Interagency Regional Monitoring

- Overview -

Northwest Forest Plan

Introduction

Interagency Regional Monitoring

Interagency Regional Monitoring in the Pacific Northwest

Eight federal agencies (see logos) have developed an implementation and effectiveness monitoring program encompassing over 25 million acres of federal land managed by the Forest Service, Bureau of Land Management, and Park Service in western Washington, Oregon, and northwest California.

This monitoring is focused on important regional scale questions about older forests, listed species (northern spotted owls, marbled murrelets), watershed health, federal agency relationships with Tribes, and changing socio-economic conditions in communities closely tied to federal lands.

The Setting

Federal lands in western Washington, Oregon, and northwest California contain the most biologically rich and productive forests in North America. These lands are the home of more than 70 Indian Tribes and more recently, the home of settlers and their descendants from all over the globe.

Development and urbanization has had a dramatic effect in the past 150 years on the human and natural environment in the Pacific Northwest.

Expanding human population in the next several decades will increase development pressure. The need for timely, consistent, and scientifically credible information is critical.

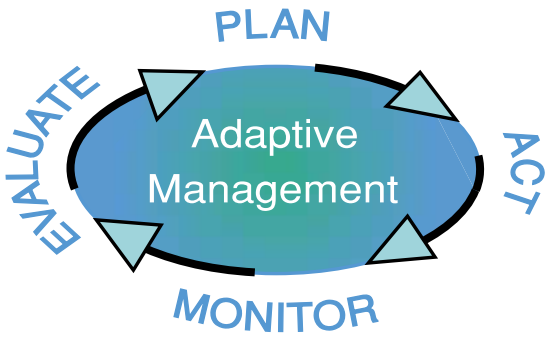
Northwest Forest Plan Regional Monitoring Goal

The goal of the regional monitoring program is to evaluate the success of the Northwest Forest Plan (NWFP) in achieving the objectives on federal lands of:

- Protecting and enhancing habitat for late-successional and old-growth forests and related species.
- Restoring and maintaining the ecological integrity of watersheds and aquatic ecosystems.
- Maintaining sustainable amounts of renewable resources that support rural economies and communities.

Why Monitor?

Decisions are usually made with the best available knowledge. If monitored, the results of todays' actions can become knowledge for future decisions. Thus, over time we are making the most of our management experiences by learning from them and passing this new knowledge to future managers.



This process of learning through monitoring is called adaptive management. Adaptive management is a cornerstone of sound natural resource management.

Many laws and regulations require monitoring. National Forest and BLM District program and project plans also require monitoring.

Types of Monitoring

It is useful to describe monitoring in three areas:

Implementation Monitoring - Are we following the standards and guidelines in the plan? Or said another way, "Are we doing what we said we would do?" In the NWFP, a regional approach to implementation monitoring was adopted early on (see p. 4).

Effectiveness Monitoring - Are the desired results being achieved? Most of the monitoring effort in the NWFP is focused on this type of monitoring (see p. 5-10).

Validation Monitoring - Are the underlying assumptions sound? This type of monitoring is usually done through a research organization. The goal here is to attempt to understand cause and effect relationships through well controlled experiments.

Website: www.reo.gov/monitoring

Interagency Partnerships

Key to Successful Monitoring

A fully integrated and coordinated (monitoring) network can provide a better understanding of our environmental resources and produce greater cost-effectiveness while continuing to meet individual agency missions.

National Interagency Committee on Environment and Natural Resources

Why a Regional Scale Program

A regional monitoring approach is needed to answer questions that are common to all National Forests, Bureau of Land Management districts, and National Parks in the analysis area. This ensures that information is gathered consistently and in a statistically sound manner such that the results can be credibly applied across this large area. Some of the more challenging questions are:

- How much old growth is there?
- Is watershed health improving?
- Is owl and marbled murrelet habitat increasing or decreasing?
- Is Tribal access to traditional resources changing?
- To what extent have communities closely connected to federal lands changed as a result of changes in federal land management policies?
- Are projects being implemented according to the Plan?

