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## INTRODUCTION

The USFS Manual (FSM) directs that Best Management Practices (BMPs) will be used to control nonpoint source pollution related to all management actions with the potential to affect water quality on National Forest System (NFS) lands (FSM 2532). BMPs are the practices both the Federal and State water quality regulatory agencies expect the USDA Forest Service (USFS) to implement to meet its obligation for compliance with applicable water quality laws and standards, and to maintain and improve water quality.

This Water Quality Management Plan (WQMP) for NFS lands in California describes: 1) the BMPs that will be used for controlling nonpoint source pollution; 2) the processes for implementing those BMPs; 3) a monitoring plan to evaluate the success of the BMPs; 4) restoration of legacy water-quality problems; and 5) adaptive management processes to improve and add to BMPs when necessary to improve protection of water quality. The USFS 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).

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 all of these legal requirements, as well as with applicable USFS directives.

### Objectives

The objectives of this WQMP and handbook for NFS lands in California are:

1. To ensure that 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 principles of conservation biology.
2. To protect the quality and beneficial uses of water from further degradation in water bodies that are trending toward impairment as defined by 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).
4. To remediate legacy sources of pollution.

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5. To ensure compliance with Federal and State water-quality objectives and legal requirements in the most efficient manner.
6. To provide a process for improving or adding BMPs as necessary for protection of water quality.
7. To provide a monitoring framework to evaluate the effectiveness of the WQMP in protecting and improving water quality.
8. To enhance USFS performance as a water quality management agency, and increase and improve its responsibility, transparency and accountability in its relationships with the Water Boards and the public.

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### The Legal Basis for BMPs

According to the USFS Draft National Core BMP Handbook (version of August 28, 2009):

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Section 208(b)(2)(F)-(K) of the 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.

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Section 319(a) (1) of the CWA [as amended by the Water Quality Act of 1987] requires each State to:

- Identify its navigable waters which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of the Act.
- Identify those categories of nonpoint sources or, where appropriate, particular nonpoint sources 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 nonpoint sources identified, and to reduce to the maximum extent practicable, the level of pollution from such nonpoint sources.
- Identify and describe State and local programs for controlling pollution added from nonpoint sources 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 nonpoint source 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 nonpoint source pollution to meet water quality standards within that State. 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 (emphasis added). 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 both. 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]).

### Relationship between State and USFS BMPs

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 USFS must use nonpoint source controls, including BMPs, approved by the appropriate State as described above.

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Several different relationships occur throughout the United States regarding State-specific BMPs and NFS lands. States usually have their own sets of BMPs, and when they do the USFS adheres to them. A second situation occurs when the USFS has authored the BMPs and a State has agreed that those practices conform to State requirements. The use of USFS-authored BMPs is usually formalized through a MOU. The third situation occurs when USFS-authored BMPs have gone through a formal public review process, been approved by the State and/or EPA, and the governor of the State has designated the USFS as the water quality management agency for NFS lands within the State. In each circumstance the responsibility of the USFS may differ somewhat, but the State or EPA is always the final authority.

### WQMP Chronology

Water-quality regulation of activities on NFS lands is the result of both federal and state laws. As noted above, Congress, in amending the Federal Water Pollution Control Act (Clean Water Act) in 1972, waived sovereign immunity for federal agencies, and included in the law a requirement that federal agencies comply with all state and local laws pertaining to water quality to the same extent as nonfederal entities. The State's Porter-Cologne Water Quality Control Act was chaptered in 1969, augmenting the State Water Resources Control Board and establishing the nine Regional Water Quality Control Boards. The Federal Water Pollution Control Act of 1972 was amended by the Clean Water Act of 1977. Clean Water Act Section 208 provided authority and funding for states to develop water quality management plans (WQMPs) and to designate water quality management agencies with primary responsibility for implementing those WQMPs. The WQMPs were to address, among other things, nonpoint source pollution. USEPA promulgated regulations specifying the contents required in a WQMP (including best management practices 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 amendments. Also, the governor delegated to the SWRCB the authority granted by Clean Water Act Section 208 to certify proposed WQMPs for the State. Accordingly, the USFS and SWRCB initiated a 208 water quality management planning process for nonpoint source activities on NFS lands in California. The USFS, 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.

