

INTRODUCTION

This document is the Water Quality Management Plan (WQMP) for NFS lands for those portions of the Pacific Northwest Region, the Pacific Southwest Region and the Intermountain Region located within the State of California. It sets forth best management practices (BMPs) to be used for controlling nonpoint source (NPS) pollution originating on those National Forest System (NFS) lands, and the processes for implementing those BMPs. The Forest Service will use these BMPs and processes to comply with provisions of:

1. Federal water quality statutes and regulations, including the Clean Water Act (CWA), the Coastal Zone Act Reauthorization Amendments (CZARA), and the related regulations of the U.S. Environmental Protection Agency (USEPA).
2. California's water quality requirements, including the Porter-Cologne Water Quality Control Act (PCA); water quality control regulations, plans, policies, and program plans approved by the State Water Resources Control Board (SWRCB) pursuant to the foregoing federal and state statutes.

The provisions of this WQMP are designed to conform and comply with these legal requirements. BMPs are the practices both the State and Federal water quality regulatory agencies expect the Forest Service to implement to meet its obligation for compliance with applicable water quality standards, and to maintain and improve water quality.

The Legal Basis for BMPs

Section 208(b)(2)(F)-(K) of the federal Clean Water Act (CWA) requires the development of a State-based process to identify, if appropriate, agricultural, silvicultural and other NPSs of pollution and to set forth procedures and methods, including land use requirements, to control to the extent feasible such sources.

Section 319(a) (1) of the CWA requires each State to:

- Identify its navigable waters which, without additional action to control NPSs, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of the Act.
- Identify those categories of NPSs or, where appropriate, particular NPSs which add significant pollution in amounts which contribute to such navigable waters not meeting water quality standards or the Act's goals and requirements.
- Describe the process, including intergovernmental coordination and public participation, for identifying BMPs and measures, to control those NPSs identified, and to reduce to the maximum extent practicable, the level of pollution from such NPSs.
- Identify and describe State and local programs for controlling pollution added from NPSs to, and improving the quality of, each such portion of the navigable waters, including but not limited to those programs which are receiving Federal assistance under subsection 319(h) and (i).

The State water quality plan should include identification of the process by which NPS controls, including BMPs, are selected to achieve water quality standards. The process should include:

- design of BMPs based on site-specific conditions, technical, economic and institutional feasibility, and the water quality standards of those waters potentially impacted;
- implementation monitoring to ensure that practices are correctly designed and applied;
- effectiveness monitoring to determine: (a) the effectiveness of practices in meeting water quality standards, and (b) the appropriateness of water quality criteria in reasonably assuring protection of beneficial uses; and
- adjustment of BMPs when it is found that water quality is not being protected to a desired level; and/or
- possible adjustment of water quality standards based on considerations in 40 CFR 131.

Once BMPs have been approved by a State, the BMPs become the primary mechanism to control NPS pollution to meet water quality standards within that State. Absent evidence to the contrary, proper installation, operation and maintenance of State-approved BMPs are presumed to meet a landowner's or manager's obligation for compliance with applicable water quality standards. If subsequent evaluation indicates that approved and properly installed BMPs are not achieving water quality standards, the State should take steps to: (1) revise the BMPs, (2) evaluate and, if appropriate, revise water quality standards (designated beneficial uses and water quality objectives), or (3) both of the foregoing. If BMPs are revised, the landowner or land manager is expected to begin implementing the revised BMPs. Through the iterative process of monitoring and adjustment of BMPs and/or water quality standards, it is anticipated and expected that BMPs will lead to achievement of water quality standards (EPA-823-B-94-005a [SAM 32]).

Section 313 of the CWA states that the federal government is subject to and will comply with all Federal, State, interstate and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution in the same manner, and to the same extent as any nongovernmental entity. This means the Forest Service must use NPS controls, including BMPs, approved by the State.

Accordingly, the Forest Service Manual (FSM) directs that BMPs will be used to control NPS pollution related to all management actions with the potential to affect water quality on NFS lands (FSM 2532).

BMPs as a Process

The BMPs in this WQMP are deliberately general and non-prescriptive. They require the development of site-specific prescriptions based on local site conditions requirements to achieve State water quality standards. Watershed specialists (hydrologists, soil scientists, geologists and/or fish biologists), or other trained and qualified individuals, use the applicable techniques suggested herein to develop site-specific BMP prescriptions to be applied to a specific project to protect water, aquatic and riparian resources. These site-specific BMP prescriptions are displayed as mitigation measures, physical design limitations, or specific operating instructions in the project's NEPA documentation. These prescriptions must then be transferred to enforceable language in the project's authorization(s) provisions, contract specifications or building plans. Lastly, the provisions, specifications or plans must be administered on the ground to ensure compliance. Each step in this chain is an essential component of protecting water quality. Implementation failures can usually be traced back to one of these steps.

BMP prescriptions will not always be effective in attaining water quality standards. To account for this, implementation and effectiveness monitoring is included as an essential component of the BMP process. Practices that are identified as ineffective must be modified. Maintenance must also be performed as needed. Maintenance may require work outside of the contract or authorization that originally installed the BMP. BMPs are not designed for any specific storm recurrence interval, and success of BMPs will depend in part on weather as well as implementation. The BMP feedback loop is illustrated in Figure 1.

WQMP Historical Context

The State's Porter-Cologne Water Quality Control Act was chaptered in 1969, augmenting the State Water Resources Control Board (SWRCB) and establishing the nine Regional Water Quality Control Boards (RWQCBs). CWA Section 208 provided authority and funding for states to develop WQMPs¹ and to designate water quality management agencies with primary responsibility for implementing those WQMPs. The WQMPs were to address, among other things, NPS pollution. USEPA promulgated regulations specifying the contents required in a WQMP (including BMPs and the process by which they were to be implemented), the process to be used for WQMP development, and the qualifications required of a management agency (40 CFR, Part 130, Section 130.6).

The PCA authorized the SWRCB to exercise any powers delegated to the states by the Federal Water Pollution Control Act or subsequent amendments². Also, the governor

¹ WQMPs must not be confused with water quality control plans required by the Porter-Cologne Act.

² For the Lake Tahoe Basin, the Tahoe Regional Planning Agency is the designated water quality planning agency. This is the only such designation within NFS lands in California.