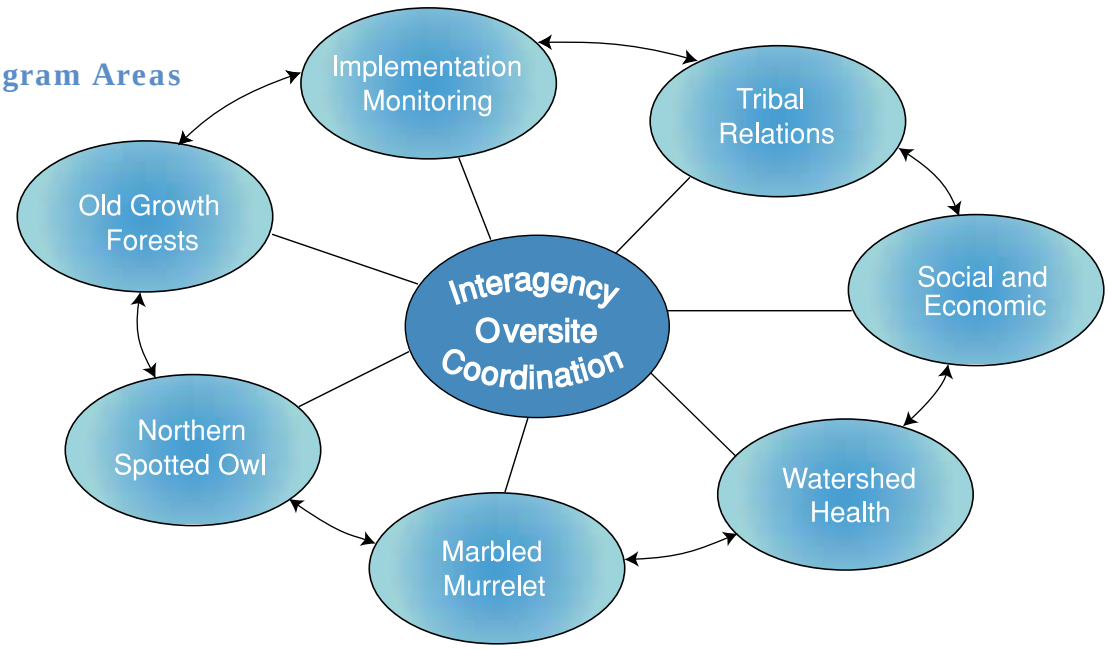
Operationally, local units or a regional team can do the actual data gathering. Cost-effectiveness, need for consistency, and workforce availability factor into these operational decisions. In the Northwest Forest Plan area, regional monitoring involves both local and regional teams.

Interagency Approach and Benefits

The Interagency Regional Monitoring Team has the goal of fostering an era of unparalleled coordination within and between agencies for all aspects of monitoring. Our approach is to focus on answering regional questions that meet agency needs, to develop comparable data collection methods, to make data accessible within and across agencies, and to conduct integrated assessments of information across agency boundaries.

Interagency cooperation in planning and action has many benefits. Coordinated monitoring efforts build upon the strengths of existing monitoring and research activities from all agencies. Broad participation encourages the integration of environmental and resource data with social and economic considerations. Recurrent comprehensive assessments address the evolving information needs of agency decision makers.

Key Program Areas



Implementation Monitoring

Monitoring compliance with the Plan's Standards and Guidelines

" . . . I learned quickly and became very impressed with the monitoring process as an open and informative means of learning about and understanding what the agencies are doing."

"I am impressed with the way agency project developers respond to the requirements and accept the associated frustration."

Quotes from Olympic Provincial Team members

Key Question - To what extent have monitored activities complied with the Northwest Forest Plan standards and guidelines?

The implementation of these standards and guidelines must be monitored to ensure that management actions are meeting prescribed standards and guidelines across federal lands.

Approach

The method used to answer the key question is to annually monitor **randomly** selected projects using a neutral assessment tool (questionnaire) administered by a **jury or group** leveling process (e.g. 12 Provincial Teams which include members of the Provincial Advisory Committees). Provincial reports are submitted to a Regional team that summarizes the results into a regional report.

