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Ron Kikel, 2010

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INTRODUCTION

The Mt. Hood National Forest (the Forest) continues with a strong commitment to the Forest Service motto of “Caring for the Land and Serving People.” Inherent in this commitment is monitoring for sustainability of the Forest. The goal is to work with partners in finding an appropriate balance between sustainable social, economic, and ecological systems. The intent is to satisfy the values of the present without compromising the needs of future generations.

The Land and Resource Management Plan for the Mt. Hood National Forest (Forest Plan), as amended in 1994 by the Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan), was approved by Regional Forester John F. Butruille on October 17, 1990, and implementation of the Forest Plan began on February 11, 1991. In 2010, the Forest was in its twentieth year of management under the Forest Plan.

A part of implementing the Forest Plan involves a commitment to monitor and evaluate how well the Forest is doing. Based on review of information collected, adjustments in management actions or anticipated results can be identified. This process allows the Forest Plan to remain an active, usable document. Monitoring provides the decision-makers and the public information on the progress and results of implementing the Forest Plan. As the Forest completes the second decade under the Forest Plan, the Forest is beginning to switch the focus from short-term implementation monitoring to monitoring long-term outcomes of management with respect to key social, economic and ecological systems. This document highlights what the Forest is doing now, describes trends in key resource areas that are important to understanding long-term effects, which ultimately affect the opportunity to sustain our needs now and in the future.

PROGRESS TOWARDS SUSTAINABILITY ON THE MT. HOOD NATIONAL FOREST

In managing the Forest sustainably, we strive to meet the needs of the present without compromising the ability of future generations to meet their own needs. In doing so, we seek to ensure that (1) ecosystem integrity is maintained and ensured; and, (2) the well-being of people is maintained or enhanced. The Federal commitment to sustainable forest and resource management is reflected in the agency’s mission statement and Strategic Plan. In addition, the proposed 2011 National Forest Management Act planning rule affirms the overall goal for sustainability of National Forests and Grasslands, including the ecological, social, and economic components.

Sustainability monitoring is a framework for long-term monitoring that describes, assesses, and evaluates progress towards sustainability and helps to validate current management. Ultimately, it

provides the manager with information on conditions necessary to sustain systems, understand influences of forest management, and for balancing ecological requirements against social and economical considerations, values, and desired outcomes.

BACKGROUND

The question of sustainability has become a key consideration in most human endeavors. The key question is not how much should we harvest or how much should we protect, but rather—is the overall system sustainable? Many organizations, nations and industry groups have been trying to develop a set of criteria and indicators (C&I) to assess sustainability of forest ecosystems. The 1992 United Nations Conference on Environment & Development in Santiago, Chile led to an international agreement to develop criteria to assess sustainable ecosystem management. The Montreal Process Working Group was formed to advance the development of internationally accepted C&I for temperate and boreal forests at the national scale. In 1995, the US agreed to use the Montreal Process C&I to measure national progress in achieving the goals of sustainable forest management.

Although much of the initial focus on C&I came from the need to report both nationally and internationally on sustainable forest management, there was a growing realization that sustainability issues are multi-scaled and that the national goals of sustainability rest, in a large part, on the actions that are carried out on the forest management unit scale. The need for forest- scale C&I initiatives arose from recognition that local-unit monitoring and reporting were essential to understanding and achieving sustainability. As a first step towards using local unit criteria and indicators, the Forest Service, in cooperation with the Centre of International Forestry Research (CIFOR), conducted a test in an area including the Boise National Forest in 1998. The CIFOR-North American test (Boise test) developed specific local unit criteria and indicators (similar to the Montreal Process C&I) that, when implemented, provide a measure of ecological, social and economic well being conditions in North America.

Based on this preliminary test, the Forest Service Local Unit Criteria and Indicator Development (LUCID) test was chartered by the Chief in 1999. The LUCID pilot project was conducted by the USDA Forest Service Inventory and Monitoring Institute in conjunction with eight national forests to determine whether adopting a program of sustainability monitoring could enhance current monitoring programs at the local scale in the Forest Service. Using a systems framework, the LUCID test would further refine the criteria and indicators selected during the Boise test to define locally relevant core set of indicators that can be used by national forests to monitor system sustainability.

The Mt. Hood National Forest LUCID team used the pilot test as an opportunity to begin building relationship with public entities that share common interests in the sustainability of resources, not just within the boundaries of the national forest, but in the surrounding areas and communities. As a result, Portland State University became full partners with the Mt. Hood's LUCID team.

TRANSITIONING THE FOREST PLAN MONITORING REPORT

Using the tools and lessons learned from the LUCID test, the Mt. Hood National Forest transitioned into a monitoring program that can answer the key sustainability questions and build a long-term method for looking at the Forest. The purpose of this report is to enhance the understanding of ecological, social, economic and institutional conditions and trends related to the Mt. Hood National Forest in order to contribute to a continuing dialog on achieving progress in sustainable management.

Systems-Based Approach

Transitioning the monitoring report to a systems-based framework provided a means of studying the many competing influences on an area as one complete system in a sustainability context. It helped to describe important relationships across social, economic, and ecological systems. In such a framework, we can move away from our traditional approach of implementation monitoring, and instead, monitor the state of systems characterize by the critical system components (indicators) of forest sustainability. The collective information from all indicators is what informs us about the status of forests. See **Appendix B** for the Mt. Hood National Forest's list of criteria and indicators.

Oregon Board of Forestry's Seven Strategies

In 2003, the Forestry Program for Oregon introduced a framework for discussing and measuring forest sustainability in Oregon, which included the development of seven strategies, adapted from the Montreal Process criteria. In 2007, nineteen indicators were introduced and endorsed by the Oregon Board of Forestry as tools to measure progress toward meeting sustainability goals.

The monitoring report is organized by the Oregon Board of Forestry's Seven Strategies for forest sustainability (see Table 1). Table 1 provides a crosswalk between the Oregon Strategies, the Montreal Process criteria, and the Mt. Hood National Forest criteria derived from the LUCID test. Additionally, Table 1 highlights the relationship of the Oregon Strategies and the Mt. Hood Forest Plan's goals, as well as points out the Forest's desired future conditions and legal framework. Table 3 and the text in Appendix B provide further context in understanding how the Mt. Hood National Forest's work relates to larger-scale sustainability frameworks being used statewide and globally.

Table 1: Oregon Strategies/Mt. Hood National Forest Criteria/Montreal Process Criteria Crosswalk

Forestry Program for Oregon Strategies	Mt. Hood NF/LUCID Project Criteria	Comparable Montreal Process Criteria
Strategy A. Promote a sound legal system, effective and adequately funded government, leading-edge research, and sound economic policies	Criterion 1.3. Institutional Adequacy Criterion 1.1. Collaborative Stewardship	Criterion 7. Legal and institutional framework for forest conservation and sustainable management
Strategy B. Ensure that Oregon's forests provide diverse social and economic outputs and benefits valued by the public in a fair, balanced, and efficient manner	Criterion 1.2. Community Resilience Criterion 1.4. Social and Cultural Values Criterion 1.5. Community Livability Criterion 3.1. Sustain minimum stocks of natural, human and built capital. Criterion 3.2. Produce and consume sustainable flows of market goods and services. Criterion 3.3. Produce and consume sustainable flows of non-market goods and services. Criterion 3.4. Ensure an equitable distribution of benefits and costs. Criterion 3.5. Maintain an appropriate regional economic trade balance.	Criterion 6. Maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies.
Strategy C. Maintain and enhance the productive capacity of Oregon's forests to improve the economic well-being of Oregon's communities	Criterion 2.3 & 2.4. Maintenance of Ecosystem Function & Structure	Criterion 2. Maintenance of productive capacity of forest ecosystems
Strategy D. Protect, maintain, and enhance the soil and water resources of Oregon's forests	Criterion 2.3 & 2.4. Maintenance of Ecosystem Function & Structure	Criterion 4. Conservation and maintenance of soil and water resources
Strategy E. Contribute to the conservation of diverse native plant and animal populations and their habitats in Oregon's forests	Criterion 2.2. Landscape Structure & Composition Criterion 2.5 & 2.6. Population Function & Structure Criterion 2.7. Genetic Function/Structure	Criterion 1. Conservation of biological diversity
Strategy F. Protect, maintain, and enhance the health of Oregon's forest ecosystems, watersheds, and airsheds within a context of natural disturbance and active management	Criterion 2.1. Landscape Function Criterion 2.3. Ecosystem Function	Criterion 3. Maintenance of forest ecosystem health and vitality
Strategy G. Enhance carbon storage in Oregon's forests and forest products	Criterion 2.3. Ecosystem Function	Criterion 5. Maintenance of forest's contribution to global carbon cycles

FOREST PLAN MONITORING REPORT
An Overview of Current Resource Conditions



STRATEGY A

Promote a sound legal system, effective and adequately funded government, leading-edge research, and sound economic policies.

This criterion and associated indicators addresses the extent that the legal (laws, regulations, guidelines), institutional (structure for social processes), and economic (economic policies) frameworks support the conservation and sustainable management of forests. It includes the capacity to measure and monitor indicators and the capacity to conduct and apply research and new technologies. The adequacy of these frameworks is of critical importance to social and forest sustainability.

Legal Framework

The legal framework that provides the foundation for resource management on the Mt. Hood National Forest is described in Appendix B. The Forest is subject to a host of federal regulations. The principal regulations of greatest relevance to National Forest managers are associated with the following statutes:

- Clean Water Act (CWA)
- Code of Federal Regulations (CFR), Title VII
- Endangered Species Act (ESA)
- Healthy Forests Restoration Act (HFRA)
- Multiple Use-Sustained Yield Act (MUYSA)
- National Environmental Policy Act (NEPA)
- National Forest Management Act (NFMA)
- Occupational Safety and Health Act (OSHA)
- Organic Administration Act
- Wilderness Act
- Wild and Scenic Rivers Act

Forest Service activities are also governed through administrative requirements such as applicable sections of the U.S. Code, the Forest Service Manual, and the Forest Service Handbook. Other agencies who partner in various aspects of forest management on Forest include NOAA (National Oceanic and Atmospheric Administration) Fisheries, the U.S. Fish and Wildlife Service, and the Oregon State Historic Preservation Office. Other government-to-government relations regarding forest management are maintained with the Confederated Tribes of Warm Springs and the Confederated Tribes of Grand Ronde.

Customary & Traditional Rights of Indigenous People

The Forest Plan recognizes the federal government trust responsibilities to protect and preserve ceded rights and privileges of Native American Indians to access and use the Forest for traditional

and religious values, including coordination and consultation of projects located on these accustomed areas. In 2010, consultation with the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) was completed on all projects located on tribal lands and usual and accustomed areas. Informal consultation was conducted with the Confederated Tribes of Grand Ronde and CTWS in 2010 for the proposed Road Decommissioning Increment II.

Economic Framework

A regulatory environment and policies that recognize the long-term nature of investments and that allow the sustained use of goods and services at a level that meets the long-term demands for forest products and services provide an economic framework which supports sustainable forest management. The Forest is managed in such a fashion that it will be resilient to external shocks in delivering its essential ecological, social and economic services. The determination of the capital base to pass on to future generations and investments is a social (and largely political) decision.

Every year, the Forest puts together a program of work based on the Forest's annual allocation of appropriations from Congress, the Forest's management capacity, and National, Regional, and Forest priorities. Outputs and activities in individual years will vary due to changing conditions and Congressional budget appropriations. The annual program is an incremental step toward implementation of the goals and objectives and moves the Forest towards the many desired future conditions as set forth in the Forest Plan. The purpose of this monitoring item is to track funding levels necessary to achieve the outputs predicted in the Forest Plan. The total budget predicted for full Forest Plan implementation was \$21,759,718; actual funds available in FY 2010 were \$22,412,925 plus \$10,930,303 in American Recovery and Reinvestment Act funds. However, resource areas are experiencing funding shortfalls from those projected in the Forest Plan, causing some program areas to move more slowly in meeting Plan objectives. In 2010, the Forest completed a Forest-wide comprehensive strategy for vegetation management that addresses needs, opportunities and challenges. The strategy is intended to identify and prioritize opportunities to develop annual integrated programs of work to be implemented commensurate with the Forest's annual appropriations for current and out-year action plans; to prioritize funding and resources to the areas that have the greatest need and/or opportunity to result in long-term gains in healthy watersheds and forest conservation; to supply a predictable amount of forest products and restoration of priority watersheds and diverse habitats; and to build partnership, collaboration and public support with citizen groups, neighboring communities, and the Tribes.

Institutional Framework

Institutions are the set of rules or processes used by individuals to organize activities that produce outcomes. They guide people's interactions and provide the means for problem resolution. Institutions can support sustainable forest management by providing for public involvement activities, public education, maintain physical infrastructure to facilitate supply and delivery of ecosystem services, and undertake periodic forest planning, assessment and policy review. Institutions, social values, and processes contribute to the governance of the forest system.

Collaborative Stewardship

Collaborative stewardship is an example of a social process that integrates public values into forest management activities and hence, increases the likelihood of sustainability. Collaborative stewardship is the opportunity to have public values and beliefs heard, considered and incorporated into forest

management activities, and the ability of publics to participate in management actions. Collaborative stewardship involves citizens in forest management activities, builds community and forest sector capacity, and integrates various kinds of expertise in the decision-making process.

Volunteers & Partnerships

Volunteers and partnerships are an integral part of implementing the natural resource agenda at the local level. Volunteers include both individuals and organized groups. Some partnerships are involved in major collaborative and stewardship roles. During the 2010 season, Mt. Hood broke its own volunteer engagement records, logging over 34,500 volunteer hours valued at over \$730,000. Coupled with the hosted programs of Northwest Service Academy and YCC, over 58,000 hours of work was contributed.



Figure 1: Tilly Jane A-Frame, managed by the Portland Chapter of the Oregon Nordic Club.

Agreements with the Confederated Tribes of Warm Springs, Pacific Crest Trail Association and the Mt. Hood National Forest created an opportunity for 10 youths from Warm Springs to do trail work on the south end of the Forest for 8 weeks. In addition, the forest established or continued over 400 organizational partnerships which leveraged an additional \$3.5 million in external resources to accomplish mutually beneficial work.

The Forest has won awards and recognition in past years for its volunteer, youth, hosted and partnership programs such as Cascade Streamwatch, Salmon Watch, Clackamas Stewardship Partners, Sandy River Basin Partners, Barlow/Hood River Youth Conservation Corps, and others. Volunteers and partners contribute labor, skills, and funding, performing work in the interpretative program, fishing clinics, archeological survey projects, wildlife tracking surveys, trail maintenance, restoring recreation sites, grooming of snow trails, and filling positions as fire lookouts and wilderness stewards. As the number of Forest employees continues to diminish, more emphasis is placed on organized volunteer groups and partners to take an active role in recruiting, training and supervising volunteer activities.