Land Use Activity

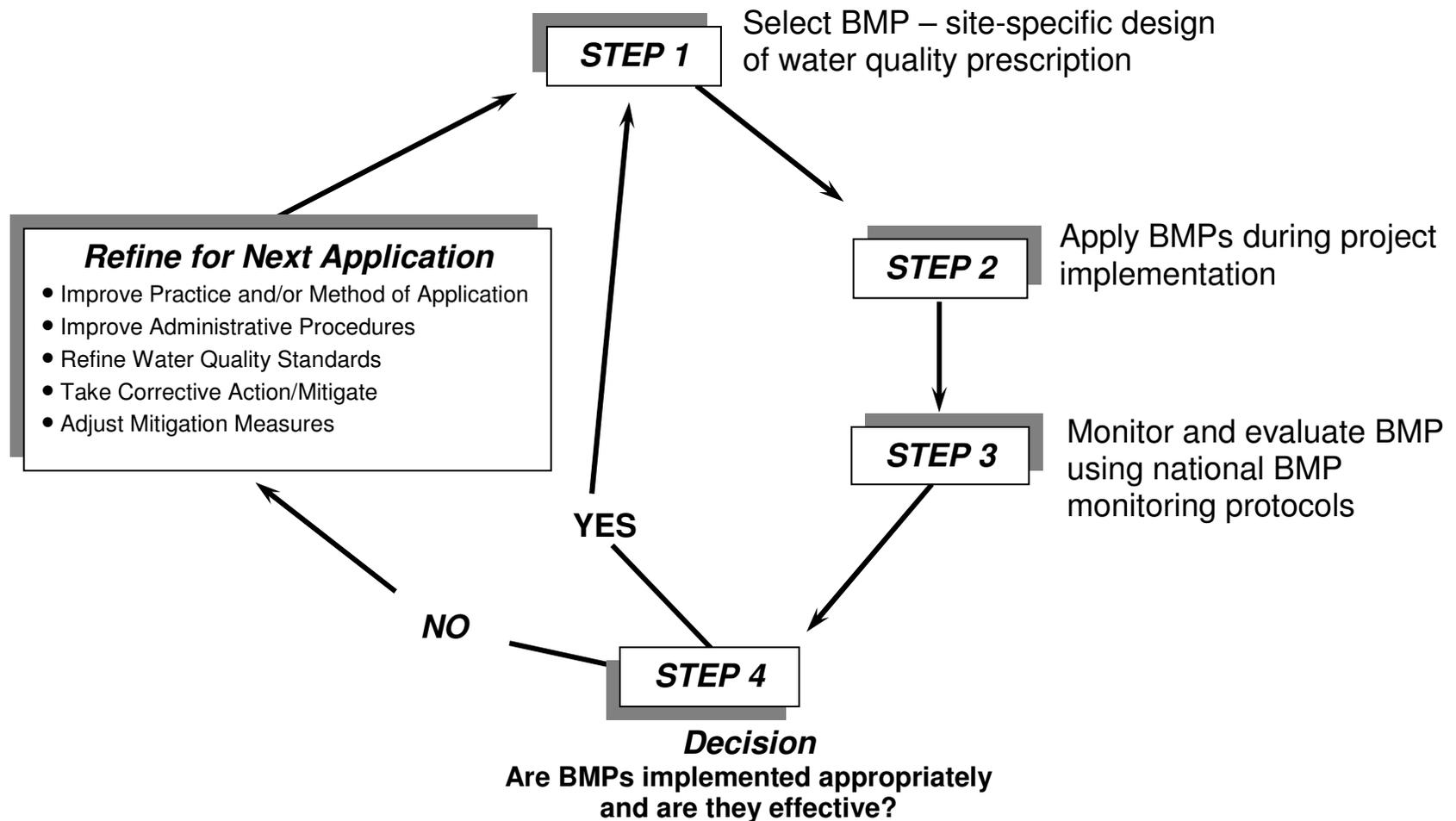


Figure 1: Iterative Process of Non-Point Source Pollution Control

delegated to the SWRCB the authority granted by CWA Section 208 to certify proposed WQMPs for the State. Accordingly, the Forest Service and SWRCB initiated a 208 water quality management planning process for NPS activities on NFS lands in California. The Forest Service, including the Pacific Northwest Region, the Pacific Southwest Region, and the Intermountain Region, drafted a proposed WQMP for NFS lands in California, and it was reviewed by SWRCB. Issues related to CWA Section 303(d) or Federal or State Endangered Species Acts were not on the radar screen and were not addressed.

In 1981, the SWRCB, in accordance with CWA Section 208, took the following actions:

- 1) It certified the document entitled “Water Quality Management for National Forest System Lands in California” as a WQMP;
- 2) It designated the Forest Service (all three Regions) as the management agency with primary responsibility for WQMP implementation; and
- 3) It executed a management agency agreement with the Forest Service, setting forth the latter’s commitment to implementing the WQMP, and expressing the anticipation that RWQCBs would waive imposition of waste discharge requirements under the PCA.

In accordance with USEPA regulations, these SWRCB actions were all submitted to USEPA for approval, which was granted.

For about the next 20 years, things operated largely as anticipated on NFS lands, except that over time both the Water Boards and the Forest Service increasingly neglected application of the WQMP. During that time, Section 319 was added to the CWA to provide funding for implementation of NPS management plans. Congress eliminated funding for implementation of Section 208, and the related USEPA regulations were rescinded. In 1988, SWRCB adopted the “Source of Drinking Water” Policy (SWRCB Resolution 88-63).

The Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 (Section 6217) required affected states to develop NPS control programs for waters that flowed to the ocean. USEPA promulgated “Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (g-Guidance) to implement it, specifying the contents of such plans and requiring implementation of specific “management measures” (mostly performance standards) for silviculture and some other NPSs. USEPA unilaterally listed most North Coast streams as water-quality-impaired pursuant to CWA Section 303(d). Many of these waters are located within, or have headwaters within, NFS lands. A subsequent Consent Decree mandated that the North Coast RWQCB and USEPA calculate Total Maximum Daily Loads³ (TMDLs) for the 303(d)-listed waters in the North Coast region.

In 2000, the Forest Service and Water Boards collaboratively reviewed and revised WQMP’s BMPs. The SWRCB deemed these changes to be administrative and non-substantive, so re-certification of the WQMP was not needed.

³ A conservative estimation of the amount of pollutant that a water body can assimilate and still fully support all designated beneficial uses of water.

Major changes in California's water quality regulatory landscape occurred in the first decade of the 21st century.

1. The Porter-Cologne Act was amended to require that all Water Board waivers of waste discharge requirements be formal, temporary, conditional, and include monitoring as a condition. The North Coast RWQCB adopted a conditional waiver of waste discharge requirements for timber harvesting on NFS lands and is now working on a waiver addressing all NPS activities on NFS lands. Two other RWQCBs adopted conditional waivers for timber harvesting, and one has adopted a waiver for grazing. There are currently no waste discharge requirements or any other waivers addressing other types of activities on NFS lands in California.
2. The SWRCB was, for the first time, authorized to adopt its own waivers, which could be statewide.
3. Pursuant to CZARA and USEPA (g) guidance regulations, SWRCB and the State Coastal Commission adopted, and USEPA approved, California's Nonpoint Source Pollution Control Program (NPS Program Plan), which sets forth "management measures" (mostly performance standards) for silviculture and several other activities that generate NPS pollution⁴. USEPA holds the State accountable for conforming to these management measures.
4. SWRCB adopted the Policy entitled "Implementation and Enforcement of the Nonpoint Source Pollution Control Program" (NPS Policy). It sets forth key elements for a third-party NPS pollution control program that are applicable to this WQMP.
5. SWRCB adopted the Policy entitled "Addressing Impaired Waters: Regulatory Structure and Options". It sets forth alternative ways of meeting TMDL goals.
6. The National Marine Fisheries Service and the State Department of Fish and Game began listing various populations of anadromous salmonids and steelhead trout a threatened or endangered pursuant to the Federal or State Endangered Species Acts, a process that is still continuing. NFS lands harbor much of the remaining habitat and refugia for some of these populations, especially along the North Coast.
7. USEPA and the North Coast RWQCB have calculated sediment and thermal pollution TMDLs (which are the two most common pollutants being discharged from NFS lands), and the RWQCB has been developing TMDL implementation plans.

These many changes indicated that the 2000 WQMP needed to be significantly revised and updated (or replaced), and that the regulatory mechanisms needed to be reconsidered and streamlined. This WQMP is the immediate successor to that WQMP.

⁴ Pursuant to the USEPA (g) guidance regulations for implementing the Coastal Zone Act Reauthorization Amendments, the terms "best management practices" and "BMPs" are no longer used by the State; the word "best" and the "B" have been dropped.