In 1981, the SWRCB, in accordance with Clean Water Act 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;

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¶ Regions may supplement the National Core BMPs with additional practices or more specific techniques to meet Regional needs. Existing Regional BMP handbooks may be added as supplements as necessary to maintain agreements with states, although it is desirable to eventually incorporate the National Core BMPs into those agreements. Existing practices and/or State BMPs may also be maintained by establishing applicable cross references that demonstrates the relationship among State or Regional BMPs and the National Core BMPs. ¶

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¶ The National Core BMPs in this handbook are deliberately general and non-prescriptive. They require the development of site-specific prescriptions based on local sit... [1]

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- 2) It designated the USFS (all three Regions) as the management agency with primary responsibility for WQMP implementation; and
- 3) It executed a management agency agreement with the USFS, 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.

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In accordance with USEPA regulations, these SWRCB actions were all submitted to USEPA for approval, which was granted in 1981.

During the following 20 years, a number of new federal and state laws were enacted that affected the status of the WQMP and accompanying MAA. In 1987, the federal Water Quality Act was approved, adding Section 319 to provide funding for implementation of nonpoint source 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 nonpoint source 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 nonpoint sources of pollution.

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In 2000, the USFS and Water Boards collaboratively reviewed and revised the WQMP and BMPs. Revisions primarily involved the references cited for the BMPs. The SWRCB deemed these changes to be administrative and non-substantive, so re-certification of the WQMP was not needed.

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Additional major changes in California's water quality regulatory landscape occurred after approval of the revised WQMP in 2000:

- 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. Two RWQCBs have adopted conditional waivers of waste discharge requirements for timber harvesting and vegetation management, and one has adopted a waiver covering most resource-management activities on NFS lands.
- 2. The SWRCB was, for the first time, authorized to adopt its own waivers, which could be statewide.
- 3. Pursuant to CZARA and pursuant to 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

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forth "management measures" (mostly performance standards) for silviculture and several other activities that generate nonpoint source pollution. USEPA holds the State accountable for conforming with these management measures.

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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 nonpoint source 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 Total Maximum Daily Load (TMDL) goals.
6. Many water bodies on and downstream of NFS lands were added to the State's section 303(d) list of impaired water bodies.
7. 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.
8. USEPA and the North Coast RWQCB began calculating 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.
9. The USFS began development of a set of National Core BMPs.

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The 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.

### Authorities

#### USFS

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

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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

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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 USFS, 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. Formatted: No underline  
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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 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. Formatted: No underline
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. Formatted: No underline
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. Formatted: No underline
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. Formatted: No underline

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

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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:

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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.

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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.

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3. Porter-Cologne Water Quality Control Act.

1. This act mandates the Water Boards to:

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- 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.

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2. Pursuant to CWA Section 303(d) (and sometimes court orders), the Water Boards use their PCA authority to:

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- 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.

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- c. Promulgate TMDL implementation plans sufficient to ensure eventual delisting of the water body segment.

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

Related USFS Programs

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This WQMP is related to other USFS directives and programs that govern water-quality protection and improvement on NFS lands. These directives and programs are briefly described in this section.

USFS activities are governed by a planning framework that includes general policies and directives as well as specific standards and guidelines. The USFS planning framework includes formal directives contained in the Forest Service Manual and Forest Service Handbook, standards and guidelines from provincial and national forest plans, and the USFS Watershed Improvement Program.

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Key water quality components of the USFS planning framework are described below:

Land and Resource Management Plans—Each national forest has a Land and Resource Management Plan (LRMP), also known as a “forest plan.” These plans provide broad guidance for forest management over relatively long (10 to 15 years) periods. LRMPs determine areas within each forest that are suitable for different resource management activities, including timber harvest, livestock grazing, and recreation, and establish desired conditions for forest resources. LRMPs include plans for wildfire suppression. LRMPs also include standards and guidelines for activities and projects within the national forest. LRMPs are prepared and analyzed under the National Environmental Policy Act (NEPA).