Collaborative Efforts

Collaboration between local, state, federal agencies, tribes and other organizations continues to provide the necessary foundation for getting work done on the Forest. Watershed councils, Resource Advisory Committees, non-profit organizations, and community work are examples of public involvement in natural resource management and decision-making processes. The following are a sampling of the ongoing collaboration efforts on the Forest that are providing an increased capacity and collaborative decision-making for sustainable management of the Forest and support to the Mt. Hood Strategic Stewardship Plan:

Stewardship Contracts

In FY 2005, a collaborative group known as the Clackamas Stewardship Partners (CSP) was formed with an interest in utilizing stewardship contracting authorities to implement priority watershed

restoration and wildlife projects in the Clackamas watershed. This collaboration has been very successful, even winning the prestigious US Forest Service and Natural Resources Conservation Service “Two Chiefs’ Partnership Award” in 2008. The efforts of diverse stakeholders, including county government, local environmental organizations, and others, has resulted in over \$3,115,534 in job-creating restoration projects already completed or under contract in the Clackamas River Basin as well as \$2,495,989 in job-creating restoration projects already completed or under contract on National Forest System lands in the Hood River and Wasco Counties. In 2010, five stewardship contracts resulted in \$1,846,000 of revenue for restoration projects in the Clackamas River Basin. An additional two stewardship contracts resulted in \$501,605 of revenue for hazardous fuels reduction projects on the Hood River and Barlow Ranger Districts.

Sandy River Basin Partners

The Sandy River Basin Partners is a consortium of state, federal and local government organizations and private conservation groups interested in the long-term ecological health and management of the Sandy River Basin towards recovery of salmonids listed under the Endangered Species Act in the Sandy River watershed. Numerous projects implemented in 2010 include: side channel restoration, engineered log jams, large wood habitat features, and road decommissioning projects. The Salmon River Restoration Plan (RDG, 2009) is in full implementation mode with numerous projects being implemented annually including side channel restoration, engineered log jams, large wood habitat features, and road decommissioning projects.



STRATEGY B

Ensure that the Mt. Hood National Forest provides diverse social and economic outputs and benefits valued by the public in a fair, balanced, and efficient manner.

This criterion and associated indicators address the long-term maintenance of multiple socioeconomic benefits to meet the needs of society. Indicators include the production of forest products and ecosystem services such as clean air, water, fish habitat, scenery and recreational opportunities. Investments in growing healthy forests, infrastructure, workforce capital, research and technologies can enrich individuals and communities by providing for environmental services and cultural, social, and spiritual needs and values. Equity is an important facet of social and cultural values. It refers to the inter- and intra-generational distribution of costs and benefits of sustainability. The well-being of forest-based communities is an important social value and an important aspect of public decision-making and policy regarding forests. As communities develop greater capacity and more resources, they can act as stewards of forest resources, maintain and improve their social well-being and determine their respective relationship and roles in sustaining forests.

Social and Cultural Values

These indicators provide an overview of community values and needs, and the extent to which those values are integrated into forest management decisions and policy discussions. Cultural and spiritual connections to forests vary among local communities and are represented by social values that the local communities place on a forest's contribution to providing scenic landscapes, recreational activities, special places, and traditional and religious uses.

Recreational Values

Developed Recreation

As part of the Recreation Facility Analysis in 2007, the forest developed a recreation program niche statement which defines the benefits that the forest can provide. The following is an excerpt that addresses recreational values:

Mt. Hood is an Oregon icon, exemplifying the connection between community and place. With its many historic and cultural threads, the mountain is woven into the economic and social fabric of people and communities in and around the forest. More than four million people come to the forest each year for play, exercise, learning, connection to nature, and spiritual renewal. Visitors appreciate the variety of year around, easily accessible recreation activities; and many consider it their "back yard." They value the landscape tapestry that provides great trails and opportunities for solitude. Others may only see the mountain from afar, but their lives are enriched by its intrinsic values.

The Forest Plan goal is to provide year-round dispersed and developed recreation opportunities. Towards those goals, the Forest participated in the 2007 national recreation facility analysis (RFA) which evaluates each developed recreation site against established national criteria including conformance with the forest niche, financial efficiency, and environmental and community sustainability. The program of work is intended to bring the forest's developed recreation sites into alignment with the recreation niche and also with the resources available to operate and maintain them to standard. The program of work is important to address the backlog of needed maintenance at facilities that has been increasing over the years, creating health, safety, and visitor satisfaction concerns.

Wilderness

The Forest Plan goal for wilderness is to manage and maintain wilderness character and natural processes and to provide a wide range of permitted uses. In 2004, the Forest Service established a performance measure for evaluating how well the agency is managing wilderness. Each wilderness area is evaluated annually against the following ten elements: fire management; non-native, invasive plants; air quality; wilderness education plans; opportunities for solitude; recreation site inventory; outfitter/guides; land management plan standards; information management; and baseline workforce. Currently, the Forest's wilderness areas have not met the minimum stewardship levels established for these performance measures. The Chief of the Forest Service has challenged the agency to manage 100% of the National Forest wilderness areas to minimum stewardship levels by 2014, the 50th anniversary of the Wilderness Act. This challenge has become known as the 10-Year Wilderness Stewardship Challenge (10YWSC).

Recreation visitation to the Mt. Hood wilderness in 2010 (at reporting trailheads) continues to fall into the 30,000 to 40,000 band as it has for more than a decade. There does not appear to be a discernable upward or downward trend in wilderness use.

The 2009 Omnibus Public Land Management Act established three new wilderness areas and further expanded existing wilderness areas in Mt. Hood National Forest. The total estimated new wilderness is 124,200 acres.

Wild and Scenic Rivers

The Forest Plan goal is to maintain or enhance all eligible, suitable and designated Wild and Scenic Rivers. The national performance measures for Wild and Scenic River (W&SR) management are:

- Outstandingly Remarkable Values (ORV) described
- River sections classified
- Legal boundary established
- Comprehensive River Management Plan (CRMP) completed
- Water resource projects evaluated
- Water quality protected
- ORVs protected
- Recreation use managed
- Interagency relationships developed

None of the Wild and Scenic Rivers managed by Mt. Hood National Forest met all of the criteria in 2010. The ORVs for the five original Wild and Scenic Rivers (Clackamas, Roaring, White, Salmon, and Sandy) have been established. An evaluation of the effects to ORVs was completed and submitted to the Regional Office for every in-stream project in 2010.

Nine new Wild and Scenic River segments were designated with the passage of the Omnibus Public Land Management Act of 2009. In 2010, outstandingly remarkable values (ORVs) were determined for two of the newly designated rivers—Fifteenmile Creek and East Fork Hood River.

Cultural Heritage

The Forest Plan goal is to locate, protect, maintain and enhance prehistoric and historic sites, buildings, objects and antiquities of local, regional or national significance. Significant (National Register eligible) historic buildings and structures are maintained, stabilized, and repaired according to historic preservation standards, in consultation with the State Historic Preservation Office (SHPO). In 2010, the Forest began development of a historic property management plan for the Mile Bridge tract, now managed as a National Register eligible historic district.

Historic preservation efforts for 2010 focused on Timberline Lodge. There were no new nominations to the National Register of Historic Places.

Interpretation, education, and volunteerism are three typical methods used to facilitate public involvement in the Heritage program. Volunteers from Oregon Archaeological Society participated in the Camas Prairie Archaeological Testing Project and continued participation in the Site Stewardship Program designed to ensure that particularly vulnerable prehistoric sites receive periodic monitoring and condition assessment.



Figure 2: Scaffolding on Timberline Lodge during chimney restoration project.

Built Capital

Built capital is the infrastructure (roads, trails, recreational facilities, etc.) that supports the flow of goods and services.

Access and Travel Management

The Forest continues to advance towards its goals associated with roads. The Forest is maintaining or improving the mainline road system while decommissioning or closing unneeded roads, and the size of the Forest's transportation system is decreasing. In 2010, approximately 50% of our 3,107 mile road system is either closed to public access or classified as "available for closure or decommissioning." Road maintenance funding for the last few years has been decreasing, and the Forest is unable to keep up with the deteriorating and aging road system. The limited road maintenance funds are being focused on the highest-priority roads, primarily the low-clearance passenger car roads that access major recreation destinations. Road closures are also being

implemented over [the much higher cost of] road decommissioning. During 2010, the Forest performed road maintenance on 476 miles of maintenance level 2-5 road (52% of ML 3-5 roads and 12% of ML 2 roads) and decommissioned 134 miles of road.

A Record of Decision was signed in August, 2010, that fundamentally changes OHV management in the forest. The Forest Plan was amended shifting access policy from “open unless signed closed,” to “closed unless designated open.” Designation of open routes (roads and trails) and areas will be depicted on the forest’s motor vehicle use map (MVUM) which will be published on an annual basis. The forest’s first MVUM will be published in early 2011.

Campgrounds & Ski Areas

The Forest Plan goal is to provide developed recreation sites designed to meet user’s needs, interests, and equipment and are maintained to a level expected by the users.

Campgrounds on the Forest fill a social and economic niche that many long-time visitors appreciate. That user group, however, is not expanding as originally projected, and may be decreasing. Based on current and predicted use patterns and interest, the Forest has more developed camping capacity than demand at many of the campgrounds on most days during the camping season except on weekends during July and August. Visitation and utilization data were reported by permit holders for concessionaire-managed campgrounds in 2010. The Highway 26 and Clackamas River Complex campgrounds had robust occupancy, considering that western Oregon experienced an especially cool and rainy spring. The highest mean occupancy level in 2010 was 56% at Hoodview Campground (Timothy Lake). At the other end of the occupancy spectrum, Riley Horse Camp, Summit Lake, and McNeil Campgrounds had mean occupancy levels of 8%, 9%, and 12%, respectively.

During the 2009-2010 ski season, use of Mt. Hood National Forest’s three largest alpine ski areas (Mt. Hood Meadows, Ski Bowl, and Timberline) was 13% higher than the previous season, surpassing both the state and regional percent changes from the previous year, which were 8.78% and 7.52% respectively. Mt. Hood Meadows regained the top spot as the most-visited ski area in Mt. Hood National Forest with a total of 458,257 visits (an increase of 16% from the previous year), according to the Pacific Northwest Ski Areas Association 2009/2010 Annual Visitation Report. Timberline reported 368,563 visits (a 36% increase from the previous year). Use at Ski Bowl declined by 4%, and Cooper Spur did not open for the season. Summit Ski Area provided no report for the season.

Trails

The Forest Plan goal is to manage and maintain trails for a variety of uses and experiences consistent with public demand. The Forest currently has 977 miles of trails compared to the Forest Plan projection of 1,560 miles during the second decade of the Plan. The Forest Plan also projected an average of 74 miles of trail construction and reconstruction per year. Appropriated trail construction funding has diminished, and the actual average accomplishment for the Forest is considerably less.

In 2010, the Mt. Hood National Forest awarded contracts to replace 22 trail bridges throughout the Forest, reconstruct a portion of Pioneer Bridal Trail and the Pacific Crest Trail near Buck Peak, and construct a new ADA-accessible trail and fishing access across the dam at Trillium Lake. These contracts were funded by the American Recovery and Reinvestment Act (ARRA) of 2009. In 2010, 309 miles of system trails were maintained to standard via ARRA funding. This work was accomplished by Northwest Service Academy (AmeriCorps) and Northwest Youth Corps crews, Oregon Youth Employment Initiative crews (Urban Rangers), volunteer labor, and a Forest Service (Hood River Ranger District) trail maintenance crew.

Continuing into 2011, ARRA funds are being used for a trail location and mapping contract, which is an effort to describe the arc of every system trail in Mt. Hood National Forest using GPS technology.



Figure 3: Pacific Crest Trail near Lolo Pass

Natural Capital

Natural capital is the stock of resources that ecological systems generate as diverse streams of valuable products and services in the future. Natural capital may also provide services like recycling wastes and erosion control. Since the flow of services from ecosystems requires that they function as whole systems, the structure and diversity of the system are important components of natural capital.

Timber

The Forest Plan goal is to sustain ecological conditions to provide a continuing supply of forest products and a positive economic return. The Forest is striving to provide a predictable level of forest products to the regional economy. The Forest Plan, as amended, identifies about 40 percent of the Forest as “Matrix” lands. Within the total Matrix allocation, approximately 183,000 acres (17 percent) of the Forest land base is “timber emphasis,” wherein the primary objective is timber production. For the remainder of matrix land outside of timber emphasis designation, vegetation management is still a major activity, however, timber management is undertaken as a means to meet other (primary) resource objectives (e.g., scenic viewshed, deer and elk winter range, special emphasis watershed, etc.). In 1995, the Forest Plan, as amended, set a Probable Sale Quantity (also called PSQ, which represents the amount of timber volume that could be sold in a given year) of 64 million board feet (MMBF). Litigation and annual funding are two of the most constraining factors that affect attainment of the PSQ.

In FY 2010, the budget allocation scheduled the Forest to offer for sale approximately 35.1 MMBF (54.8% of PSQ). The Forest offered for sale approximately 32.2 MMBF, and awarded a total of 40.8 MMBF. The majority of this volume was offered using stewardship contracts through “best value” bid procedures. The contracts resulted in a revenue source which will accomplish restoration projects

such as fuel reduction, road maintenance, road decommissioning, OHV damage repair, pre-commercial thinning and wildlife habitat enhancement. In 2010, retained receipts were used to implement or put under contract \$285,000 in restoration projects across the Forest. The Clackamas River Basin Council implemented \$140,000 in aquatic restoration projects off-Forest, including two culvert replacements and a fish passage improvement project, through a stewardship agreement. The restoration projects implemented on-Forest included aspen restoration to restore wildlife habitat, noxious weed treatments, road maintenance to restore water quality, and OHV restoration to improve soil productivity. Another \$70,000 in restoration projects were approved and will be implemented in FY 2011. These include two hazardous fuels reductions projects and a fish habitat restoration project.

The Forest also made significant progress on planning projects that accomplish wildfire risk reduction objectives and commercial thinning in overstocked plantations. These planning efforts will result in timber sales and stewardship contracts in FY2011 and 2012.

Green Biomass

Offering a predictable supply of green biomass is an important means of providing alternative energy sources, and is a growing economic interest in the Pacific Northwest. Currently, the Forest makes green biomass available from treatments such as thinning and fuel reduction. Since 2007, every timber sale or stewardship contract on the Mt. Hood National Forest has included an option for the contractor to remove green biomass. In addition, the Forest, along with other National Forests has entered into an agreement with the Confederated Tribes of Warm Springs to provide up to 80,000 BDT (bone dry tons) of biomass in support of the Tribes' co-generation proposal. In 2010, approximately 200 truckloads of biomass were removed from active sales on the Hood River and Barlow Ranger Districts. This was the first year that the piles were removed for commercial purposes, and the primary purpose was energy generation.