Authorities

Forest Service

As a federal agency, the Forest Service is bound by federal Laws, executive orders, and Department of Agriculture directives, which are the basis for its programs and operations. Federal laws and executive orders of direct and specific application to water quality management include the following:

1. Organic Administration Act of 1897 (16 U.S.C. 475). This law defines original National Forest purposes 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 1960 (16 U.S.C. 528). This law expands National Forest purposes to include watershed, wildlife and fish, outdoor recreation, range and timber. Renewable surface resources are to be managed for multiple use and sustained yield of the several products and services that they provide. The principles of multiple use and sustained yield include the provision that the productivity of the land shall not be impaired.
3. National Environmental Policy Act of 1969 (42 U.S.C. 4321, 4331-4335, 4341-4346, 4346a-b, 4347). This law declares a national policy that encourages a "productive and enjoyable harmony between humans and their environment." All federal agencies, including the Forest Service, are required to use a systematic interdisciplinary approach to planning and decision-making. In addition, the federal agencies are to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment.
4. Environmental Quality Improvement Act of 1970 (42 U.S.C. 4371-4374). 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 (33 U.S.C. 1251, 1254, 1323, 1324, 1329, 1342, 1344). This series of laws establishes goals, policies and procedures for the maintenance and improvement of the Nation's waters. It addresses both point and NPSs 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 NPSs. 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 NPS pollution and also requires development of water quality management plans.
6. The Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (16 U.S.C. 1600-1614). This law 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 1976 (16 U.S.C. 1600-1602, 1604, 1606, 1608-1614). This law amended RPA, emphasizing interdisciplinary involvement in the preparation of land and resource management plans. The law reinforced the concept of multiple use management of NFS lands 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.

SWRCB and Regional Water Quality Control Boards (collectively "Water Boards")

As State agencies, the Water Boards are under mandate by federal laws, USEPA water quality regulation and funding requirements, and state laws that are the basis for their programs and operations. Laws and regulations of direct and specific application to water quality management include the following:

1. Clean Water Act. This law establishes the national program for maintaining, protecting and restoring the quality and beneficial uses of the nation's navigable waters. USEPA has the primary responsibility for implementing this law, and has promulgated extensive regulations for doing so. Both the law and the related USEPA regulations delegate substantial portions of implementation responsibility to the states, especially Sections 208 and 319, which address NPS pollution control. USEPA also required that states adopt a statewide antidegradation policy as a component of their water quality standards (40 CFR, Part 131, Section 131.12). SWRCB's "Policy with Respect to Maintaining High Quality of Waters in California" (SWRCB resolution 68-16) is applied in a manner consistent with the USEPA anti-degradation requirements.
2. Coastal Zone Act Reauthorization Amendments. This law augments the NPS provisions of the Clean Water Act. The SWRCB/Coastal Commission NPS Program Plan was designed to comply with USEPA's (g) Guidance requirements, including incorporation of "management measures" for silviculture and other NPS-generating activities. USEPA has approved this plan, and holds the state accountable for implementing it.
3. Porter-Cologne Water Quality Control Act.
 1. This act mandates the Water Boards to:

- a. Adopt or approve water quality control plans that set forth, on a regional or statewide basis, standards to be attained by the State's waters. These standards must include designated beneficial uses of water, the water quality objectives necessary to maintain those beneficial uses or to prevent nuisance, and an anti-degradation policy (SWRCB Resolution 68-16).
 - b. Promulgate waste discharge requirements (WDRs) or temporary conditional waivers thereof to implement applicable water quality standards.
 - c. Take enforcement actions for violations, or threatened violations, of the PCA, of water quality regulations, of water quality standards or prohibitions set forth in applicable water quality control plans, or of WDRs or waivers.
2. Pursuant to CWA Section 303(d) (and sometimes court orders), the Water Boards use their PCA authority to:
 - a. List water body segments that are failing to attain water quality standards (i.e., where beneficial uses of water are impaired). Many of these are within or have tributaries within, NFS lands, particularly those listed for sediment or thermal pollution.
 - b. Calculate the allowable total maximum daily load (TMDL) of pollutant that the water body segment can assimilate and still attain water quality standards, given a margin of safety.
 - c. Promulgate TMDL implementation plans sufficient to ensure eventual delisting of the water body segment.

These Water Board water quality standards, plans and policies, are all applicable to activities on NFS lands in California.

Related Forest Service Programs

The Forest Service BMPs for NPS control need to be seen within the context of the overall process by which they are implemented (see Section -----), as well as the context of other related Forest Service programs for protecting and improving watersheds, riparian areas, and water quality. This section addresses the latter context.

The USFS is mandated to assess and improve watershed conditions on NFS lands. The Forest Service Watershed Protection and Management Policy (FSM 2520) provides national direction for watershed condition assessment, watershed improvement, emergency burned area response for wildfires, monitoring, riparian area management, floodplain management and wetland protection, emergency watershed protection, and

natural disaster and flood damage surveys. Watershed improvement activities include road decommissioning, meadow restoration, and reforestation of burned areas. The Forest Service is developing a national Watershed Improvement Needs Inventory database to help facilitate this process.

The Forest Service allocates appropriated funds annually to each national forest for watershed improvement projects. Funds are allocated based on watershed condition and priority, including 303(d) status, forest capabilities to successfully implement projects, and planning (NEPA) status. Several other Forest Service funding sources support watershed restoration on national forests, including long-term restoration of burned areas, invasive species removal, fish passage projects associated with forest highways, and legacy roads projects. These funding sources vary from year to year and are integrated with the watershed restoration program.

The National Forests also work in partnership and across Forest boundaries with state agencies, county and local government, local water agencies, and resource conservation districts in Integrated Regional Watershed Management Groups and other resource management programs. Cooperative agreements with volunteer organizations and a variety of grants are used to leverage available resources.

The USFS is required to assess and consider the potential for cumulative watershed effects of proposed activities. The USFS Pacific Southwest Region Cumulative Watershed Effects policy (FSH 2509.22) provides an approach to assessing the potential for cumulative watershed effects related to management activities on NFS lands. The approach uses the Equivalent Roaded Area (ERA) model to make a preliminary assessment of watershed conditions by comparing effects of past, existing, and reasonably foreseeable actions to a watershed threshold of concern. More detailed analyses are required when ERA totals equal or exceed the threshold of concern. Although the policy does not include mitigations, the assessment of potential cumulative watershed effects is included in NEPA analyses and can guide selection of alternatives by decision makers.

The Forest Service Ecological Restoration policy (FSM 2020) requires the USFS to manage NFS lands for ecological resilience, sustainability, and ecosystem services. This directive applies to all program areas and activities. For example, reforestation projects are designed to include a natural mix of species rather than restricting planting to commercially valuable species.

Each national forest is managed under a Land and Resources Management Plan that includes Standards and Guidelines that apply to project activities. As part of the NEPA process, action alternatives are assessed for their compliance with standards and guidelines. No alternative that fails to comply with any applicable standards can be selected by a deciding official in a Record of Decision for an EIS. Two groups of national forests, known as provinces, are managed under provincial standards and guidelines. These provinces are the Northwest Forest Plan forests, which include the Six Rivers, Klamath, and parts of the Shasta-Trinity, Modoc, and Mendocino National

Forests and the Sierra Nevada Framework Planning Amendment forests, including the Lassen, Plumas, Tahoe, Eldorado, Stanislaus, Sierra, Sequoia, Inyo, Lake Tahoe Basin Management Unit, and part of the Modoc. Standards and guidelines for the Northwest Forest Plan and for the Sierra Nevada Framework are available via the internet.