Northwest Forest Plan (NWFP) - The NWFP includes an assessment and planning process for the Six Rivers, Klamath, Mendocino, Shasta-Trinity, and Rogue River-Siskiyou National Forests, as well a portion of the Modoc National Forest. The NWFP amended the LRMPs for these forests in 1994.

The Aquatic Conservation Strategy (ACS) of the NWFP (<http://www.reo.gov/library/reports/newsandqa.pdf>) has nine objectives for maintaining and restoring the function, diversity, and integrity of the riparian and aquatic system, including water-quality protection:

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1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include

floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Key Watersheds comprise a system of large refugia for fish and wildlife based at the watershed scale. Key Watersheds comprise nearly 40% of USFS lands within the forests managed under the NWFP, and are managed to maintain or recover habitat for anadromous and resident fish species. Key Watersheds have a high priority for restoration. Specific road management guidelines apply to Key Watersheds: 1) no new roads in roadless areas within Key Watersheds; 2) no new roads in unroaded portions of roadless areas within Key Watersheds; and 3) reduction in existing road mileage within Key Watersheds (no net increase if funding is insufficient to implement reductions).

Riparian Reserves - Riparian reserves are a key component of the ACS and comprise lands along streams and unstable and potentially unstable areas where special standards and guidelines direct land use. Riparian reserves apply to all ephemeral, intermittent, and perennial streams and geologically unstable areas. These reserve areas maintain hydrologic, geomorphic and ecological processes that directly affect streams and fish habitats. Widths of the reserves can range from a minimum of 100 feet on each side of ephemeral and/or intermittent streams to over 300 feet on each side of perennial fish bearing streams. Only activities that protect

or enhance ACS objectives are permissible within a riparian reserve. Riparian reserves serve to protect aquatic resources and water quality from timber harvesting activities, road building, and other nonpoint source activities such as grazing, by maintaining a diverse riparian community, a buffer area from upslope activities, canopy for shade and aquatic nutrition, and filtration of sediment from hillslopes.

Watershed Analysis, another component of the ACS, is required for all 5<sup>th</sup> field watersheds managed under the NFWP. Watershed analysis is a process that evaluates the geomorphic and ecological processes operating in a watershed and is intended to enable watershed planning to achieve ACS objectives. Watershed Analysis provides the basis for monitoring and restoration programs. Watershed Analysis informs restoration planning efforts through the identification of watershed problems, such as erosional features, problem roads and road sections, and riparian areas not meeting the ACS objectives, as well as identifying those areas that should be preserved from any activities.

The Sierra Nevada Framework Plan Amendment (SNFPA), amended in 2004 (<http://www.fs.fed.us/r5/snfpa/final-seis/>), is analogous to the NWFP. The SNFPA provides similar guidance for forests in the Sierra Nevada and Modoc Plateau, including the Modoc, Lassen, Plumas, Tahoe, Eldorado, Stanislaus, Sierra, Inyo, and Sequoia National Forests, and the Lake Tahoe Basin Management Unit. The SNFPA includes an Aquatic Management Strategy (AMS) similar to the ACS. The SNFPA equivalent to the "Riparian Reserve" is the "Riparian Conservation Area." The SNFPA equivalent to "Key Watershed" is "Critical Aquatic Refuge." The SNFPA equivalent to "Watershed Analysis" is "Landscape Analysis."

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The four southern California national forests (Los Padres, Angeles, San Bernardino, and Cleveland National Forests) have consistent LRMPs that are comparable to the NWFP or SNFPA. Although each southern California national forest has its own LRMP, they have all adopted similar supplements to the Forest Service Handbook (FSH 2509-22) that provide protection to riparian conservation areas similar to the protection afforded through the NWFP and SNFPA.