Highlights

For the 6-year period (1996-2001), activities monitored included: 138 timber sales, 63 watershed analyses, 24 road projects, 18 restoration projects, 4 fuel reduction projects and several other individual activities.

To date, there has been greater than 95% compliance with meeting the standards and guidelines for the activities monitored.

Involving a spectrum of federal, state, local government and community leaders (as members of the Provincial Advisory Committees) to evaluate on-the-ground activities fosters healthy discussions which build trust and understanding.

Website: www.reo.gov/monitoring/implementation

Planning Provinces
Northwest Forest Plan

Oregon Coast Provincial Monitoring Team discussing a timber sale designed to improve forest health in a Late Successional Reserve Land Use Allocation.

California Coast Province Road Decommissioning Project in a key watershed designed to reduce impacts to the natural hydrologic flow and riparian and stream habitats.

Old Growth

Monitoring Vegetation Change

Key Questions

- How much old growth forest is there on federal land in the Pacific Northwest?
- What is its pattern across the landscape? Across the network of Reserves?
- Is the amount of old growth changing? How fast? Why?
- Is the Northwest Forest Plan providing for conservation and management of old growth forests?

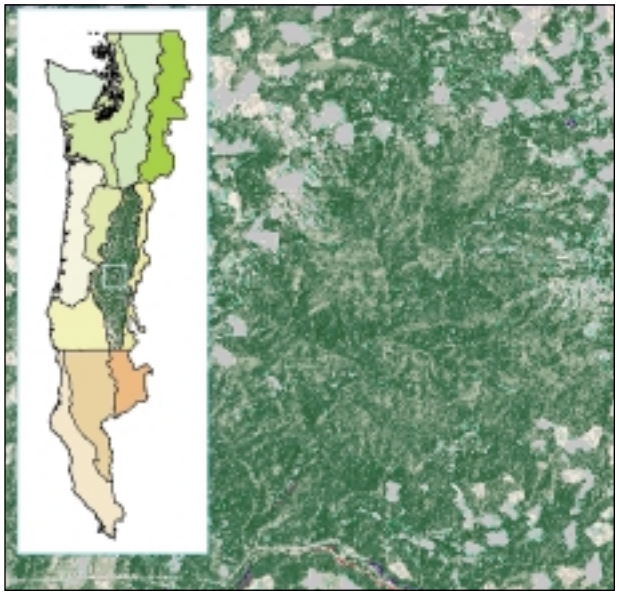
Two Views of Old-Growth Forests

These monitoring questions address both landscape patterns (from vegetation maps) and stand-scale characteristics (from detailed vegetation surveys). Long-term monitoring of observed forest conditions with respect to expected trends provides the link to determining the effectiveness of the Northwest Forest Plan.

Mapping of Current Forest Vegetation

Goals - Develop a consistent and continuous map of forest vegetation for the entire NWFP area. Establish a baseline of old growth at the beginning of the Plan, and from which future changes can be evaluated.

Methods - Map vegetation using satellite imagery from Landsat Thematic Mapper and other spatial data. The Interagency Vegetation Mapping Project in Washington and Oregon, and USFS Remote Sensing Lab CalVeg program in California develop maps of forest type, cover, and size for the twelve physiographic provinces comprising the NWFP area.

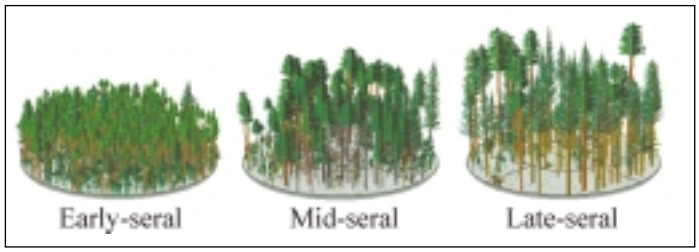


Large conifer-dominated forest mapped from satellite imagery in the Western Oregon Cascades province.

On-the-ground Vegetation Surveys

Goals - Analyze information about old growth structural attributes and composition that remote sensing cannot detect. Provide a reliable statistical sample for describing structural condition of vegetation at regional scales.