The Northwest Forest Plan and the Sierra Nevada Framework Planning Amendment both include Aquatic Conservation Strategies. These strategies protect aquatic and riparian habitats by limiting resource management activities to those activities that benefit aquatic and riparian resources. Extensive watershed or landscape analyses are required prior to implementing management actions in riparian areas. For example, new roads and landings are generally prohibited in riparian areas. Fuels reduction treatments, however, can be conducted if analysis has shown that the treatment will benefit the riparian zone by decreasing the risks of catastrophic fires.

NPS OVERVIEW

Review of Nonpoint Sources on NFS Lands

A variety of activities occur on NFS lands in California. Some are clearly potential point sources of pollution (e.g., building construction), others are clearly dispersed activities comprising potential NPSs (e.g., wilderness camping), and some are intermediate (e.g., livestock grazing). Some of these are Forest-Service-initiated activities to manage natural resources; others represent Forest Service management of activities of other forest users (e.g., off-highway vehicle use). Some of these activities are very common across NFS lands (e.g., timber harvesting, camping); others are quite infrequent or local in nature (e.g., permitted special uses). It is probably not effective to impose statewide BMPs on the latter types of NPS activities. This WQMP addresses those NPS activities that are relatively common on NFS lands in California and that can be most effectively addressed by some kind of statewide Water Board regulatory mechanism.

The following spectrum of NPS activities was considered in developing this WQMP; those shown in bold were deemed to have the highest priority for immediate BMP updating, both by the public and agency staff.

Timber Management

Biomass Removal
Christmas trees/firewood
Vegetative Conversion
Invasive Species Treatment

Fuels Treatment/Forest Health

Fire Suppression
Post-fire salvage/rehab

Rangeland Management

Restoration Projects
Utility corridors

Forest Roads (all aspects)

Motorized recreation

Off-highway vehicles

Non-motorized recreation
(all types)

In-water recreation
Parking/staging areas

Trails

Campgrounds

Rural Residences

OBJECTIVES AND POLICY

Objectives of This WQMP and Handbook

1. To ensure that, on NFS lands in California, the quality and beneficial uses of water are maintained where they are in good condition, consistent with the federal and State anti-degradation/non-degradation policies, and the principle of conservation biology.
2. To ensure that, on NFS lands in California, the quality and beneficial uses of water are protected from further degradation where they are declining toward being listed as water quality limited pursuant to Clean Water Act Section 303 (d).
3. To make substantial progress toward eventual delisting of water body segments that have been listed pursuant to Clean Water Act Section 303(d) and that are located on, or receiving contributing pollutant discharges from, NFS lands.
4. To remediate legacy sources of pollution on NFS lands in California.
5. To ensure compliance with water quality goals and legal requirements in the most efficient manner.
6. To consolidate direction applicable to BMP use for NPS pollution control on NFS lands in California for the maintenance, protection, and recovery of beneficial uses of water.
7. To establish a uniform process of BMP implementation that will meet the intent of: 1) the Federal and State water quality laws, executive orders, and the United States Department of Agriculture (USDA) directives, and 2) Water Board water quality standards, plans and policies that are applicable to activities on NFS lands in California.
8. To incorporate water quality maintenance, protection, and improvement considerations into the site-specific planning process.
9. To employ a nested monitoring strategy involving different types of monitoring at different geographic scales.
10. To ensure that this WQMP and the implementation thereof are effective in achieving these objectives on NFS lands in California, and where they are not, that the practices and/or implementation processes are refined and adapted as appropriate.
11. To enhance Forest Service performance as a water quality management agency, and increase and improve its responsibility, transparency and accountability in its relationships with the Water Boards.

The first five of these objectives are the performance standards to which the Water Boards hold the Forest Service accountable.

Policy

The Forest Service will comply with the objectives, policies, and procedures of agency directives, handbooks and manual, including, but not limited to, those required in Forest Service Manual (FSM) 2532.

The Forest Service will be responsive, in an ongoing and cooperative manner, to the environmental intent, goals and objectives provided by the Clean Water Act, the Coastal Zone Act Reauthorization Amendments, and related USEPA regulations.

The Forest Service will comply with the State's Porter-Cologne Water Quality Control Act, applicable water quality control plans and policies enacted by the Water Boards, and regulatory mechanisms imposed by the Water Boards.

The following actions will be used to manage water quality on NFS lands in California:

1. Perpetually implement BMPs during current management activities on all NFS lands in California.
 - a. The Forest Service will continually implement these BMPs to minimize impacts of current management activities from NPS pollution. This will involve the following facets:
 - 1) 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.
 - 2) 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.
 - 3) Appropriate BMPs will be properly installed and maintained.
 - 4) An iterative process will be implemented, comprising site-specific identification of treatment and control needs, BMP implementation, monitoring and evaluation, and adaptive management (see Figure 1).
 - 5) Three types of monitoring will be applied to BMPs: 1) statewide programmatic monitoring of BMP implementation and effectiveness, 2) instream BMP validation monitoring in a few selected watersheds, and 3) project-scale instream monitoring where water quality concerns are elevated (see Figure 2).
2. Correct legacy water quality problem sites on NFS lands in California.
 - a. Where, due to past management actions and/or to natural occurrences (e.g., fires and floods), sites are located on NFS lands that are, or have the potential to become, a source of NPS pollution, the Forest Service will act to remediate these legacy sites, insofar as resources and priorities allow.
 - b. Remediation of these legacy sites will involve the following facets:
 - 1) In collaboration with the Water Boards, the Forest Service will identify such sites (or watersheds) on NFS lands in California and prioritize them for remedial action on a statewide basis. This prioritization process will include:
 - a) The condition and sensitivity of the watershed(s) affected.
 - b) Evaluation by appropriate specialists of the need for and type of treatments needed;
 - c) The relative cost-effectiveness of the treatments; and

- d) The type and availability of funding.
- 2) Accomplishment of remediation is dependent on funding, personnel availability, and work priority relative to other management goals and objectives.
 - a) Some remediation projects may be funded by sources focused on specific issues (e.g., roads, grazing, Knutsen-Vandenberh (KV) funds).
 - b) Watershed improvement funds will be used for such work only where no other funding is available to correct the problem.
 - c) The State and Regional Boards will cooperate with the USFS to seek external funding for restoration through the 319 and other grant processes.
3. Protect the quality and beneficial uses of water on NFS lands in California where they are threatened with further degradation.
 - a. Where waters on NFS lands are not yet legally listed as water-quality-limited pursuant to Clean Water Act section 303(d), but their condition is on a trajectory toward that condition, the Forest Service will be proactive in helping to protect those waters from further impairment.
 - b. The protection measures used may include more rigorous implementation of the BMPs set forth herein, more widespread treatment of legacy sites, and/or application of watershed-scale improvements.
4. Contribute to restoration of impaired beneficial uses of water.
 - a. Where waters that are listed as water quality limited pursuant to Clean Water Act Section 303(d), or tributaries that exacerbate the condition causing the listing, are located on or adjacent to NFS lands in California, the Forest Service will be proactive in helping to restore those waters to a condition in which they can be de-listed.
 - b. This will include the following facets:
 - 1) With the Water Boards, collaboratively establish statewide restoration priorities (including, but not limited to, TMDL implementation) for such waters.
 - 2) Evaluate existing legacy sources of pollution, as well as future potential NPSs, to determine the need for restoration and type of enhanced management practices or other treatments that may be necessary.
 - 3) Schedule and prioritize restoration projects as part of regular work planning and budgeting process and work cooperatively to prioritize restoration projects using one-time or short-term non-recurring funds (for example, Legacy Roads).
 - 4) The restoration measures used may include more rigorous implementation of the BMPs set forth herein, application of enhanced BMPS, more widespread treatment of legacy sites, and/or application of watershed-scale improvements.
 - 5) Instream effectiveness monitoring will be more rigorously applied.

