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DRAFT REPORT

Northwest Forest Plan: The First Ten Years (1994-2003)

Implementation Monitoring: Accomplishments and Compliance with Plan Requirements

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Abstract

The Northwest Forest Plan (the Plan) describes a management strategy for nearly 25 million acres of federally managed land in Washington, Oregon, and northern California. Monitoring is an essential component of natural resource management because it provides information on the relative success of management strategies. The Record of Decision (ROD) for the Plan stated that the implementation of the standards and guidelines will be monitored to ensure that management actions are meeting the objectives of the prescribed standards and guidelines (implementation monitoring).

This report consists of two separate but related sections, both about implementation monitoring for the Plan. The first reviews accomplishments during the Plan's first 10 years, as they relate to aquatic, terrestrial and social strategies and process activities developed to meet Plan goals. These accomplishments are compared to expectations found in the Plan when available. Areas of emphasis include aquatic conservation strategy components, timber volumes, silvicultural activities, and process activities such as interagency collaboraton.

The second reviews the results of implementation monitoring and whether projects and watershed level evaluations comply with the standards and guidelines from the Plan's record of decision (the ROD). The monitoring program is described including the use of the Provincial Advisory Committees Areas to participate in the reviews of selected projects. Instances of noncompliance for projects and watershed scale standards and guidelines are identified.

Summary

The Northwest Forest Plan (the Plan) describes a management strategy for nearly 25 million acres of federally managed land in Washington, Oregon, and northern California. Monitoring is an essential component of natural resource management because it provides information on the relative success of management strategies. The Record of Decision (ROD) for the Plan stated that the implementation of the standards and guidelines will be monitored to ensure that management actions are meeting the objectives of the prescribed standards and guidelines. Monitoring will provide information to determine if the standards and guidelines are being followed (implementation monitoring). Monitoring results will provide managers with the information to determine whether a goal has been met, and whether to continue or to modify the management direction. In addition, monitoring will be done to verify if the standards and guidelines are achieving the desired results (effectiveness monitoring) and to determine if the underlying assumptions are sound (validation monitoring) (USDA, USDI, 1994b, p. E-1).

This report has two separate but related sections, both about implementation monitoring for the Plan. The first reviews management activities during the Plan's first 10 years, as they relate to aquatic, terrestrial, and social strategies and process activities developed to meet Plan goals. The second reviews the results of monitoring and whether projects implemented and watershed scale actions comply with the standards and guidelines from the Plan's record of decision (ROD).

Although the Plan includes lands administered by other federal agencies, this report is limited to actions on the 30 USDA Forest Service (FS) and USDI Bureau of Land Management (BLM) administrative units (the units) in the Plan area. The monitoring addressed in this report was generally from 1994 to 2003.

Accomplishments

Data for this report were assembled from agency databases and other existing reports and reviewed by agency specialists. Both the expected and the actual activities are described, if both types of data exist. Sometimes the data are incomplete because of different data reporting standards, protocols, and definitions the agencies used; different periods for which data were available; or difficulties in distinguishing if reported accomplishments were in or out of the Plan area (when land management units were split by Plan boundaries.)

AQUATIC CONSERVATION STRATEGY

This report begins with activities associated primarily with the aquatic conservation strategy (the aquatic strategy). Its four components are watershed analysis, key watersheds, watershed restoration, and riparian reserves.

About 550 fifth-field-scale watersheds with FS- and BLM-managed lands are in the Plan area. Agency records showed that about 89 percent of the Plan-prescribed watershed analyses, covering an average of more than 85 percent of the federal land area for all units, were reported as completed. These

percentages are similar to results obtained during compliance monitoring. From 1999 to 2003, watershed analyses were reported completed for 75 of 88 (85 percent) of the reviewed watersheds. Units also reported completing watershed analyses on an average of more than 91 percent of the area in the 164 key watersheds and nearly all of the inventoried roadless areas in the Plan area. Watersheds with small areas of federally managed land, with few cooperators, or with a lack of anticipated actions (for example, inventoried roadless areas) still remain to be completed.

Through the ROD, the agencies identified 164 key watersheds in the Plan area. Activities reported in key watersheds from 1998 to 2003 included adding structures in 240 miles of streams; developing 117 miles of instream passage; treating 3,933 riparian acres, 113 miles of riparian area, and 6,474 upland acres; decommissioning 295 miles of roads; improving 1,235 miles of roads; and treating 286 acres of wetlands. For 40 key watersheds examined during compliance monitoring, road mileages were reduced 509 miles or 8.5 percent compared to 470 miles or 5 percent in the remainder of the 49 fifth-field non-key watersheds examined.

Watershed restoration is designed to improve degraded habitat. The most important components are controlling road-related runoff and sediment production, restoring riparian vegetation, and adding complexity to the stream (USDA, USDI, 1994b, p. ROD-10). The investment in these implemented projects was reported as $90,818,928 for 1998 to 2003. Accomplishments include 927 miles of instream structures, 661 miles of instream passage, 68,847 acres of riparian treatment, 32,415 acres of upland treatment, and 3,085 miles of road improvement. The total length of roads built on BLM and FS-managed lands from 1995 to 2002 was 353.5 miles; the total decommissioned or closed roads was 3,324 miles.

Riparian reserve widths, established in the ROD, were intended to be interim until the field units adjusted them to fit local conditions through watershed analysis and field examination (USDA, USDI, 1994b, p. ROD-9 and B-13). Of 78 watersheds reviewed, interim default riparian reserves had not been adjusted in 67 (nearly 86 percent) because interim boundaries were considered adequate, the burden of proof for change was too great, and no compelling reasons to adjust them were found. Actions in riparian reserves

included 927 miles of instream structures, 661 miles of instream passage, 68,847 acres treated, 660 miles treated, and 1,503 wetland acres treated.

TERRESTRIAL STRATEGY

Activities primarily associated with vegetation management include silvicultural activities, such as timber harvest, and mechanical (for fuels and density management) and prescribed fire treatments. The Plan assumed much of the harvest would arise from regeneration harvest in late-successional forests, including old-growth. Most of this harvest would be in the matrix and adaptive management area land use allocations. Additional harvest methods included partial removal such as selection cuts, improvement cuts, thinning where a commercial product is extracted, sanitation cuts, and density management which could be used in all land use allocations. Partial removal methods dominated across the Plan area regardless of land allocation. Of the 340,264 acres harvested, 287,414 acres (84.5 percent) were treated by techniques characterized as partial removal. Regeneration harvest was done on 52,850 acres (15.5 percent) of the acres harvested.

Other silvicultural activities, such as mechanical treatment and prescribed fire, were also used. In 2003, 1,904 projects were carried out on 131,603 acres. Most mechanical and prescribed fire treatments (68 percent or 1,306) and acres (59 percent or 78,430) were in the wildland-urban interface. Although this information is only for one year, it serves as a beginning point or baseline for future reports.

ECONOMIC WELL-BEING

Activities associated primarily with economic well-being include timber sales and grazing. The Plan used the term probable sale quantity (PSQ) for estimating the likely sustainable average annual timber sale volume. From fiscal year 1995 through 1998, the PSQ was 868 million board feet, however, expectations of volume sold would be 60 and 80 percent of PSQ for 1995 and 1996 respectively. This was due to start needs to implement surveys and conduct assessments. In 1999, estimates were reduced by 57 million

board feet to 811 million board feet and, in 2001, by 6 million board feet to the current PSQ of 805 million board feet.

Only those lands considered suitable for the production of timber on a sustained basis contribute volume to PSQ. Lands suited for long term timber production are located within matrix and adaptive management areas the land allocations in the Plan.

The PSQ amounts and the volume offered have been annually tracked by the agencies. The PSQ estimates are a decadal measure based on volume estimates from matrix and adaptive management areas. The Forest Service measures achievement of PSQ on a decadal basis since the regulations allow for annual fluctuations. The O&C Act, which guides the management on the Oregon BLM lands, requires that the BLM offer the established harvest level on an annual basis. Timber sustainability is the yield that a forest can produce continuously at a given set of management intensities. Volume offered is an annual measure that reflects all volume offered regardless of the land use allocation, and it therefore cannot be compared directly to PSQ anticipated levels. Volume offered includes volumes from reserve lands such as late successional and riparian reserves and from wood not meeting utilization standards, neither of which count towards PSQ attainment.

For the reporting period from 1995 to 2003, about 4.736 billion board feet of timber have been offered for sale for all FS and BLM agencies in the Plan. About 3.633 billion board feet has been offered by FS units and about 1.103 billion board feet has been offered by BLM units. An average of about 526 million board feet per year has been offered in the nine years of the reporting period.

The volume attributable to PSQ of the total volume offered is estimated to be about 80 percent over the 9 year reporting period, with 20 percent of the volume offered resulting from timber sales in reserved lands. Thus, about 421 million board feet of timber is attributable to the PSQ on an average annual basis since 1995, which can be loosely compared to the expected average annual amount of 776 million board feet

expected for this reporting period (including reductions due to the start up period). About 105 million board feet offered annually resulted from management on reserve lands.

Range use decreased between 1993 and 2002 as was expected. The number of animal unit months and allotments both decreased by 30 percent and the number of permittees decreased by 37 percent.

PROCESS ACTIVITIES

The Plan identified three processes central to its strategy: adaptive management, interagency collaboration, and public participation in agency implementation of the Plan and decision making.

Ten adaptive management areas (AMAs) were established across the region. They range from about 92,000 to nearly 500,000 acres of federally managed lands and are well distributed in the physiographic provinces of western Oregon, Washington, and northern California. Management plans were developed for nine of the 10 AMAs.

One AMA objective was to test the ROD's standards and guidelines or alternative management approaches. A review of Pacific Northwest Research Station projects from 1999 to 2003 indicated that only 7 of 31 studies related to the Plan have been conducted in AMAs. Of these, only four specifically tested the standards and guidelines or new management approaches.

Interagency collaboration has been a focus of activities in the Plan area. An interagency decision group was formed, as stipulated in the Plan, called the Regional Interagency Executive Committee (REIC), where the chair rotates between the FS and BLM. This interagency group serves as the senior regional entity to provide prompt, coordinated, and successful implementation of the Plan. The Plan also established the Regional Ecosystem Office, which is responsible for developing, evaluating, and resolving consistency and implementation issues. Other examples of interagency, collaborative groups include the

Office of Forestry and Economic Assistance, and the Oregon, Washington, and California State Community Economic Revitalization Teams.

Local government and interest group participation implementing the direction in the Plan was encouraged by establishing the Provincial Advisory Committees (PACs) for each of the 12 planning provinces. One of the main objectives was to use this group for implementation monitoring of projects on federal lands. The PACs include members of local communities; representatives from federal, state, county, and tribal governments; the timber industry; environmental groups; recreation and tourism organizations; and up to five other public-at-large members, all of whom serve as key advisory bodies to the Provincial Interagency Executive Committees (PIECs). The members of the PIECs are responsible for federal land management activities in each province. Because of this thorough inclusion of many different communities and perspectives and because the PAC meetings are open to the public, these groups are consistent with the Federal Advisory Committee Act requirements.

Compliance with standards and guidelines

The ROD consists of detailed standards and guidelines and land use allocations that provide a framework for ecosystem management principles for three interrelated strategies: aquatic, terrestrial, and socioeconomic. In May 1995, a guide for implementing monitoring was prepared to be used in developing the implementation monitoring program for assessing compliance with the standards and guidelines. The program has two parts: a regional implementation monitoring team (the regional team) and twelve provincial implementation monitoring teams (the provincial teams). The regional interagency team has a full-time leader and several part-time, supporting, interagency staff. Guidance to the team is provided by an interagency leadership group called the monitoring program managers.

The approach to implementation monitoring has been to identify a set of Plan projects or activities each year and then to determine how consistent they were with the Plan standards and guidelines. The project types to be monitored in a given year are identified by consulting with the monitoring program managers

and reviewing PAC recommendations. Each year, a list of applicable projects and activities is compiled by the region from field input. A random stratified sample is then drawn from this list to identify those projects or activities to be monitored that year. The PACs are then used to review the projects on the ground and determine whether standards and guidelines have been met. Annual monitoring reports were prepared to collate the responses across the Plan area. The results discussed in the compliance section of this report have been derived from the annual monitoring reports.

The monitoring of 240 projects from 1996-2003 showed that compliance with the standards and guidelines was high, but not all project types were monitored in high numbers. Where sufficient numbers of project types (>10) were monitored, the percentage compliance ranged from a low of 67 for timber sales to 100 for most other projects (such as timber sales, silvicultural projects, and restoration) in all land use allocations. More than 57 percent (92 of 162) of the timber sales monitored were 100 percent compliant; fewer than 7 percent (12 of 162) had compliance rates less than 90 percent. In total, 62.5 percent (150 of 240) of all projects monitored were 100 percent compliant, and only 8 percent (19 of 240) had compliance rates less than 90 percent.

From 1999 to 2003, 89 watershed scale activities and programs were monitored, showing much variability in compliance with the standards and guidelines. High compliance was noted for certain standards and guidelines; for example, 85 percent of those reviewed had reduced roads in key watersheds; and restoration opportunities were identified in 100 percent of the assessments reviewed. Compliance with other standards and guidelines was in the middle range (50-85 percent); for example, in using assessment information to develop priorities for restoration funding and strategies for monitoring. The standards and guidelines relating to developing a road management plan to meet aquatic strategy objectives had a compliance rate of 46 percent. This lower compliance would seem to indicate a problem, but -- on closer examination -- the respondents provided explanations that meeting aquatic strategy objectives was adequately addressed by other documentation, such as access travel management plans or Flood Emergency Response Management plans.

A review of implementation monitoring results was intended to identify patterns of noncompliance. Most instances are scattered across the entire spectrum of standards and guidelines, indicating relatively few individual compliance issues. For projects, 14 compliance questions resulted in noncompliance for at least 3 projects, mostly relating to snags, coarse woody debris and riparian reserve standards and guidelines. The major instances of noncompliance for watershed scale standards and guidelines (10 questions) centered mostly on the lack of completed or adequate planning documents, such as road management plans that focused on Aquatic Conservation Strategy objectives. Road management plans were often not completed when management units had other planning documents or internal administrative policies to minimize road effects. A definite trend toward improving compliance with most of the standards and guidelines is showing up as the road planning documents are gradually being funded and completed.

During the reviews, reasons for noncompliance were identified. Of the total of 90 instances of noncompliance for projects, 48 (53%) were due to improper planning, 18 (20%) were due to improper implementation of projects designed to follow the standards and guidelines, and 24 (27%) were for other qualified reasons. For example, one project cut 34 snags in 7 campgrounds for safety, so snag requirements were not met, nor could they have been, given public safety issues. The standard and guideline is applicable to timber sales and does not give qualifications for safety reasons, which is why the initial response was considered noncompliant.

Recommendations

The report concludes with recommendations for improving implementation monitoring for both activities and compliance monitoring. Changes are recommend in five topical areas, including developing an activities database that tracks accomplishments, improving the follow-up and distribution of compliance monitoring results, improving participation in monitoring, establishing a mandate and support for implementation monitoring for field units, and improving the general program design.