Special Forest Products

Over the past 10 years, the Forest has supplied moderate levels of firewood and Christmas trees to the local communities as well as the greater Portland area. The Forest has also supplied other special forest products for both commercial and personal use. These include boughs for holiday wreaths, greenery for floral arrangements, mushrooms and others such as carving stock and transplants. Due to the adjacent large population and the high-value products available, such as noble fir boughs, the Forest has one of the largest and most efficient Special Forest Products programs in the Nation. While these products do not contribute significantly to the regional economic system, they do provide for a considerable amount of employment for local workers. Future expectations are that Christmas trees, bough harvesting, and firewood opportunities will be limited due to less regeneration harvest occurring on the Forest, while demand for these products increases. In 2010, the Forest sold 6,500 special forest products permits generating over \$125,705 in receipts.

Range

Approximately 15% of the total acres on the Forest are in grazing allotments. Issuing grazing permits to local ranchers adds an element of economic viability to ranch operations, while at the same time, the private ranch lands provide essential big game winter habitat which is in critical short supply. These allotments are comprised of a mosaic of grass and shrub lands, meadow complexes, timbered areas, and harvested timber lands. Harvested lands in these allotments generally produce forage for

about twenty to thirty years before the overstory canopy (trees) re-grow and again dominate the site. This is called “transitory range.”

The Forest Plan goal is to provide quality forage conditions for commercial domestic livestock and to prevent unacceptable damage to other resource values. Range objectives were quantified and expressed as an output called “AUMs” (animal unit months). The total current permitted AUMs are 3,642. In 2010, actual livestock use was 1,660 head months.

Monitoring of existing vegetation conditions and long-term trends in vegetation are in place on all allotments. These measurements indicate that overall range condition is stable to improving and moving towards Forest Plan objectives.

In addition, Forage utilization monitoring studies were conducted on all active allotments to monitor the consumption of the current years forage by both permitted livestock and wildlife. Of the fifteen established monitoring sites grazed this season, all sites (100%) met utilization standards and guidelines established. However, there are concerns over the loss of transitory range due to the decrease in harvest levels, and resulting increase of livestock pressure on riparian areas and heavy recreation use.

Minerals

The Forest Plan goal is to facilitate exploration and development of energy and mineral resources while maintaining compatibility with other resource values. The Forest continues to be able to supply high quality rock products to the general public, other government agencies, and for their own use. There are no currently active locatable or leasable mineral developments on the Forest. During 2010, 5000 cubic yards of mineral materials were used by other government agencies, 80 cubic yards were used by the public, and 29,530 cubic yards were used by the Forest. The continuing demands for “landscape rock” are depleting sources of easy accessible loose rock material on the Forest.



STRATEGY C

Maintain and enhance the productive capacity of Mt. Hood National Forest to improve the economic well-being of Mt. Hood's communities.

This criterion and associated indicators address the Forest's productive capacity for sustainable timber production. The Forest Plan requires monitoring for catastrophic changes in the timber inventory as a result of natural disturbances, the level of treatments to enhance growth and health of stands, adjustments in harvest level or land base available for timber production due to land allocation changes, suitability, regeneration success, harvest levels compared to levels projected in the Forest Plan, and cumulative effects.

Productive Capacity

The Forest Plan requires monitoring for accomplishments of management practices programmed to contribute to future sale quantity. Examples of these capital investments/management practices include reforestation and timber improvement activities which contribute not only to future sale quantity, but to long-term productive capacity, forest health, carbon sequestration, and other resource objectives which help to maintain sustainable conditions. The Pacific Northwest Current Vegetation Survey (CVS), along with Forest GIS layers of land allocations, can be used to estimate the current standing inventory of the Forest and annual rates of growth and mortality. Tree growth rates can be used as estimates of productive capacity. One measure of sustainability is whether the level of timber harvest is considered sustainable in terms of forest growth. Overall annual growth is more than 13 times harvest levels, and annual mortality exceeds harvest by a factor of 8 to 1. On matrix lands only, growth is almost 3.7 times the rate of harvest. This indicates that timber harvest is having a very small effect on net productivity while management practices, such as thinning and reforestation, are contributing to increasing growth rates.

Stand improvement activities are monitored as they contribute to the future allowable sale quantity and increase long-term capacity of forest land by promoting healthy stand conditions and growth. They include pre-commercial thinning, pruning, and fertilization. In FY 2010, the Forest accomplished 1,676 acres of pre-commercial thinning. The Forest continues to fund pre-commercial thinning treatments primarily through the use of Stewardship Contracting authorities and Payments to the Counties funding.



STRATEGY D

Protect, maintain, and enhance the soil and water resources of Mt. Hood National Forest.

Lincoln, Boxshall and Clark (1982)¹ define an ecosystem as: “A community of organisms and their physical environment interacting as an ecological unit.” These criteria include physical environmental indicators that are related to soil, air and water characteristics. Physical environmental indicators are essential in tracking sustainable forest management because the maintenance of appropriate levels of soil oxygen, nutrients, moisture, and organic matter is key to the long-term productivity and resilience of forest ecosystems.

Water Quality

Many factors – changing climate, wildfires, insect outbreaks, timber harvest, roads, and even urban sprawl – are influencing water supplies from forests. The Forest Plan goal is to protect and maintain the character and quality of water, providing for long-term, sustained production resulting in favorable flows from the watersheds on the Forest. In addition, the unique and valuable characteristics of floodplains, riparian areas, and associated riparian and aquatic ecosystems are to be protected. The purpose of monitoring is to assess Forest Service compliance with the Clean Water Act, to collect data on water quality trends, and to monitor the effectiveness of watershed restoration work.

Water Quality Trends

Trend monitoring is conducted to monitor water quality (temperature, turbidity, pH, etc.) over time and to assess whether the Forest Plan standards and guidelines are maintaining or improving water quality. Monitoring funds were used for water temperature trend monitoring on a total of 41 sites: Zigzag Ranger District (20 sites), Barlow Ranger District (5 sites), and Clackamas River Ranger District (12 sites), with the objective of gathering data on existing water temperature conditions, water temperature recovery in certain watersheds, and compliance with State water quality standards for temperature. Eleven of forty-one of the streams monitored did not meet one or more of the DEQ water temperature standards, even though in most cases these same streams provide very good water quality for fish. This is down from the summer of 2009, when 25 of the 35 stations monitored exceeded state standards. A record-setting heat wave affected Oregon and most of the Western U.S during 2009. This extremely warm weather may have resulted in some of the streams exceeding the DEQ water temperature standards. There is some uncertainty if the streams that do not meet one or more of these standards would have met these standards prior to the onset of various resource management activities.

¹ Lincoln, R.J., G.A. Boxshall, and P.F. Clark. 1982. A dictionary of ecology, evolution and systematics. Cambridge University Press, Cambridge, UK.

The Clackamas River and Eagle Creek water monitoring stations continuously record water quality on the Forest and provide the downstream water providers an early warning of turbidity problems. For 2010, water quality was found to be very good at these sites.

Clean Water Act Compliance

With continued implementation of Best Management Practices, watershed restoration, and the Forest Plan (as amended), water quality and watershed conditions are expected to be maintained and in some areas show an improving trend.

Cumulative Effects

The Forest plan relies on cumulative effects analyses to determine watershed conditions, to provide us information about the watershed's ability to resist and recover from disturbances and to filter and maintain water quality. During 2009 and 2010, a watershed cumulative effects analysis was completed for the Huckleberry Thin Environmental Assessment on the Clackamas River Ranger District and the Bear Springs Plantation Thin on the Barlow and Hood River Districts using the Aggregate Recovery Percentage (ARP) methodology. A non-ARP cumulative effects analysis was completed for the Forest-wide Off-Highway Vehicle Management Plan, Clackamas River Road Decommissioning for Habitat Restoration, increment 2, Zigzag Road Decommissioning for Habitat Restoration, Increment 2, and the Sportsman's Paradise Hazardous Fuels Reduction Project on the eastside of the Mt. Hood National Forest. Post-project ARP analysis indicates that these projects will be within the guidelines set forth by Forest-wide standard and guidelines FW-063 and FW-064 pertaining to cumulative watershed effects.

Stream Function & Condition

Federal lands, on average, comprise from two-thirds to three-quarters of the total land ownership in these river basins, thereby emphasizing the critical importance of the aquatic habitat conditions on the Forest and the important role the Forest provides for the conservation and restoration of aquatic species. Forest Plan Standards and Guidelines, as amended by the Northwest Forest Plan, were designed to maintain or enhance aquatic habitat complexity and fish habitat capability. Watershed scale monitoring is completed through two programs: the Mt. Hood Stream Inventory Program and the Aquatic and Riparian Effectiveness Monitoring Program (AREMP).



Figure 4: Salmon River

The Mt. Hood National Forest Stream Inventory program, part of a provincial program which includes the Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area, evaluates trends and determines if the Forest is meeting aquatic habitat standards and guidelines. Each year, fish biologists on the forest evaluate monitoring and information needs, such as project level planning or updating a Watershed Analysis document, and choose the streams to be inventoried. The stream inventories collect information on stream conditions, including habitat typing (e.g., pools, riffles, glides), riparian and

upland vegetation, management activities near the stream, streambed composition, and fish species presence. The Little Sandy River and Pink Creek were sampled in 2010. Based on stream inventory results, the aquatic habitat conditions for streams and rivers on the Forest appear to be stable and improving. Continued aquatic restoration projects, implemented in collaboration with partners and stakeholders, will further improve conditions and ensure an abundance of high quality habitat on the Forest for conservation and recovery of many fish species in the local region.

AREMP is a multi-federal agency program developed to assess the effectiveness of the Aquatic Conservation Strategy (ACS) of the Northwest Forest Plan. The objective of the ACS is to maintain or restore the condition of watersheds in the Northwest Forest Plan area. AREMP tracks changes in watershed condition over time. Watersheds are sampled each year over a 5-year rotation. In 2010, the AREMP program sampled 28 random sixth field watersheds across Washington, Oregon, and California. One of the watersheds was Still Creek, located within the Sandy River basin. Surveying streams provides an excellent opportunity to detect the presence or absence of “high concern” invasive plants and animals on federal lands. During the 2010 field season (June through September) AREMP crews surveyed 185 sites in 28 watersheds for invasive species. Crews recorded 8 detections of invasive terrestrial plant species in 5 watersheds. Information and annual summary reports for the AREMP program is found at:

<http://www.reo.gov/monitoring/reports/watershed/aremp/welcome.htm>.

Soil Productivity

The Forest Plan goals are to protect, maintain and restore soil productivity, and to stabilize or restore damaged or disturbed soil areas. Standards, specific to maintaining physical soil quality properties, require that no more than 15% of an activity area is to be in a degraded condition from the combined impacts of compaction, displacement, or severe burning. Organic carbon is an important energy source for the microbiological component of the soil ecosystem. Organic matter in the form of large wood on the forest floor or smaller woody material, including the litter layer, is important sources of organic carbon. Maintenance of carbon cycling through conservation of large wood material is addressed through the standards identified for wildlife habitat needs. Soil monitoring is guided by two needs. First, to document cumulative effects, and second, to evaluate planning areas and specific stands proposed for timber harvest activity so that effects can be better predicted.

No harvest units were monitored in 2010. New monitoring in existing planning areas was not needed because previous years monitoring data was already available and adequate.



STRATEGY E

Contribute to conservation of diverse native plant and animal populations and their habitats in the Mt. Hood National Forest.

Maintaining native species is a fundamental tenet of any conservation effort. Diversity is a function of the relationship between system structure (species composition, genetic diversity, age classes, deadwood and vegetation patterns at various scales, etc.) and system dynamics or processes (nutrient cycles, interactions among species, etc). The first signs of environmental stress usually occur at the population level, affecting especially sensitive species. If there is sufficient redundancy, other species may fill the functional niche but may not be an efficient backup. These early warning signs detect ecosystem-level change. This criteria looks at the maintenance of viable populations of native species, including the processes that define interactions between them and their habitat. Monitoring and understanding changes in vegetation composition, diversity and structure are of particular importance and could serve as an indicator of ecosystem change.

Vegetation Composition and Pattern

All seral stages (early, mid and late) and their distribution on the landscape provide information on the diversity and pattern of land cover types that provide wildlife habitat, filter and maintain water quality, and provide habitat connectivity. Fifty-nine percent of the Forest is in the mid-seral stage of stand development. This condition is due to extensive stand-replacing wildfires early in the last century and forest management where stands which regenerated 30 or more years ago have grown to plantations of commercial size. Dense mid-seral stands on the eastside and backlog of stands needing some level of stocking control, such as pre-commercial thinning, raise concerns that these stands will contribute to the potential for large disturbances such as wildfire, windthrow, or insect outbreaks. This concern extends to the plantations within the Northwest Forest Plan-designated Late Successional Reserves. The strategic intent of the Forest is to maintain the health and vigor of the mid-seral stands (both natural and man-made) to insure long-term productive capacity of the forest and to improve growth rates, thereby moving these stands towards conditions more reflective of historic distributions while balanced with social and economic needs and protecting investments already made in forest plantations. Early seral distribution is also a concern. With fire suppression and the reduction in timber harvest, there has been a decline in “quality” early seral habitat. Quality early seral provides a richness of structures, biodiversity, and a diversity of processes. Many species are tied to all seral stages and are directly tied to some components of early seral. Of particular concern is the limited forage availability for deer and elk populations on the Forest as early seral habitat declines.

Population Viability

The National Forest Management Act requires that “...fish and wildlife habitat be managed to maintain viable populations of existing...species in the planning area.” To ensure this, the regulations direct that habitat must be provided to support a minimum number of reproductive individuals and

habitat must be well-distributed so that those individuals can interact with others within the planning area.

Fish Habitat

The Forest Plan goals for the fisheries program are to maintain aquatic habitat quality, as well as diverse and sustainable fish populations. The aquatic resources monitoring program is the starting point to track the status of populations of concern, such as the Endangered Species Act (ESA) listed fish; develop long term data sets on migration and population trends; and conduct effectiveness monitoring for restoration projects designed for habitat recovery and long term sustainability of fish populations. Federally-listed fish species on the forest include steelhead, coho, Chinook, and bull trout.

The fish population or habitat monitoring information is used to better understand life history stages of different populations as well as to focus recovery efforts for ESA-listed or sensitive fish species. Forest Service personnel, in collaboration with government, non-government, and Tribal partners, monitor fish production in each basin. In 2010, salmon, steelhead, and bull trout populations were monitored in the Fifteenmile, Hood River, Clackamas, and Sandy River basins. Five projects are ongoing: 1) Steelhead spawning surveys in Fifteenmile Creek 2) Smolt production monitoring in the Sandy River Basin for long-term population estimates, 3) Sandy Basin spring Chinook spawning surveys, 4) the Clackamas River bull trout re-introduction: food web baseline assessment to evaluate the effects of a planned bull trout re-introduction on anadromous and resident salmonids and other key species in the upper Clackamas River basin, and 5) the Hood River bull trout population life history monitoring.

Monitoring results indicate that the actual utilization of habitat by various fish species is far below the overall productive capacity of rivers and streams on the Mt. Hood National Forest, and that the overall abundance of anadromous fish and bull trout is quite low in many of the stream and rivers on the Forest. Hood River bull trout populations are considered to be at high risk of extinction.