Methods - Analyze data from permanent grid plot inventory programs, including Forest Inventory and Analysis (FIA) and Current Vegetation Survey (CVS).



Vegetation survey information can be used to characterize forest structure such as tree sizes and canopy layering.

Change Detection and Trend Analysis

Goal - Track losses and gains in forest conditions from a variety of sources - management, natural succession, wildfire, insects and diseases.

Methods - Conduct remote sensing change detection using paired satellite images captured at 5-year intervals to detect stand-replacing disturbances such as harvest and wildfire. Track changes due to growth and succession on remeasured plots.

Track agency activity records, fire perimeter boundaries, and aerial insect and disease surveys. Refine expected trends using predictive models designed to simulate ecological processes under different management and disturbance scenarios at stand and landscape scales.

Highlights - Integration of these projects will allow an assessment of late-successional and old growth forest status and trends to be conducted every five years. The most recent map data and results are available on the Interagency Regional Monitoring website: **www.reo.gov/monitoring/og**

Northern Spotted Owl

Monitoring Populations and Habitat

Key Questions

- What is the trend in adult survival and reproduction of northern spotted owl (*Strix occidentalis caurina*) populations?
- What is the trend of the amount of spotted owl habitat in Late-successional Reserves?
- Can we predict spotted owl occurrence and demographic performance from landscape scale habitat characteristics?

Approach

Monitoring of spotted owl occupancy, survival and reproduction in eight demographic study areas is the focus of the population element of the monitoring plan. These demographic areas average 700,000 acres in size and collectively cover over 5,600,000 acres in Oregon, Washington and northern California.

Habitat monitoring will be accomplished by tracking the amount and distribution of owl habitat range wide. The habitat maps are derived from vegetation data interpreted from satellite imagery.

The Forest Service's Pacific Southwest Region CalVeg vegetation maps and the Interagency Vegetation Mapping Project map products will provide the base vegetation information, respectively, for California and Oregon/Washington.

Integration of population data and habitat information through model development research has the potential to provide the capability to predict owl occupancy and perhaps demographic performance based upon habitat condition. A research project has been initiated to explore these relationships.

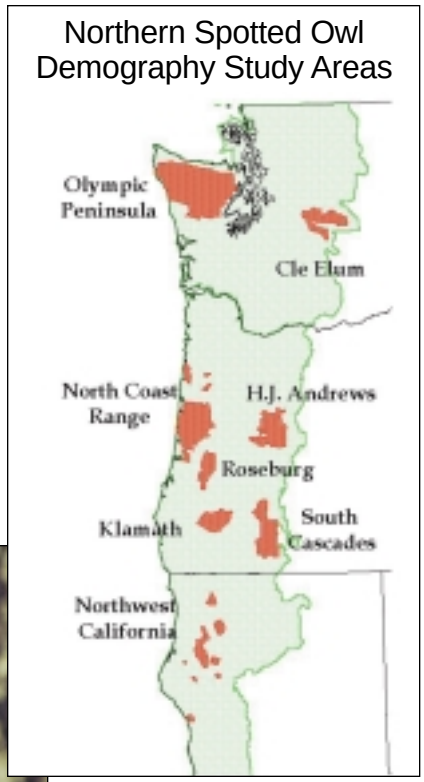
Highlights

A comprehensive population trend analysis using over 15 years of capture history data on over 6,000 spotted owls is conducted and reported on every five years.

Habitat map development and evaluation was initiated in the Western Cascades Province of Oregon and the Klamath Province in northern California. Habitat maps will be produced for each of the twelve physiographic provinces in the range of the spotted owl.

In late 1999, research on predictive model development was initiated to determine if habitat quantity and quality can be used to reliably predict abundance and demographic performance of northern spotted owls.

A pilot study has been completed in the Oregon Coast Range Province and the scientists are now working in the Western Cascades Province in Oregon and the Olympic Peninsula in Washington. Results from the most recent analyses are available on the effectiveness monitoring webpage:



Spotted Owl Effectiveness Monitoring Demography Study Areas.

Jason Mowdy

Adult (left) and fledgling spotted owls.