The USFS Watershed Improvement Program (WIP) is a nationwide USFS program that guides assessment of watershed conditions, inventories and identifies watershed restoration needs, and implements restoration activities. Implementation of the WIP results in assessment and restoration on a watershed scale.

In accordance with the WIP, each Forest identifies the priority watersheds for restoration, and the essential projects that will bring about improvement in watershed condition. The intent of the program is to focus watershed restoration activities in priority watersheds and progress through the priority watersheds in a stepwise manner, eventually providing assessment and restoration for all the watersheds. As described in more detail below, priority watersheds receive heightened water quality protection under the USFS Guidance and are integral for maintaining sanctuary habitats for threatened and endangered species and unique

plant and animal communities. Watershed restoration projects are not limited to priority watersheds, and are used to address watershed issues and water quality problems in lower priority watersheds.

The primary components of the WIP are:

Priority Watershed Selection

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Watershed Assessments or Watershed Analyses

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Watershed Improvement Needs Inventories

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Essential Project Identification (for example, road crossings, road decommissioning, landslide stabilization)

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Watershed Restoration Plans

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Annual Watershed Improvement Accomplishments Reporting

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USFS directives that provide guidance for watershed-scale planning, restoration, and assessment, include:

The USFS Region 5 FSH 2509.22 Soil and Water Conservation Handbook, Chapter 20 (July 1988), requires the USFS to assess and consider the potential for cumulative watershed effects of proposed activities. The USFS Pacific Southwest Region Cumulative Watershed Effects policy provides an approach to assessing the potential for cumulative watershed effects related to management activities on NFS lands. The approach uses the Equivalent Roded 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.

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The USFS Manual 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 USFS Manual, Chapter 2020 (September 2008) that provides a policy for using ecological restoration in the management of National Forest lands, further supporting watershed analysis and restoration and the ACS.

## Policy

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

The USFS will comply with applicable forest plan standards and guidelines.

The USFS 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 USFS 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. Implement BMPs during all current management activities on all NFS lands in California.
2. Review and revise BMPs as needed to reflect the most recent state-of-the art methods and techniques of BMP implementation and changes in USFS policy and direction.
3. Implement an iterative adaptive management process for BMP implementation (Chapter X).
4. Correct legacy water-quality problems.
5. Establish a monitoring program (Chapter Y) to determine the effectiveness of the WQMP for protecting and improving water quality.

### BMPs in NEPA Analyses and the Interdisciplinary Approach.

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:

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1. The physical, biologic, meteorological and hydrologic environment where the activity takes place (for example, 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.

These four factors vary throughout NFS lands in California. It follows then, that the extent and kind of potential contaminants are variable, as are the most appropriate abatement and control measures.

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.

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 include 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.

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 (see Chapter Y, Administrative Practices). The BMPs will be incorporated into these documents in various ways such as, design specifications, contract

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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.



clauses, or management requirements and mitigation measures. This assures that they are part of the project work to be accomplished.

Pollution-control techniques that can be used to implement BMPs are described in the references listed in the On-Line Library (Chapter Z). BMPs should be implemented to the standards described in the On-Line Library references.

BMPs can be used for activities other than the primary activity for which it was developed. For example, BMPs 1-8 and 1-19, which deal with designation and protection of streamside management zones, are included with the Timber Management BMPs, but can be used for other types of activities and projects, including engineering, recreation, and range management.

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There are various methods and techniques available to implement a BMP

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Further, because a particular

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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 (... [38]

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## **BMPs as a Process**

The National Core BMPs in this handbook 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 in the National Core BMPs 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.