- 6) Use the applicable Forest Service program area (i.e. Timber, Range, Recreation, etc.) funds for water quality protection throughout the life of a project, including post-project BMP maintenance and restoration or mitigation of project related water quality impacts.
 - 7) Use watershed improvement funds to help restore 303(d)-listed waters when no other funding sources, e.g. roads, grazing, Knutsen-Vandenberg (KV) etc., are available to correct the problem.
 - 8) The USFS will work with the State and Regional Boards to identify opportunities for external funds for watershed restoration efforts.
5. Refine and adapt all of the above management actions, as needed.
- a. The Forest Service will periodically review the need for changes in or additions to the BMPs, the BMP implementation processes, the legacy site remediation measures, and the approaches used to protect threatened waters or to help restore 303(d)-listed waters, and revise or augment them as appropriate.
 - b. This will have the following facets:
 - 1) The review will be informed by results of inspections, monitoring/evaluation, and research findings.
 - 2) The Regional Forester will assign responsibility for conducting the development and improvement actions that the review recommends, and will direct staffing needs to implement those actions.
 - 3) The Forest Service will test the results of these studies before adopting new BMPS or other actions.
 - 4) Once adopted, implementation of the new BMPs or other actions will follow the agency policy and direction cited as references for each new or revised action (see Section 13???)

GENERAL PROCEDURES FOR ENSURING IMPLEMENTATION OF STATEWIDE BMPS AND LEGACY REMEDIATION PRACTICES

Introduction

There are administrative procedures used for implementation of all or most BMPs or legacy remediation practices. Rather than repeat them for each practice, they are set forth in this section. Nuances applicable to individual categories of practices are discussed under the sections setting forth those practices.

The general administrative categories are National Forest planning, project planning, project administration (e.g., contract terms and specifications, inspections and change orders).

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 BMPS 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.

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 BMPs 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.

Implementation of BMPs

The BMPs described herein are neither detailed prescriptions nor solutions to specific non-point pollution sources. Rather, they are action-initiating mechanisms, processes, and practices that call for the development of site-specific detailed prescriptions are designed at the project scale during planning. Development of prescriptions is aided by results from ongoing monitoring, and may also follow direction developed at the Forest scale.

Although some pollutants may be thought of as characteristic of a management activity, the actual extent to which contaminants from an activity have the potential to degrade water quality will vary based on:

1. The physical, biologic, meteorological and hydrologic environment where 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 of the activity area to surface waters.
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.

There are various methods and techniques available to implement a BMP, and not all are applicable to every site. The appropriate method or combination of methods is identified during the onsite evaluation of a specific project. The methods are thereby custom fitted to the physical and biological environment of the project area. 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.

Further, any given BMP is applicable in any similar circumstance, regardless of the particular category in which it is located. For example, BMP 1-11, "Suspended Log Yarding In Timber Harvest", and BMP 1-12, "Log Landing Location" are also applicable to tree removal within a developed campground for safety (hazard tree removal), or campground expansion, or insect infestation eradication purposes, even though they reside in the Timber Management category of BMPs. 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. This multi-resource, cross-resource utility is true for all BMPs in this document whenever applicable.

Application of BMPs

After the BMPs 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 BMPs: 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 BMPs 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 BMPs 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

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 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.

Refining BMPs

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.

STATEWIDE BEST MANAGEMENT PRACTICES

Introduction

These BMPs are compiled from Forest Service manuals, handbooks, contract and permit provisions, policy statements and other relevant references. These practices act as checks and balances that protect the quality of the water, aquatic and riparian resources 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 associated with NPS pollution, while meeting other resource goals and objectives.

Each BMP is organized according to the following format:

Title	Includes the sequential number of the BMP within the resource area and title of the BMP.
Reference	Identifies the Forest Service Manual or Handbook direction pertinent to the BMP.
Objective	Describes the desired results or attainment of the practice as it relates to water, aquatic and riparian resource protection.
Explanation	Includes background information to provide context for the BMP. 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 it.
Techniques	Suggested techniques to achieve the BMP objectives.

At the end of each resource category is a listing of additional BMP references applicable to the subject resource category.

LEGACY PROBLEM SITE REMEDIATION

Watershed restoration involves a 3-step process: inventory, prioritization, and scheduling. All 3 steps are envisioned as cooperative efforts between national forests and the State and Regional Boards. Flexibility is needed to allow for response to new stresses such as storms and fires, as well as short-term funding opportunities.

Inventory

Inventories are needed to determine the type, scale, and location of existing threats to water quality so that restoration projects can be effectively planned. Both the USFS and the State and Regional Boards have guidelines for inventory protocols for potential erosion from some land-use activities, such as roads and timber harvests. However, methods need to be developed for other activities such as livestock grazing and recreation. Inventories require significant investments of staff time, and the needs for information need to be balanced against the need to accomplish restoration.

The USFS will:

1. Use a 10-year planning “horizon” for inventories and update annually with new information;
2. Start with available information (for example, road and OHV trail inventories) using established protocols;
3. Base additional inventories on risks for beneficial uses, size, probability of failure, and levels of public use;
4. Establish inventory protocols for grazing, recreation, and mining.

Prioritization of potential restoration sites is a 2-step process. First, the watersheds in which restoration efforts will be focused are selected. Next, the sites within those watersheds are prioritized for restoration.

Prioritization

Watershed prioritization has historically been a significant and difficult challenge for Regional Board-USFS cooperation. The Boards have as their highest priorities the state’s 303(d) list of impaired waters. The national forests have as their highest priorities the priority watersheds selected on the basis of values, threats, and opportunities. National forests have USFS regional direction to use at least 75% of their available watershed resources in priority watersheds. Impaired waters overlap partially with priority watersheds, but priority watersheds also include high-quality watersheds that may be at risk but are not degraded. National forests have therefore been required to use a substantial proportion of their limited watershed funds for non-impaired waters.

Within selected watersheds, site prioritization can rely on quantitative information from inventories. The most significant threats in terms of pollutant amounts and values at risk can be assigned the highest priorities.

The USFS will:

1. Request new direction from the Regional Forester to allow national forests to use more of their available resources on listed impaired waters, while continuing to provide support for protection of high-quality at-risk waters;
2. Prioritize watersheds for restoration activities cooperatively with the State Board, based on 303(d) listings, ESA listings, and beneficial uses, particularly municipal water supplies;
3. Within selected watersheds, prioritize subwatersheds based on USFS priority watersheds and condition classes (Regional or forest-specific);
4. Within subwatersheds, prioritize projects based on quantitative inventory information;
5. Review and adjust priorities annually with involvement of national forests and the State Board.

Scheduling

Scheduling for restoration projects is contingent upon available funds. Federal funding is difficult to predict, so scheduling needs to be sufficiently flexible to allow for unexpected changes.