Wildlife Habitat

The Forest Plan goals for the wildlife program are to protect, maintain or enhance habitat quality and maintain viable populations of native and desired non-native wildlife species. Many wildlife species depend on either or both late- and early-seral habitats. A continuous supply of early-seral habitat well-distributed across the landscape would be optimum to sustain good populations of early-seral obligate species. Given the emphasis on managing lands for late-seral habitat, the expected trend is a shift of the federal landscape to mature and late-seral habitats creating a greater need for quality early-seral habitats. The Northwest Forest Plan manages for late-seral habitats across the landscape in designated Late Successional Reserves, Congressionally Withdrawn Areas, Riparian Reserves, and designated Wilderness Areas. Most wildlife biologists believe that late-seral habitat is sufficiently protected by these designations to sustain late-seral species.

In the Forest Plan, harvest activities were expected to help maintain stable populations of deer and elk by providing a consistent quantity of foraging areas and early-seral plant communities. With a reduction in regeneration harvest, suppression of fire and dense nature of the habitats in the western Cascades, less forage is being produced for deer and elk making forage a limiting factor on the Forest. The eastside districts are increasing some forage areas with underburn treatments and wildfires when they occur. At present, biologists believe populations are stable, based on anecdotal evidence. In addition, road densities in winter range in most watersheds are above the standard

suggested by the Forest Plan. Road densities are barriers to connectivity and the reduction of roads increases the usability of habitat by deer and especially elk. Other habitat concerns for wildlife include increasing pressure on unique or sensitive habitats from recreation use, roads and grazing.

Martens and pileated woodpeckers are ecological indicator species for mature and old growth coniferous forests on the Forest. Late Successional Reserves, Riparian Reserves, and designated Wilderness Areas are providing sufficient habitat and anecdotal evidence indicates the populations appear viable. Remote camera and tracking surveys have shown good populations of marten. There have been no surveys for pileated woodpeckers, although there are regular sightings during field visits. Snag monitoring on Clackamas River Ranger District provides anecdotal evidence that populations of pileated woodpeckers seem adequate. As a result of decreased harvest and an increase in insect and disease activity, there has been an increasing amount of snags and down wood.

High-elevation habitats have been used for breeding for species such as gray-crowned rosey finch, horned larks, American pipits, American marten, and wolverine. For some species, such as wolverine, this was a last stronghold for their populations. Backcountry use and high-elevation recreation are intruding more and more into these habitats, placing increasing pressure on these high elevation species. These stresses create a concern for the sustainability of some of these species. An increased effort should be made to monitor these populations and to limit the amount of intrusion.

Riparian habitat has the highest wildlife use of all habitats on the Forest. With the practice of managing for Riparian Reserves, this habitat is well protected and there should be very little concern for sustainability of species requiring this habitat.

Special Habitats

Within the Mt. Hood National Forest, there are a variety of sub-dominant plant communities that enrich the forest with complexity and diversity. They provide important habitat to wildlife species that may not be common elsewhere on the Forest, are often sought-after recreational areas, and some, like the huckleberry, have cultural value to local Tribes for which the Forest has trust responsibilities.



Figure 5: Whitebark pine cone

These important plant communities include huckleberry, aspen, whitebark pine, open oak and pine-dominated habitat, and open grass/forb meadows. All of these plant communities are declining in quality and/or quantity due to conditions such as overstocked forest stands, forest encroachment, and/or insects and disease created through fire suppression, climate change, and past management actions.

Other special habitats include wetlands, caves, mines, cliffs, and talus slopes which are home to many sensitive plants and animal species. Human disturbances, including recreation, roads, encroachment by invasive plant species and grazing, are major impacts on these unique habitats and sensitive species. In addition, climate change may provide an additional stress which can eliminate these species altogether.

Species of Concern

The Forest Plan goal for wildlife species of concern is to protect or enhance habitat for threatened, endangered and sensitive animals and to assist with their recovery. For peregrine falcon and bald eagle, the goal is to re-establish these nesting species on the Forest.

Bald Eagle

The USDI Fish and Wildlife Service delisted the American bald eagle in 2007. The Forest Plan designates bald eagle areas on the Forest for existing and established winter communal roost areas. In 2010, monitoring show nesting efforts were successful for the Rock Creek Reservoir eagle pair and there are two chicks being cared for at the nest. In addition, a new nest was created by the Forest Service in a location with less public traffic in hopes that it will be utilized in the future. The Clear Lake nest site was active in 2010 but not tracked.

Peregrine Falcon

The USDI Fish and Wildlife Service delisted the peregrine falcon in 1999. The Forest Service will continue to manage the peregrine as sensitive species. For the peregrine, potential nesting habitat occurs on all Ranger Districts. Monitoring for peregrine nesting in 2010 was confined to the two known nest sites and both nest sites failed.

Northern Spotted Owl

The northern spotted owl is listed as threatened by the U.S. Fish and Wildlife Service. Management of spotted owls is outlined in the Northwest Forest Plan Standards and Guidelines and includes designated 100 acre Late Successional Reserves (LSRs) for known owl sites. An interagency demographic study sampling spotted owl populations across its range has replaced monitoring on individual Forests. To date, the demographic study reports a 2.8% decline per year in the spotted owl population for Oregon. In 2010, Portland General Electric began spotted owl surveys for their Cascade Crossing Transmission Project along the proposed right-of-way. Seven spotted owl locations were detected, one of which is occupied by a pair of spotted owls. Barred owls appeared to be occupying the territories of the other known sites.

Lynx

Lynx is listed as threatened in Oregon by the U.S. Fish and Wildlife Service. The Forest currently has no mapped lynx habitat. Based on trapping records, the Oregon Department of Fish and Wildlife feels this species has been extirpated from Oregon or never existed in the State.

Threatened, Endangered and Sensitive Plants

Sensitive plant species associated with non-forest habitats, such as meadows, grasslands, rock outcrops, and other natural openings, continue to be vulnerable to impacts from invasive plant encroachment, livestock grazing, off-road vehicles, recreational activities, and climate change. The Regional Forester's Sensitive Species List for plants was last revised January 2008. The list includes 114 vascular and non-vascular plant lichen and fungi species that are documented from, or are suspected to occur on the Forest. There is one federally-listed Threatened plant, *Aquatilis howellii*, which is found in the Columbia River Gorge and suspected to occur on the Hood River Ranger

District. Sensitive plant inventories have been conducted for all ground-disturbing activities, and mitigation measures have been effective in maintaining the integrity of sensitive plant sites.

Ecological Legacies

Ecological legacies, such as dead wood (remnant snags, large down woody debris), caves, nutrient cycles, seed banks, genetic diversity and habitat connectivity, are important components of the environment that persist through multiple phases and successional changes in an ecosystem. Sustainable timber harvesting focuses on maintaining biological legacies while removing timber. These long-term strategies and more ecologically-based management practices are being incorporated in vegetation prescriptions allowing natural processes and legacies to maintain balance in a complex but still fairly predictable ecosystem.

Dead Wood

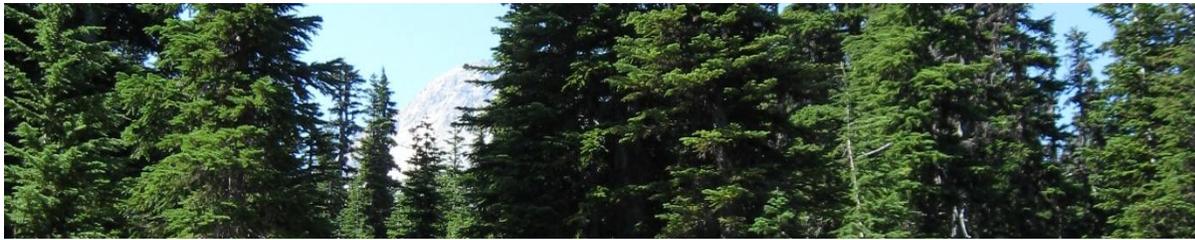
The Northwest Forest Plan provides standards and guidelines for snags and down woody material to meet wildlife habitat needs and maintenance of organic matter for soil productivity. Current monitoring data indicate that snag retention levels are meeting standards and guidelines (snags are surviving harvest activities), snags are increasing over time (due to reduced harvest of stands prone to insect and disease outbreaks), and that wildlife trees are being used by cavity users. In 2010, the Forest completed a deadwood assessment which provides watershed and forest-level condition of deadwood levels and distribution compared to historic range of variation.

Genetic Diversity

Genetic diversity is fundamental for populations of forest-dwelling organisms to be able to adapt to changing environmental conditions. The Forest Plan direction is to maintain genetic diversity of forest stands and to maintain forest health through genetic resiliency thus reducing impacts of disease, animals, insect, or climatic damage. This indicator can be used to address issues related to effects of forest management on genetic diversity. Current reforestation practices ensure genetic diversity by planting appropriate species, and additional species diversity is gained from natural regeneration.

Habitat Connectivity

The Northwest Forest Plan has been designed to provide connectivity of late successional species along the Cascades. The Plan should adequately sustain populations and ensure genetic viability across the Cascade Range. However, this does not address a concern for connectivity across high-traffic roads, especially for those species whose population drops below a critical threshold. The Highway 26 & 35 corridors are the road systems of highest concern on the Forest. Many species are sensitive to vehicle traffic and just the traffic alone can act as a barrier. Those individuals that try to cross are likely to be hit in the road. The road system, including the possibility of installing wildlife crossings, is currently being reviewed.



STRATEGY F

Protect, maintain, and enhance the health of Mt. Hood National Forest's ecosystems, watersheds, and airsheds within the context of natural disturbance and active management.

These indicators were based on maintaining integrity of ecological systems to provide sustainable forests.

Disturbance Processes

Ecosystems are dynamic, and as such, disturbances and stresses are part of them. It is important to note those disturbances and stresses that are either foreign to or outside the range of the disturbances and stresses with which the ecosystem evolved. Such disturbances and stresses pose a serious threat to the sustainability of a given ecosystem because they may exceed the ability of the ecosystem to accommodate them without major changes in the structure, composition, and/or function components. When ecosystems are pushed too far, there is a loss of natural resiliency, ecosystem capacity, and biodiversity. Disturbances impact all aspects of ecosystems at a landscape level including successional pathways, carbon balances, nutrient cycles, water quality and quantity, habitat and forage availability, scenery, availability of products, and economic values of products. These criteria and indicators provides us with information about the landscape's ability to increase or decrease the effects of fire and wind on the Forest; to provide habitat for different kinds of wildlife including rare species; to resist and recover from disturbances; to filter and maintain water quality; and to provide information on the diversity and pattern of land cover types. It also helps us to look at the implications of vegetation management actions including road building on attaining landscape-desired conditions.

These criteria and indicators focus on the processes, structures and composition that influence landscape patterns and distribution.

Wildfire and Prescribed Fire

Fire is a dominant disturbance process that has influenced vegetation at many spatial scales over the past several centuries. At a broad scale, fires influenced vegetation patterns by affecting the distribution of stand types and seral stages across the landscape. Intensity and frequency of fires can affect composition and structure of plant communities at a finer scale. Current vegetation patterns and plant community dynamics have been altered by fire suppression for the last 60-100 years. In addition, climate change is predicted to increase the vulnerability of some ecosystems to fire due to warmer drier conditions, increased fuel loadings, and increased insect outbreaks. This raises questions about the effects of the current fire regimes and management activities towards achieving desired and sustainable vegetation and landscape patterns.

The overall goal of the fire management program is to provide fire protection capability to support attainment of land and resource objectives. Fire protection and fuel treatment objectives are identified in the Forest Plan for monitoring. The plan states that if the standards and guidelines are implemented, there should be no increase in the number and acres of human-caused wildfires (56 fires and 408 acres/year based on five years of data). To date, the number of human-caused fires and acres burned are below Forest Plan estimates. For the 2010 fire season, a total of 60 fires were reported, 15 of which were lightning ignitions and 45 of which were human-caused. Reported burned acres totaled 4,646 acres. The occurrences of large lightning fires in wilderness and remote areas of the Forest over the last few years have increased the five-year average of acres burned.

Changes in vegetative conditions have altered disturbance regimes, particularly on the drier eastside of the Forest, resulting in the potential for larger, more severe fires that are outside the historic range of variability. Changes in stand structure, species composition, and accumulated fuels have predisposed extensive areas to insect infestations and disease, and high-intensity wildfires that may threaten nearby communities, watershed values, and key ecological components. Plant communities that became adapted to low intensity, frequent fires are less able to survive and recover from high-intensity (stand replacement) fire. It is expected that resource damage and value lost will increase.



Figure 6: Regrowth in the area burned by the 2008 Gnarl Ridge Fire

These altered disturbance regime areas are specifically targeted by the 10-Year Cohesive Strategy, Mt. Hood's 5-year strategy for integrating fuels and vegetation treatments, and the 2008 Strategic Framework for Responding to Climate Change. Specific objectives of these strategies include modifying fire behavior to protect homes, infrastructure and municipal watersheds in the Wildland Urban Interface (WUI), and ecologic restoration of stands and landscapes outside of the WUI. In 2010, the Forest completed 3,791 acres of hazardous fuels treatments, exceeding the Forest Plan's 800-acre annual estimate.

The Forest is continuing to seek markets for biomass and small-diameter material. Development of local co-generation facilities and mobile chipping plants are examples of several processes that will help to make biomass utilization a reality.

The Forest has prioritized planning and implementing landscape scale fuels and vegetation management projects entering into cooperative efforts with the State, tribal governments and local landowners. Fire regime condition classes (scheduled for 2011 update) and forest vegetation and fuels data updates are ongoing. This will greatly enhance our ability to quantify and monitor many deteriorating conditions in these ecosystems, including how current fire regime and management activities are affecting vegetation and landscape patterns, how to incorporate fire back into the ecosystem, and how Forest Service efforts in stewardship, partnerships, education and training are contributing to restoring forest health and safety. This effort should provide fire managers with the landscape-scale information that will help improve strategic decision-making in both the prescribed fire and wildfire arenas.

Harvest/Silviculture

The vegetation patterns or mosaics help us understand the implications of vegetation management on attaining landscape-desired conditions. Harvest, another dominant disturbance process, influences vegetation patterns by affecting the distribution of seral stages across the landscape. Harvest also can influence successional processes by alteration of stand structures and composition. Over the last decade, there has been a decline in timber harvest. Less than one tenth of one percent of the land base is being treated by harvest to meet various objectives. Vegetation management is prioritized towards restoration treatments such as reducing fuel hazards, improving wildlife habitat and maintaining forest health. There also has been an overriding shift from regeneration harvest to commercial thinning. This raises sustainability questions about the effects of management activities on achieving desired vegetation and landscape patterns.

