to fulfill identified actions
 - e. Identification of the staff or individual responsible for assessing whether the actions were accomplished by the assigned individual(s) within the time frame specified.
3. Forests will document BMP implementation and/or effectiveness deficiencies that need to be resolved at the Regional level (research needs, practice improvement, practice development voids, standards or objectives refinement, etc.) and transmit the needs to the Range and Watershed Management Staff in the Regional Office.
 4. Forests will develop an action plan to respond to In-Channel Evaluations that indicate beneficial uses are not protected, or that we are not meeting the objectives established for the evaluation.

Regional Office

1. The Regional Office Range and Watershed Management Staff will develop an action plan that responds to implementation and/or effectiveness deficiency needs forwarded from the Forests that require resolution at the Regional level.

Action Plan will include:

- a. Identification of actions to be taken
- b. Identification of parties to be involved and/or responsible for actions
- c. Identification of time frames within which actions are to be taken
- d. Identification of funding needs and sources necessary to fulfill the identified actions.

15.33 Distribution of Reports

Forest reports and action plans will be provided to the Forest Supervisor, Watershed Staff Officer and other Staff Officers administering each of the BMP resource categories.

Regional reports will be provided to the Washington Office Watershed and Air Management Staff, Regional Forester, the Watershed Director, the other staff directors administering each of the BMP resource category programs, Forest Supervisor, the State Water Resources Control Board's and the EPA's Nonpoint Source Pollution administrators.