The USFS will:

1. Schedule for a 5-year planning cycle, updated annually;
2. Cooperate with the State and Regional Boards to take advantage of short-term funding opportunities;
3. Include restoration in NEPA analyses for legacy sites within new project boundaries;

Fund legacy site restoration with available K-V funds within boundaries of commercial timber sales.

IMPAIRED WATER BODY SEGMENTS

Statewide Prioritization of Recovery/Restoration Needs

Optional Approaches

Implementing Recovery – Enhanced Management Practices and Administration

Verifying Effectiveness – Enhanced Monitoring

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MONITORING

A comprehensive and regionally consistent water-quality monitoring program is needed to guide water-quality protection programs on national forests in the Pacific Southwest Region. The program described below is intended to meet the needs of the Region as well as the State Water Resources Control Board and the Regional Water Quality Control Boards for water-quality information.

Criteria

The program is designed to include the following:

1. A scientifically valid approach to data collection and analysis.
2. Early detection of water-quality problems associated with current management activities.
3. Follow-up monitoring to ensure correction of known deficiencies and to evaluate long-term effectiveness of water-quality protection measures.
4. Conjunctive hillslope and in-channel monitoring ("nested" monitoring) to evaluate linkages between BMP effectiveness and effects on beneficial uses.
5. Evaluation of trends in beneficial uses in receiving waters downstream of forest management activities, including waters listed as impaired under section 303(d).
6. Assessments of water quality in relatively pristine reference streams for comparison with listed and potentially listed impaired waters.
7. Targeted monitoring of high-risk projects.
8. Flexibility in program scope to ensure that the program can be accomplished with available Forest Service resources.

Program Management

1. The monitoring program is a regional program coordinated by the Regional Office and conducted by the national forest staffs.
2. Monitoring targets are made based on regional priorities, rather than being evenly distributed among forests.
3. Annual targets for all monitoring activities are set by the Regional Office and communicated to the State and Regional Boards. Targets are changed as necessary to reflect changes in funding and staffing.
4. Funding to support monitoring is allocated based on assigned targets.
5. National Forest watershed staff is used to conduct monitoring to the extent possible, but monitoring may also be conducted by other trained USFS personnel.
6. Each national forest will submit an annual monitoring report to the State and the appropriate Regional Boards. The USFS Regional Office will submit an annual summary of monitoring results for all forests in the Pacific Southwest Region, and will compile a more detailed analysis of monitoring results every 4 years.

Monitoring Plan

This plan relies on existing well-documented monitoring methods. Hillslope monitoring for management activities use Best Management Practice Evaluation Program (BMPEP, U.S. Forest Service, Pacific Southwest Region, 2002) protocols. In-channel monitoring follows Stream Condition Inventory (SCI, U.S. Forest Service, Pacific Southwest Region, 2005) protocols.

1. Hillslope monitoring of current management activities and corrective actions

- a. All projects will have administrative implementation monitoring using a “checklist” approach. This monitoring will be conducted by USFS project staff (timber, range, recreation, etc.) and will be coordinated and reviewed by the Forest Hydrologists. Administrative implementation monitoring is the primary systematic means for early detection of potential water-quality problems, and will be completed early enough to allow corrective actions to be taken, if needed, prior to the onset of the first winter after project implementation.
- b. The BMPEP, with random site selection, will continue to be the primary means of assessing the effectiveness of water-quality protection for current projects on NFS lands at the hillslope scale.
- c. Effectiveness monitoring for BMPEP protocols that have consistently scored 95% or higher for 5 consecutive years at the Regional level will be reduced to allow efforts to focus on implementation, retrospective, and beneficial-use monitoring.
- d. Corrective actions will be taken in response to recommendations made the previous year to address water-quality protection, and these actions will be documented in annual BMPEP reports.
- e. Follow-up monitoring for sites that were not rated as fully implemented or effective the previous year will be conducted, and results will be presented in annual BMPEP reports.
- f. Selected “high risk” projects in watersheds that are at or above thresholds of concern for cumulative watershed effects, as determined by the Equivalent Roaded Area model, or in watersheds with 303(d) listed impaired waters, will have non-random BMPEP effectiveness monitoring.
- g. National forests will conduct road patrols to the extent allowed by weather, safety, and road conditions during and after major storms to detect and correct road drainage problems that could affect water quality.

2. Retrospective hillslope monitoring of past management activities

- a. Sample pools will be developed for timber, engineering, and grazing projects completed in the past 5 years that were rated as effective as part of the random BMPEP monitoring.
- b. Projects will be selected randomly for retrospective BMPEP effectiveness evaluations.

- c. Results of retrospective monitoring will be compared to original BMPEP effectiveness scores to determine if BMPs remained effective over a period of years.

3. Representative in-channel beneficial-use monitoring

The purpose of in-channel monitoring of beneficial uses is to determine whether BMPs collectively are effective in protecting water quality at the watershed scale. Effectiveness will be assessed by monitoring trends in channel characteristics that affect beneficial uses and by comparing channel characteristics of streams downstream of intensively managed areas with those in relatively pristine reference watersheds (the paired watershed approach). The State Board SWAMP program criteria will be used to determine which streams will be considered reference streams.

Because USFS resources are limited, monitoring will be restricted to a relatively small number of sites. Therefore, monitoring sites will need to be carefully selected to represent large landscapes within the national forest system. Detecting downstream channel changes related to upstream activities is problematic (MacDonald and Coe, 2006), so monitoring sites will be located on headwaters streams. Paired monitoring sites (intensively managed and reference) will be selected to have similar valley segment and stream reach characteristics (Bisson and others, 2006).

- a. Fixed long-term locations for SCI surveys will be selected by the forest hydrologists and Regional Office in cooperation with the State and Regional Board staffs to represent areas of similar landform, geology, climate, and vegetation. SCI sites will be selected to minimize variability in channel type.
- b. SCI survey locations will be paired, with one reference watershed and one intensively managed watershed in each pair.
- c. SCI surveys will be made at least once every 5 years and as soon as possible following major (RI>10 year) floods. Roughly 20% of the watersheds will be surveyed each year, on average.
- d. Adverse impacts in intensively managed watersheds will be inferred by comparison of SCI results with SCI results for reference watersheds.
- e. Non-random "nested" BMPEP evaluations for all current management activities will be conducted within the selected intensively-managed watersheds. Implementation and effectiveness results will be compared to SCI results.
- f. For watersheds 303(d) listed for water temperature, SCI water-temperature monitoring will be conducted for at least one full snow-free season. In addition, effective shade will be monitored using Solar Pathfinders.

Sites will be removed from or added to the sample pool as needed by the Regional Office in consultation with the State and Regional Boards.

ADAPTIVE MANAGEMENT

Adaptive management as used in this plan means adjusting preventive and restorative methods to improve water-quality protection based on monitoring results. The general approach followed by the USFS is to:

1. Identify problems through systematic monitoring (see Monitoring section below);
2. Identify appropriate corrective actions;
3. Verify implementation of corrective actions;
4. Document implementation of corrective actions;
5. Report discrepancies and corrective actions in annual reports to State and Regional Boards.

Response procedures for monitoring program components

1. Annual BMP implementation checklist discrepancies

District and forest hydrologists will:

- a. Check with project administrator to verify discrepancies;
- b. Identify corrective actions in cooperation with project administrator;
- c. Conduct follow-up inspections to verify corrective actions;
- d. Document corrective actions in project file;
- e. Describe discrepancies and corrective actions in annual reports.