Harvesting continues to occur at a rate below the annual probable sale quantity prescribed by the Forest Plan. In 2010, harvest occurred on 1,833 acres, with the majority of the harvest, 88%, occurring on lands designated as matrix lands in the Northwest Forest Plan and a lesser amount of harvest in late successional reserves (12%). Fifty-one percent of harvest occurred on the Mt. Hood Forest Plan land allocation *C1-Timber Emphasis* with 46% occurring on Category B land management allocations where timber production is a secondary goal. Commercial thinning was the harvest method on 87% of the acres, selection harvest on 4%, and group selection harvest on 9% of the acres.

Current and potential future forest health issues continue to be a concern on the Forest. This includes a backlog of overly dense, young stands in need of pre-commercial thinning; large acreages of changed ecological conditions on the eastside as a result of fire suppression and increasing levels of insect damage and mortality. Recommendations are for more thinning to improve stand conditions in both the pre-commercial and commercial size classes, and salvage harvest to reduce accumulations of hazardous fuels in select locations.

Noxious Weeds

Noxious weeds or invasive plant species are recognized as a major threat to native plant communities, especially on disturbed sites and grasslands. Invasive plants displace native vegetation, alter species composition of forests and rangelands, reduce the productivity of desired commodities, reduce species diversity, and adversely affect recreational quality. The Forest Plan goal is to control noxious weed infestations and prevent their spread through a combination of efforts including prevention, education, inventory, treatment, and monitoring in accordance with the Record of Decision (ROD) and Final Environmental Impact Statement (FEIS) for Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon (March 2008) and the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for Preventing and Managing Invasive Plants in the Pacific Northwest Region (October 2005). The Mt. Hood National Forest cooperates with the Oregon Department of Agriculture, Wasco County and Hood River County Weed Departments, Bonneville Power Administration, Garlic Mustard working group, the Columbia Gorge Cooperative Weed Management Area (CGCWMA), the Four County CWMA, the Nature Conservancy (TNC), Clackamas River Basin Council, and the Confederated Tribes of Warm Springs to conduct inventories, treat noxious weeds and coordinate weed education.

Monitoring is conducted on weed control treatments, known infestations, and new infestations. A total of 1358 acres of noxious weeds were treated on the Forest in 2010 primarily with herbicides and some hand-pulling. Chemical control methods have been effective in reducing the number of noxious

weeds. Biological controls for the knapweeds have had modest impact thus far. Mitigation measures to reduce the risk of noxious weed establishment are being implemented for all ground-disturbing activities including those activities not considered ground-disturbing such as weed-free hay and straw for backcountry horse use. Weed-free forage notification signs were installed along major Forest roads and highways in 2010. Education efforts include Weed Awareness Week, information kiosks on invasive species at strategic locations, and participation on the Sandy Basin Weed Watcher Early Detection training.

New infestations are still occurring. Surveys continue to locate satellite populations of hawkweed associated with the primary infestation along the Big Eddy-Ostrander transmission line from Lolo Pass west to the Forest boundary. New infestations of Sulfur cinquefoil (*Potentilla recta*) were found on Barlow and near Hood River Districts. A relatively new invader, Garlic Mustard (*Alliaria petiolata*), which has established itself in parts of the Columbia River Gorge and some Portland parks, has the potential to spread on to the Forest and is being closely monitored.

A thorough, systematic inventory of noxious weeds across the Forest has not been completed to quantify the full extent of the spread of known untreated sites. However, there are estimates that invasive plants are currently spreading at a rate of 8 -12% annually. Observations have noted increasing populations of diffuse knapweed (*Centaurea diffusa*) along Hwy. 26 and Hwy. 35 corridors on the Forest. Observations also indicate non-native Yellow and Orange Hawkweed (*Hieracium aurantiacum* and *Hieracium floribundum*) may be spreading. Satellite populations have been detected up to 10 miles from the one main population on Zigzag Ranger District. Untreated or sporadically treated spotted and diffuse knapweed in the Lake Branch area (1310 road system) of Hood River Ranger District continue to flourish. Noxious weed populations were noted during a 2010 monitoring assessment of decommissioned roads in several watersheds.

Forest Insects and Diseases

Disturbances related to forest insects and diseases are mapped during the annual Aerial Detection Survey conducted by the Forest Health Protection group. For the last several years, bark beetle outbreaks have caused a significant amount of tree mortality on the Mt. Hood National Forest and adjacent lands. Approximately 186,000 acres, or seventeen percent, of the Forest has significant levels of dead trees from bark beetle activity. There are approximately 316,000 acres of affected lands, including lands immediately adjacent to the Forest, namely the Confederated Tribes of the Warm Springs Reservation of Oregon. Most of the mortality is comprised of lodgepole pine killed by mountain pine beetle (*Dendroctonus ponderosae*), subalpine fir infested by balsam woolly adelgid (*Adelges piceae*), and true firs killed by fir engraver (*Scolytus ventralis*) and silver fir beetle (*Pseudohylesinus sericeus*). Mortality estimates are comprised, to a lesser extent, of other tree species including ponderosa pine, western white pine, whitebark pine, Douglas-fir, mountain hemlock and Engelmann spruce.



Figure 7: *Armillaria ostoye* mushrooms, a common sign of *Armillaria* root disease

Mortality from mountain pine beetle is declining since the outbreak has killed most of the host habitat. Still, there are areas of lodgepole pine likely to be killed within the next year or two such as near Summit Lake and near Government Camp. As the roots of the standing dead trees decompose, they will begin to fall and contribute to fuel loadings. Although mortality in lodgepole pine from mountain pine beetle is decreasing, acres affected by the balsam woolly adelgid are increasing. In 2010, acres with Douglas-fir beetle caused mortality also increased. Significant amounts of tree mortality have accumulated over the last ten years causing increased concern over hazardous fuels. Most of the beetle-killed lodgepole have been dead for several years and therefore the rate of falldown will be increasing.

Field surveys were completed for both the high-elevation whitebark pine, and the northernmost populations of sugar pine located on the Clackamas River Ranger District. In summary, both the whitebark pine and sugar pine populations are exhibiting severe decline due to a combination of a non-native pathogen, white pine blister rust, and the mountain pine beetle. It is recommended that the Forest pursue restoration activities and re-establishment of new populations with blister rust-resistant seedlings.

Hillslope Processes/Geologic Resources

The primary geologic hazard on the Forest is landslides. The types of landslides common on this forest are: earthflows, slumps, debris flows, debris slides, and rockfall. These landslide types can be natural or human-induced. Landslides have some beneficial effects, such as delivering large woody debris to streams, but can also deliver unwanted fine sediment to streams. The areas most at risk for landslides are portions of the Clackamas River watershed, where dormant-to-active earthflow complexes cover many square miles, and the area around Mt. Hood, where all the major drainages are subject to periodic massive debris flows. The Forest Plan direction is to maintain hydrologic and physical balances to prevent reactivation or acceleration of large slow-moving earthflow areas. The desired conditions for these areas are forest stands of varying age classes, mostly greater than eight-inch diameter trees and 70% crown closure, with management activities designed to maintain long-term stability. Measurements at established earthflow monitoring stations have been made annually since 1993 and are showing movement rates ranging from zero to several feet per year. Much additional effort is still needed in verifying the scientific validity of the standards and guidelines for earthflows, particularly those covering hydrologic recovery. Additional efforts in 2011 should be focused on continuing the review of the risk classification system for earthflows, and continuing the field verification of the earthflow and landslide boundaries.

There were three timber harvest units in FY10 on land mapped as moderate-risk earthflow. Those units totaled 19 acres. All timber harvest units on B8 (earthflow) land were commercial thinnings that temporarily reduced the crown closure to less than 70%. It is estimated that recovery to 70% crown closure will occur in approximately 10 years. No roads were constructed on B8 (earthflow) land.

There were no timber harvest units on mapped landslides other than B8 land in FY10. No roads were constructed on mapped landslides other than earthflows.

Climate Change

Climate change is one of the greatest challenges to sustainable management of forests and grasslands and to human well-being because rates of change will likely exceed many ecosystems' capabilities to naturally adapt. Climate change adds an additional "stress" to ecosystems that further alters ecosystem processes, water availability, species assemblages, and the structure of plant and

animal communities and their interactions. Increased wildfire severity and area burned, large-scale bark beetle infestations, and changing water regimes have been driven, in part, by changing climate. Land use change, management practices, and disturbances on forests and grasslands have also contributed to increasing greenhouse gases. Continued emission of greenhouse gases at current rates would intensify these impacts greatly. Even if global greenhouse gas emissions were eliminated today, the Intergovernmental Panel on Climate Change predicts with high certainty that global temperatures would continue to warm for the next 100 years (IPCC 2007)².

Growing evidence over the 20th century shows that the Pacific Northwest region has grown warmer and wetter. Temperature and precipitation measurements and surveys of non-vascular plants (epiphytic lichens) is demonstrating some of the first effects of climate change on biological diversity and species distribution patterns in the Pacific Northwest region. The Mt. Hood National Forest Air Program, working cooperatively with the regional Air Program, is documenting the ecological effects of climate change and that this change is not even across the landscape but depends on the topography and local factors. While there is still much uncertainty in being able to predict future climate, several regional climate models provide some scenarios of what to expect:

Water-Related

Warmer, wetter winters and warmer, drier summers are anticipated. A lower snow pack creates a disruption in the hydrologic cycle which can lead to more winter flooding, rising stream temperatures, earlier snowmelt, reduced stream flows, and reduced seasonal water-storage capacity for forest soils. The demand for water resources, already stressed by a growing populace, will likely lead to summer water shortages. All these changes to the hydrology and capacity of the forested systems will put greater stress on federally listed aquatic species and challenge the resiliency of all forest ecosystems.

Terrestrial-Related

Vegetation response to warming temperatures will vary by ecosystems. Timing changes with temperature sensitive physiological processes (flowering, bud flush) and survival will affect wildlife. A warmer, drier climate favors increased fire frequency and severity. Warmer temperatures create favorable conditions for pests currently limited by cold winter temperatures and frost. While vegetative composition responses to ecosystem changes due to climate change will occur by adaption over time, vegetative loss due to climate change will occur rapidly through fire and insect and disease outbreaks. The magnitude of change in temperature and local responses by plant communities will vary by location and their ability to “weather” the changes. Impacts to wildlife will depend on the rate of change in the vegetation and wildlife dispersal mechanisms.

By Forest Zones/Physiographic Provinces on the Forest

The drier Eastside Cascade forest physiographic province will be even more sensitive to water stress which can result in the water-related conditions described above, as well as probable increased vulnerability to fire severity.

For the Westside Cascade forest physiographic province, regional climate models differ in their prediction for precipitation changes. The future climate could be wetter or drier. Warmer

² IPCC. 2007. Climate Change 2007: Synthesis Report. Summary for Policymakers.

temperatures and change in hydrologic cycles, as described above, will result in longer summers and more droughts. In the wettest portions of the Forest, productivity may even increase.

For upper-elevation forests, snow packs will be reduced, hydrologic cycles could change, and some upper-elevation forest zones could be lost. Monitoring by the regional and Forest air program is already showing that the most dramatic warming is occurring in the mid to high elevation Oregon and Washington Cascades. From a biodiversity perspective, species at greatest risk on the Forest would be rare alpine and subalpine species with cold temperature requirements.

Air Quality

Forest Plan goals for management of air resources are to continue to improve the existing character of air quality from the past; management activities do not degrade Class I or II Wilderness and general forest standards; and the requirements of the State Implementation Plan for the Clean Air Act are met.

Specific objectives for Forest-level air resource management include:

1. Monitoring air pollutants when Forest Service goals and objectives are at risk and adequate data are not available.
2. Defining selected sensitive indicators of air quality, Air Quality Related Values (AQRV). Monitor AQRVs and establish the acceptable level of protection needed to prevent adverse ecological, human (visitor experiences such as visibility or odors), or cultural (e.g. archeological) impacts.
3. Minimizing air pollutant impact from land management activities.
4. Managing smoke from management ignited prescribed fires.

Smoke Emissions

Smoke from prescribed fires is the primary air quality concern from management activities. The goal of the Forest Plan is to reduce emissions 63% by the end of the first decade of the Forest Plan, which is being achieved to date. The Forest remained in compliance throughout the monitoring period (October 2009 – September 2010).

Air Pollutants

The air pollutants of greatest concern on the Mt. Hood National Forest and its Class I Wilderness are nitrogen oxides, ammonia, sulfur dioxide, toxic metals, and ozone. Emissions of nitrogen oxides from fossil fuel combustion and ammonia from agriculture are the primary source of eutrophying air pollutants. These pollutants are deposited from the atmosphere to forest ecosystems as nitrate and ammonium ions. Because forest ecosystems of the Cascades are generally adapted to low nutrient inputs, too much nitrogen can cause shifts in species composition favoring those with higher nitrogen requirements—usually weedy species—over endemic and ecologically important species. Atmospheric transformations of nitrogen oxides and sulfur dioxide also produce nitric and sulfuric acids, the primary components of acid rain. These acidifying and oxidizing pollutants are most detrimental to the health of plants.

Biomonitoring remains the primary method by which the Mt. Hood National Forest monitors air quality. AQRVs monitored by the Mt. Hood National Forest are vascular plants sensitive to ozone,

and non-vascular plants (epiphytic lichens and mosses) sensitive to nitrogen- and sulfur- containing pollutants.

Of all the national forests in Oregon, the Mt. Hood National Forest is most vulnerable to air pollution because of its proximity to the Portland/Vancouver metropolitan area to the west, and, to the east, the intensively agricultural counties of Hood River, Wasco and the Columbia Basin. It is a tribute to state and federal environmental policies that, despite a marked increase in state population since 1982, air

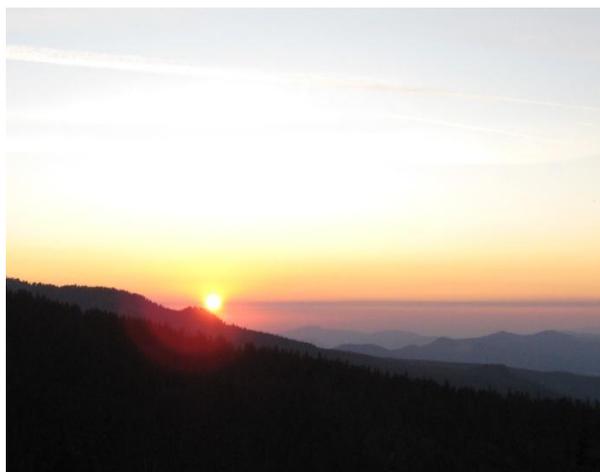


Figure 8: View from Cloud Cap, looking northwest

quality on the Mt. Hood National Forest has generally stayed the same, improved, or is still within clean site ranges for most monitored pollutants. The condition, species diversity, and abundance of the most air-pollution sensitive vegetation so far indicates an overall steady state or slight improvement in air quality. Visibility in the Mt. Hood Wilderness is comparable to other Class I Wildernesses in Oregon, as are fine particulates from forest fires. However, a few areas are worrisome. Concentrations of ammonia in precipitation consistently exceeded critical levels for sensitive epiphytes in the Bull Run watershed from 1982 through 2003, when monitoring ceased. Total nitrogen deposition was two to three times the

background level during the same period. Sensitive, nitrogen fixing lichens and some epiphytic mosses are sparse in this area and the Mark Hatfield Wilderness in general. Although lichen-community based air quality scores were still below published response thresholds in the Wilderness, it may be that slightly acidic deposition is preventing a shift toward eutrophic species—which are typically present at sites with poor air scores.