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Acronyms and Abbreviations

ACS – Aquatic conservation strategy

ACSO – Aquatic conservation strategy objective

AMA – Adaptive management area

APS – Annual program summary

ASQ – Allowable sale quantity

AUM – Animal unit month

AWD – Administratively Withdrawn Areas

BA – Biological assessment

BE – Biological evaluation

BLM – Bureau of Land Management

BO – Biological opinion

CA – California

CRGNSA – Columbia River Gorge National Scenic Area

CT – Commercial thinning

CWD – Coarse woody debris

dbh – Diameter at breast height

DFO – Designated federal official

DOI – Department of the Interior

EA – Environmental assessment

EIS – Environmental impact statement

ESA – Endangered Species Act

FS – Forest Service

FSEIS – Final supplemental environmental impact statement

GIS – Geographic information system

HUC – Hydrologic unit classification

IAC – Intergovernmental advisory committee

ID Team – Interdisciplinary team

IM – Implementation monitoring

INFRA – Infrastructure database

IRDA – Interagency restoration database

KRNCA – King Range National Conservation Area

LSOG – Late-successional and old-growth

LSR – Late-successional reserve

LSRA – Late-successional reserve assessment

LSRO – Late-successional reserve objectives

LUA – Land use allocation

MAR – Management attainment report

MAT – Matrix

MLSA – Managed late-successional area

MOU – Memorandum of understanding

MPM – Monitoring program managers

NEPA – National Environmental Policy Act

NFPORS – National fire plan operations & reporting system

NFS – National Forest System

NMFS – National Marine Fisheries Service

NOAA – National Oceanic and Atmospheric Agency

NPS – National Park Service

NSO – Northern spotted owl

O&C – Oregon and California

ONRC – Oregon Natural Resource Council

OR – Oregon

PAC – Provincial advisory committee

PCFFA – Pacific Coast Federation of Fishermen's Associations

PCT – Pre-commercial thinning

PIEC – Provincial interagency executive committee

PIMT – Provincial implementation monitoring team

Plan – Northwest Forest Plan

PNW – Pacific Northwest

PSQ – Probable sale quantity

PTSAR – Periodic timber sale accomplishment report

QAQC – Quality assurance; quality control

R5 – Region 5, Pacific Southwest Region, USDA Forest Service

R6 – Region 6, Pacific Northwest Region, USDA Forest Service

RAC – Resource advisory committee

REO – Regional ecosystem office

RIEC – Regional interagency executive committee

RIMT – Regional implementation monitoring team

RMP – Resource management plan

ROD – Record of decision

RR – Riparian reserve

Rx – Prescribed

S&G – Standards and guidelines

S&M – Survey and manage

STARS – Sales tracking and reporting system

TSIS – Timber sale information system

USDA – United States Department of Agriculture

USDI – United States Department of the Interior

USFWS – United States Fish and Wildlife Service

WA – Washington

WAs – Watershed analyses

WO – Washington office

WUI – Wildland urban interface

General Introduction

SCOPE

This report addresses both accomplishment of activities and compliance with standards and guidelines in the record of decision (ROD) for all or parts of 30 USDA Forest Service (FS) and USDI Bureau of Land Management (BLM) administrative units (the units) in the area of the Northwest Forest Plan (the Plan). This area encompasses nearly 25 million acres of federally managed land in Washington, Oregon, and northern California. Although the Plan includes lands administered by other federal agencies, this report is limited to actions by the FS and BLM, except where noted (as in restoration activities that include some National Park Service lands). The monitoring period addressed in this report was generally from 1994 to 2003.

Monitoring is an essential component of natural resource management because it provides information on the relative success of management strategies. The ROD for the Final Supplemental Impact Statement on *Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted* Owl (the Plan) stated that the implementation of the standards and guidelines would be monitored to ensure that management actions meet the objectives of the prescribed standards and guidelines. Monitoring results were intended to provide managers with the information to determine whether a goal has been met, and whether to continue or to modify the management direction.

The 30 units are 19 National Forests, 5 BLM Districts, 4 BLM Field Offices, the Columbia River Gorge National Scenic Area, and the King Range National Conservation Area. They are as follows:

Forest Service:

Washington	**Oregon**	**California**	**Washington, Oregon**
National Forests	**National Forests**	**National Forests**	**National Scenic Area**
Gifford Pinchot	Deschutes	Klamath	Columbia River Gorge
Mt. Baker-Snoqualmie	Mt. Hood	Lassen	
Okanogan	Rogue River	Mendocino	
Olympic	Siskiyou	Modoc	
Wenatchee	Siuslaw	Shasta-Trinity	
	Umpqua	Six Rivers	
	Willamette		
	Winema		

Bureau of Land Management:

Oregon	**California**	**California**
District	**Field Office**	**National Conservation Area**
Coos Bay	Arcata	King Range
Eugene	Redding	
Medford	Ukiah	
Roseburg		
Salem		
Klamath Falls (field office)		

Most of the Units are entirely in the Plan area except for the following: Columbia River Gorge National Scenic Area, and the Okanogan, Deschutes, Winema, Klamath, Lassen, Modoc, Shasta-Trinity, and Mendocino national norests, and the Ukiah, Klamath Falls, and Redding BLM field offices (Figure 1). Land area officially covered by the Plan in the Lassen and Modoc National Forests is so small that the associated activities have not been tracked separately by the agencies and are thus not included. Although small, those lands are also managed by the Plan's standards and guidelines (Woltering, et al., 2003, p. 3 and 4).

OVERVIEW

The two separate but related sections in this report are both about implementation monitoring for the Plan. The first summarizes the accomplishments of management activities during the Plan's first 10 years as they relate to aquatic, terrestrial, and social strategies and public involvement and collaboration process activities developed to meet Plan goals. The second summarizes the results of monitoring and whether the projects implemented and the watershed scale actions comply with the standards and guidelines from the Plan's ROD. Monitoring is intended to determine how well the Plan is working and whether expectations are being met. Implementation monitoring serves as an important baseline for both effectiveness and validation monitoring.

Each topic is divided into several sections: introduction, questions, results, data sources, and methods. Generally, the accomplishments and compliance are reported regionally, but occasionally they are reported for provinces, states, or FS regions depending on data availability and compatibility. Many, but not all, activities described in the Plan's ROD are covered in this report. Those not addressed here (such as recreation and mining) may be covered in the "Northwest forest plan: the first ten years, rural communities and economies", (Charnley et al., 2005). Activities addressed in other RODs (such as for the survey and manage species

documents) are not covered in this report, nor are those management actions that do not have standards and guidelines listed in the ROD (such as inventories).

Accomplishments

INTRODUCTION

Reviewing land management activities requires evaluating actual Plan actions, including watershed analysis, timber harvest, road management, and aquatic conservation projects, as well as other activities, such as restoration and grazing. Here, the key activities are reviewed by comparing them to expectations based on Plan assumptions. This section thus sets the stage for a better understanding of the findings of effectiveness monitoring.

Both expected and actual activities are reported for each variable if both types of data are available. Where only the activity data exist and the expected level of activity cannot be quantified, the actual activity is reported without reference to what was expected. The absence of data is also addressed. Either way, the basis for the expectation, even if only qualitatively, and the data sources for both expected and actual activities are addressed.

Management activities are grouped into the following four categories, though most activities are actually part of more than one category: the Aquatic Conservation Strategy, vegetation management, economic and social well-being, and process activities developed to meet Plan goals. The Aquatic Conservation Strategy has four components: watershed analysis, key watersheds, riparian reserves, and watershed restoration. Project activities have aspects of vegetation management while contributing to economic and social well-being. Timber harvest, using a variety of silvicultural systems, can be a restoration activity and also supply wood products to support economic and social well-being. Selected activities of each category are

described under headings of expectations, associated monitoring questions, results, and data sources and methods.

Collecting two kinds of data required two different kinds of sources. Agencies collected quantitative data and qualitative assessments. The quantitative data consist of reported outputs and activities. Experts made more subjective, qualitative assessment of activity accomplishments, such as the results of collaboration.

Responsibility for quantitative data collection belongs to the field units, such as from FS Ranger Districts and BLM Field Offices. The units record information in various ways, including individual field-unit records, unit accomplishment reports (BLM), management accomplishment reports (FS), and national or regional databases. Agencies collected information on accomplishment from existing upward reporting processes, such as timber volume offered for sale and activities accomplished. More detail on units of measure, comparability, reports, and responsibilities for each activity follow. The quantitative data reported in the results section was assembled from agency regional and state office databases and / or existing reports and reviewed by agency specialists.

Scientists and other experts made the qualitative assessments on how social process strategies were initiated and operated. For example, Shindler et al. (1999) "examined the written record and other evidences and ideas from public involvement efforts" to "evaluate citizen and agency interactions" and the Plan was assessed for the President and Congress by Tuchmann et al. (1996).

Data completeness and its use are influenced in several ways, such as:

- Different data-reporting standards, protocols, and definitions used by the agencies;
- Different times for which data were available;
- Individual subjectivity in reporting data; and

- Forest and district boundaries split by the Plan's boundary - - that is, inability to distinguish from some existing reports if accomplishments are in or out of the Plan area.

Moreover, data can be unavailable in the format needed to answer the monitoring questions or it may not exist. When these problems appear, this report attempts to explain the extent of the existing data coverage. Where results are presented, they are considered to represent the type and degree of actions accomplished in the Plan area.

ACTIVITIES ASSOCIATED PRIMARILY WITH THE AQUATIC CONSERVATION STRATEGY

The aquatic conservation strategy consists of four components: watershed analysis, key watersheds, watershed restoration, and riparian reserves.

Watershed Analysis

What were the expectations?

The ROD (USDA, USDI, 1994b ROD p.10) says that watershed analysis is a systematic procedure to characterize the aquatic, riparian, and terrestrial features in a watershed. Managers are expected to use information gathered during watershed analyses to refine riparian reserve boundaries, prescribe land management activities including watershed restoration, and develop monitoring programs. Watershed analysis, one of the primary components of the Plan's aquatic strategy, is required prior to conducting activities in key watersheds, inventoried roadless areas in non-key watersheds, and riparian reserves before initiating all but minor actions. Watershed analysis is not designed to encourage new human disturbance; it is focused on collecting and compiling information about the watershed, in areas where management activities are permitted, and it is essential for making sound management decisions (USDA, USDI, 1994b, ROD p. 73).

The ROD does not quantify the expectation, but instead states that watershed analyses should be completed before actions, except for minor ones, are initiated in a key watershed. Priority for the earliest completion of watershed analysis is given to key watersheds with planned activities. The analyses are also required in inventoried roadless areas and riparian reserves before projects are implemented (USDA, USDI, 1994b, B-30). Ultimately, watershed analysis should be conducted in all watersheds on federal lands as a basis for ecosystem planning and management (USDA, USDI, 1994b, B-20). Also, as new information became available, the analysis was expected to be updated.

What are the monitoring questions?

Were watershed analyses completed as expected?

- How many watershed analyses were completed in both key and non-key watersheds?
- Have watershed analyses been updated?

Results

About 550 fifth-field watersheds containing lands managed by the FS and BLM are in the Plan area. Agency records show that about 89 percent of the analyses, covering an average of more than 85 percent of the federal land area for all units, were reported as completed, through February 2003 for R5 and through March 2004 for R6 and the BLM (Table 1), where data are available for 28 of 30 administrative units. The Lassen and Modoc national forests are not included because of the small amount of these forests in the Plan area.

As part of compliance monitoring, watersheds were also reviewed and evaluated to see if the watershed analysis had been completed. Results for when watershed analysis is required for project implementation was evaluated during project level compliance monitoring. From 1999 to 2003, watershed analyses had been completed for 75 of 88 (85 percent) of the reviewed

watersheds (Figure 2, one watershed reviewed did not respond to the question). Monitoring also showed that nine of the analyses reviewed had been updated and that most of the analyses (93 percent) had been completed in the first five years of the Plan (1994-1998).

Some additional watershed analysis information for key watersheds can be pieced together from agency records. Units reported completing watershed analyses on an average of more than 91 percent of the area in the 164 key watersheds. Key and non-key watershed data for 15 administrative units had a 93 percent completion rate for key watershed analyses (Table 1). Also, the monitoring program for compliance with standards and guidelines reviewed 46 fifth-field watersheds containing all or portions of key watersheds monitored from 1999 to 2003 and determined that 44 (> 95 percent) had a completed analysis.

The agencies also reported completing watershed analyses for most of the Plan's inventoried roadless areas. Inventoried roadless areas are on national forest system lands only. Ten administrative units have completed watershed analyses for all inventoried roadless areas in non-key watersheds, and eight administrative units have not (Woltering, et al., 2003, p. 22).

Watersheds with small amounts of federally managed land, lack of cooperators, or lack of planned project activity (such as in inventoried roadless areas) had a low priority for conducting analyses (Woltering, et al., 2003, p. 22). As a result, the land management agencies have not been driven to spend money on this process requirement in these remaining areas.

The exact numbers of completed analyses at the same (fifth-field) scale are unknown because the units did not report these figures consistently (Table 1). The statement of greater than 89 percent completion of watershed analysis is considered accurate. The amount of the area covered (85 percent) is considered conservative and is likely more because the data only represent what is actually known.

Data Sources and Methods

Data sources include the following: annual program summaries for Oregon BLM; FS annual management attainment reports; the 2003 biological assessment[1] (2003 BA), Scott C. Woltering, Threatened and Endangered Species Aquatic Biologist, FS R6; Joe Moreau, fishery biologist, OR/WA State Office, BLM; inventory and monitoring program plans (FS); Watershed Analyses in the Pacific NW Region (10/8/02) (FS); Plan completion report (FS); the Plan ROD; and other records maintained by agency specialists. In addition, the results were supplemented with data from the Northwest forest plan (NWFP) compliance monitoring database. The completed analyses for the King Range National Conservation Area were included in the totals for the Arcata unit.

The number of completed watershed analyses reported in the 2003 BA was updated through March 2004 for BLM in California and Oregon and FS R6 via consultation with the Oregon State BLM Office, and FS R6 headquarters personnel. Information for FS R5 was as of February 2003. Region 6 and OR BLM have accomplishment reports that list the number of watershed analyses completed each year. No watershed analysis database has been developed by either agency, however. Resource specialists have developed and maintained data sets to fit their individual needs. Portraying a region-wide map of watersheds with completed analyses was intended, but it cannot be produced now because many watershed names, boundaries, and identification numbers have changed over the years, and those changes have not been tracked consistently. To produce a map covering the watersheds with completed analyses in the Plan area, the units would need to be contacted individually, given a standard base map, and instructed to identify the watersheds with completed analyses. Inadequate time and resources prohibited such a map from being completed for this report.

[1] Woltering, S.C., Moreau J., McDougal L. 2003. Biological Assessment of the USDA Forest Service (FS) and USDI Bureau of Land Management (BLM) Land and/or Resource Management Plans (RMPs) in the Northwest Forest Plan (NWFP) Area, June 19, 2003. 106 pp.

Key Watersheds

What were the expectations?

Quantitative expectations were not identified in the ROD. Expectations were implied by the standards and guidelines relating to key watersheds (ROD B-18 and 19 and C-7). They include:

- Key watersheds would reflect inherent aquatic values;
- Key watersheds would serve as refugia for maintaining and recovering habitat for at risk stocks of anadromous salmonids and resident fish populations; and,
- Priority for restoration would be toward key watersheds, within funding constraints, resulting in no increase in roads in inventoried roadless areas in key watersheds and a net decrease in roads in key watersheds.

What are the monitoring questions?

Based on the identified expectations, the following questions are addressed by activity accomplishment monitoring, supplemented with compliance monitoring information:

- Did agencies implement key watersheds, and what is their total population?
- Were key watersheds based on inherent aquatic values?
- How much restoration activity was in the key watersheds?
- Did the road miles in inventoried roadless areas in key watersheds increase?
- Did the road miles in key watersheds decrease since the Plan was implemented?

Results

Through the ROD, the agencies identified 164 key watersheds (Figure 3) in the Plan area (USDA, USDI, 1994b, p. ROD-10). The criteria provided in the Plan for establishing a key watershed were:

- Fifth-field watersheds with some or all of the land managed by the federal government;
- Watersheds with at-risk anadromous salmonids, bull trout, and resident fish; and,
- Watersheds where protecting high water quality was important.

Two types of key watersheds were described by additional criteria (USDA, USDI, 1994b, p. ROD-10):

- Tier 1 key watersheds contribute directly to conserving at-risk fish species. They also have a high potential of being restored and are mostly watersheds previously identified by the scientific panel on late-successional forests (Thomas, et al., 1993) or the scientific assessment team (FEMAT 1993).

- Tier 2 key watersheds are important sources of high quality water, yet may not contain at-risk fish stocks.