Jason Mowdy

A successful banding.

Marbled Murrelet

Monitoring Murrelets from Land to Sea

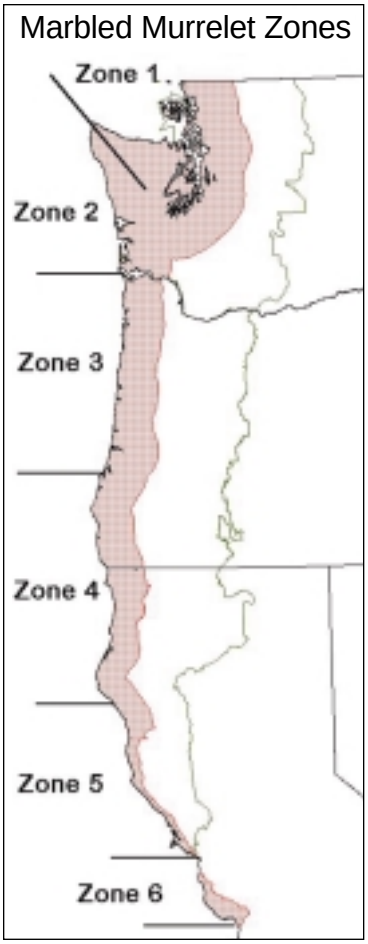
"The nesting of the Marbled Murrelet is one of the unsolved mysteries in American ornithology."

A.C. Bent, Life Histories of North American Birds, 1919
(Still unsolved in 2002)

Key Questions

- What is the status and trend of the marbled murrelet population throughout the range of the Northwest Forest Plan?
- What is the trend in amount and distribution of marbled murrelet nesting habitat throughout the range of the Northwest Forest Plan?

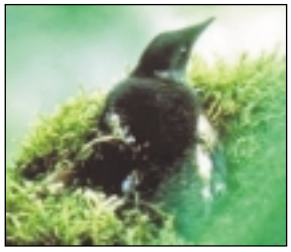
Marbled Murrelets (*Brachyramphus marmoratus*) nest predominantly in coastal old-growth forests but forage in the marine environment. Therefore, our monitoring program was designed with both a terrestrial and a marine component. The focus of the terrestrial component is to assess the status of murrelet nesting habitat while the focus of the marine component is to assess population size and trends.



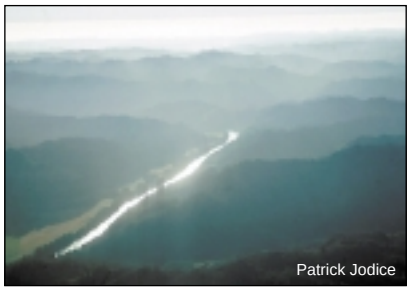
Population Monitoring

Goal - To estimate the size of and monitor changes in marbled murrelet populations throughout the range of the Northwest Forest Plan.

Methods - Scientists conducted transects at sea to survey for marbled murrelets. Population and density estimates were then calculated for five conservation zones within the range of the Northwest Forest Plan.


Marbled murrelet nest in forest canopy.

Highlights - This survey design was implemented in 2000 and the results of that survey provided the first year of population and density estimates throughout the range of the Northwest Forest Plan. The total population estimate within the range of the Northwest Forest Plan based on the first two years of surveys was approximately 20,000 birds. The greatest concentration of murrelets occurred from central Oregon to Northern California, as well as within the inland waters of Washington.



The Oregon Coast Range provides valuable nesting habitat for marbled murrelets.

Nesting Habitat Monitoring

Goal - To assess the nesting habitat baseline for marbled murrelets throughout the range of the Northwest Forest Plan.

Methods - Scientists developed a GIS approach and field-based approach to assess nesting habitat. GIS models use satellite imagery and GIS layers to develop maps of current murrelet nesting habitat. Field-based models use data collected at known murrelet nest sites to better define nesting habitat and assess the availability of nesting habitat across the Forest Plan area. Both approaches are integrated with the Old Growth module.


Martin Raphael
Conducting marbled murrelet surveys in Puget Sound, WA.