## Land Use Activity

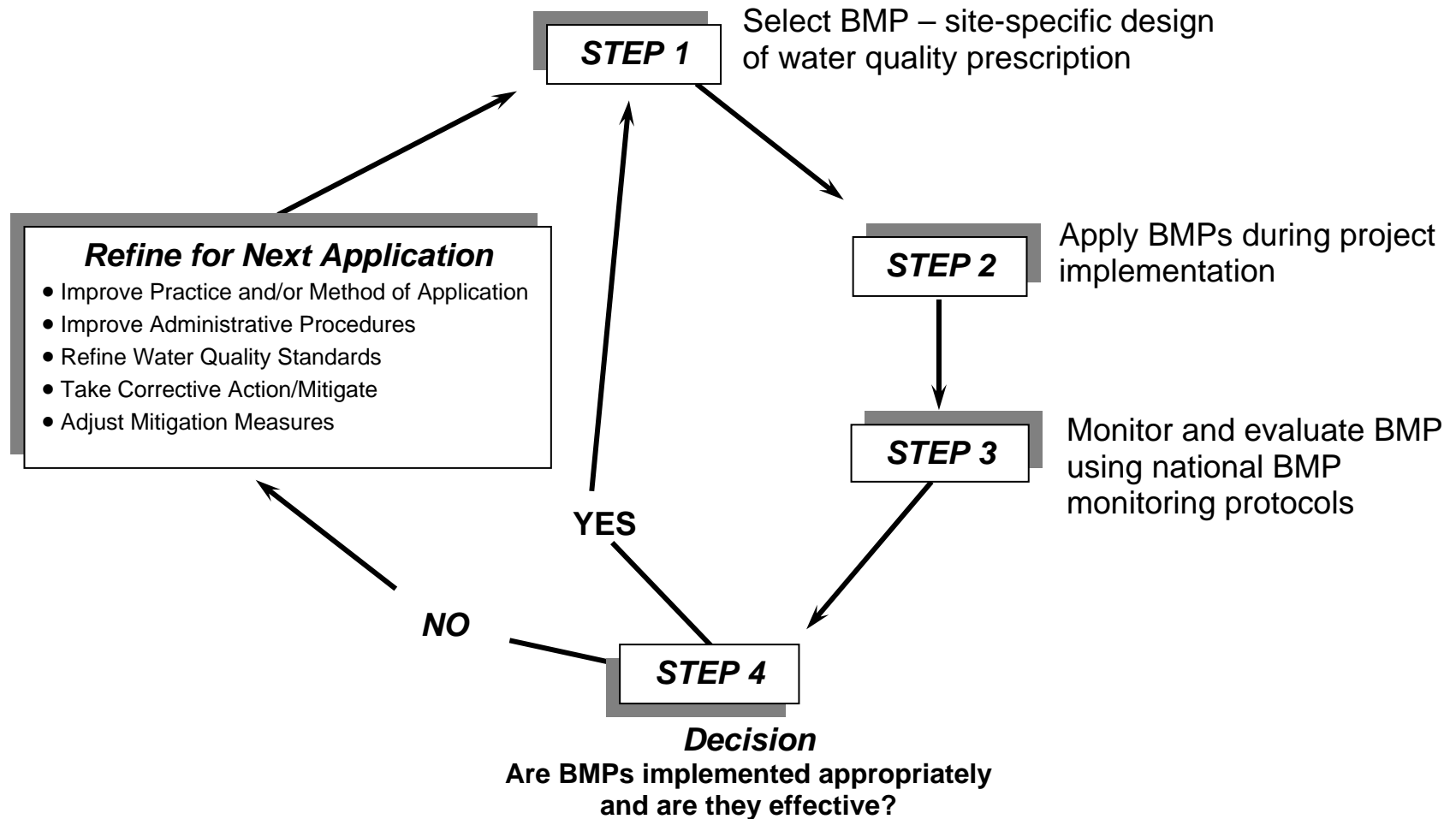


Figure 1: Iterative Process of Non-Point Source Pollution Control

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Issues related to Clean Water Act Section 303(d) or Federal or State Endangered Species Acts were not on the radar screen and were not addressed.

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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 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 Routed 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.

## **Review of Nonpoint Sources of Pollution 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 nonpoint sources of pollution (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 nonpoint source activities. This WQMP addresses those nonpoint source 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.