The ROD actually lists two different sets of numbers: 141 Tier 1 and 23 Tier 2 (USDA, USDI, 1994b, p. ROD-10); and 143 Tier 1 and 21 Tier 2 (USDA, USDI, 1994b, p. B-18) for the two types of key watersheds; however, the total acreage in key watersheds is identical. The former set is used for reporting purposes because these numbers are found in the decision portion of the ROD. The 141 Tier 1 key watersheds encompass 8,119,400 acres and the 23 Tier 2 key watersheds encompass 1,001,700 acres. In total, key watersheds encompass 9,121,100 acres or 37 percent of the Plan land base. The other, non-key watersheds total 15,334,200 acres or 63 percent of the federal land base. Only two administrative units, the Columbia River Gorge National Scenic Area and the Ukiah Field Office have no key watersheds.

Activities reported in the interagency restoration database (IRDA), accomplished in key watersheds from 1998 to 2003, include 240 miles of instream structures, 117 miles of instream passage, 3,933 riparian acres treated, 113 miles of riparian area treated, 6,474 upland acres

treated, 295 miles of roads decommissioned, 1,235 miles of roads improvements, and 286 acres of wetlands treated (see definition of categories, Table 2), but the actual amount is certainly greater (see data constraints described in the data sources and methods section, below). Figures 4a-c show the general location and distribution of restoration projects in the Plan area in both key and non-key watersheds: both table and figures show key watersheds were not the expected priority for restoration. The field unit's most common explanations given during compliance reviews were that not all of the key watersheds needed restoration; that avoiding even short-term effects on watersheds is important to fish and to watersheds with high water quality; and that more important and immediate needs were identified in non-key watersheds (for example, providing fish passage, shade and habitat) (Annual Implementation Monitoring Reports 2000-2003).

Aquatic scientists identify roads as having one of the most significant management effects on the habitat of listed fish species and water quality in the Pacific Northwest. Agency roads databases do not record information by key watersheds, but the interagency restoration database for 1998-2003 shows that more than 295 miles were decommissioned and nearly 1,235 miles were improved in key watersheds. From 1999 to 2003, compliance monitoring sampled 89 watersheds containing 46 key watersheds to determine compliance with reducing road miles. Actual amounts of mileage reductions on monitored key watersheds were recorded from 2000-2003, including:

- Overall road mileage in 40 reviewed key watersheds was reduced 509 miles (8.5 percent), compared to 470 miles (5 percent) in the remainder of the reviewed fifth-field non-key watersheds (Table 3).
- Specifically, road mileage was reduced in 34 of the reviewed key watersheds, increased in 1 (for temporary roads), and remained constant in the remaining 5 (that is, no new building or reductions).

Compliance monitoring in the 40 key watersheds is considered to represent the status of road mileage in the remaining key watersheds in the Plan area. The contrasting results comparing key

watersheds with non-key watersheds (Table 2) can perhaps be explained by the lack of data from some administrative units and how results were recorded for roads partially within key watersheds (Table 2). The lack of a baseline accounts for the inability to report road mileage increases in inventoried roadless areas in key watersheds.

Data Sources and Methods

Data sources include the 2003 Biological Assessment, Plan Record of Decision, Plan FEIS, interagency restoration database (IRDA), NWFP compliance monitoring database, and agency road databases. Values from these databases and documents were collated to provide results. Data gaps were filled if the values were easily attainable. Unit data calls were not done.

The activities listed in the interagency restoration database (used to develop Table 2) represent only a portion of those actually completed. Unit participation in providing data to be included in the database was sporadic and not comprehensive, largely because of the lack of time, money, and need. Restoration accomplishments might be available from individual units, but limited time and resources hindered collecting that information.

Changes in road mileage by key watersheds or by inventoried roadless areas are not available from the regional and state office databases. This question could be answered by a lengthy process involving regional GIS personnel—and a data call to the units, requiring each unit to devote a lot of time and resources to analyze (developing GIS coverage and verifying road status) and establish a baseline from which to measure future changes. The large amount of time and work needed to find data to answer the road related questions were not anticipated, so some monitoring questions about roads cannot be addressed in this report (see Table 4). Maps showing FS inventoried roadless areas can be viewed at http://www.roadless.fs.fed.us/, but they do not show existing roads.

Restoration Projects

What were the expectations?

Watershed restoration is designed to restore currently degraded habitat. The most important components are controlling and reducing road-related runoff and sediment, restoring riparian vegetation, and enhancing instream habitat complexity. Restoration programs were to initially focus on arresting road-related erosion and using silvicultural treatments in riparian reserves to restore canopies of large conifers. Instream restoration is inherently short-term, and it will be accompanied by upslope and riparian restoration to achieve long-term watershed restoration (USDA, USDI, 1994b, p. ROD-10).

Watershed restoration is designed to address past disturbances by treating roads (such as decommissioning, upgrading, and modifying drainage), restoring riparian vegetation, and restoring instream habitat structure (USDA, USDI, 1994b, p. ROD-73).

No quantified expectation was found: the goal was to make restoration a priority and accomplish it.

What are the monitoring questions?

- What were the treatments?
- How much money was invested on restoration projects?
- What were the restoration treatments in riparian reserves? (see riparian reserve results section).

Results

The BLM and FS have made restoration a priority, as recorded by the results from 89 watershed scale activity reviews from 1999 to 2003. Seventy-nine watershed analyses (88 percent) identified opportunities for restoration and 76 percent used information from the analyses to develop priorities for restoration funding. Reported restoration accomplishments by the FS and BLM are shown for 1998 to 2003 (Table 2); their location and distribution are shown in Figures 4a-c. Accomplishments include 927 miles of instream structures, 661 miles of instream passage, 68,847 acres of riparian treatments, 32,415 acres of upland treatments, and 3,085 miles of road improvements; the actual amounts are undoubtedly greater because not all restoration efforts have been reported (see discussion in data source and methods section).

A particular focus of watershed restoration has been reducing road mileage (Woltering, et al., 2003, p. 71). As of 2002, the net system road mileage in units where data were available (25 of 30) had been reduced by 4,307 miles or 4.7 percent in various ways (Woltering, et al., 2003, p. 26-27 and Table 4). New road building in FS Plan areas had also decreased since the late 1990s (Figure 5). Decommissioning had also decreased over time, but continued to average nearly nine times the amount of roads built each year from 1995 to 2002. The outcome was similar for BLM OR, where nearly 100 miles were built and about 1,015 miles were closed or decommissioned for the same time period. The total amount of roads built on BLM and FS lands from 1995 to 2002 was 353.5 miles; the total amount of decommissioned or closed roads was 3,324 miles (Table 5).

Maintaining roads is also important to the aquatic strategy. From 2000 to 2003, an average of 20,590 miles or about 30 percent of FS R6 and BLM OR system roads were maintained annually (Table 6). As expected, the more traveled roads (maintenance levels 3-5) received priority.

The cost of the restoration projects listed in Table 2 at the locations shown in Figure 4 was reported as $90,818,928 from 1998 to 2003 (Table 7). The boundaries of the hydrologic units listed in Table 7 are shown in Figure 6.

Data Sources and Methods

Data sources include the 2003 biological assessment, NWFP compliance monitoring database, interagency restoration database, FS infrastructure database, BLM roads database, BLM annual program summaries and the Plan's ROD.

The ROD specified qualitative expectations, and the interagency restoration database recorded acres and miles treated by location and expenditures. The original data sources used to populate the agency databases were local field-unit maps and records for both the FS and BLM.

The interagency restoration database was begun in 1998. Data from earlier years were not used because the reporting focus was different (for example, jobs rather than accomplishments), and data were not compiled in 1997. The reliability of data used in developing Table 2 is not complete because of inconsistent field participation in reporting accomplishments and lack of consistency across units about which units of measure to report; for example, some units reported acres treated, and others miles treated. All data provided from databases were marked: "Data not available for some administrative units. Others may be incomplete. Most of the data provided is for Oregon and Washington."

The compatibility of databases to display some changes (such as road decommissioning) to the system road network varies by agency, state or regional office, and by individual unit. Each agency interprets road categories somewhat differently. As a result, Figure 5 and the accompanying description of BLM accomplishments were developed from data based on various definitions of road decommissioning used by the BLM, R5, and R6. Changes in roads by agency

individually for BLM in Oregon and the FS regions are shown in Table 5. Also, the agency databases do not have a reliable way to determine the amount of system roads in riparian reserves because a spatial layer is not available. Thus, questions about the length of roads, road building, and road decommissioning in riparian reserves cannot be addressed.

Road mileage for national forests partially in and out the Plan area also includes system road mileage for the non-Plan areas. Thus, of the 10 FS units with non-Plan area, the Deschutes, Okanogan, and Winema National Forests are at least 28 percent or more non-Plan area (Table 4, which is derived from the 2003 BA). The Colombia River Scenic Area, Klamath, Mendocino, and Shasta-Trinity units are less than 5 percent non-Plan area. The BLM system road mileage is only for the Plan area (Woltering, et al., 2003, p. 26). Net changes to BLM road mileage represent time differences from year 2000 to 2003 except for the Arcata and Redding units, which cover changes from 1994 to 2003. The period used to calculate net changes to road mileage by unit for the FS differs by region and units. The Oregon and Washington units cover differences for 1993-2002; the California units vary, for the most part, by national forest: the Klamath (1993-2002), Six Rivers (1994-2002), and the Mendocino and Shasta-Trinity (2000-2002). The Colombia Gorge Scenic Area road mileage was not tracked separately from the Mt. Hood and Gifford Pinchot national forests until recently, so net changes were not used. No data were collected for the Modoc and Lassen national forests because so little land is in the Plan area. Existing FS roads with incorrect mileages in the database were corrected. Some user created ghost roads, not inventoried because they were not agency approved, have been entered into the Infra database (Woltering, et al., 2003, p. 27). Although most units exhibited a net reduction for road mileage, this finding is confounded because the outcome of initiatives to validate management jurisdiction of road segments was also included in the net total. Thus, the numbers in Table 4 are the net outcome of the miles of road decommissioned, small increases in miles of road built, and changes in management jurisdiction for roads (Woltering, et al., 2003, p. 71). With such large databases on the national forests, omissions and other kinds of errors are to be expected, uncovered, and corrected from time to time (Woltering, et al., 2003, p. 27).

Riparian Reserves

What were the expectations?

Riparian reserves are intended to restore and maintain aquatic ecosystem functions including terrestrial riparian habitat for dispersal and connectivity. Together with other components of the aquatic conservation strategy, riparian reserves will provide substantial benefits to watershed protection and they were also designed to help reach and maintain water quality standards, a fundamental aspect of watershed protection. Both riparian and late-successional reserves were to provide areas of high quality stream habitat and act as centers from which degraded areas can be recolonized as they recover (USDA, USDI, 1994b, B-12-13).

In general, except for habitat improvement, activities were not expected in riparian reserves that did not improve riparian dependent conditions and necessary for restoration (USDA, USDI, 1994b, B-31). Riparian reserve widths established in the ROD were intended to be interim until field units adjusted them to fit local conditions through watershed analysis and field examination (USDA, USDI, 1994b, ROD-10). Thus, the direction in the ROD merely spelled out the intent and starting points from which expected adjustments to the riparian widths would be made (USDA, USDI, 1994b, B-13).

What are the monitoring questions?

A key question is, were riparian reserves established as stipulated by the ROD standards and guidelines and were they modified following watershed analysis and site specific project analysis?

Two other monitoring questions are

- What actions were taken to improve riparian reserves?

- How much of each action was accomplished?

Results

The agencies generally mapped interim riparian reserves as projects were planned. According to the Plan's ROD, the interim reserve widths were designed to provide substantial protection for fish and riparian habitat until watershed and site-specific analysis could be completed. Few adjustments were made to the interim widths (Woltering, et al., 2003, p.66), however, and only where obvious (for example, when a riparian-reserve width based on tree height extended over the top of a ridge). Results of compliance monitoring in 1999 to 2003 also supports this observation. Of 78 watershed assessments reviewed, interim riparian reserve widths had not been adjusted in 67 watersheds (nearly 86 percent). Field personnel reported that they thought the burden of proof required to change the widths was generally too great, the interim boundaries were considered adequate or better, or both, and, no compelling reasons to adjust them were found (Annual Implementation Monitoring Reports, 2000-2003).

During project compliance monitoring from 1996 to 2003, the following questions were asked during the monitoring reviews about the ROD standards and guidelines and resulted in higher levels of noncompliance:

- ❖ Have the riparian reserve boundaries been established for seasonally flowing or intermittent streams, wetlands less than 1 acre, and unstable and potentially unstable areas as the greater of the following:
    - The extent of unstable and potentially unstable areas (including earth flows);
    - The stream channel and extent to the top of the inner gorge;
    - The outer edges of riparian vegetation;
    - The slope distance of one site-potential tree height or 100 feet; or

- As modified through watershed analysis, Interdisciplinary team, and a National Environmental Policy Act process?

❖ Have riparian reserve boundaries been established for permanently flowing, non-fishbearing streams (the greater of):

- The top of the inner gorge;
- The outer edges of the 100-year floodplain;
- The outer edges of the riparian vegetation;
- The slope distance of one site-potential tree height, or the slope distance of 150 feet, or;
- As modified through watershed analysis, Interdisciplinary team, and a National Environmental Policy Act process?

The results of the first question were 14 of 184 applicable projects monitored (8 percent) did not meet the standard and guideline for intermittent stream riparian reserves. The results of the second question were 5 of 146 applicable projects monitored (3 percent) did not meet the standard and guideline for permanently flowing stream riparian reserves. For further explanation and analysis, see Table 8 and Appendix A.

Between 1998 and 2003, the agencies took the actions listed in Table 2 and shown in Figure 4a-c to treat streams, wetlands, and acres in the riparian reserves. The actions included 927 miles of instream structures, 661 miles of instream passage, 68,847 acres treated, 660 miles treated, and 1,503 wetland acres treated (see data sources and methods sections for key watersheds and restoration projects for an explanation of the completeness of this information). The types of activities reported in compliance monitoring mirrored those listed in Table 2 and described above.

Similar to the emphasis described in the sections on key watersheds and restoration projects, road management is important in riparian reserves. Agencies do not track road management specifically in riparian reserves, but compliance monitoring evaluated 77 watershed analyses

during 2000 to 2003, in part to determine the existence of road management plans that addressed the aquatic strategy objectives for riparian reserve management in relation to roads (USDA, USDI 1994b, C-33, RF-7). Of the 80 responses, 46 percent had plans that specifically addressed these objectives (Table 8). (The total number of responses is different from the assessments reviewed because the number of responses includes watersheds monitored more than once and the answer changed between reviews. In addition, the question was not asked in 1999). Most reporting units without plans specifically addressing roads in riparian reserves thought aquatic strategy objectives were covered in other documents or in other ways, such as project NEPA analysis, standard operating procedures, Flood Emergency Response Management plans, and unit-wide travel management plans. Evaluation showed that every method addressed some of the priorities listed in the standards and guidelines for:

- Inspecting and maintaining roads during and after storms;
- Regulating traffic during wet periods;
- Identifying and correcting road drainage problems to prevent damage to riparian reserves; and
- Developing road management objectives for each road.

Regardless of the method, none, however, addressed all of the priorities. The most frequent explanations given during compliance monitoring were the lack of adequate workforce and budgets to develop plans and conduct the work and the rationale that several other means were used to address and meet the aquatic strategy objectives.

Data Sources and Methods

Data sources include: 2003 BA, the Plan's ROD, Interagency Restoration database, and the compliance monitoring database. For an explanation of the data limitations, refer to the restoration projects data sources and methods section.