Small increases in sulfur accumulated in epiphytic vegetation were documented across many sites in the Forest, and about 20% of sites exceeded expected background ranges for this element. Continued increases in sulfates could adversely affect species distribution and abundance of sensitive vegetation. Cadmium, vanadium, and zinc levels in vegetation, are still low, but appear to be increasing. The concentration of sites with increased vanadium and sulfur concentrations in the eastern sections of the Forest indicates new sources or increased emissions from existing sources east of the Cascade crest.



STRATEGY G

Enhance carbon storage in Mt. Hood National Forest and forest products.

Potential changes in the physical and chemical nature of the earth's climate are likely to have impacts on forest ecosystems. The extent and magnitude of these changes are uncertain. Forests and forest management can make a difference in responding to the challenges of climate change through carbon sequestration and storage. The United States has the world's fourth largest forest estate and one third of its land area is in forestland. America's forests offset about 10% of our country's carbon emissions. Based on 20 years of targeted research and a century of science and management experience on public and private lands, the Forest Service strategy is to lead efforts to mitigate and adapt to climate change, and provide options for reducing carbon emissions through use of forest products, biofuels, and sustainable operations.

Carbon Sequestration

Interest in carbon sequestration has increased in an effort to explore opportunities for climate change mitigation. Carbon sequestration is the process by which atmospheric carbon dioxide is absorbed by trees through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soil. Sustainable forestry practices can increase the ability of forests to sequester additional atmospheric carbon while balancing with other ecosystem services. Planting trees, restoration, increasing health and resiliency of forests, increasing forest growth, and treating invasive species are examples of ways to increase forest carbon.

Pacific Northwest forests have a high potential to store carbon due to their composition of long-lived species and high productivity. The role of federal forests in managing under the uncertainty of climate change is still being formulated and the evaluation of global change effects is perhaps more appropriate at the regional level than at the project level. However, managers are beginning to integrate considerations for climate change impacts in their programs by improving ecological health and anticipating changes in disturbance regimes, thereby, enhancing the capacity of forests and grasslands to adapt to the environmental stresses of climate change and maintain ecosystem services.



Conclusion

In conclusion, based on overall forest condition, review of the monitoring information, and ongoing management activities, the Mt. Hood Forest Plan, as amended by the Northwest Forest Plan of 1994, is sufficient to guide management of the Forest over the next year. Minor non-significant amendments may be made as the need arises.

APPENDIX A

DETAILED REPORTS, INCLUDING FOREST PLAN MONITORING GOALS AND RECOMMENDATIONS

STRATEGY A

Promote a sound legal system, effective and adequately funded government, leading-edge research, and sound economic policies.

Volunteers and Partnerships

Volunteers and partnerships are an integral part of implementing the natural resource agenda at the local level. Volunteers include both individuals and organized groups. Some partnerships are involved in major collaborative and stewardship roles. During the 2010 season, Mt. Hood broke its own volunteer engagement records by logging over 34,500 volunteer hours valued at over \$730,000. Coupled with the Hosted programs of Northwest Service Academy and YCC, the program hours exceeded 58,000 hours of worked contributed. Agreements with the Confederated Tribes of Warm Springs, Pacific Crest trail Association and the Mt. Hood created an opportunity for 10 youths from Warm Springs to do trail work on the south end of the Forest for 8 weeks. In addition, the Forest established or continued over 400 organizational partnerships which leveraged an additional \$3.5 million in external resources to accomplish mutually beneficial work.

Zigzag Ranger District received national recognition for being chosen Forest Service Unit of the Year for Volunteer Management. Zigzag consistently promotes an active program of volunteer management that many times exceeds 25,000 hours per year in contributed work.

Forestwide, volunteers and partners contribute labor, skills, and funding, performing work in the interpretative program, fishing clinics, archeological survey projects, wildlife tracking surveys, trail maintenance, restoring recreation sites, grooming of snow trails, and filling positions as fire lookouts and wilderness stewards. As the number of Forest employees continues to downsize, more emphasis is placed on organized volunteer groups and partners to take an active role in recruiting, training and supervising volunteer activities.

Highlights from 2010 include:

Urban League & Youth Employment Institute – Portland Youth Explorers & Urban Rangers

An initiative with the Urban League of Portland, Youth Employment Institute (YEI), Oregon State Parks, Oregon Youth Conservation Corps, Bureau of Land Management, Gifford Pinchot National Forest, and Columbia River Gorge National Scenic Area. Through the program, 14-15 year olds from North and Northeast Portland were introduced to ecological concepts and outdoor recreational activities throughout the summer. The 2010 program expanded to serve 16-21 year olds, contributed towards Forest Service targets, offered academic credit, and expanded to include REI and the African American Outdoor Association as new partners. ARRA funding supported a YEI trails crew on the Westside of the Forest.

The Portland Youth Explorers and Urban Rangers programs introduce inner city youth ages 14-22 to natural resources career options and outdoor recreation through classroom lessons, mission critical Forest Service field projects, and field trips.

Activities in the summer of 2010 included:

- Trail brushing (approx. 6.5 miles) and tread work (approx. 1.25 miles)
- Removal of scotch broom and stinky bob invasive plants
- Litter cleanup at Zigzag compound, Timberline Lodge, various campgrounds
- Building picnic tables

- Repairing and cleaning boardwalk at Little Crater Lake and Clackamas River trail
- Fish monitoring with smolt traps and electroshocking
- 7-day backcountry camping trip for 10 participants who won essay contest

Youth Conservation Corps

Barlow and Hood River Ranger Districts engaged 10 local teenagers to work and learn on the forest in partnership with Oregon Youth Conservation Corps and Hood River and Wasco Counties.

Cross Country Skiing with Washington School for the Blind

Hood River Ranger District partnered with the Oregon Nordic Club, Wy'East Nordic, Mountain Tracks, and Northwest Interpretive Association to host 20 participants from the Washington School for an overnight stay and cross country skiing expedition. Students were given ski lessons and then participated in geology environmental education activities that evening. AmeriCorp interns, Nordic club volunteers and FS employees served as guides and mentors for the students. Much learning however was 2 way- especially in the snowball fight strategies!

Zig Zag Interpretive Program

Each summer and throughout the year the Zigzag Ranger District recruits volunteers and student interns to provide interpretation, conservation education, and visitor information at Timberline Lodge, Wildwood Recreation Area, Timothy & Trillium Lakes and various other locations across the Mount Hood National Forest and it neighboring communities. Both volunteers and interns work under the guidance of the Forest Service Interpretation and Conservation Education Specialist along with the Interpretive Program Manager. Volunteers and student interns from around the country are first trained, then perform a myriad of tours, hikes, talks, and special events. In 2010 these individuals volunteered almost 6,000 hours and interacted with over 30,000 visitors.

Northwest Service Academy Interns

Each Ranger District on the Forest hosted a Northwest Service Academy/Americorps intern who Serves as Community Stewardship Coordinator, expanding the role of the forest in our surrounding communities. These young Americorps interns deserve credit for Mt. Hood working with more volunteers for more hours than ever before!

Collaborative Efforts

Collaboration between local, state, federal agencies, tribes and other organizations continues to provide the necessary foundation for getting work done on the Forest. Watershed councils, Resource Advisory Committees, non-profit organizations, and community work are examples of public involvement in natural resource management and the decision-making process. The following are a sampling of the ongoing collaboration efforts on the Forest that are providing an increased capacity and collaborative decision-making for sustainable management of the Forest and support to the Mt. Hood Strategic Stewardship Plan.

The Forest was able to leverage a total \$4,835,316 for FY 2010 which included partner contributions (singular and ARRA), program manager/partner contributions, PAYCO projects, stewardship contracts and on- and off-forest restoration projects funded with retained receipts from Stewardship Contracts.

American Recovery and Reinvestment Act

Implementation of the American Recovery and Reinvestment Act lent the Forest Service a unique opportunity to invest in our partners. During extremely difficult economic times, the Mt. Hood National Forest was able to provide some degree of financial stability to key partners by funding mission-critical joint programming. In all, nearly \$13 million worth of Mt. Hood Economic Recovery projects (over 70% of total project value) were delivered by partners. These investments resulted in local employment, critical infrastructure improvements, and enhanced financial health of long-term strategic partners. A brief synopsis of Mt. Hood ARRA-supported partnership work follows:

Oregon Youth Conservation Corps (OYCC) – A \$9.675 million grant supported employment of approximately 3,000 youth across the state of Oregon to perform a variety of land stewardship activities on and off public lands.

A quote from OYCC:

The US Forest Service personnel in Oregon are not your average company employees. They are our friends, leaders and neighbors. They care not only about what is happening on their own individual forests, but look beyond their borders to the state as a whole. The Oregon Youth Employment Initiative (OYEI) is a great example of this. Though the project and funding was secured at a regional level, the Mt. Hood National Forest was tasked with distribution of funding for youth employment throughout the state of Oregon. Partnering with the Oregon Youth Conservation Corps (OYCC), OYEI has been an incredible success. Youth and supporting adults have been put to work in every county in Oregon. In tough economic times many organizations have chosen to pull back, eliminate worthwhile programs, and maintain the status quo. Luckily, for the citizens of Oregon, this was not the case. From the leadership of the Mt. Hood NF, down to the individual Ranger Districts, they chose to increase their support with funding, supplies materials and technical assistance. A quote within a quote: 'We may not know what the future holds, but we know who holds the future.' About 3,000 youth and supporting adults so far thank you.

-- John Asher, Director, Oregon Youth Conservation Corps

Army Corps of Engineers – A \$2.6 million intergovernmental agreement has supported engineering design and contracted infrastructure improvements and deferred maintenance at Timberline Lodge. Mt. Hood was able to meet the ARRA goals of putting people to work quickly while restoring the public jewel of Timberline Lodge by accessing the expertise and contracting tools of the Army Corps. Work included through this agreement includes potable water system improvements, installation of an emergency generator, and replacement of the Day Lodge roof and flooring.

Northwest Youth Corps – A \$375,000 participating agreement established the Mt. Hood Conservation Heritage Corps. Through the summers of 2009 and 2010, over 100 youth were employed to maintain 55.9 miles of trails across the forest.

Northwest Service Academy (NWSA) – A \$230,000 participating agreement supports Americorps field crews performing trails work across the forest in the summers of 2010 and 2011. In 2010 over 75 miles of trails were maintained under this agreement. In addition,

A quote from NWSA:

Northwest Service Academy's long-term partnership with the Mt. Hood National Forest has been incredibly important to fulfilling our mission of developing community leaders while

addressing critical environmental issues. I could list at least ten ways that our work together is mutually beneficial, but the bottom line is that together we're finding creative and innovative ways to steward our natural resources. In this context, ARRA funding allowed us to expand our partnership while also providing the Academy with important stability during a period of reduced fiscal resources.

– Brendan Norman, Northwest Service Academy, Mt. Adams Center Director

Youth Employment Institute (YEI) – An \$85,500 participating agreement supports employment of youth ages 14-24 from inner city Portland to perform trail maintenance across the forest. In the summer of 2010, approximately 30 youth were hired through this agreement and performed over 8 miles of trail maintenance.

A quote from YEI:

ARRA support from the Mt. Hood National Forest enabled us to serve more youth and introduce them to natural resource concepts and public lands. Without this partnership, we would not have been able to offer programming to 14-16 year old youth in the summer of 2010.

– Bennie Boggan, Executive Director, Youth Employment Institute

Stewardship Contracting

In FY 2005, a collaborative group known as the Clackamas Stewardship Partners (CSP) was formed with an interest in utilizing stewardship contracting authorities to implement priority watershed restoration and wildlife projects in the Clackamas watershed. This collaboration has been a wonderful success story, even winning the prestigious US Forest Service and Natural Resources Conservation Service's "Two Chiefs' Partnership Award" in 2008. In FY 2010, CSP worked on the Huckleberry Enhancement, Jazz Plantation Thinning and Road Decommissioning projects on the Clackamas River Ranger District.

On the Hood River and Barlow Ranger Districts, several different collaborative groups have been formed to work on hazardous fuels reduction projects under the Healthy Forest Restoration Act. The collaborative groups have completed planning projects in the wildland-urban interfaces of Sportsman's Park, Camp Baldwin, and City of The Dalles Municipal watershed. In FY 2010, the Mill Creek Collaborative Group re-convened to begin working on hazardous fuels reductions projects within the interior of The Dalles Municipal watershed.

The efforts of diverse stakeholders in these collaborative groups, including county government, local environmental organizations, and others, has resulted in over \$3,115,534 in job-creating restoration projects already completed or under contract in the Clackamas River Basin as well as \$2,495,989 in job-creating restoration projects already completed or under contract on National Forest System lands in the Hood River and Wasco Counties. In 2010, five stewardship contracts resulted in \$1,846,000 of revenue for restoration projects in the Clackamas River Basin. An additional two stewardship contracts resulted in \$501,605 of revenue for hazardous fuels reduction projects on the Hood River and Barlow Ranger Districts.

In FY 2010, retained timber receipts were used to implement or put under contract \$285,000 in restoration projects across the Forest. Clackamas River Basin Council implemented \$140,000 in aquatic restoration projects off-Forest, including two culvert replacements and a fish passage improvement project, through a stewardship agreement. The restoration projects implemented on Forest included aspen restoration to restore wildlife habitat, noxious weed treatments, road maintenance to restore water quality, and OHV restoration to improve soil productivity. Another \$70,000 in restoration projects were approved and will be implemented in FY 2011. These include two hazardous fuels reductions projects and a fish habitat restoration project.

Sandy River Basin Partners

The Sandy River Basin Partners is a consortium of state, federal and local government organizations and private conservation groups interested in the long-term ecological health and management of the Sandy River Basin towards recovery of salmonids listed under the Endangered Species Act in the Sandy River watershed. In 2009 The Freshwater Trust, on behalf of the Sandy River Partners, retained River Design Group to complete an existing conditions assessment (Salmon River Restoration Plan, RDG 2009) and provide a restoration plan for the Salmon River. Numerous projects implemented in 2010 include: side channel restoration, engineered log jams, large wood habitat features, and road decommissioning projects. The restoration plan is in full implementation mode with numerous projects being implemented annually including: side channel restoration, engineered log jams, large wood habitat features, and road decommissioning projects.

Financial Review

The purpose of this monitoring item is to track funding levels necessary to achieve the outputs predicted in the Forest Plan. The total budget predicted for full Forest Plan implementation was \$21,759,718. In FY 2010 in addition to normal appropriated and other funds of \$22,412,925 the Forest spent \$10,930,303 in American Recovery and Reinvestment Act funds on various projects including improvements to Timberline Lodge, roads and trails. Additional information on funding levels may be found in each program area detailed later in this report.