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## Objectives

The objectives of this WQMP and handbook are[F1]:

- 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.
- 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).
- 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.
- To remediate legacy sources of pollution on NFS lands in California.
- To ensure compliance with water quality goals and legal requirements in the most efficient manner.
- 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.
- 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.
- To incorporate water quality maintenance, protection, and improvement considerations into the site-specific planning process.
- To employ a nested monitoring strategy involving different types of monitoring at different geographic scales [not sure this is an objective but rather a means]
- 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.
- 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.



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My table might fit well in here to summarize the WQMP

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The Forest Service will continually implement these BMPs to minimize impacts of current management activities from nonpoint source pollution. This will involve the following facets:  
Forest[F2] 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.

The text and references for each

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BMP will be

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I'm not sure what this means or is intended to accomplish.

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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[F3].

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Appropriate BMPs will be properly installed and maintained.  
An iterative process will be implemented, comprising site-specific identification of treatment and control needs, BMP implementation, monitoring and evaluation, and

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***adaptive management*** (see Figure 1).

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Might be best to cite or cut and past draft plan v. 1.7 here. We currently have 3 types of monitoring: Hillslope BMPEP monitoring, retrospective BMPEP monitoring, and watershed-scale in-channel monitoring

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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).. Further monitoring discussion and format per Barry[F4].

Correct legacy water quality problem sites on NFS lands in California.

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As we discussed, we will probably want some sideboards to indicate we are not responsible for stopping all natural erosion on NFS lands

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Clarify that this includes a statewide prioritization of TMDL implementation

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Great point, for our road erosion surveys we want to identify opportunities to PREVENT erosion as well as sites we need to fix.

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Where, due to past management actions and/or to natural occurrences[F5] (e.g., fires and floods), sites are located on NFS lands that are, or have the potential to become, a source of nonpoint source

pollution, the Forest Service will act to remediate these legacy sites, insofar as resources and priorities allow.

Remediation of these legacy sites will involve the following facets:

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:

The condition and sensitivity of the watershed(s) affected.

Evaluation by appropriate specialists of the need for and type of treatments needed;

The relative cost-effectiveness of the treatments; and

The type and availability of funding.

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

Some remediation projects may be funded by sources focused on specific issues (e.g., roads, grazing, Knutsen-Vandenberh (KV) funds).

Watershed improvement funds will be used for such work only where no other funding is available to correct the problem.

The State and Regional Boards will cooperate with the USFS to seek external funding for restoration through the 319 and other grant processes.

Protect the quality and beneficial uses of water on NFS lands in California where they are threatened with further degradation.

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. The protection measures used may include more rigorous implementation of the BMPs set forth herein[F6], more widespread treatment of legacy sites, and/or application of watershed-scale improvements.[xxxx]

Contribute to restoration of impaired beneficial uses of water.

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.

This will include the following facets:

With the Water Boards, collaboratively establish statewide restoration priorities for such waters[F7].

Evaluate existing legacy sources of pollution, as well as future potential nonpoint sources[F8], to determine the need for

restoration and type of enhanced management practices or other treatments that may be necessary.

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).

The restoration measures used may include more rigorous implementation of the BMPs set forth herein[F9], application of enhanced BMPS, more widespread treatment of legacy sites, and/or application of watershed-scale improvements.

Instream effectiveness monitoring will be more rigorously applied. 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.

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.

The USFS will work with the State and Regional Boards to identify opportunities for external funds for watershed restoration efforts.

Refine and adapt all of the above management actions, as needed

**(ADAPTIVE MANAGEMENT)**

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.

This will have the following facets:

The review will be informed by results of inspections, monitoring/evaluation, and research findings.

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.

The Forest Service will test the results of these studies before adopting new BMPS or other actions.

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???)

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## **GENERAL PROCEDURES FOR ENSURING IMPLEMENTATION OF STATEWIDE BMPS AND LEGACY REMEDIATION PRACTICES[F10]**

### **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).

### **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.

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S 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.

## **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.

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).

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.

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:



Ensure the effective application of the BMPs on the ground.

Update and refine BMPs as a result of knowledge gained from monitoring and evaluating previous applications.

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.