ACTIVITIES PRIMARILY ASSOCIATED WITH VEGETATION MANAGEMENT (TERRESTRIAL STRATEGY)

Silvicultural Activities

Timber Harvest Activities

Background

This background applies to this section as well as the next section titled "ACTIVITIES ASSOCIATED PRIMARILY WITH ECONOMIC WELL-BEING". A direct link exists between discussions of timber harvest activities and acreage treated and the resultant board feet produced as a product to support social and economic well being. To achieve a certain timber volume, assumptions were made on the types of treatments that would be necessary in younger and older forests. The following is a discussion of what was anticipated to be produced for timber volumes and, both, the types of treatment to occur and the types of forested stands to be treated.

In April 2, 1993, at the Forest Conference, President Clinton set forth five principles to guide and develop a management strategy to protect the old-growth related species and produce a sustainable harvest of timber. The principle relevant to forest products was "the plan should produce a predictable and sustainable level of timber sales and non-timber resources that will not degrade or destroy the environment." (USDA, USDI, 1994b, p. 3). The FSEIS for the Plan set its purpose and need as "…the need for a sustainable supply of timber and other products that will help maintain the stability of local and regional economies, and contribute valuable resources to the national economy, on a predictable and long-term basis." (USDA, USDI, 1994b, p. 26).

In the FSEIS for the Plan, “the federal forests of the region are to be managed under a nondeclining yield mandate which means that scheduled annual harvest levels can be maintained without decline over the long term if the land allocations and associated standards and guidelines and the planned schedule of harvests and regeneration are followed.” (USDA, USDI, 1994a, p. 3&4-263). This can also be stated as the “planned harvest level in future decades cannot be less than the current decade’s planned harvest level.” (USDA, et al. 1993, p. VI-4), meaning that planned harvest levels can be predicted and sustained over the long term**.**

The Plan relies on the analysis in FEMAT (USDA, et al. 1993) report for timber production estimates with the probable sale quantity (PSQ) being used instead of allowable sale quantity (ASQ). The objective associated with PSQ was to “estimate sale levels likely to be achieved as opposed to estimating ceiling or upper-limit harvest levels (ASQ). The use of PSQ rather than ASQ recognizes the uncertainties in the estimates.” (USDA, USDI, 1994a, p. 3&4-263). The PSQ levels represent neither minimum levels that must be met nor maximum levels that cannot be exceeded. They are rough approximations because of the difficulty associated with predicting actual timber sale levels over the next decade, given the discretion that agency land managers possess in administering plans and deciding when and where to offer timber sales, as well as the complex nature of implementing many of the standards and guidelines. The PSQ estimates represent the best assessment of the average amount of timber likely to be awarded annually in the planning area over the next decade after a start up period (USDA, USDI, 1994b, p. 19). It was also anticipated that sustainable sale estimates were expected to be revised with the completion of draft Forest and District plans or when current plans are revised (USDA, USDI, 1994a, p. 3&4-263).

Only those lands considered suitable for the production of timber on a sustained basis contribute volume to PSQ. Lands suited for long term timber production are located within matrix and adaptive management areas of the land allocations in the Plan. Matrix and adaptive

management area lands include productive forest, nonproductive forest and non-forest lands. Timber suitable acres, on the other hand, include only the physically and economically suitable timberland in the matrix or adaptive management areas. So although lands within matrix and adaptive management areas contribute to the PSQ, not all the lands in these areas are suitable for timber production (USDA, USDI, 1994a, p. 3&4-264).

There are also land allocations in the Plan area that are not suited for timber production and are incompatible with the objective of sustained timber yields: congressionally reserved areas such as wilderness; administratively withdrawn areas, such as those areas designated in local forest plans or resource management plans that do not focus on timber production such as intensive recreation; late-successional reserves; and riparian reserves. When timber volume is produced from these lands, the prime objective is not producing timber but in conducting vegetation management to achieve other resource or management objectives. For example, thinning is done in young stands to increase growth in residual trees in late-successional reserves. The volume produced from thinning trees does not contribute to PSQ volume levels, although the volume is included in the annual volume offered for sale to purchasers and trees do go to the mills for processing. This results in supporting jobs and the local economy. Therefore, volume offered includes both volume attributable to the PSQ (arising from timber sales on matrix or adaptive management areas) and volume arising from vegetation management on reserve lands to meet resource or management objectives.

The PSQ level identified in the FSEIS for the Plan was 958 million board feet. This is considered "net" volume and does not include "other wood". Other wood is defined as decaying or deformed wood that is not processable in the mills. Other wood also includes smaller diameter wood not meeting utilization standards and therefore not considered in the PSQ calculations. Historically, other wood accounted for about 10 percent of the volume offered from timber suitable lands (USDA, USDI, 1994a, p. 3&4-269).

Of the 24.5 million acres of federal land under the Plan, approximately 8 million acres are estimated to be late-successional forest, including old-growth (USDA, USDI, 2000, p. 220). Late-successional forests are those seral stages that include mature and old-growth age classes, normally including stands more than 80 years old. Of the total area of the Plan, about 4 million acres are in matrix lands and 1.5 million acres are in adaptive management areas. Of these acres in 1994, the Plan estimated that there were about 1.3 million acres of late successional forests in matrix and adaptive management areas (USDA, USDI, 2000, p. 430).

Changes in the PSQ and late-successional forest acres since 1994

Between 1994 and 2000, a 15 percent reduction in the PSQ resulted from finalizing FS and BLM resource management plans and adjustments to the riparian reserve network, especially including intermittent stream reserves. This new value for the PSQ was 811 million board feet. Additionally, in 2001, the BLM State Director lowered the PSQ for the Coos Bay and Eugene Districts by 6 million board feet to 805 million board feet in response to the transfer of lands to the Coquille Tribe and additional protection for late successional forests (USDA, USDI, 2004 p. 221). These changes corresponded to a reduction of late-successional forest within matrix and adaptive management area, leaving about 1.1 million acres of late-successional forest in the land allocations contributing to PSQ timber harvest volume.

Additional reductions in PSQ are from implementing the decision and FSEIS (USDA, USDI, 2004) to remove or modify the survey and manage mitigation measure standard and guidelines. This FSEIS estimated that the PSQ would be reduced from 805 million board feet to 770 million board feet in the Plan area. Effects at the administrative unit would vary from this regional-scale analysis, however, the PSQ at a regional scale for the national forests and BLM districts would not be declared (USDA, USDI, 2004, p. 219). The PSQ remains at 805 million board feet. Modifications from this decision to National Forest and BLM District level PSQ would be based on

the accumulation of specific, unit effects during individual land and resource management plan revisions (USDA, USDI, 2004 p. 228).

Expectations

Most of the harvested volume in early decades after the Plan's adoption was assumed to come from late-successional forests including old-growth in the matrix, much of it through regeneration harvest (USDA, USDI, 2000, p. 431). Individual NF and BLM resource management plans outline assumptions for the amount and timing of silvicultural prescriptions such as thinning and regeneration harvesting. The planning assumptions are based on the type of forests and the mix of older and younger forests available for harvest in each unit. The ability to implement the full range of silvicultural prescriptions outlined in the individual management plans was necessary to meet both individual and Plan harvest goals (Woltering, et al., 2003, p. 28). In FS R6, most of the PSQ volume would come from four forests: the Gifford Pinchot, Mt. Hood, Umpqua, and Willamette national forests, through the use of regeneration harvests. The expectations were as follows:

- Timber harvest attributable to PSQ would only occur in the 22 percent of the Plan area on land designated as matrix or adaptive management areas, and only in compliance with standards and guides designed to achieve conservation objectives (USDA, USDI, 1994b, p. 2). Matrix land is the area in which most programmed timber harvest was expected (USDA, USDI, 1994b, p. 7).

- On most administrative units, the PSQ depends heavily on harvesting late successional forest for 3 to 5 decades until early successional stands (less the 80 years of age) begin to mature and become available for harvest. Because of this dependence, harvest schedules showed that about 90 percent of the PSQ over the first decade depends on harvest of late-successional forest, mostly from regeneration harvest (USDA, USDI,

2000, p. 431). Individual management plans outline assumptions for the amount and timing of prescriptions such as thinning, partial cutting, and regeneration harvesting. Achieving the PSQ for individual administrative units and for the Plan area as a whole is contingent on the ability to implement the full range of silvicultural prescriptions outlined in individual management plans (Woltering, et al., 2003, p. 28). The assumptions were not applicable across all national forests and BLM districts in the Plan area, however. For example, in individual management plans, forests east of the Cascade Range were assumed to harvest more acres by using partial removal techniques, and forests west of the Cascades were to conduct more regeneration harvests. The types of treatments would mostly be regeneration harvest in late-successional stands, including old growth, however.

- Treatments to be used to obtain objectives in reserves were expected to be density management, selection cuts, improvement cuts, sanitation cuts, and special cuts, but the volume arising from these activities would not be attributed to the PSQ. Late-successional reserves were to be managed to protect and enhance old-growth forest conditions. For each late successional reserve (or group of small reserves) managers were to prepare an assessment of existing conditions and appropriate activities. Thinning and other silvicultural treatments could occur in stands up to 80 years of age if the treatments were beneficial to the creation and maintenance of late-successional forest conditions. In the reserves east of the Cascades and in Oregon and California Klamath Provinces, additional management activities were allowed to reduce risks of large scale disturbance. Any volume arising from these treatments was in addition to the PSQ volume since no programmed timber harvest was permitted in the reserves (USDA, USDI, 1994b, p. 8). The FSEIS for the Plan estimated about 100-170 million board feet (depending on the alternative selected) could be produced from management in reserve lands (USDA, USDI, 1994a, p. 3&4-264). Appropriate silvicultural practices in riparian reserves include, but are not limited to, thinning densely stocked young stands to

encourage development of large conifers, releasing young conifers from over topping hardwoods and reforesting shrub and hardwood dominated stands with conifers (USDA, USDI, 1994b, p. B-31).

What are the monitoring questions?

- Was the mix of harvest methods achieved as expected?
- Was regeneration harvest the primary method used to achieve the first decade's PSQ?
- Was most harvest in late-successional forests including old growth?

Results

Results are recorded for total timber volume offered and related harvested acres and are not restricted to harvest on matrix and adaptive management areas. Treatment types and acres has not been compiled regionally by timber suitable lands and reserve lands for both agencies. Harvest has occurred within matrix and adaptive management areas (attributable to PSQ) and within reserve lands not attributable to PSQ (such as in late successional reserves and riparian reserves). There is no regional database currently compiled that divides acres treated into "PSQ" lands and "non-PSQ lands" so quantification would be difficult. Harvest methods defined as partial removal dominated on all lands (harvest methods included as partial removal are defined in Table 9).

In the Oregon BLM, regeneration harvest timber sales sold during fiscal years 1999-2001 were reduced by 89 percent compared to anticipated amounts in the Plan. Regeneration harvest sales of forest stands older than 200 years was reduced by 88 percent during this same period. In comparison, the 1995-1998 timber sales were 22 percent less than the harvest assumptions anticipated in the Plan. These percentages are based on timber volume offered and not acres treated. This period was prior to the requirements for survey and manage species and subsequent lawsuits that limited harvesting in 1999-2001. Information on stand age of harvested

stands by treatment type (regeneration harvest or partial harvest) for the FS is currently not recorded.

For both agencies, reduction in regeneration harvests in late-successional forest was in response rulings of the Pacific Coast Federation of Fishermen's Associations et al. v. National Marine Fisheries Service lawsuits in watersheds with listed anadromous fish. This ruling constrained timber sales requiring biological opinions and resulted in limits of regeneration harvests in older forests and more emphasis on thinning in younger stands (USDA, USDI, 2004, p. 222). As an example, during the period from about 1997 to 2003, managers have avoided areas proposed for timber harvest with the presence of listed anadromous species and have focused timber sales in areas without late-successional habitat in younger stands. In addition, survey and manage requirements also resulted in avoidance of late-successional forest harvest. As an example, timber sales planned in red tree vole habitat have showed in pre-disturbance surveys that the area has nest structures but only those nest structures with red tree vole activity are protected. The protection measure normally resulted in a 10 acre management area. When managers were faced with numerous nest structures in a sale area, they weighed the additional staff required to climb trees to determine red tree vole activity and the need to reconfigure the sale with not doing the work and moving to another area. Numerous protection sites also resulted in making the sale operationally unfeasible, meaning that the timber could not be logged without damaging protected areas or that the operation would not be economically feasible (USDA, USDI, 2004, p. 224). Therefore, managers chose to avoid these areas and focus timber harvest in younger stands. With the latest FSEIS to remove or modify the survey and manage mitigation measure standard and guidelines, the red tree vole protection area has been significantly reduced.

Of the 340,264 acres harvested, 287,414 acres (84.5 percent) were treated by techniques characterized as partial removal. Regeneration amounted to 52,850 acres (15.5 percent) of the acres harvested and was not the predominant method used. The main reasons were legal challenges associated with survey and manage species and listed fish populations, higher costs

to produce or rework regeneration sales in late-successional forests (such as surveying and avoiding habitat for rare or uncommon species), and field level exploration and testing of ways (for example, thinnings) (Charnley, et al., 2005). The acres of each harvest category for 1995 to 2003 are summarized in Table 9 and Figure 7. The harvest methods included in both the regeneration and partial removal categories are described in Table 9.

Summary

Thus, the mix of harvest types, as anticipated, was not as expected and the assumption that the most harvest activity would be by regeneration methods was not met (Figure 7 and Table 9). Partial harvests were the primary treatment method. Treatment in late-successional forests with additional requirements for protection of survey and manage species was avoided from approximately 1997 to 2003. Additionally, regeneration harvest in watersheds with listed fish populations was also avoided.

The mix of harvest methods was not as expected. More harvest occurred as partial harvest than regeneration harvest. Regeneration harvest was not the primary method to contribute to the PSQ. Harvest in late-successional forest was reduced because of legal challenges and avoidance.

Data Sources and Methods

Data sources include the Periodic Timber Sale Accomplishment Report (PTSAR) database, the Timber Sale Information System (TSIS), 1994 FSEIS, Plan ROD, 2000 Survey and Manage FSEIS, 2004 Remove or Modify Survey and Manage FSEIS, personal interviews, and the annual accomplishment reports, which yielded actual activities. Interpretation of the Plan's EIS analysis files, especially the timber section, the ROD, and budget direction, in each agency yielded the expectations.

The BLM and FS data systems at the regional and state offices are very different in what is tracked and reported based on program management and direction. Data on acres harvested by land use allocation is available from the individual national forests, but not tracked in the regional office. Similar information for BLM is available in the District Annual Program Summary reports.

Other Silvicultural Activities (mechanical and prescribed fire)

What were the expectations?

In addition to timber harvest, other silvicultural activities such as mechanical treatments, prescribed fire, and plantings were expected, though no quantitative expectations were established. (Prescribed fire is defined as a silvicultural treatment in the Plan's ROD (USDA, USDI, 1994b, C-12). Estimates of the expected acreage of prescribed fire use were calculated for all federally managed lands in the FSEIS for the Plan. Assumptions about the ecological need for prescribed burning, the hazard reduction necessary for risk management, and the amount of prescribed burning necessary for site preparation were made with the likely amount of acreage treated annually to be about 89,000 acres. This estimate is a generalization because many of the assumptions could not be validated until watershed analysis or site-specific project analysis would be completed (USDA, USDI, 1994a, 2-70 to 2-71). More recently, these activities were to be a means to maintain or improve resource condition. The desire to reduce the risk and severity of catastrophic events near populated areas determined that most of the mechanical and prescribed fire treatments were in the wildland-urban interface, as found in the 2003 Forest Health Bill and Appropriations Committee language.

What is the question?

What silvicultural treatments were used on the Plan area?

Results

The acres with mechanical and prescribed fire treatments in 2003 are shown in Table 10. The 1,904 projects totaled 131,603 acres. Most mechanical and prescribed fire treatments (68 percent or 1,306) and acres (59 percent or 78,430) were in the wildland-urban interface. For eastside forests in drier conditions, more funding is available to reduce hazardous fuels. Although this information is for only one year, it is an example of treatments and will serve as a beginning point or baseline for future reports. It also reflects the expected emphasis of conducting projects in the wildland-urban interface primarily to reduce the risk of wildfire by reducing fuel densities.