Each year, Congressional budgets move the Forest towards the many desired future conditions identified in the Forest Plan. The annual program is an incremental step toward implementation of the goals and objectives set forth in the Forest Plan. Outputs and activities in individual years will vary due to changing conditions and Congressional budget appropriations.

The figures below show a significant change as related to the total Forest budget and workforce (Full Time Equivalent = FTE) since 1990.

Table 2: Mt. Hood National Forest Budget, 1990-2010

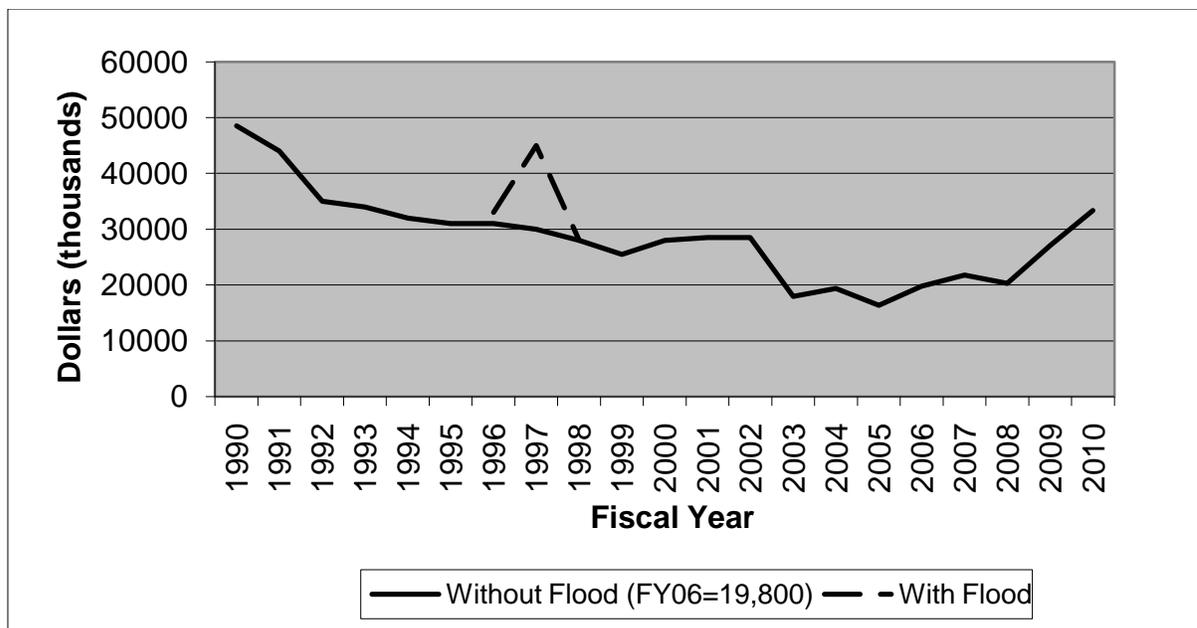
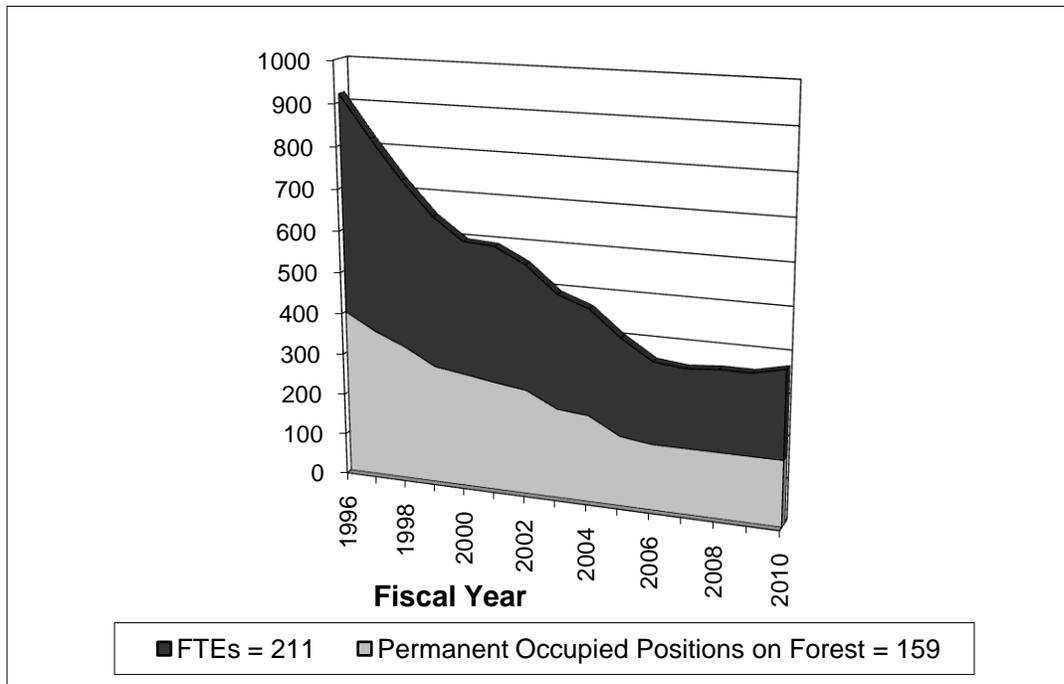


Table 3: Mt. Hood National Forest Workforce, 1995-2010



Forest Plan Amendments

As the Forest continues to implement the *Mt. Hood Land and Resource Management Plan*, as amended by the Northwest Forest Plan, it is apparent that amendments and clarification of direction is continually needed if the Forest Service is to meet the expectation and desires of the public. New information identified through various monitoring programs will continue to be evaluated. The need to change the Forest Plan will be reviewed in accordance with the National Forest Management Act (NFMA) regulations and the Northwest Forest Plan Standards and Guidelines.

An important aspect of keeping the Forest Plan an up-to-date, living document is the preparation of amendments. Based on analysis of objectives, standards, monitoring, and changing conditions, the Forest Plan will need to be amended from time to time. Some of these amendments may involve significant changes and will require an Environmental Impact Statement to be completed. Other changes, however, will require only minor adjustments and an Environmental Assessment may be adequate.

As of September 30, 2010, eighteen amendments have been made to the Forest Plan. Five amendments reflect changes made during Wild and Scenic River planning; three concern invasive plant (noxious weed) management; one adjusts a Research Natural Area Boundary; one responds to Elk Habitat Enhancement needs; one deals with standards and guidelines relating to management of Habitat for Late Successional and Old Growth Related Species within the Range of the Northern Spotted Owl; one expands Mt. Hood Meadows ski area permit boundary; one Congressional Act modifies activities within the Bull Run watershed; one designates Timberline Lodge and its immediate environs (approximately five acres) as a Historical Special Interest Area (A-4); and one changes the visual quality objective for roads near Timberline Lodge.

The eighteen amendments are:

1. October 3, 1991. **Big Bend Mountain Research Natural Area.** This amendment changes the boundary within the Bull Run Watershed.
2. March 10, 1993. **Salmon Wild and Scenic River Environmental Assessment and Management Plan.** This amendment delineates final river boundary and eliminates “regulated” timber harvest within the corridor.
3. April 19, 1993. **Clackamas Wild and Scenic River Environmental Assessment and Management Plan.** This amendment delineates final river boundary and removes all National Forest System land within the river corridor from “regulated” timber harvest.
4. May 17, 1993. **Lemiti Elk Habitat Enhancement Project.** This amendment exchanges an existing Roded Recreational Management Area at Lemiti Creek with an adjacent Deer and Elk Summer Range Management Area.
5. September 13, 1993. **Roaring National Wild and Scenic River Environmental Assessment and Management Plan.** This amendment delineates final river boundary and modifies management direction within the corridor relating to recreational developments, timber harvest and commercial livestock grazing.
6. December 8, 1993. **Environmental Assessment for Management of Noxious Weeds, Mt. Hood National Forest.** This amendment clarifies noxious weed management objectives by adding missing statements pertaining to noxious weed management under Goals, Desired Future Condition and Resource Summary sections of the Forest Plan.
7. February 24, 1994. **Upper Sandy National Wild and Scenic River Environmental Assessment and Management Plan.** This amendment delineates final river boundary and eliminates “regulated” harvest within the corridor. It provides replacement management direction for the new A-1 allocation.
8. May 13, 1994. **Record of Decision for Amendments to Forest Service and Bureau of Land Management planning documents within the range of the Northern Spotted Owl.** This decision amends current land and resource management plans with additional land allocations and standards and guidelines.
9. November 3, 1994. **White River National Wild and Scenic River Management Plan.** This amendment delineates final river boundary which included the adjustment of the river corridor termini to include White River Falls. It also modified management direction in relation to recreational use, timber harvest, and road construction among other site specific management activities.
10. 1996. **The Oregon Resource Conservation Act of 1996 Changed the Allocation for the Bull Run Area from Administratively Withdrawn to Congressionally Withdrawn.** This amendment prohibits harvesting of trees for timber management within the Bull Run drainage and prohibits the authorization of salvage sales.
11. January 24, 1997. **The Environmental Impact Statement for the New Long Term Conceptual Master Plan for Mt. Hood Meadows Ski Area.** This amendment expands the ski area permit

boundary by 96 acres to include an area which was being used by the ski area. It changes the land allocation for this area from a Wildlife/Visual classification to Winter Recreation classification. It also changes the Northwest Forest Plan allocation from Matrix to Administratively Withdrawn.

12. November 4, 1998. ***The Timberline Lodge Master Development Plan Amendment.*** This amendment adopts the Historic Building Preservation plan to provide the long-term management strategy for Timberline Lodge as a National Historic Landmark. The amendment also designates Timberline Lodge and immediate environs as a (Historic) Special Interest Area (A-4 Land Allocation).

December 11, 2000. ***Wilderness Recreation Spectrum allocations and Forest Plan standards.*** This amendment would make revisions to the Wilderness Recreation Spectrum allocations and Forest Plan standards dealing with "Limits" as related to Limits of Acceptable Change process. Standards relating to visitor use, restoration of impacted sites and public involvement are adjusted. **Note:** This decision was recalled based on information identified during the administrative appeal process. A new decision has not yet been issued and the amendment has not been implemented.

13. October 11, 2005. ***Pacific Northwest Region Invasive Plant Program – Preventing and Managing Invasive Plants Record of Decision.*** This amendment adds invasive plant management direction, including invasive plant prevention and treatment/restoration standards intended to help achieve stated desired future conditions, goals and objectives. The management direction is expected to result in decreased rates of spread of invasive plants, while protecting human health and the environment from the adverse effects of invasive plant treatments.
14. November 1, 2005. ***Timberline Express Final Environmental Impact Statement.*** This amendment revises the Visual Quality Objective (A11-017 and A11-020) from "Partial Retention" to "Modification" in the foreground, as viewed from Timberline Highway (Highway 173), West Leg Road (Road 2645), Timberline Road, and riparian areas within the Timberline Special Use Permit area. This change increases the percent of the seen area visually disturbed at any one time.
15. February 29, 2008. ***Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon.*** This amendment allows, where appropriate, careful and targeted herbicide use to treat invasive plants according to the Pacific Northwest regional standards and in accordance with the project design criteria. This amends six existing Forest Plan standards and guidelines that discourage or prohibit the use of pesticides, including herbicides.
16. January 14, 2009. ***Designation of Section 368 Energy Corridors on National Forest System Lands in 10 Western States.*** Under Section 368 of the Energy Policy Act of 2005, amends the Forest Plans of 37 western National Forests to designate the preferred locations for rights-of-way for energy facilities. Two such corridors are identified on the Mt. Hood National Forest. The designation of the "West-wide Energy Corridors" and amendment of Forest Plans does not authorize any projects, mandate that future rights-of-way be located in the corridors, or preclude the Forest Service from denying a project or requiring design revisions.
17. August 27, 2010. ***Off-Highway Vehicle (OHV) Management Plan.*** Amends 20 Forest Plan standards and guidelines in order to limit OHV use to designated routes, prohibit cross-country travel by OHVs, replace the enforcement tool to the MVUM, and to remove the requirement to post areas or roads as closed to OHV use.

STRATEGY B

Ensure that the Mt. Hood National Forest provides diverse social and economic outputs and benefits valued by the public in a fair, balanced, and efficient manner.

Recreation

Monitoring Goals

The Forest Plan projects increases in demand for virtually all recreation opportunities provided by the forest over the long-term. It also predicts that meeting demand will depend, to a significant extent, on privately developed and operated sites and opportunities. As demands for winter sports, organizational activities, and overall developed recreation opportunities increase, they will be met by concessionaires or permit holders. Primitive and semi-primitive recreation opportunities will be limited primarily to wilderness, special interest areas, and some unroaded areas where natural conditions will be maintained. In wilderness, heavily used trails, trailheads, and campsites will be returned to a more primitive state.

Monitoring current recreation use, and tracking recreation use trends, helps the forest to evaluate and predict (1) recreation infrastructure needs, (2) capital investment opportunities, (3) recreation use fee structures, and (4) private sector opportunities.

Existing Conditions

As part of the Recreation Facility Analysis in 2007, the Forest developed a recreation program niche statement. The Forest's recreation niche defines the best-suited recreation experiences or benefits that the Mt. Hood National Forest can provide. It is what makes the Forest special, and fosters quality recreation versus quantity, or trying to be all things to all people. It provides a description of the uniquely specific recreation opportunities provided by the Forest within the context of the forest's ecological features, opportunities provided by others in the area, and the demands and desires of recreation visitors to the area now and into the future. The niche provides the context for all recreation programs on the Forest and will help the Forest match up what is most wanted with what we can best provide to create the most value for the public within available resources.

The Mt. Hood National Forest recreation niche statement is:

A Mountain of Possibilities

Mt. Hood is an Oregon icon, exemplifying the connection between community and place. With its many historic and cultural threads, the mountain is woven into the economic and social fabric of people and communities in and around the forest. Through collaboration, Mt. Hood National Forest staff fosters citizen stewards who contribute their talents toward the betterment of the forest and who share their outdoor skills with others. Sustainable partnerships increase the Forest's contribution to quality of life and sense of place. More than four million people come to the Forest each year for play, exercise, learning, connection to nature, and spiritual renewal. Visitors appreciate the variety of year around, easily accessible recreation activities; and many consider it their "back yard." They value the landscape tapestry that provides great trails and opportunities for solitude. Others may only see the mountain from afar, but their lives are enriched by its intrinsic values.

In 2010, the majority of Mt. Hood National Forest campgrounds were managed by concessionaires, as they have been for over 15 years. For the twelfth consecutive year, the Hwy. 26 and Clackamas River complexes of campgrounds were managed by Thousand Trails Management Services, Inc. However, management of the Timothy Lake and Lake Harriet Campgrounds was transferred from Thousand Trails to Portland General Electric (PGE), a change resulting from negotiations to renew PGE's Federal Energy Regulatory Commission (FERC) license for North Fork Clackamas River power generation. Six Olallie Lake Complex campgrounds were again under permit to the new owner of Olallie Lake Resort (in 2009, they were managed by Forest Service personnel). Three small Hood River Ranger District campgrounds (Wahtum Lake, Rainy Lake, and Black Lake) were managed under concession permit issued to the owners of Lost Lake Resort. Only 21 small east-side rustic campgrounds were managed by Forest Service personnel in 2010 under Recreation Enhancement Act (REA) fee authority. No campgrounds were closed or decommissioned.