## Introduction

These BMPs are compiled from Forest Service manuals, handbooks, contract and permit provisions, policy statements and State or the National Core BMPs. 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 nonpoint source pollution, while meeting other resource goals and objectives.

The BMPs are grouped into the following resource categories:

National Core BMPs	Existing WQMP BMPs	Proposed BMP Categories
Aquatic Ecosystems Activities Chemical Use Activities Facilities & Nonrecreation Special Uses Activities Wildland Fire Mgt Activities Minerals Activities Rangeland Management Activities Recreation Activities Road Management Activities Vegetation Harvest and Regeneration Activities Water Uses Activities	Timberland Management Road and Building Site Construction Mining Recreation Vegetative Manipulation Fire Suppression and Fuels Mgt Watershed Management Range Management	<u>Resource Extraction Activities</u> Timber Management Biomass Removal Minerals and Mining <u>Resource Utilization Activities</u> Rangeland Management Vegetative Conversion <u>Resource Protection Activities</u> Fire Suppression Fuels Treatment Invasive Species Treatments <u>Forest Management Infrastructure</u> Roads and Road Systems (Planning, Construction, Maintenance, and Decommissioning) <u>Public Recreation Management</u> Vehicular recreation & road use Concentrated recreation Dispersed recreation Aquatic recreation



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 NFS lands in California. It follows then, that the extent and kind of potential contaminants are variable, as are the most appropriate abatement and control measures. The management practices include such phrases as: "according to design," "as prescribed," "suitable for," "within acceptable limits," and so on. The BMPs presented in this document include a list of recommended techniques that can be prescribed to meet the objective of the BMP. Not all suggested techniques will be applicable in all settings. The suggested list of techniques is not all inclusive; there may be other techniques not listed in the BMP that would work as well or better than the suggested techniques to meet the BMP objective in a given situation. The specific techniques to be applied to a particular project will be chosen by watershed specialists or other qualified personnel during the planning process and will be the result of site-specific evaluation, past experience, and monitoring results. **OR** 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.

For example, BMP Road-4 dictates that roads will be correctly maintained to drain and 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 technique or combination of techniques, to correctly drain the road is identified. The techniques are thereby custom fit to the physical and biological environment of the project area.

Once the appropriate prescription has been developed, the measures for road drainage, for example, must then be included in the appropriate controlling document. If the road work is part of a timber harvest, then the Timber Sale Contract is used to implement the BMP. If the road drainage is part of a hard rock mine operation, then the prescription would be included as a part of the Mining Plan of Operation. If the road work were part of work on a ski resort, then inclusion in the Special Use Permit for the resort would be necessary.

Further, because a particular BMP is located within a given resource category does not imply that it has no applicability in other resource areas. 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 Veg-5 "Suspended Yarding Operations", and BMP Veg-6, "Landings", reside in the Vegetation Harvest and Regeneration Activities category, they are also applicable to tree removal in the developed campground area, even when 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 Streamside Management Zone (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 "Roads Management Activities" BMPs, whether the road is for timber harvesting, mining, recreation access, or some other purpose; the road BMPs are applicable.

This multi-resource, cross-resource utility is true for all BMPs in this handbook whenever applicable. The specific document with BMP details will be different (e.g. the recreation development plan may apply in place of the timber sale plan), and the individual 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.

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

## **Statewide BMPs and Individual Implementation Processes**

### **Verifying Implementation and Effectiveness (or put in Monitoring section)**

## **STATEWIDE LEGACY PROBLEM SITE REMEDIATION**

### **Introduction**

### **Statewide Prioritization and Planning**

### **Statewide Remediation Practices and Individual Implementation Processes**

### **Verifying Implementation and Effectiveness (or put in Monitoring section)**

## **APPENDICES**

Appendix A – List of Acronyms

Appendix B – Glossary of Terms

Appendix C - List of References

## Appendix A

### 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  
~~WQIO –~~  
~~WQMA – Water Quality Management Agency~~

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Appendix B

## **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 nonpoint source 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 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 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 as 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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