Results are not presented for other types of silvicultural treatments.

Data Sources and Methods

Data were provided from the National Fire Plan Operations and Reporting System. A different database was used before 2003, and the data were transferred to the system in April 2004. Regional Office personnel are not sure the data in the system is good enough to reflect actual work before 2003 and thus accomplishments from before 2003 are not included here.

Grazing

Grazing is also considered a vegetation management method, but it is described in the next section.

ACTIVITIES ASSOCIATED PRIMARILY WITH ECONOMIC WELL-BEING

The major components of the economic and social well-being strategy were:

- The Northwest economic adjustment initiative to bring assistance to workers and their families, businesses, and communities;
- Assistance to encourage growth and investment of small businesses and secondary manufacturers in the wood-products industry (Tuchman et al., 1996); and
- Payments to counties to compensate for reductions in payments traditionally tied to federal timber receipts; and
- Outputs and natural resource activities, including some process activities (such as public participation and interagency cooperation).

This report does not address the adjustment initiative, payments to counties, and assistance to the wood-products industry; "The Northwest forest plan: the first ten years, rural communities and economies" report (Charnley et al.,2005) will discuss those topics. Instead, we focus here on the outputs and natural resource activities (timber and grazing) on federally managed lands in the Plan area. Public participation and interagency cooperation are addressed in the PROCESS ACTIVITIES section of this report.

Timber Sales

Background and expectations

The background provided in the previous section, ACTIVITIES PRIMARILY ASSOCIATED WITH VEGETATION MANAGEMENT (TERRESTRIAL STRATEGY), provides the context for timber harvest levels and volume offered in the area of the Plan. Important concepts to remember are that the PSQ arises from timber harvest on matrix or adaptive management area lands only and is an estimate of volume likely to be achieved. Achievement of the PSQ relies on the emphasis of regeneration harvest in late-successional forests, including old growth. The history of PSQ levels

is described below. Other volume can arise from vegetation management activities to meet resource or management objectives on reserve lands. This volume does not contribute to PSQ attainment but is included in the agencies' volume offered totals. The FSEIS for the Plan estimated about 100-170 million board feet (depending on the alternative selected) could be produced from management in reserve lands (USDA, USDI, 1994a, p. 3&4-264).

Historically, the annual sale offerings from the 1980s were about 4.5 billion board feet in the Plan area (Table 11 and Figure 8). From 1990 to 1992, there was a drop to 2.4 billion board feet being offered annually, generally as a result of legal challenges and court rulings (USDA, USDI, 1994a, p. 3&4-264-265).

This section examines trends in timber volume offered, to assess how well the expectations outlined in the Plan have been achieved. The expectations were:

- Agencies' harvest targets were 60 and 80 percent of the PSQ during the start up years of 1995 and 1996 because of the need to implement surveys and conduct assessments (USDA, USDI, 2004, p. 221).

- The initial PSQ was 958 million board feet (Table 11 and Figure 8). The PSQ was adjusted during the life of the Plan as more site-specific information became available. In 1995 to 1998, the PSQ was 868 million board feet. In 1999 to 2000, the PSQ was 811 million board feet. In 2001 to 2003, the PSQ was 805 million board feet (Table 12). Taking into consideration these adjustments and the start up reductions, this equates to an annual average of 776 million board feet from 1995 to 2003. PSQ is revised in association with the planning cycle of the individual forests and districts to account for new information and changed circumstances such as changes to the survey and manage standard and guidelines.

What were the monitoring questions?

- Were expected timber amounts offered for sale?
- How much was offered compared to the past and the planned amount (PSQ)?
- Was a sustainable supply of timber available on a predictable and long-term basis?
- What percent of volume offered was attributable to PSQ?
- What percent of volume offered was a result of vegetation management in reserves?

Results

The PSQ amounts and the volume offered have been annually tracked by the agencies. The PSQ estimates are a decadal measure based on volume estimates from matrix and adaptive management areas. The Forest Service measures achievement of PSQ on a decadal basis since the regulations allow for annual fluctuations. The O&C Act, which guides the management on the Oregon BLM lands, requires that the BLM offer the established harvest level on an annual basis. Timber sustainability is the yield that a forest can produce continuously at a given set of management intensities. Volume offered is an annual measure that reflects all volume offered regardless of the land use allocation, and it therefore cannot be compared directly to PSQ established levels. Volume offered includes timber volume from reserve lands such as late-successional and riparian reserves and from wood not meeting utilization standards, neither of which count towards PSQ attainment.

For the reporting period from 1995 to 2003, about 4.736 billion board feet of timber have been offered for sale for all FS and BLM agencies in the Plan. About 3.633 billion board feet has been offered by FS units and about 1.103 billion board feet has been offered by BLM units. An average of about 526 million board feet per year has been offered in the nine years of the reporting period. However, annual sale offerings cannot be directly compared to the PSQ because these amounts include volume not attributable to PSQ from reserve lands.

The volume attributable to PSQ of the total volume offered is estimated to be about 80 percent over the 9 year reporting period, with 20 percent of the volume offered resulting from timber sales in reserved lands. Thus, about 421 million board feet of timber is attributable to the PSQ on an average annual basis since 1995, which can be loosely compared to the expected average annual amount of 776 million board feet expected for this reporting period. About 105 million board feet offered annually resulted from management on reserve lands. Between seventy-one and eighty-six percent of the volume offered for R6 is attributable to PSQ. For FS R5, 94 percent of the offered volume is attributable to PSQ and for BLM, approximately 84 percent of offered volume is attributable to PSQ.

The volume of timber offered relative to the PSQ levels defined by the agencies Forests and Districts since fiscal year 1995 (October 1994), six months after the Plan went into effect is displayed in Figure 9. In the late 1990s, sale offerings fell short of the PSQ as a result of several compounding factors, including appeals and protests related largely to survey and manage species issues on individual projects (Oregon Natural Resource Council), enjoined biological opinions (Pacific Coast Federation of Fishermen's Associations v. National Marine Fisheries Service), agency implementation of the survey and manage species mitigation measures, risk aversion by some managers such as focusing harvest in young stands, and other reasons (Woltering, et al., 2003, p. 28). Most of the volume for R6 was planned to come from only a few (4) forests west of the Cascade Range. But the volume was not offered from the subject forests as anticipated for reasons similar to those given for not achieving the PSQ. Furthermore, achieving the PSQ largely depended on the use of regeneration harvesting methods in late-successional forests, and that harvest did not occur (see discussion in previous section).

For a predictable and sustainable level of timber sales volume to be produced from federal lands, the underlying PSQ assumptions must be able to be achieved. The individual forest and district plans identify these assumptions for the intensity of management, the types of stands treated,

and the land base available for harvest. Even when the Plan was initiated in 1994, however, the likelihood of achieving the PSQ was anticipated to be difficult. Johnson et al. (1993) stated,

> Overall, uncertainty will cloud the preparation of timber sales prepared under the direction of the FEMAT report for the foreseeable future. Planning processes for which we have no blueprint will be required that measure and control cumulative effects. Extensive project surveys will be needed for a multitude of species before timber sales can go forward; as species are located, significant sale modification or abandonment maybe necessary. In sum, it will be difficult in the future to achieve predictable supplies of timber from federal lands in the owl region.

This team also identified the reliance of harvest of late-successional forest to achieve PSQ. They suggested that this dependence in today's social climate would make achieving the PSQ difficult at best. Their predictions have been realized. A predictable and sustainable level of timber volume has not been achieved because of the actual reliance of partial harvests and avoidance of timber harvest in late-successional forest for the period from 1995 to 2003.

Since fiscal year 2000, the volume of timber offered has risen from a low of 18 percent of the volume compared to PSQ estimates in that year, to 59 percent in 2003. Charnley et al. (2005) has additional discussion on this topic and also provides a description of the volume offered prior to the Plan.

Data sources and methods

Data sources include: 1994 FSEIS, Plan ROD, 2000 Survey and Manage FSEIS, 2004 Remove or Modify Survey and Manage FSEIS, 2003 BA, agency databases (PSTAR and TSIS reports) and the Northwest forest plan: the first ten years, rural communities and economies (Charnley, et al., 2005).

The figures are reliable for the planned PSQ volumes and for the offered volumes. The agencies usually do two things to the data when they go from original observations to estimated total volumes. First, they measure the logs in either cubic feet or board feet and then calculate volumes for either the short-log or the long-log method. Region 6 (FS) uses the long-log method, Region 5 (FS) reports in cubic feet, and the BLM reports in short logs. These approaches assume different amounts of each log are available for commercial use, so they yield different answers. A fraction can be used to convert from short to long logs and long to short, but the answers are never the same as if the original assumptions - long logs, short logs, or cubic feet - were used. State and regional office personnel provided the converted figures; here, the volume is reported as long logs. Furthermore, the kind of sale and the land use allocation from which the wood was cut can affect whether the wood contributes to PSQ volume. Despite these judgment calls and resultant use of calculations to re-estimate volumes, estimates for wood volumes are accepted by all participants as both reliable and consistent.

The intent was also to report volume offered by land use allocation but only approximations of volume offered by land use allocations could be done. The FS R6 Regional Office does not typically report volume offered by land use allocation. Instead, a financed target is established annually and the volume from any land use allocation can be counted toward meeting their timber production target. BLM District Annual Program Summaries have information for both volume sold by land use allocations and acres cut by treatment type. Region 5's report shows volume offered by land use allocation from 1995-2000. To achieve a common format would likely require a data call to the field or regional and state offices.

Grazing

What were the expectations?

Range use was thought to be an incidental activity compared to others, like timber and restoration, as is reflected in how little reference to it is given in the Plan's standards and guidelines. Grazing amounts were expected to be modified downward under all alternatives described in the FSEIS, particularly in the riparian reserves. The modifications were expected to have consequences for individual permittees (USDA, USDI, 1994a, 3&4, p. 276).

What are the monitoring questions?

- Did adjustments in grazing activity occur? What were the adjustments?

Results

Authorized range use was reduced between the period before the Plan (1993) and after several years of its implementation (2002) (Table 13 and Figure 10). The number of animal unit months and allotments each decreased by 30 percent, and the number of permittees decreased 37 percent. Refer to Charnley et al. (2005) for a more thorough discussion of grazing.

Data Sources and Methods

Data sources included agency grazing records, agency annual Plan accomplishment reports and personal interviews with agency specialists.

The Plan did not address range management directly, but by inference it may have influenced range-use numbers through the standards and guidelines. Range use before and after the Plan (1993 and 2002) was compared. Actual activity, based on agency records, aggregated unit estimates up to the Plan area.

Regional and state office experts in range management reviewed the monitoring records and found that, all too often, the records were estimated merely by using data from previous years. This lack of data reliability led the experts to look at the data for years just before the Plan and around 2002 to see if any of those data appeared to be actual measurements. From this review, a set of data were calculated. The calculations are labeled 1993 and 2002 because those are the mid-point years. In reality, the data for any one area came from one of the three years (1992 to1994) before and one of the three years (2001 to 2003) after the ROD.

One inconsistency was that the California BLM reported numbers of allotments but not leases; Oregon BLM reported leases but not allotments. Neither reported the number of permittees, so an assumption was made, just for display purposes, that the number of allotments or leases equaled the number of permittees for BLM. The BLM did not report acres of active allotments so the total could not be calculated. The FS totals are known and reported in Table 13.

PROCESS ACTIVITIES

In addition to watershed analysis reported in the aquatic strategy section, the Plan identified three other social and public involvement processes:

- Adaptive management;
- Interagency collaboration; and
- Public participation in agency implementation of the Plan and decision making.

This section summarizes these activities; Plan expectations provide benchmarks against which to judge accomplishments.

Adaptive Management Areas

What were the expectations?

> Adaptive management involves experimentation, identifying new information, evaluating it, accounting for it in discretionary decisions, and determining whether to adjust Plan direction. The object is to improve the implementation and achieve the goals of the selected alternative (USDA, USDI, 1994b, p. 32).

The Plan called for two avenues: first, it established 10 adaptive management areas (AMAs), set aside to increase learning about adaptive management by trying to develop nontraditional techniques to meet management objectives. "The standards and guidelines outside of the adaptive management areas represent the planners' best efforts to provide appropriate levels of protection for late-successional and old-growth forest related species. Inside the adaptive management areas, the activities and the standards and guidelines are presented essentially as a starting point, to help describe the objectives, and then local teams may either use such direction or develop something different" (USDA, USDI, 1994b, p. ROD-67). Second, adaptive management was to be the way the entire Plan area would be managed in time.

What should be expected from an adaptive management approach? McLain and Lee (1996) observed that adaptive management has three elements:

- Learning;
- Sharing what is learned; and
- Using what is learned in subsequent actions.

And to properly scale expectation, Stankey et al. (2003) noted that "...adaptive management literature reports only modest achievements in any of these elements."

What are the monitoring questions?

- Did the agencies manage the 10 AMAs in accordance with ROD expectations?

  Was a management guide developed for each area?

  What types of activities were identified for implementing?

- What outputs have been accomplished in AMAs?

  Have AMAs served as centers for experimenting and testing alternative approaches for achieving Plan objectives?

  Did activities in AMAs comply with Plan standards and guidelines?

- What options could improve AMA management to promote Plan intent and meet AMA objectives?

Results

In accordance with the ROD, 10 AMAs were established across the Plan area (Figure 11). The areas range from about 92,000 to nearly 500,000 acres of federally managed lands and are well distributed in the physiographic provinces of western Oregon, Washington and northern California. Management plans were developed for nine of the 10 AMAs.

The AMAs have been active participants in research and monitoring related to the Plan. Ongoing research and monitoring projects in AMAs have been listed at their website (http://www.reo.gov/AMA/index.htm). The projects are summarized by topic for each AMA (Table 14). The Central Cascades lists the most projects. This AMA contains the H. J. Andrews Experimental Forest and has strong connections with Oregon State University and the Pacific Northwest Research Station.

A review of project titles showed that very limited work is being done in AMAs to test the standards and guidelines or alternative management approaches. The PNW Station projects

from 1999 to 2003 show only seven of 31 studies related to the Plan in AMAs, only four of which specifically tested what the Plan intended (March 10, 2004, Intergovernmental Advisory Committee Report).

Several barriers have prevented developing projects for testing new management approaches in AMAs. With the exception of two provisions of limited application related to woody debris and the 15 percent retention requirements, no ROD or standard and guideline provisions for exemptions, exceptions, fast track, or other flexibilities have been used solely because an activity is proposed in an AMA. Laws such as the National Environmental Policy Act and the Endangered Species Act, agency regulations, and procedural requirements (such as watershed analysis) apply to all activities in AMAs, including research. No Plan provisions were identified for exempting proposed activities in AMAs from standards and guidelines for overlapping land allocations (late-successional reserves, riparian reserves). Examples of barriers that have been identified include limitations in funding, risk aversion, challenges related to collaboration, and competing priorities.

In one AMA, a research proposal to test alternative silvicultural prescriptions in fostering old-growth conditions along the riparian zone was opposed because the researcher was unable to provide fishery biologists and regulators with a guarantee that the experiment would not jeopardize salmon populations; approval was contingent on providing sound scientific evidence of no possible adverse effects. The resulting situation, in which experiments can be undertaken only with a guarantee of no adverse consequences, establishes a difficult, if not impossible, decision criterion. When outcomes are uncertain, undertaking actions are resisted because of the inability to ensure that unwanted effects will not result (Stankey et al., 2003). A conclusion by Gunderson (1999) concurs: "... if the risk of failure during experimentation is not acceptable, then adaptive management is not possible."

The AMAs have been active in sharing new information derived from ongoing projects. For example, the Central Cascades and Applegate AMAs have shared their results with others

through a variety of means, including web pages, tours, newsletters, symposia, and short papers written for public understanding. In addition, the Central Cascades AMA began bringing in personnel from other ranger districts and field units so they could participate in an adaptive management process, then return to their work units and begin applying it there.