2. Annual random BMPEP monitoring implementation failures

District and forest hydrologists will:

- a. Discuss failure with project administrator;
- b. Identify corrective actions;
- c. Conduct follow-up inspections to verify corrective actions;
- d. Document corrective actions in project file;
- e. Describe discrepancies and corrective actions in annual reports.

3. Annual random BMPEP effectiveness failures

District and forest hydrologists will:

- a. Evaluate hydrologic conditions at the time of failure;
- b. Conduct field visit to determine causes of failure;
- c. Identify corrective actions;
- d. Verify implementation of corrective actions during the following year;
- e. Recommend measures to improve BMP effectiveness to the regional hydrologist;
- f. Document findings in project file and in annual report.

4. Retrospective BMPEP effectiveness failures

District and forest hydrologists will:

- a. Evaluate hydrologic conditions most likely to have contributed to failure;
- b. Conduct field visit to determine causes of failure;
- c. Identify corrective actions;
- d. Verify implementation of corrective actions during the following year;
- e. Recommend measures to improve BMP effectiveness to the regional hydrologist;
- f. Document findings in project file and in annual report.

5. In-channel monitoring

- a. Annual results will be reviewed by the forest hydrologist to identify any current conditions or trends that indicate potential cumulative watershed effects.
- b. Forest watershed staff will identify preventive or restoration actions needed to improve channel conditions.
- c. Results of monitoring and a description of corrective actions will be included in annual reports.

6. Field observations independent of systematic monitoring programs

- a. All USFS staff will report observations of existing or potential water-quality impairments immediately to the local line officer and forest hydrologist.
- b. Line officers will determine appropriate corrective actions.
- c. Forest hydrologists will report violations of basin plans to regional board staff.
- d. All water-quality impairments requiring corrective actions will be documented in annual reports.

7. Storm patrols

- a. USFS staff assigned to storm patrol duties will be qualified to use the necessary tools to make emergency repairs to road drainage facilities.
- b. Road patrol teams will document locations of problems with GPS units and provide information on problem locations to the district or forest hydrologist.
- c. District and forest hydrologists will work with Engineering staff to prevent future recurrences.

APPENDICES

Appendix A – List of Acronyms

Appendix B – Glossary of Terms

Appendix C - List of References

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List of Acronyms

AASHTO – American Association of State Highway and Transportation Officials
AML – Abandoned Mine Lands
AMP – Allotment Management Plan
ASTM – American Society for Testing and Materials
AOI – Annual Operating Instructions
BAER – Burned Area Emergency Response
BLM – Bureau of Land Management
BMP – Best Management Practice
BMPEP – Best Management Practice Evaluation Program
CE – Categorical Exclusion
CERCLA – Comprehensive Environmental Response, Compensation and Liability Act
CFR – Code of Federal Regulations
CI – Construction Inspector
CO – Contracting Officer
COR – Contracting Officer's Representative
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
EA – Environmental Assessment
EHR – Erosion Hazard Rating
EIS – Environmental Impact Statement
ER – Engineering Representative
FERC – Federal Energy Regulatory Commission
FLPMA – Federal Land Policy and Management Act
FSH – Forest Service Handbook
FSM – Forest Service Manual
HUC – Hydrologic Unit Code
IC – Incident Commander
IDT – Interdisciplinary Team
IMT – Incident Management Team

KV – Knutsen – Vandenberg
LID – Low Impact Design
LRMP – Land and Resource Management Plan
MIST – Minimum Impact Suppression Tactics
MSDS – Material Safety Data Sheet
MVUM – Motor Vehicle Use Map
NEPA – National Environmental Policy Act
NFMA – National Forest Management Act
NFS – National Forest System
NOI – Notice of Intent
NPDS – National Pollutant Discharge Elimination Permit System
OHV – Off Highway Vehicle
OSHA – Occupational Safety and Health Administration
PL – Public Law
PSEP – Pesticide Spill Emergency Plan
R-4 – Forest Service Region 4 (Intermountain Region)
R-5 – Forest Service Region 5 (Pacific Southwest Region)
R-6 – Forest Service Region 6 (Pacific Northwest Region)
SMZ – Streamside Management Zone
SPCC – Spill Prevention Control and Countermeasure
STORET – USEPA Database for STORage and RETrieval of environmental data
SUP – Special Use Permit
SWRCB – State Water Resources Control Board
TMO – Trail Management Objectives
TSA – Timber Sale Administrator or Administration
TSC – Timber Sale Contract
TSPP – Timber Sale Planning Process
USC – United State Code
USDA – United States Department of Agriculture
USFS – United States Forest Service
USDI – United States Department of Interior
USEPA – United States Environmental Protection Agency
VIS – Visitor Information Service

Glossary of Terms

401 Certification: Certification by a state that a permit or license issued by the Federal government meets applicable state water quality requirements. Under Section 401(a) (1) of the CWA, federal agencies may not issue permits for activities that “may result in any discharge into navigable waters” until the agency obtains certification that the authorized activity will comply with water quality standards (33 U.S.C. § 1341).

402 Permit: (See National Pollutant Discharge Elimination System) Permit issued by the state or EPA that regulates the amount, timing and composition of point source discharges to waters of the U.S. (33 U.S.C. § 1342).

404 Permit: Permit issued by the U.S. Army Corps of Engineers to regulate the discharge of dredge and fill materials to waters of the U.S., including wetlands (33 U.S.C. § 1344).

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 erosion and gravitational displacement.

Aquatic Ecosystem: The stream channel, lake or estuary bed, water and biotic communities and the habitat features that occur therein. (FSM 2526.05)

Armor: (1) To apply rock, mulch, or vegetation to damaged areas to serve as protective covering. (2) To use rock, concrete, asphalt, gravel, riprap, gabions, or equivalent for protection of a ditch, channel, or low water crossing. (3) Any natural-occurring quality, characteristic, situation or thing that serves as a protective covering. (EPA, 1980).

Bankfull/Bankfull Discharge: The bankfull stage corresponds to the discharge at which channel maintenance is the most effective, that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels. Bankfull discharge is associated with a momentary maximum flow which, on the average, has a recurrence interval of 1.5 years as determined using a flood frequency analysis. (Dunne and Leopold, 1978).

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.

Beneficiation: Crushing and separating ore into valuable substances or waste by any of a variety of techniques in order to extract minerals.

Best Management Practice: Methods, measures, or practices selected by an agency to meet its NPS control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2(m)). **OR**

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 NPSs 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 BMPs. **OR** BMP implementation and effectiveness monitoring using National Core BMP protocols and reporting systems.

Biological Opinion (BO): An official report by the Department of the Interior, Fish and Wildlife Service (FWS) or the Department of Commerce, National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) issued in response to a formal Forest Service request for consultation or conference. It states whether an action is likely to result in jeopardy to a species or adverse modification of its critical habitat. (FSM 2670.5).

Buffer Zone: (see Streamside Management Zone (SMZ)) (1) A protective, neutral area between distinct environments. (2) An area which acts to minimize the impact of pollutants on the environment or public welfare (NV Division of Water Resources).

Burned Area Emergency Response (BAER): Projects undertaken following wildfires that are necessary to minimize negative effects on soil productivity and water quality, and to minimize sources of damage to human life and property. Such projects are funded under the Burned Area Emergency Response funding authority (FSM 2523).

Cross Drain: A ditch or relief culvert or other structure or shaping of the traveled way designed to capture and remove surface water from the traveled way or other road surfaces. **OR** 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.