Highlights - We initiated data collection for the field-based approach in 2001. Habitat data are being collected from over 200 plots in Washington, Oregon, and California between 2001-2002. Updated results from annual surveys can be found at: **www.reo.gov/monitoring/murrelet.**

Watershed Health

Monitoring Aquatic and Riparian Conditions

"The health of our waters is the principal measure of how we live on the land."

Luna Leopold

Key Question - Are federal plans and projects improving the health of our watersheds in the Pacific Northwest?

Program Overview

Healthy watersheds are critical to ensuring a high quality of life for our society by providing clean water, productive habitat for fish and wildlife, and a variety of natural resource products. The Aquatic/Riparian Effectiveness Monitoring Plan tracks the ecological condition of watersheds by evaluating status and trends of watershed, stream, and riparian conditions.

Methods

A variety of different physical, chemical, and biological characteristics are examined in each watershed using a combination of field measurements and GIS tools. Local experts from each aquatic province within the Northwest Forest Plan help us continually refine - based on best available science - the criteria used to evaluate the relative condition of each attribute.

Monitoring is based on the best available science. Watershed data are analyzed using a computer-based decision support model to ensure consistent and systematic interpretation of monitoring information.

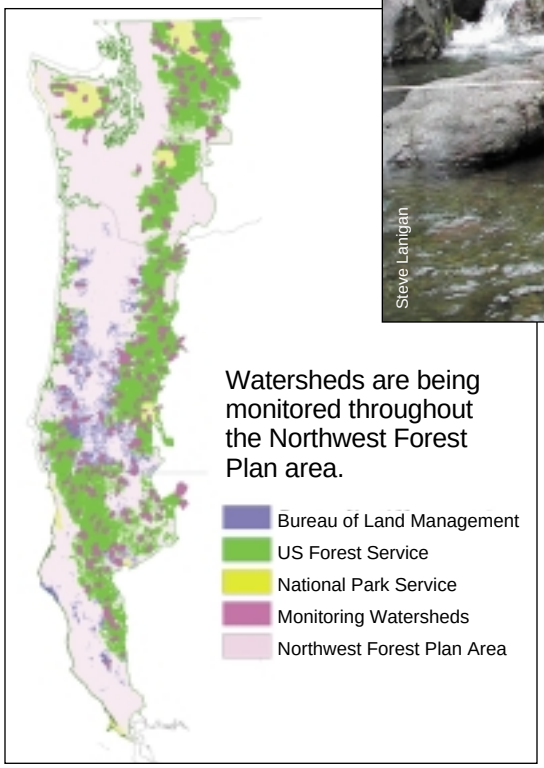
Monitoring results indicate how well federal landowners are managing watersheds, and can also be used to help prioritize restoration activities that range from changing land management actions over large landscapes to in-channel restoration projects.

Highlights

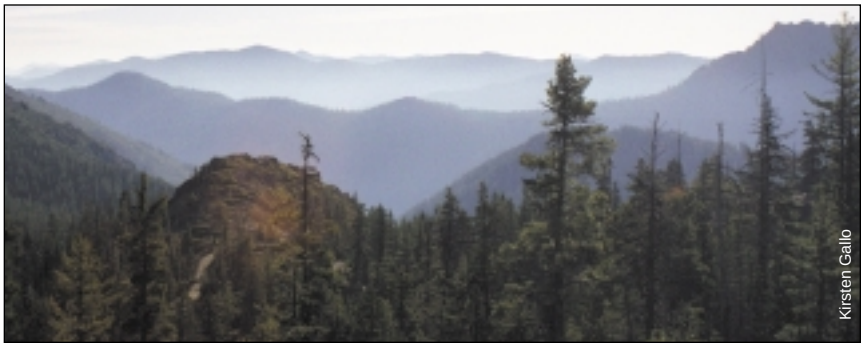
- Scientists and managers from six federal agencies developed the Aquatic/Riparian Effectiveness Monitoring Plan being used to monitor watershed health.
- Monitoring results from 250 randomly selected watersheds (10,000 to 40,000 acres in size) are being used to determine how well we are protecting and restoring watersheds on federally owned lands within the NWFP area.
- We are cooperating with Washington, Oregon, and California state agencies by sharing tools for monitoring watershed health on state and private lands as part of a state-federal partnership to restore salmon populations.