Activities were reviewed in AMAs for compliance with the standards and guidelines as part of the implementation monitoring program. Percentage compliance is shown in Table 15; it is commensurate with what was achieved in other land use allocations across the area of the Plan.

Line officers responsible for managing AMAs have recently been interviewed by the AMA working group on their suggestions for improving AMA management. The top three suggestions were:

- Increased funding (new money; not at the expense of other programs);
- Regional leadership, including clarification of expectations and support for priorities; and
- Changes in land allocation hierarchy and relief from applying the standards and guidelines.

All respondents identified a need for increased funding and resources to improve AMA performance, and seven of 10 AMAs indicated that changes to improve their management would not be a priority unless new funding was available. The need to achieve a balance with other work was expressed, as were concerns that funding might be diverted from other programs to fund AMAs.

Data Sources and Methods

Data sources include subcommittee reports to the Intergovernmental Advisory Committee (March 10, 2004), the NWFP compliance monitoring database, and reviews of the following adaptive

management literature: Gunderson (1999), and Stankey et al., (2003), *Journal of Forestry* 101(1):41, and information from the AMA website (http://www.reo.gov/AMA/index.htm).

Interagency Collaboration

What were the expectations?

The ROD explains that, "This decision sets forth a new way of managing BLM and FS lands. In addition to new land allocations, it requires new techniques of analysis, new decision-making forums, **new kinds of interagency collaboration** (emphasis added), new approaches to scientific oversight and monitoring, new survey procedures, new public participation strategies, and new standards and guidelines." The Secretaries of the Interior and Agriculture recognized that this collaboration would take some time to implement, when the following was written into the ROD, "the implementation of this new way of doing business will proceed as quickly as possible. But it cannot be instantaneous. A transition period is needed to allow for procedures and analysis techniques to be developed; for training to occur; for budgets to reflect the new kind of work required; and for completion of the surveys, analyses and planning to support project proposals" (USDA, USDI, 1994b, p. ROD-55). The standards and guidelines call for a high level of coordination and cooperation among agencies during implementation. Issues were to be discussed, objectives clarified, and problems solved in collaboration (USDA, USDI, 1994b, p. E-15)

What are the monitoring questions?

- Did the agencies attempt collaboration?
- What is the evidence of such attempts?

Results

At the regional scale, the agency leaders staffed an interagency decision group, called the Regional Interagency Executive Committee. This interagency group serves as the senior regional entity to provide prompt, coordinated, and successful implementation of the Plan. The chair rotates between the Forest Service and the Bureau of Land Management. The Plan also established the Regional Ecosystem Office which is responsible for developing, evaluating, and resolving consistency and implementation issues. Many other interagency collaborative teams were formed and staffed, and many continue to this day. Examples include the following:

Regional Interagency Executive Committee (active)

Provincial Interagency Executive Committees (active)

Provincial Advisory Committees (active)

Monitoring Program Managers group (active)

Northwest Forest Plan Interagency Monitoring Program (active)

Regional Ecosystem Office (active, though reduced)

Office of Forestry and Economic Development (inactive)

Oregon, Washington, and California State Community Economic Revitalization Teams (inactive)

Interagency Geographical Information System (GIS) program (active, reduced)

Interagency participation in Intergovernmental Advisory Committee (active)

Interagency participation in monitoring and evaluation, such as Provincial Implementation Monitoring Teams (active)

Interagency participation in adaptive management area planning and management (active)

Interagency participation in watershed analyses development (active)

Several of these collaborative efforts are summarized below.

Regional Interagency Executive Committee

Regional executives of eight federal agencies are members of the Regional Interagency Executive Committee (the RIEC) with the objective of deciding Plan issues as stipulated in the ROD (USDA, USDI, 1994b, p. E-16). This interagency group serves as the senior regional entity to provide prompt, coordinated, and successful implementation of the Plan. They, in turn, use the Regional Ecosystem Office (see next paragraph) as their staff.

Regional Ecosystem Office

The Regional Ecosystem Office was staffed as a multiple-agency office, as stipulated in the ROD. The office provides staff work and support to facilitate REIC decision making and prompt interagency issue resolution in support of implementation of these standards and guidelines. It was also responsible for evaluation of major modifications arising from adaptive management process and will coordinate the formulation and implementation of data standards. (USDA, USDI, 1994b, p. E-16). The people worked together to interpret the Plan and related policy and take their recommendations to the RIEC for approval. Their mission is to promote implementing the Plan consistently across the Plan area, while allowing for recognition of differences among communities and lands. In 2004, the membership was reduced because of lower needs.

Office of Forestry and Economic Assistance

Tuchmann et al. (1996) of the *Office of Forestry and Economic Assistance*, reported to the President and Congress,

> United States Office of Forestry and Economic Development was created to oversee and coordinate the implementation of the Plan for two years. As the administration's representative in the region, the office served as a focal point for Plan activities, coordinating interagency and intergovernmental efforts, and serving as a communications link from the region to Washington, DC. The office was created at the request of the White House by the Secretaries of Agriculture, Interior, Labor, Commerce, and Housing and Urban Development; and the

administrators of the Small Business Administration and the Environmental Protection Agency (MOU 1993b).

The office closed in February 1996 because the 2 year limitation period was over. With the interagency committees established, implementing the Plan began to move forward. The various committees began meeting regularly, creating new channels of communication, coordination, and cooperation between the agencies and with state, local, and tribal governments and the public (Tuchmann et al., 1996, p. 56).

Oregon, Washington, and California State Community Economic Revitalization Teams

The Multi-Agency Command, a Washington, D.C., group, was charged with entering into an agreement with the Governors of Oregon, Washington, and California to carry out the provisions of the initiative, as a partnership of federal, state, tribal, local, and other parties. The *Federal-State Memorandum of Understanding for Economic Adjustment and Community Assistance* (1993) was executed between the chair of the Multi-Agency Command, the three Governors, and three county officials representing affected communities in each of the states. The existing authorities and statutory obligations of the participating federal and state agencies and officials are not affected by the agreements in either the *Interagency* or the *Federal-State Memorandum* (Tuchmann, et al., 1996, p. 56). These teams are no longer in existence.

Intergovernmental Advisory Committee and the twelve Provincial Advisory Committees

Thirteen advisory committees were formally created on September 30, 1994, when the *Intergovernmental Advisory Committee and the twelve Provincial Advisory Committees* were officially established by two separate charters (USDA 1994). The Intergovernmental Advisory Committee, whose 20 members include one official each from local, state, and tribal governments in Washington, Oregon, and California, serves as the lead advisory body to the Regional

Interagency Executive Committee. The Committee designated the Inter-Organization Resource Information Coordinating Council as its subcommittee (Tuchmann et al., 1996, p. 57). More information on the provincial advisory committees can be found in the next section.

In addition to these coordinating committees, Tuchmann et al. (1996) reported these accomplishments:

- These committees continue to operate and serve as discussion forums;
- Most agency personnel state that "… working together ... improved relations between agencies ..."; and
- The BLM and FS developed interagency committees to share information, especially for GIS, with the *Inter-Organization Resource information Coordinating Council*.

The AMAs modeled interagency efforts by either sharing one coordinator for two AMAs, such as in the Applegate and North Coast Range AMAs, or had each agency's representative work closely with the other, as was done in the Central Cascades and Little River AMAs. They jointly developed web sites and public tours. Other AMAs had partnerships with the Fish and Wildlife Service, the National Marine Fisheries Service, and FS personnel. Most of the AMA efforts are no longer active, however.

Data Sources and methods

Data sources included: Summarizing of a qualitative discussion based on the Pipkin report; formal PNW review; Tuchmann et al. (1996), annual reports to Congress by the Regional Ecosystem Office and by agencies; and AMA annual reports.

Participation

What were the expectations?

Provincial advisory committees were to be formed for each of the 12 planning provinces in the Plan area and were to be composed of members of local communities. The intent was to have members representing the cross-section of values found in those local communities and to include state and regulatory agency participation. These committees were identified to provide monitoring reports from the provinces. The provinces would also encourage and facilitate information exchange on complementary ecosystem management among federal and nonfederal land managers (USDA, USDI, 1994b, p. E-17). These committees were to meet regularly to provide advice to the implementing agencies.

Federal agencies were expected to actively seek ways to involve local communities and individual citizens in planning for decisions, without giving up the agency's stewardship and management responsibilities to the land or to look out for the needs of people who are not local.

What are the monitoring questions?

- Were PACs formed in accordance with the Federal Advisory Committee Act and Plan expectations?
- Did the agencies participate actively with local communities through the provincial advisory committees?

Results

Provincial Advisory Committees and Local Communities

The Provincial Advisory Committees were formed and composed of members to serve as key advisory bodies to the 12 Provincial Interagency Executive Committees, whose members are responsible for federal land management activities in each Province. The Provincial Advisory Committees have up to 29 members, including representatives from federal, state, county, and tribal governments, the timber industry, environmental groups, recreation and tourism organizations, and up to five other public-at-large members.

These advisory committees marked an important step forward for both interagency and intergovernmental coordination, and they are creating new ways to involve local governments, tribes, and the public in managing the Plan's forests. The committees allow a wide representation of interests to be heard by federal policy makers while still complying with the requirements of the Federal Advisory Committee Act. The law requires that the membership of the advisory committees represent a balance among various groups, communities, and people interested in natural resources, and that the number of seats on the committees should be limited to a workable size (Tuchmann et al., 1996, p. 54). The meetings are open to the public, and normally 2 to 4 times per year, depending on the province.

Participation in compliance reviews by provincial advisory committee members, the host unit, and others is a key component of the implementation monitoring strategy. Participation is documented each year in the project review reports produced by the provincial implementation monitoring team leaders. The participation information from compliance monitoring efforts was used to develop Figure 12, which shows participation by affiliation from 1996 to 2003. The data show a good and fairly consistent distribution of participants by affiliation. The number includes all participants, of which most are committee members. As expected, the BLM and FS represent the highest participant percentage in any given year because the number includes those staff needed to explain the project and provide logistics.

Adaptive Management Areas

The adaptive management areas (AMAs) were much more than places to try new silvicultural techniques; they were viewed as places to explore how local communities and their citizens could more effectively interact with federal land managers. But can the administrators of the public lands maintain the responsibility of looking out for the national public interests and actively involve local citizens in making decisions? In effect, 10 hypotheses were tried, including a null hypothesis of no change in how to do business. Some examples follow.

The local citizens of the Hayfork area formed a not-for-profit organization called the Hayfork Watershed Research and Training Center with funding from Americorp. They continue to work to this day in a partnership with the Six Rivers and the Shasta-Trinity national forests to provide training, research relevant to the area, and job opportunities for locals.

The Applegate area citizens formed a not-for-profit group called the Applegate Partnership. If focused its work on conservation efforts and interacting with all the agency offices, including county, state, federal, and the university to provide avenues to participate with government decision making.

The Central Cascades area regularly deals with local small business to address specific ecological concerns influenced by forest management activities. University researchers partner with agency managers and scientists to create a world-class research environment.

The Olympic Peninsula, home to a diverse group of interests, actively participates in adaptive management area efforts, through the provincial advisory committee.

The Cispus area is closely related to the local community through partnering with local schools in environmental education. The communities and the national forest continue many years of active training of school students with both teachers and agency personnel.

Several international meetings of administrators and local community members were attended by local community representative and local adaptive management area administrators, giving opportunities for people throughout the world to lean from each other. In 1998, the adaptive management area network hosted such a meeting, and, as part of it, three different areas -- the Central Cascades, the Applegate and the Hayfork -- hosted people from different countries.

Data Sources and Methods

The information was summarized from adaptive management area annual reports and the NWFP compliance monitoring database.

Compliance with Standards and Guidelines

Introduction

The management strategy in the ROD consists of detailed standards and guidelines and specific land use allocations, which provide a comprehensive set of ecosystem management frameworks for three interrelated strategies: aquatic, terrestrial, and socioeconomic (FY 1997 Implementation Monitoring Program Annual Report, p. 5).

The management strategy requires monitoring to determine how well the Plan is working and whether the agency activities satisfy Plan goals and objectives. Monitoring has three components: implementation, effectiveness, and validation monitoring. "Monitoring will … determine if the standards and guidelines are being followed (implementation monitoring); verify if

they are achieving the desired results (effectiveness monitoring); and determine if the underlying assumptions are sound (validation monitoring)" (ROD, p. E-1). The ROD further explains that, "Implementation of these standards and guidelines will be monitored to ensure that management actions are meeting the prescribed standards and guidelines and they comply with laws and management policies" (ROD, p. E-1). Additionally, the ROD states, "Monitoring will be conducted at multiple levels and scales…to allow…information to be compiled and considered in a regional context" (ROD, p. E-1). And, implementation monitoring, across all land allocations in the Plan, serves as an important baseline for both effectiveness and validation monitoring.

Purpose and Background, Including Expectations, of Compliance Monitoring

The purpose of implementation (compliance) monitoring is to determine and document if the Plan and its standards and guidelines are being consistently followed. The measure of success or expectation is not specified in numbers or percentages in the ROD. Rather, monitoring provides the public and agency officials with feedback about how well, both locally and regionally, particular activities comply with meeting standards and guidelines designed to achieve the strategies. The monitoring is iterative and adaptive to help determine compliance, whether deficiencies were found in implementing them, and if corrective actions are needed. The results generally lead to immediate adjustments in management actions by the local field unit if noncompliance is found. Implementation monitoring also documents actual management practices as they are conducted by field units, thus providing an important link between line officers and Plan implementation direction.

After the ROD was signed in 1994, an interagency work group (the group), attached to the Research and Monitoring Committee of the Regional Ecosystem Office, was assigned to develop the Plan's implementation monitoring approach. The group's work culminated in the release of a final draft implementation monitoring guide (the guide) in May 1995 (Alegria et al., 1995). The guide identified a program of monitoring for all federal land management agency organizational

strata. The Regional Interagency Executive Committee (RIEC) decided that the initial monitoring effort should be conducted at the field level and that emphasis has been maintained since 1996. The group's recommendation for field project monitoring was to systematically evaluate compliance with the ROD standards and guidelines through a strategy that emphasized a federal interagency, interdisciplinary approach, but also included members of the public. The RIEC approved both the recommendation and establishing of a Regional Implementation Monitoring Team (the regional team) to carry out the strategy. It consisted of a team leader and a representative from the FS R6, FS R5, US Fish and Wildlife Service R1, and the BLM (OR, WA). In 1999, the RIEC mandated establishing the monitoring program managers group as their representatives to oversee the Plan's monitoring programs. It consists of representatives of all signatory agencies to the ROD.

A word about local monitoring efforts

All BLM and many FS field units also monitor projects and activities for a variety of purposes. For example, monitoring may address local issues of public interest, management actions not covered by Plan direction, and local land use plan requirements. Field unit monitoring information was not used in this report because this information was not consistently collected among the field units.

Objectives of this section

The objective in this section is intended to address compliance with the standards and guidelines with an emphasis on identifying those less compliant. The results of implementation monitoring have been aggregated from the annual results from 1996 to 2003 to provide information for this 10-year report. This is the first year that implementation monitoring has been assessed for multiple years, especially to identify any trends. The second primary objective is to identify recommendations for improving the implementation monitoring process.

Assessment of Compliance

What are the monitoring questions?

- What was the level of compliance with the standards and guidelines contained in the ROD for the activities monitored?

    Which standards and guidelines had less compliance?

    What were the common reasons given for noncompliance?

Results

Project Compliance

Compliance monitoring is conducted using the 12 Provincial Advisory Committees' (PACs) members reviewing project documents and visiting the project in the field. Project compliance is determined by the PAC members attending the reviews and is based on documentation, and at times, actual measurements in the field. The results from each province are collated into one annual report. Results displayed for this report, are the aggregation of all annual reports from 1996 to 2003.