Fen: Geographically restricted wetlands where perennial groundwater discharge occurs on the time scale of centuries to millennia and where little erosion occurs. Fens are generally characterized by their stable presence on the landscape for thousands of years and associated plant and animal communities that may be relics from historic glaciation periods (Cooper, 1990)

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 area 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 (FSM 2527.05).

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 leaves, needles, sticks, limbs, etc., and exposed roots, stumps, surface gravels and living vegetation

Groundwater Dependent Ecosystem: Community of plants, animals and other organisms whose extent and life processes depend on groundwater. Examples include: many wetlands; groundwater-fed lakes and streams; cave and karst systems; aquifer systems; springs and seeps (USFS, 2007)

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. (USFS, 2000).

Lake: An inland body of standing water, perennial or intermittent, that occupies a depression in the earth's surface, and too deep to permit vegetation to take root completely across the expanse of water.

Land and Resource Management Plan (LRMP or LMP): A forest-wide document that provides direction for managing NFS lands within the unit 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.

Mineral Lease: The agreement outlining the basic terms for developing minerals, such as royalty to be paid, length of time, type of mineral and description of affected land. Federal mineral leases are managed by the BLM.

Municipal Supply Watershed: A watershed that serves a public water system as defined in the Safe Drinking Water Act of 1974, as amended (42 U.S.C. §§ 300f, et seq.); or as defined in state safe drinking water statutes or regulations (FSM 2542.05).

National Pollutant Discharge Elimination System (NPDES): (See 402 Permit) The system for regulating the point source discharge of pollutants to waters of the U.S. through the issuance of permits by State water quality regulatory authorities or EPA. This system is established by Section 402 of the Clean Water Act.

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 Pollution: Diffuse sources of water pollution that originate at indefinable sources, such as from silvicultural and recreational activities. Practically, non-point 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. **OR**
Point Source Pollution: Water pollution originating from a discrete identifiable source, or conveyance.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes (40 CFR 230.3). Resource objectives should also be considered when determining practicable alternatives to meet a project's overall purposes.

Prescribed Wildland Fire: A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met prior to ignition (Fire Executive Council, 2009).

Reference Condition: The set of selected measurements and/or conditions used as representative of the natural potential condition of a stream. The selected measurements and/or conditions describe a minimally impaired watershed or reach characteristic of a stream type in an ecoregion. Minimally impaired sites are those with the least anthropogenic influences and represent the best range of conditions that can be achieved by similar streams within an ecoregion. Reference conditions can be established using a combination of methods: a single or multiple reference sites; historical data; simulation models; and/or expert opinion/professional judgment (From EPA, 1996).

Restoration: The process of assisting the recovery of resilience and adaptive capacity of ecosystems that have been degraded, damaged or destroyed. Restoration focuses on establishing the composition, structure, pattern and ecological processes necessary to make terrestrial and aquatic ecosystems sustainable, resilient and healthy under current and future conditions (FSM 2020.5).

Riparian Area: Geographically delineable areas with distinctive resource values and characteristics that are comprised of the aquatic and riparian ecosystems (FSM 2526.05).

Riparian Ecosystem: A transition area between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water (FSM 2526.05).

Riparian Habitat Conservation Area(s): An area adjacent to streams that in some Regions reflects additional management requirements and implications in addition to minimal standards of State SMZs.

Road: A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail (36 CFR 212.1; FSM 7705).

Road Decommissioning: Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36CFR212.1, FSM 7703).

Road Management Objective (RMO): Road management objectives (RMOs) and trail management objectives (TMOs) document the intended purpose, design criteria (FSM 2353.26 and 7720), and operation and maintenance criteria (FSM 2353.25 and 7730.3) for each NFS road and NFS trail. RMOs and TMOs require written approval by the responsible official and are included in the applicable forest transportation atlas (FSM 7711.2, para. 2a). (FSM 7714).

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.

Sediment Traps: Structures such as slash windrows, weed-free straw bales, sediment pits, log steps, and silt fences keyed into the ground below roads, trails, and similar soil disturbances to disperse runoff energy, trap sediment, and assist filter strips in keeping sediment out of water bodies.

Spawning Habitat: Specific type of place in aquatic ecosystems with necessary physical, chemical and biological components necessary for aquatic organisms to carry out the process of fertilizing, depositing and successful hatching of eggs. Specific

spawning habitat is influenced by larger scale processes and temporal changes in ecological conditions. (Armantrout, 1998)

Special Use Authorization (Special Use Permit – SUP): Authorization for occupancy and use of NFS lands for activities not provided for in activity-specific statutes such as for minerals, grazing and logging. Activities authorized under special uses include water withdrawal and transmission, agriculture, outfitting and guiding, recreation, telecommunication, research, commercial photography and video productions, and road and utility rights-of-ways.

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.

Stormwater Permit: A form of 402 permit regulating storm water discharges from industrial activities, including construction (40 C.F.R. § 122.26).

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. The SMZ is not a zone of exclusion, but is designed and delineated for the application of special management controls aimed at the maintenance and/or improvement of water quality or other water- and riparian-dependent values. The width of the SMZ may vary by stream type or class or other site-specific factors or requirements. At a minimum, the width of the SMZ must comply with state requirements. SMZ delineation may encompass the floodplain 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. Other names for the SMZ include: ~~Water Influence Zone (WIZ) (R2), Streamside Management Unit (SMU) (R6), Riparian Corridor (R8), Riparian Management Corridor (RMC) (R9) and Streamside or Riparian Buffer (R10)~~ stream protection zone, riparian reserves, and riparian habitat conservation areas.

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.

Swale: A landform feature lower in elevation than adjacent hillslopes, usually present in headwater areas of limited areal extent, generally without display of a defined watercourse or channel, which may or may not flow water in response to snowmelt or rainfall. Swales exhibit little evidence of surface runoff and may be underlain by porous soils and bedrock that readily accepts infiltrating water. These are areas where soil moisture concentrates that often do not exhibit pedologic or botanical evidence of saturated conditions (Random House, 1967; Dunne and Leopold, 1978)

Temporary Road or Trail: A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a Forest Transportation Atlas. (36 C.F.R. 212.1).

Tilth: The physical structure of soil as it influences plant growth. A soil with good tilth is porous, allowing water to infiltrate easily and permitting roots to grow without obstruction.

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, located in section "C" of the contract.

Trail: (a) A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212.1; FSM 7705). (b) A commonly used term denoting a pathway for purposes of travel by foot, stock or trail vehicles (FSM 2353.05)

Tremie: A funnellike device lowered into water to deposit concrete.

Unstable Soils: Those soils that have properties that make them susceptible to dislodgement and downslope transport of soil and rock material under direct gravitational stress. The process includes slow displacement such as creep and rapid movements such as landslides.

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.

Use of Wildland Fire: Management of either wildfire or prescribed fire to meet resource objectives specified in Land/Resource Management Plans (Fire Executive Council, 2009).

Waterbody: Features such as rivers, streams, reservoirs, lakes, ponds, wet meadows, fens, bogs, marches, and wetlands.

Water Right: A property right granted by a state to the use of a portion of the public's surface water resource obtained under applicable legal procedures.

Wetlands: Those areas that are inundated by surface or groundwater with a frequency sufficient to support and that, under normal circumstances, do or would 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, wet meadows, river overflows, mud flats, and natural ponds. (FSM 2527.05). **Fens?**

Wildfire: Unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires (Fire Executive Council, 2009).

Wildland Fire: A general term describing any non-structure fire that occurs in the wildland. (Fire Executive Council, 2009).

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