Website:
www.reo.gov/monitoring/watershed

Pool depth is one of the attributes measured during stream surveys.



Monitoring results indicate how well federal landowners are managing watersheds.



Social and Economic Change

Monitoring Trends in Local Communities

"We must never forget the human and the economic dimensions of these problems."

Federal Ecosystem Management Assessment Team, Mission Statement, 1993

Program Overview

In the early 1990s, forest-associated communities in the Pacific Northwest, still struggling with the legacy of recession and industry consolidation in the 1980s, were met with new restrictions for cutting timber on federal lands. Concerns about the possible social and economic impacts of federal forest management on these communities led to a monitoring requirement in the Record of Decision for the Northwest Forest Plan, framed as a question:

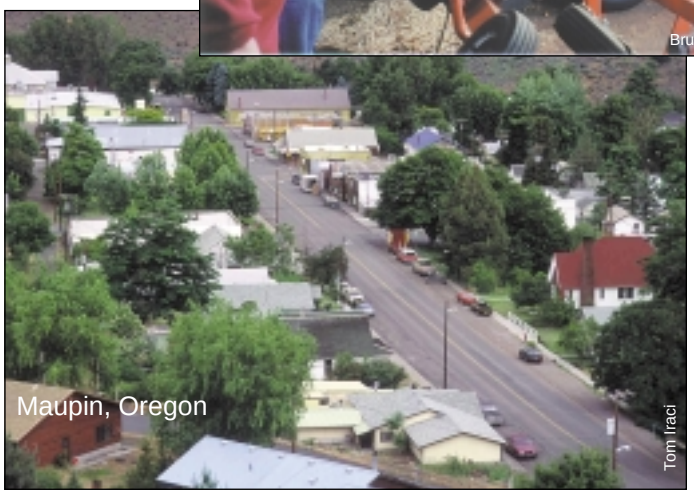
Are local communities and economies experiencing positive or negative changes that may be associated with federal forest management?

Monitoring Objectives

Key objectives of the monitoring program are to identify those communities experiencing significant positive or negative conditions or trends, and to improve understanding of the relationship between federal forest management and these trends.

Small log milling.

Bruce Goines



Maupin, Oregon

Tom Iraci

Monitoring efforts focus on local communities.

Key Questions

- Are local communities and economies experiencing significantly positive or negative conditions or trends that may be associated with federal forest management?

Tracking social and economic conditions in local communities will allow participating agencies to identify successful locales, as well as those experiencing difficulties, and provides the potential to focus management accordingly.

- Have changing federal forest management and change in local economies and social trends been significantly associated?

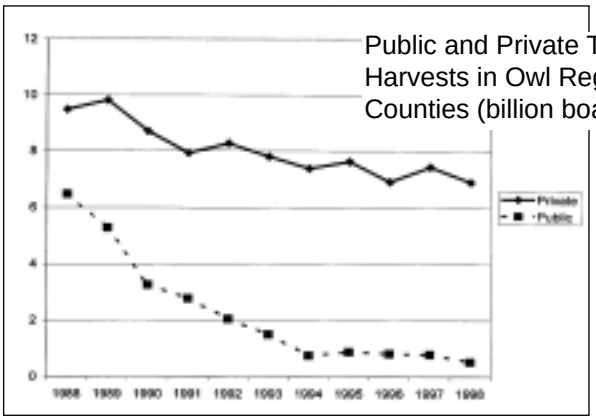
This part of the effort will help agency planners to better understand the degree to which change in Pacific Northwest communities has been associated with federal forest management.

- Are the differing economic and social conditions and trends experienced by Pacific Northwest communities significantly associated with certain community characteristics?

The degree of association between critical community characteristics such as population size, employment opportunities, proximity to federal land, or delivery of federal relief, and local economic and social change, will be assessed.

Along with an improved understanding of the effects of federal management, this part of the strategy will help identify communities that may be vulnerable to future changes in federal forest management.