The monitoring of 240 projects from 1996 to 2003 showed that compliance with standards and guidelines was high, but not all project types have been monitored in high numbers. Where sufficient numbers of project types (>10) were monitored, the percentage compliance ranged from a low of 94 for timber sales in matrix to 100 for most other projects (such as timber sales, silviculture, restoration) in all land use allocations. The results for five project types are shown in Table 16; it is designed to follow closely the ROD format by describing compliance associated with land use allocations, the aquatic conservation strategy, survey and manage species, and

biological opinions. The survey and manage species are divided into species 1, 2, and, 3, which use different question sets depending on the decision dates for projects and which standards and guidelines were applicable for the project types being monitored. The questions used to assess compliance were reviewed and adjusted each year, as described in the methods section. For example, questions related to biological opinions, survey and manage (species 3), and "others" specific to project type (such as prescribed fire) were recently added and assessed. The recently added questions had fewer responses.

The range of percentage compliance for all 162 timber sales monitored is shown in Figure 13, and the range of percentage compliance for all 240 projects monitored, regardless of land use allocation, is shown in Figure 14. More than 57 percent (92 of 162) of the timber sales monitored were 100 percent compliant, but fewer than 7 percent (12 of 162) had compliance rates less than 90 percent. By comparison, 62.5 percent (150 of 240) of all projects monitored were 100 percent compliant, and only 8 percent (19 of 240) had compliance rates less than 90 percent.

Compliance for monitored projects for each year has been greater than 95 percent, and it approached 99 percent in 2003 (Figure 15), but the comparison is year to year for all projects reviewed, regardless of when they were implemented or when decisions were signed. An improvement to evaluate trends in the future would be to compare projects by the year each decision was made and implemented, and to track the difference from year to year (for example, comparing projects decided and implemented in 1998 with those decided and implemented in 1997.)

The results of compliance monitoring cannot be extrapolated to the entire population of projects and activities implemented under the Plan because of the method of selection and the number of projects monitored. The results, however, do provide insight into possible problems and trends where a sample size of at least 10 projects or activities (timber sales, other silvicultural activities, prescribed fires, road management, watershed restoration, and watershed assessments) has

been monitored. Where a sample size of fewer than 10 of a specific project type was monitored (recreation, grazing, and mining), the results stand only as case studies (Tables in Appendix B).

Specific Information Related to Compliance with Aquatic Strategy Standards and Guidelines

A separate analysis of compliance with the aquatic strategy's standards and guidelines was requested by the team leader for the Aquatic/Riparian Effectiveness Monitoring Module. That analysis also showed high compliance (see Appendix C). Monitoring from 1996 to 2003 showed a greater than 95 percentage compliance rate in each year for the land management activities monitored. This finding showed that the BLM and FS units understand the standards and guidelines and their use in project design (Woltering, et al., 2003, p. 71). An item of particular importance to the success of the aquatic strategy is the reduction in road mileage in watersheds: road miles were reduced 5 percent in the fifth-field watersheds and 8.5 percent in the key watersheds reviewed from 1999 to 2003 (Table 3).

Watershed Scale Monitoring Results

From 1999 to 2003, 89 watershed scale activities and standards and guidelines were monitored (Figure 16 and Table 8). The monitoring showed a high variability in complying with the ROD covered in the watershed scale questionnaire (Table 17). The compliance rates ranged from 100 to 46 percent. High compliance was noted for some: for example, 85 percent had reduced roads in key watersheds, and 100 percent had identified road restoration opportunities and maintaining late-successional forests in watersheds with 15 percent or less late successional forest conditions. These rates of noncompliance are much higher than those encountered for projects. Noncompliance centered mostly on the lack of completed planning documents, such as road management plans, that addressed aquatic strategy objectives. Compliance for other standards

and guidelines were in the mid-range (50-85 percent), such as using the assessment information to develop priorities for restoration funding and monitoring strategies. The standard and guideline relating to developing a road management plan to meet aquatic strategy objectives had a compliance rate of 46 percent, suggesting a possible problem, but the respondents explained that meeting aquatic strategy objectives was adequately addressed in other documentation or through administrative procedures. Road management plans were often not completed or adequate when management units had other planning documents or internal administrative policies to minimize the effects from roads. An example is the completion of Flood Emergency Response Management plans that do not specifically speak to the aquatic conservation strategy but identify processes and actions to complete during storm and flood events. A definite trend toward improving compliance shows up with most of the standards and guidelines as the planning documents are gradually funded and completed.

Explanations for most assessment questions are provided in the “reasons not met” column in Table 17 and in Appendix A. Additional useful information was derived from the assessment reviews, such as the finding that nearly 93 percent of the reviewed watershed analyses were completed before1998 and about 10 percent had been updated. Also, most watershed analyses were including information on survey and manage species to characterize the watershed and to prepare for site-specific project planning.

Noncompliance with ROD Standards and Guidelines for Projects

Most noncompliance for projects is scattered across the entire set of standards and guidelines showing relatively few individual standard and guideline compliance issues. Fourteen standards and guidelines were not met for three or more projects and the 14 are summarized in Table 17 and Appendix A which provides a more detailed analysis. The number of not met responses for the 14 specific standards and guidelines ranged from 14 to 3. The percentage of applicable projects reviewed with not met responses ranged from 36 to 2 percent. The percentage rates of

applicable projects with not met responses are listed from highest to lowest in Table 17. The instances of noncompliance mostly centered on snags, coarse woody debris, and riparian reserves. Trends for those standards and guidelines with higher percentages of noncompliance related to projects are unclear. Several types of applicable projects (mainly timber sales) have not been monitored in recent years, and similar projects were not always monitored in each year or compared by the year they were decided and implemented.

During the reviews, reasons for noncompliance were identified. Generally, they can be classified into one of three general categories: improper planning; improper implementing; or other qualified reasons. Improper planning meant that the planning documents did not contain information for meeting that standard and guideline. Improper implementing meant that the planning document indicated the need to meet the standard and guideline but when the project was planned on the ground, the standard and guideline was not implemented. Other qualified reasons meant that the standard and guideline was not met for other reasons, such as public safety. For each occurrence of noncompliance with a project listed in Table 17, a review was undertaken to classify the reason into one of the categories. Of the 90 noncompliances for projects, 48 (53%) were due to improper planning, 18 (20%) to improper implementing of projects designed to follow the standards and guidelines, and 24 (27%) were for other qualified reasons (for example, one project cut 34 snags in 7 campgrounds for safety, so the snag requirements were not met because of the safety needs in the campgrounds).

Data Sources

Data sources include annual provincial implementation monitoring reports (12 each year), 1996 to 2003; annual regional implementation monitoring reports, 1996 to 2003; and the NWFP compliance monitoring database. Through the use of the database, questions were tracked through the years and the numbers of applicable projects could be determined by subtracting those projects which responded to the question as not applicable. Percentage compliance rates

for each standard and guideline were then based on met responses compared with applicable projects across all years. The database performs these calculations through built-in queries.

Methods

Background

The monitoring approach of the implementation monitoring program (the program) was initially developed by an interagency workgroup after the ROD was signed in 1994. The approach was detailed in a draft document, "Guidance for implementation monitoring for management of habitat for late-successional and old-growth forest related species in the range of the northern spotted owl" which was released for review in May 1995 (Alegria, et al., 1995). Although never finalized, it has provided the framework for the monitoring approach ever since. It included recommendations for the scope and organization of the program, as well as approaches to data collecting, reporting, and managing. Beginning in 1996, these recommendations were followed to establish the program and have continued to provide direction.

From its beginning, the scope of the program has been to determine compliance through the use of standard questionnaires about implementing the Plan regionally. This regional focus has resulted in an organization, data collection strategy, and reporting system to provide answers annually to monitoring questions that apply to the entire Plan area.

Organization

The program's organization has two parts: a regional implementation monitoring team (regional team) and 12 provincial monitoring teams (provincial teams). The regional team has a full-time leader and several part-time supporting interagency staff. The team's role is to plan the

monitoring program for each year, train provincial team staff, collate monitoring data from each province, and prepare an annual monitoring report. The regional team leader participates as a member of the interagency regional monitoring team to coordinate with other ongoing Plan effectiveness monitoring efforts (northern spotted owls, marbled murrelets, late-successional and old-growth forests, aquatic and riparian, social and economic, and tribal). Guidance to the regional monitoring team (and therefore the implementation monitoring team) is provided by an interagency leadership group called the monitoring program managers. Before the managers group was formed in 1999, this guidance was provided to the program directly by the Regional Interagency Executive Committee.

Each provincial team is also an interagency team consisting of members (or their representatives) of the provincial advisory committee, which includes people representing diverse interests in the local community, state and local government groups, tribal members, federal regulatory agencies, and the public. Interest areas represented on the teams, dependent on the province, include environmental groups, industry, grazing, mineral extraction, recreation, and watershed coalitions. The inclusion of nongovernment people on the provincial teams has served to build trust and communication in the monitoring processes and in federal land management practices. The efforts of each provincial team are coordinated through a leader who organizes the provincial reviews, coordinates with the regional team and the provincial advisory committee, and prepares the annual provincial report (review of the results).

Project Identification and Data Collection Strategy

The monitoring approach has been to identify a set of Plan projects or activities each year and then to evaluate their compliance with Plan standards and guidelines. The project types to be monitored in a given year are identified by consulting with the monitoring program managers and reviewing input from provincial advisory committees. Each year, a list of projects and activities is compiled by the region. Initially, regional databases, such as the FS sales tracking and report

system and the BLM timber sales information system were used to identify projects. This information was checked and updated by the regional or provincial teams. The data sources proved to be problematic and, beginning in 1999, data calls to the local land-management units were initiated for the projects or watershed assessments to be monitored. For example, a data call in 2002 identified 269 density management projects in late-successional reserves (the focus of monitoring for that year). A random stratified sample was drawn from this list, to identify those projects or activities to be monitored that year. In the 2002 example, projects were stratified by province to ensure regional coverage and to include as many Plan land management units as possible. The goal was to select two density management projects and corresponding watershed scale activity reviews for each province, to be reviewed by their respective provincial teams for a total of 24 projects and 24 associated watersheds across the region.

The implementation monitoring program uses questionnaires developed from the ROD to evaluate each applicable standard or guideline for a project or activity. Answers have evolved over the years and include “yes”, “no”, “filling in the blank” or “exceed”, “met”, “not met”, “not capable” or “not applicable.” Comments are also collected, particularly when a not met answer has been identified by the review team. In 2001, at the request of the monitoring program managers, several questions were added to address concerns about survey and manage species, but the questions were not related to compliance. Also, in 2002, a question related to biological opinions was added, but again it was not related to compliance.

Each year, the regional team reviews the questionnaires to ensure that all questions are clearly stated, unambiguous, and address all the applicable standards and guidelines in the ROD. A training and orientation session is held for all the provincial team leaders each year before the field season to ensure consistency and to share ideas for improving the quality of each review. Appendix D contains the 2002 questionnaire -- the control questionnaire – to which all answers from previous questionnaires were mapped and from which the NWFP compliance monitoring database was developed.

Reporting

Data collected at the provincial scale is sent to the regional team. All data are double checked for accuracy of data entry. The data are then evaluated and used by the team in preparing a draft annual report. After review and update, this report is finalized and published. All reports (1996 to the present) are available on-line at www.reo.gov/monitoring/reports.htm under implementation. A short summary is included in the annual regional monitoring report. Recommendations from the annual reports are forwarded to the monitoring program managers and field units for consideration and action by agency staff.

Summary

The monitoring focus for each year is selected based on input from the regional interagency executive committee, monitoring program managers, and provincial advisory committees. A detailed process is then followed to identify candidate monitoring projects, randomly select samples, plan and conduct reviews, prepare reports, and provide input to assist in selecting the focus for monitoring the next year (Figure 17).

A database program was developed in 2003-2004 that will improve on and shorten many of the steps. The database is described in Appendix E, and the new process is shown in Figure 18.

Activities Monitored, 1996 to 2003

Activities monitored from 1996 through 2003 are summarized in Table 8. The number of projects reviewed was 240 (238 are included in the annual reports – see comments column in Table 8), and the number of watershed scale activity reviews was 89. The location of these watersheds is shown in Figure 16. A breakdown of projects monitored by land use allocation and province is

shown in Figure 19 and the number and types of projects monitored in each province is shown in Figure 20.

In the first year of monitoring (1996), 45 timber sales were selected in the Plan provinces; 42 were included in the final report). Selections in 1997 included 40 timber sales (39 in the final report), 17 road building projects, and 16 restoration projects. The 1998 program resulted in monitoring 24 timber sales and associated road building, along with an informal feasibility inquiry into watershed-scale activities. Six watersheds (five key and one non-key watersheds) were examined (two per state). The watershed scale approach tested out sufficiently and was recommended for expanded application in 1999. The 1999 season included a review of 24 timber sales (two per province) and 12 fifth-field watersheds (one per province). In 2000, 24 watersheds were selected for watershed scale activity monitoring. In 2001, 24 randomly selected fifth-field watersheds (two per province) and 24 specific projects (one per randomly selected watershed) were scheduled for monitoring. Three project and watershed reviews in eastern Washington were canceled because of extreme fire risk. The 2002 program was designed to sample 24 randomly selected density-management projects in late-successional reserves (two per province) and 12 "other" projects. Other projects (one per province) included prescribed fire, grazing, recreation, and watershed restoration. The fifth-field watersheds containing the projects were also monitored. As in 2001, two project reviews were not conducted because of the extreme fire season and active wildfires or lack of project implementation. In 2003, two projects were planned for each province, along with an evaluation of the watershed assessments associated with them. The emphasis continued to be on monitoring density-management projects in late-successional reserves; 16 density-management projects were selected for monitoring, and 15 reviews were conducted because one project was consumed by wildfire before the scheduled review. In addition, seven prescribed fire and one mining project were evaluated.

Methods for identifying and assessing noncompliance

To determine where noncompliance was greatest over the period of implementation monitoring (1996-2003), the entire set of monitored projects and watershed assessments was analyzed by using the database to identify the highest numbers of "not met" responses for each standard and guide. Only those questions with three or more "not met" responses (a total of 24) were analyzed for this report. These "not met" responses were also analyzed in to determine the number of projects that applied to each of the standards and guidelines and the reasons for their noncompliance. The analysis included the calculation of the percentage of applicable projects and assessment topics that were noncompliant.

Improving Implementation Monitoring and Management Implications

What was the expectation?

The expectation is that the findings from implementation monitoring would lead to recommendations on how to improve the process along with a discussion of management implications, where warranted.

What are the questions?

- What are the recommendations for improving implementation monitoring?

- What are the management implications of noncompliance related to specific Plan standards and guidelines?

Results

Recommendations for improving monitoring and implications of findings related to suggested changes to the standards and guidelines come from the documents listed in the Data Sources section, but most of the recommendations actually originated from five sources: annual implementation monitoring reports (1996 to 2002); analysis of monitoring questions with most noncompliance (Appendix A); findings from the Plan implementation monitoring program 1996-2002 draft report (Appendix F); May 7-8, 2003 Plan implementation monitoring program review proceedings (Appendix G); and sample design for implementation monitoring of the Plan (Appendix H). Implications of activity accomplishments or compliance monitoring findings to future resource management will be addressed in the synthesis report.

Note that significant improvements to compliance monitoring have already been achieved as a result of input, findings, and recommendations from several sources (see Data Sources and Appendix F). Some of the more noteworthy achievements are:

- Developing an implementation monitoring database (Appendix E);
- Developing a web page;
- Publishing reports and summaries annually;
- Establishing a standardized report format;
- Selecting projects to be monitored early;
- Requiring projects to be implemented before review;
- Conducting an annual workshop for provincial team leaders before field reviews; and
- Establishing participation by senior subject matter specialists and regional team members in reviews.

Other improvements are discussed in Appendix F.

Additional improvements to the accomplishments and compliance should be addressed to make the program more responsive, credible, and efficient. The background or findings and subsequent recommendations covering five topical areas are, as follows:

Activities Database

Finding: As is common to most efforts of this magnitude, assembling data to answer monitoring questions has been extremely difficult. Problems are not only with existing data and sources, but the greater problem is the lack of a centralized (and standardized) activities database for the Plan area.

Recommendation:

This report recommends developing and maintaining an activities accomplishment database. It would help meet the goals described when the next Plan interpretive report is prepared. Specific recommendations derived from the report's section on accomplishing activities about what could be included in the database are

- A change in database approach from spread sheets to geodatabases will help resolve several shortcomings of current data collection, storage, and retrieval for key watershed, restoration activities completed and information from watershed analyses, and,
- Future efforts could include high-quality record keeping and baseline development for roads in inventoried roadless areas.

This recommendation is being analyzed in a separate report addressing data management.

The implication of not developing an activity database for the Plan is that future efforts to get information will encounter the same problems and frustrations in answering monitoring questions.

Follow up and distribution

Finding: A process for timely responses to repetitive findings and recommendations in annual reports and issues raised by the field units could be developed. Contacts for questions on standards and guidelines and posting and identifying locations of current directives, memos, and so on are sorely needed; it would also address some adaptive management concerns.

Recommendation:

- Have the subject matter specialists post responses to identified issue topics (such as coarse woody debris, riparian reserves, green tree retention, snags) and post contacts on the monitoring website in a library for these topics. The regional team could refer provincial teams to the website during workshops and during project reviews.
- The regional team could add tracking items (identified by the leaders of effectiveness monitoring modules and quality assurance, quality control team members) to the database to quantify and clarify the issues such as, frequency and geographical extent.

Finding: Defining an agency institutional structure for elevation and timely resolution of monitoring issues and recommendations is needed. Recommendations from annual reports often go unaddressed, at least in part, because no clear process for their handoff and resolution has been created.

Recommendation:

- A process is being developed by the regional monitoring leader that will address how issues will be elevated for all monitoring modules.

Finding: Results and annual reports below the FS Supervisors Office and the BLM District Office have not reached all interested parties.

Recommendation:

- National Forests and BLM Districts could include the findings from implementation monitoring reviews in the individual FS and BLM annual monitoring reports when a sample project was on a forest or BLM district in that year, along with host-unit recommendations and follow up. A reference to the website address, www.reo.gov\monitoring for the full Plan monitoring report would also be helpful. This issue will likely be addressed in the forthcoming quality assurance, quality control plan.

Participation

Finding: Field review team makeup would be strengthened by including the participation of line officers, contract administrators, tribal, non-agency provincial advisory committee members, and representatives from all ROD signatory agencies. Many of the key participants necessary to provide a full discussion and resolution of issues are often not present during the review. This omission can result in an inability to distinguish whether compliance issues are in the interpretation, the design, or the implementation phase of the project. Provincial advisory committee members and regulatory agency reviewers are charged with objectively determining consistency with the Plan. Participation of provincial advisory committee members and regulatory agency personnel increases the

knowledge base, facilitates technology transfer, and builds credibility and trust between the regulatory and land-management agencies. In addition, committee members could communicate the results of the review to their constituents, thus building credibility externally as well. Provinces where provincial teams provide a stable link to provincial advisory committee members and where line officers participate seem to promote the best participation and resolution of issues.

Recommendation:

- The regional team could continue to document participants and their affiliations in the database and provide this information as feedback in the annual reports. Annual monitoring reports could document Plan monitoring efforts when a sample project has been selected on a forest or BLM district in that year.
- Designated field officers could consider maintaining the same provincial monitoring team leaders from year to year. If new leaders and needed, they should be mentored.
- Field officers could invite the provincial advisory committee members to participate in the field reviews.
- Provincial teams could be made aware of opportunities to reimburse members.
- The regional team could continue to emphasize provincial advisory committee participation at the annual provincial team workshops.
- The Plan's monitoring program leader could attend provincial advisory committee meetings for those provinces where participation has waned.
- Monitoring program managers (especially from regulatory agencies) could encourage their field personnel on provincial advisory committees to attend the reviews.

Mandate and Recognition

Finding: Many field units view Plan implementation monitoring as an unfunded and unplanned mandate.

Recommendation:

- The regional team would continue to make data calls and select projects in the fiscal year before the one containing the monitoring. Earlier selection would allow field units to include monitoring as they develop their work plans.
- Land management agency headquarters could also address Plan monitoring in their annual work plan directives to the field offices and consider allocating funding to the field units to cover the costs of the reviews (about $5,000 per review X 24 reviews).

Finding: No reportable units of accomplishment exist for Plan implementation monitoring. Thus, field units believe they have little to show for their time, money, and effort, other than a high rate of compliance with the ROD direction and standards and guidelines.

Recommendation:

- Forests and BLM Districts could include Plan monitoring in their monitoring report and annual program summaries. Some Forests are having difficulty completing their annual reports. This recommendation would provide them with a minimum accountable item.
- Agencies could consider establishing Plan monitoring targets and reportable units in their annual work planning.

Program Design

Finding: Considering all of the ongoing monitoring efforts at regional and local scales creates the perception of possible overlap and inefficiencies.

Recommendation:

- Continue to explore means to strengthen links with other Plan monitoring modules and with local unit monitoring efforts.
- The BLM and FS could develop a standardized format for annual, local, field unit monitoring reports so information could be used to supplement the regional monitoring efforts.

Finding: The 1995 implementation monitoring protocol (Alegria, et al., 1995) was never finalized and several of the components have not been implemented. Concern has arisen about both the inability to make inferences about compliance to the entire population of projects from the current sampling scheme and the yearly adjustments made in the program. Reassessment is ongoing. Possible options for future program direction are included in Appendix H.

Recommendation:

- Because a proposal is forthcoming, regional leadership will select an option and implement it.

Finding: Develop a tracking mechanism for status of recommendations and follow-up monitoring.

Recommendation:

- The regional team could look at the possibility of incorporating this information into the regional implementation monitoring database.

Finding: The trend for several of the standards and guidelines, where noncompliance was greatest, is difficult to determine because applicable project types have not been monitored in recent years. Noncompliance does not usually appear to be the result of the standards and guidelines being poorly worded, unattainable, or unworkable. Rather, noncompliance appears to be related to planning or implementing Plan requirements.

Recommendation:

- Monitor those applicable project types where noncompliance was 10 percent or greater, so a current trend can be determined.

This problem is also being addressed in the section on options for future program direction (Appendix H).

Finding: Standard and guideline C33, RF-7 and its five components require developing and implementing a road management plan to meet aquatic strategy objectives. Implementation monitoring reviews have determined that this standard and guideline has the most noncompliance, ranging from 30 to 54 percent. These high rates of noncompliance largely result from the aquatic strategy objectives, and the five components of the standard and guideline, not being adequately addressed in road management plans. Units believe that the aquatic strategy objectives and individual components are often addressed in documents other than road management plans.

Recommendation:

- Agencies could request a review of the aquatic strategy amendment to see if an interpretation or process exists to address C33, RF-7. If it is not addressed, noncompliance will likely continue.

Finding: Several project types have not been monitored in sufficient numbers to establish a trend in compliance (mining, grazing, and recreation).

Recommendation:

- Monitor these project types in sufficient numbers and over sufficient years to determine trends.

This concern is being addressed (Appendix H).

Finding: Current trends in compliance are determined without regard for when a project was decided and implemented, which does not provide accurate information.

Recommendation:

- Record when decisions were signed for projects in the database and compare compliance between decision years.

Data Sources

Data sources include annual implementation monitoring reports, 1996 to 2002; analysis of monitoring questions with most noncompliance, 1996 to 2003 (Appendix A); draft findings from the Plan implementation monitoring program, 1996 to 2002 (Appendix F); Plan implementation monitoring program review, May 7-8, 2003 (Appendix G); and the sample design for implementation monitoring of the Plan by Jim Alegria (Appendix H).

Methods

Recommendations for improving implementation monitoring were extracted from the sources listed. Each source is inherently specific to the monitoring program. Each data source has a

section that addresses recommendations in a specific or in a general way. For example, in addition to determining compliance, each annual report contains recommendations for process improvement. Only the frequently recurring recommendations were brought forward. The findings report is a compilation of recommendations from the annual implementation monitoring reports, a draft 5-year assessment, a draft 5-year strategy, and a draft action plan. Recommendations were also taken from the proceedings of the implementation monitoring program review on May 7-8, 2003. That review included input from more than 25 people representing managers, scientists, statisticians, and field personnel. Finally, the sample design for implementation monitoring of the Plan was a commissioned venture to develop future program direction options.

Recommendations outside the scope of improvements to the process were not brought forward in this report.

Emerging Issues

Possible effects that are a part of the Plan's standards and guidelines and that may require a workload additional to the current implementation monitoring program may result from:

- New RODs for survey and manage species, the aquatic strategy and Port-Orford cedar;
- The BLM's 2008 plan revision effort;
- National fire plan monitoring;
- Data quality, reporting, and management;
- Course of future implementation monitoring program; and,
- Noxious weed management.

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Restoration Projects	FS: Karen Wilson, Scott Woltering, Gina Freel, Jim Edmonds, Peter Eldred BLM: Joe Moreau, Dick Bergen, Jeanne Keyes (contractor)
Riparian Reserves	FS: Bill Connelly, Scott Woltering BLM: Joe Moreau
Activities Primarily Associated with Vegetation Management (Terrestrial Strategy)	
Silvicultural Activities: Timber harvest	FS: Sarah Crim, Bob Ramirez, Melinda Moeur, Susan Charnley, Vicki Walker, Norm Michaels, Joanna Booser, Pat Gilmore-Brown, Don Golnick, Klaus Barber BLM: Al Wood, Bill Hatton, Paul Roush, Hank Harrison, Liang Hsin,
Other Silvicultural Activities (mechanical and prescribed fire)	FS: Melinda Moeur, Bill Fish, Tim Rich
Grazing	FS: Susan Charnley BLM: Paul Roush, Hugh Barrett
Economic Well-Being	
Timber sales	FS: Sarah Crim, Jim Shackelford, Diane Golemis, Susan Charnley, Klaus Barber, Don Golnick BLM:Lyndon Werner, Al Wood, Bill Hatton, Paul Roush, Liang Hsin, Chris Cadwell
Grazing	FS: Susan Charnley BLM: Hugh Barrett, Paul Roush
Activities Central to the Plan	
Adaptive Management (Areas)	FS: Shawne Mohoric BLM: Jerry Magee
Interagency Collaboration	Derived from reports
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Compliance of Projects and Watershed Assessments with Standards and guidelines	FS: Gery Ferguson, Regina Winkler, Candace Dillingham BLM: Liang Hsin, Jim Alegria FWS: Mario Mamone
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Glossary

Allotment – A designated area of land available for livestock grazing. Forest Service Manual (FSM) 2210

Allowable Sale Quantity – The gross amount of timber volume, including salvage, that may be sold annually from a specified area over a stated period in accordance with management plans of the Forest Service or Bureau of Land Management. Formerly referred to as "allowable cut." FEMAT

Animal Unit Month – The amount of forage necessary to sustain one cow or its equivalent for one month. FEMAT

Commercial thinning – Intermediate cutting of merchantable trees sold through a timber sale or stewardship contract, to stimulate the growth of the remaining trees and to increase the total yield of the future stand. FEMAT

Grazing – Use of federal lands for foraging of domesticated livestock, such as sheep, goats, cattle, and horses.

Habitat improvement – Projects designed to improve conditions for fish, wildlife, or watersheds that provide late-successional habitat benefits or if project effects on species associated with late-successional forests would be negligible. Projects required for recovery of threatened or endangered species should be considered, even if they result in some reduction of habitat quality for other late-successional species. IRDA (interagency restoration database)

Instream passage – Actions designed to protect and improve fish passage for juvenile or adult fish, including but not limited to removing culverts, upgrading culverts, improving or installing fish ladders, irrigation diversions, or fish screens. IRDA (interagency restoration database)

Instream structure – Actions designed to change or modify stream complexity and structure, including but not limited to adding large woody debris, building weirs or deflectors, creating pools, placing boulders, building rock gabions, adding gravel, developing or improving side channels, alcoves, or other actions designed to improve stream structure. IRDA (interagency restoration database)

Intermediate harvests – A harvest that removes trees from a stand between the time of its formation and the regeneration cut. FSM 2470

Mining – Removal of a locatable mineral deposit by locating and recording it under established rules and pursuant to the 1872 Mining Act. FEMAT

Partial removal – Harvest techniques resulting in removing selected trees from a forest stand. FEMAT

Permittees – The person or group having a grazing permit authorizing use of the public lands in an established grazing district. FSM 2230

Prescribed fire – A fire burning within an approved, predefined and planned prescription. The fire may result either from a planned or natural ignition; when a prescribed fire exceeds the prescription or planned perimeter, it may be declared a wildfire. Plan FSEIS

Probable Sale Quantity – Describes the allowable harvest levels for the various alternatives (Plan FSEIS) that could be maintained without decline over the long term if the schedule of harvests and regeneration were followed; PSQ includes only scheduled or regulated yields from the matrix and does not include “other wood” or volume of cull and other products normally part of former ASQ calculations. Plan FSEIS

Recreation – Use of federally managed lands to provide human enjoyment, such as camping, hiking, boating, swimming, riding animals or mechanized equipment.

Regeneration harvests – Timber harvest with the partial objective of opening a forest stand to the point where favored tree species can be reestablished; also any removal of trees intended to assist regeneration already present or to make regeneration possible. FEMAT

Research Activities designed to gather information and test hypotheses in a range of conditions.

Risk reduction – Management activities intended to reduce the probability of major stand-replacing events such as fire; elevated risk is attributed to changes in the characteristics and distribution of mixed-conifer forests resulting from past fire protection; these forests are in drier environments, have increased fuel loadings, have had repeated insect infestations, and are susceptible to major fires.

Road Definitions for Systems Roads

Classified roads – Roads wholly or partially in or adjacent to national forest lands and are determined to be needed for long-term motor vehicle access, including state roads, county roads, privately owned roads, national forest roads, and others authorized by the Forest Service.

Unclassified roads– Roads on national forest lands not managed as part of the forest transportation system, such as unplanned roads, abandoned travel ways, and off-road vehicle tracks that have not been designated and managed as trails; also those roads once under permit or other authorization and not decommissioned on the termination of authorization.

Road Maintenance Classes

1 – Basic custodial care (closed) – Assigned to intermittent service roads during the time they are closed to vehicular traffic.

2 – High-clearance vehicles – Assigned to roads operated for use by high-clearance vehicles.

3- Suitable for passenger cars – assigned to roads operated and maintained for travel by a prudent driver in a standard passenger car.

4 – Moderate degree of user comfort – Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds.

5 – High degree of user comfort – Assigned to roads that provide a high degree of user comfort and convenience.

C – Converted use – Converted use of the facility to another use, such as a trail.

D – Decommission – Assigned to roads that have been decommissioned. Decommissioning includes the demolition, dismantling, removal, obliteration, or disposal of a deteriorated or otherwise unneeded road, including necessary cleanup work; which action eliminates the

deferred maintenance needs for the road; portions of the road may remain if they do not cause problems or require maintenance. FS INFRA

Road Management – Any type of road management activity, such as maintaining, building, or reconstructing.

Salvage – The removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost. FSM 2430

Silvicultural treatments – Stand and vegetation management of any kind, including prescribed burning to meet management objectives, is considered a silvicultural treatment. Plan C-12

Thinning – Intermediate cutting made to stimulate the growth of the trees that remain and to increase the total yield of useful material from the stand. FEMAT

Watershed analysis A systematic procedure to characterize the aquatic, riparian, and terrestrial features in a watershed. Plan ROD-10

Watershed restoration – Improving current conditions of watersheds to restore degraded fish habitat and provide long-term protection to aquatic and riparian resources. FEMAT

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