Website: www.reo.gov/monitoring/socio



Public and Private Timber Harvests in Owl Region Counties (billion board feet)

Tribal Relations

Consultation with Indian Tribal Governments

Key Questions - Are federal land managers consulting with Indian tribes on a government-to-government basis? Are tribes able to access resources to exercise their treaty and other rights and interests?

There are 76 American Indian tribal governments in the Northwest Forest Plan area that federal agencies are required to consult with on a government-to-government basis. This is done to ensure that tribal rights and interests are considered in decisions. In order to evaluate agency performance and ultimately to improve government-to-government relationships, a monitoring program has been designed.

Following feedback from tribal governments, the Interagency Advisory Committee, tribal relations experts, and results from a "pilot" study, the monitoring program began implementation in 2002. This is done through an interview process using a standardized questionnaire. The purpose of the questionnaire is to obtain information from all tribes regarding the relative effectiveness of agency efforts.

Periodically, tribal leaders are interviewed using the standard questionnaire. This interview will be repeated every few years for each of the tribes in western Washington and Oregon and northwest California.

The results of the interviews will be used to describe long-term regional patterns in tribal relationships and to provide immediate feedback for improvement. Opportunities for partnerships and improved relationships are ultimately expected. These may then lead to improvements in management decisions.

Website: www.reo.gov/monitoring/tribal

Tribal elder describes traditional medicine and spiritual plants still used by tribal members in today's modern world.

Access to forest products for treaty and cultural uses. 40 foot canoe log, (future ocean canoe), Olympic National Forest, November 2001.

Cedar stakes and firewood for baking salmon.

Looking Forward

Lessons from the Northwest Forest Plan Experience

Interagency Partnerships

Sustaining monitoring efforts is a challenge. Early and continued involvement of many partners - agencies, research organizations, and universities - in the development, implementation, and processing of results improves commitment, ownership and funding.

Scientific Credibility

If monitoring results are to withstand public debate, they must be credible. Involving scientists in the design can help ensure credibility. Scientists both lead and participate on teams with managers in completing the NWFP monitoring protocols.

Public Involvement

Involving the community of federal, state, and local governments, and community leaders in evaluating on-the-ground results fosters healthy debate and builds trust. Implementation monitoring of the Northwest Forest Plan by Provincial Advisory Committees (PACs) has been very successful in creating such an open process.

Focus on the Most Important Questions

Taking the time to develop and prioritize the questions is critical. This lays the foundation for everything that is done afterwards. While people can become impatient with the start-up time, in the end it has paid off.

Leadership Involvement

Ultimately it is the decision-makers who are held accountable. Involving decision-makers throughout the monitoring process including development of key questions, approval of monitoring protocols, implementation strategies, and results is essential.

Use Existing Data and Programs

Don't reinvent the wheel! Lots of data, maps, and programs already exist that can be used. For example, the Forest Inventory and Analysis (FIA) data, socio-economic U.S. census data, spotted owl population data, and marbled murrelet population surveys all existed prior to the monitoring program and have become critical parts of the long-term program.

Reporting

An interpretive report format will be used to evaluate the monitoring results and recommendations.

The first comprehensive interpretive report (2004) will establish the baseline and describe status and trends since the plan was signed in 1994. This will include information on northern spotted owls, marbled murrelets, older forests, watershed condition, rural communities and tribes, and compliance with the standards and guides of the Northwest Forest Plan.

In addition, recommendations will be made based on analysis of key parts of the plan. Subsequent interpretive reports will be published every five years.

Integrating local and regional monitoring information is key to getting the whole picture

For example, questions of local concern such as "Is this road decommissioning project impacting owl pair #239," may be important to a local manager, but not be of much value for answering how this one project affects the overall owl population. However, if project level effects are considered in conjunction with the overall range-wide or province information, estimates can be made about the effect a project may have on the overall population.

Field meeting of fisheries biologists from the USDI Bureau of Land Management, USDA Forest Service, Warm Springs Tribe and the Oregon Department of Forestry.

Publications

Reports/Contacts/Website

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Interagency Regional Monitoring Website:

www.reo.gov/monitoring