The Omnibus Public Land Management Act of 2009 expanded the boundaries of all existing Mt. Hood National Forest Wilderness Areas and designated three new wilderness areas (Clackamas, Roaring River, and Lower White River). In 2010, new wilderness portal signs were posted on all trails that bisect a new wilderness boundary line. Legal descriptions for new wilderness boundaries have not yet been established, and boundary lines have not been posted. Approximately 96.6 additional miles of forest trail are in the new or expanded wilderness areas; however, none of these trails are currently monitored for use.

For several years, Mt. Hood National Forest has maintained a moratorium on new outfitter/guide and event permits in wilderness areas. That moratorium continued in 2010. In new wilderness areas designated by the Omnibus Public Land Management Act of 2009, permits for long-standing, allowable activities were renewed. Some permitted activities were modified to meet wilderness standards (such as group size). New outfitter/guide and event activities will not be permitted in expanded wilderness areas until after the completion of a capacity analysis and demand study.

Nine new Wild and Scenic River segments were designated with the passage of the Omnibus Public Land Management Act of 2009. In 2010, outstandingly remarkable values (ORVs) were determined for two of the newly designated rivers: Fifteenmile Creek and East Fork Hood River. The ORVs for Fifteenmile Creek are (1) recreational and (2) fisheries. For East Fork Hood River, the ORV is geologic/hydrologic.

Wild and Scenic River Management Plans have not yet been prepared for any of the newly designated rivers.

Monitoring Questions, Activities, and Evaluations

The following Forest Plan Monitoring questions are evaluated in this report:

- **Developed Recreation:** Are developed recreation sites providing the variety of use opportunities designed to meet user's needs, interests, and equipment; and being maintained to a level expected and accepted by those using developed facilities
- **Recreation Opportunity Spectrum (ROS) Settings:** Are physical/environmental, social, and managerial conditions for dispersed ROS settings being planned for a wide range of activities consistent with public demand?
- **Trails:** Are trails and trail corridors being maintained and managed for a variety of uses and experiences consistent with public demand?

- Wilderness: Is wilderness being managed to maintain wilderness character and natural processes and provide for a wide range of permitted uses?
- Wild and Scenic Rivers: Are the outstandingly remarkable river values of all eligible, suitable and designated Wild and Scenic Rivers being maintained or enhanced as required?
- Off-Highway Vehicle Use: Are off-highway vehicle (OHV) opportunities providing a quality experience to the customers, ensuring their safety, and the safety of the general public? Are conflicts being minimized between users, with wildlife (and their habitats), and is resource damage being minimized – in areas that are suitable for each appropriate OHV use?

Results of Monitoring

Developed Recreation

Goal: Developed recreation sites provide the variety of use opportunities designed to meet user's needs, interests, and equipment. They are maintained to a level expected and accepted by those using developed facilities.

Campgrounds

Visitation and utilization data was collected for most concession-managed campgrounds in 2010 (Table 4). The Highway (Hwy) 26 and Clackamas River Complex campgrounds had robust occupancy, considering that western Oregon experienced an especially cool and rainy spring. An unusually wet pattern in early June affected the Pacific Northwest, bringing a series of significant rain events to the Willamette Basin. Many rainfall records were broken. May was the third-wettest ever recorded at 4.75 inches of rain in Portland. April had 25 measurable days of rain. The highest mean occupancy level in 2010 was 56% at Hoodview Campground (Timothy Lake). Both Hoodview and Gone Creek Campgrounds had mean occupancy rates of 53%. At the other end of the occupancy spectrum, Riley Horse Camp, Summit Lake, and McNeil Campgrounds had mean occupancy levels of 8%, 9%, and 12%, respectively. These three campgrounds consistently have the lowest occupancy rates for the complex. Alpine campground had fewer campsites occupied in 2010 than McNeil, but had a much higher occupancy rate because of its short season of use. All of these campgrounds are being used in a manner consistent with the site design.

Lost Lake and East Fork Complex campgrounds continue to have occupancy rates in the 30% range. Usage at Lost Lake is correlated to the spring opening date which is weather-dependent. Six campgrounds in the Olallie Lake Scenic Area were managed by the new owner of Olallie Lake Resort. The resort and all of the campgrounds were closed for most of the month of August because of several large wildfires in the Scenic Area and Mt. Jefferson Wilderness.

Occupancy data for eastside rustic campgrounds was collected in 2010 and compared with the previous three years (Table 4). In 2010, Whatum, Rainy Lake and Black Lake Campgrounds (Hood River Ranger District) were managed by the Lost Lake Campground concession operator. Concession operation of these three small campgrounds has allowed the Forest Service to forestall removing improvements at the sites (toilets, tables and grills) as prescribed in the 2007 Recreation Facility Analysis. Only occupancy data for Cloud Cap and Tilly Jane Campgrounds is included in the statistic for the Hood River Ranger District rustic complex. There was a great deal of public interest in the area in 2010, which had been closed in 2008 and most of 2009 (opened in late August) due to wildfires and fire rehabilitation work.

Percent occupancy at Barlow Ranger District rustic campgrounds continues to hover in the mid-teens. Two new CXT vault toilets were installed at Eightmile Campground.

The Forest Plan projected that use of Forest Service developed sites would reach capacity in 26 years. Projections of campground occupancy that were made in the early 1990's predicted that additional capacity would be needed during the first decade of the 21st century. Occupancy figures during 2010, as well as those for the past several years, suggest otherwise. Like similar older recreation complexes throughout the National Forest System, the campgrounds on the Mt. Hood fill a social and economic niche that many long-time visitors to the Forest appreciate. That user group, however, is not expanding as originally projected. In general, the Mt. Hood National Forest has more developed camping capacity than demand on most days during the camping season. Exceptions are weekends during July and August at many of the campgrounds.

Table 4: Comparison of Mt. Hood National Forest campground use from 2007 through 2010 by number of campers and percent occupancy (total site occupancy/# sites). ND = no data available by publication date.

Campground Complex	2007		2008		2009		2010	
	Campers	% Occ						
Hwy 26	106,948	37%	99,443	41%	126,339	29%	110,115*	37%*
Clackamas River	46,461	26%	53,377	29%	54,582	24%	40,881	20%
Lost Lake & East Fork	ND	32%	ND	ND	ND	36%	ND	31%**
Olallie Lake	ND	ND	ND	ND	ND	ND	ND	ND
Barlow River Rustic	ND	13%	ND	12%	ND	14%	ND	16%
Hood River RD Rustic	ND	8%	ND	ND	ND	24%	ND	28%***

* Includes data for campgrounds managed by Thousand Trails Management Services, Inc. and PGE.

** Statistic includes data for Wahtum, Rainy, and Black Lake Campgrounds.

*** Statistic includes data for Cloud Cap and Tilly Jane Campgrounds only.

Ski Areas

Weather events on Mt. Hood during the winter of 2009-2010 were typical of El Nino trends. Data from the Northwest Avalanche Center indicates that the snowpack at both Timberline and Mt. Hood Meadows was below average for the 2009-2010 ski season. At the beginning of January, the snowpack was slightly above normal (104%), but by the end of January, the snowpack was sitting at 67% of normal. At the end of February, the snowpack was 65% of normal. Conditions such as these tend to favor the higher elevation ski areas at Mt. Hood (Timberline and Mt. Hood Meadows), and to be unfavorable for lower elevation ski areas (Cooper Spur, Summit, Ski Bowl). Ski area visitation data shown in Table 5 reflects this pattern. Use at Timberline and Meadows was up from 2008-2009. Use at Ski Bowl was down. Cooper Spur did not open at all.

Table 5: Comparison of Mt. Hood National Forest ski area visits in winter seasons beginning 2005 through 2010. Data from Pacific Northwest Ski Areas Association. Timberline includes summer skiing. DNO = did not operate.

Ski Area	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	10-Yr Avg.
Cooper Spur	22,906	19,604	21,882	4,532	DNO	11,070
Mt. Hood Meadows	503,095	460,328	509,001	395,140	458,257	396,557
Ski Bowl	304,899	370,922	413,823	411,930	393,422	256,797
Summit	14,347	14,484	22,232	14,962	No Report	9,779
Timberline	233,164	251,617	320,671	271,415	368,563	268,239

During the 2009-2010 ski season, use of Mt. Hood National Forest's three largest alpine ski areas (Mt. Hood Meadows, Ski Bowl, and Timberline) was 13% higher than use during the previous season, surpassing both the state and regional percent changes from the previous year which were 8.78% and 7.52% respectively (**Table 5**). Mt. Hood Meadows regained the top spot as the most visited ski area in Mt. Hood National Forest with a total of 458,257 visits (an increase of 16% from the previous year), according to the Pacific Northwest Ski Areas Association 2009/2010 Annual Visitation Report. Timberline reported 368,563 visits (a 36% increase from the previous year). Use at Ski Bowl actually declined by 4%, and Cooper Spur did not open for the season. Summit Ski Area provided no report for the season.

Major funding was provided through the American Recovery and Reinvestment Act (ARRA) in late 2009 to retire deferred maintenance at Timberline Lodge. In all, more than \$4.5 million dollars was invested in projects ranging from a complete facility condition survey, roof and floor restoration at the day lodge, repaving the parking areas, and window replacement in guest rooms.

ROS Settings

Goal: Physical/environmental, social, and managerial conditions for dispersed ROS settings are planned for a wide range of activities consistent with public demand.

In 2010, dispersed ROS settings were not monitored for consistency with recreation activities and public demand.

Trails

Goal: Trails and trail corridors are maintained and managed for a variety of uses and experiences consistent with public demand.

The Forest Plan projected that there would be 1,560 miles of trail during the second decade. Currently, there are 977 miles of trail in the forest. The Forest has no site-specific estimates of trail use, so it is difficult to assess if trail use exceeds capacity. Anecdotal evidence suggests that it does not.

The Forest Plan also projected that trail construction and reconstruction would average 74 miles per year for each decade. Appropriated trail construction funding has diminished, and the actual average accomplishment for the forest is considerably less. During 2010, the Mt. Hood National Forest

awarded contracts to replace 22 trail bridges throughout the forest. Funding for these contracts was provided by the American Recovery and Reinvestment Act of 2009. ARRA also funded a contract to reconstruct a portion of Pioneer Bridal Trail, and the Pacific Crest Trail near Buck Peak. ARRA funding provided for the construction of a new accessible trail and fishing access across the dam at Trillium Lake.

Approximately 309 miles of system trails were maintained to standard in 2010. This work was accomplished by Northwest Service Academy (Americorp) and Northwest Youth Corps crews, Oregon Youth Employment Initiative crews (Urban Rangers), volunteer labor, and a Forest Service (Hood River Ranger District) trail maintenance crew. Funding for this work was provided by ARRA.

ARRA also funded a trail location and mapping contract, an effort to describe the arc of every system trail in Mt. Hood National Forest using GPS technology. That contract is ongoing into 2011.

Wilderness

Goal: Wilderness is managed to maintain wilderness character and natural processes and provide for a wide range of permitted uses.

In 2004, the Forest Service established a performance measure for evaluating how well the agency is managing wilderness. Each wilderness area is evaluated annually against the following ten elements: fire management; non-native, invasive plants; air quality; wilderness education plans; opportunities for solitude; recreation site inventory; outfitter/guides; land management plan standards; information management; and baseline workforce. The national quantitative scoring rubric defines the minimum stewardship level at a score of 60 out of 100 points. To date, no wilderness in Mt. Hood National Forest has passed that threshold. Table 6 shows the annual scores for wilderness areas managed by the forest from 2006 through 2010. The Chief of the Forest Service has challenged the agency to manage 100% of the National Forest wilderness areas to minimum stewardship levels by 2014, the 50th anniversary of the Wilderness Act. This challenge has become known as the 10-Year Wilderness Stewardship Challenge (10YWSC).

Table 6: Comparison of 10YWSC scores for wilderness areas managed by Mt. Hood National Forest from 2006 through 2010.

<i>Wilderness</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
Badger Creek	15	18	20	20	22
Bull of the Woods	15	18	20	20	24
Mark O. Hatfield	51	56	58	58	58
Mt. Hood	51	56	58	59	59
Salmon-Huckleberry	51	56	58	58	58

Recreation visitation to the Mt. Hood wilderness in 2010 (at reporting trailheads) continues to fall into the 30,000 to 40,000 band as it has for more than a decade. There does not appear to be a discernable upward or downward trend in wilderness use. There were no large-scale area closures due to environmental conditions (such as wildfire) in the Mt. Hood Wilderness in 2010. For a fourth year, the Timberline Trail (#600) was impassable at Eliot Creek due to the severe washout resulting from a November 2006 storm event.

Translating visitation to recreation visitor days (an RVD = one visitor for 12 hours; and the average duration of a wilderness visit in the Mt. Hood NF is seven hours), 2010 use at Mt. Hood Wilderness trailheads was roughly 20,049 RVDs. In 2006, the number of RVDs reported at the same locations was about 18,738. The Mt. Hood National Forest Land Management Plan estimated the annual RVD carrying capacity for the Mt. Hood Wilderness at 36,118. Total visitation (RVDs) in Mt. Hood Wilderness is still well below capacity.

Table 7: Comparison of Mt. Hood Wilderness visits from 2006 through 2010. Data is from self-registration stations at trailheads. Sampling by Forest staff shows that approximately 93% of Mt. Hood National Forest wilderness visitors self-register. Total use includes overnight visits.

<i>Trailhead</i>	<i>Total Use (People) 2006</i>	<i>Total Use (People) 2007</i>	<i>Total Use (People) 2008</i>	<i>Total Use (People) 2009</i>	<i>Total Use (People) 2010</i>
Burnt Lake North	2,392	18	*	*	2,575
Burnt Lake South	951	1,569	*	*	734
Cast Creek	228	0***	*	*	326
Castle Canyon	295	294	*	*	358
Cloud Cap	2,678	3,055	3,014	8,272	3,190
Elk Cove	178	366	522	642	328
Elk Meadows North	117	131	202	224	87
Elk Meadows South	783	1,577	1,798	4,256	1,879
Hidden Lake	393	627	*	*	320
Horseshoe Ridge	280	0***	*	*	71
Mazama	402	475	1,088	1,056	377
McGee Creek	1,166	1,440	2,318	3,178	144
Muddy Fork Top Spur	2,995	3,485	*	*	4,081
Newton Creek	183	206	186	380	219
Pinnacle	187	375	222	156	233
Paradise Park	334	47	*	*	415
Ramona Falls	7,453	391***	*	*	9,016

Timberline – Climb	4,778	4,870	*	*	2,817
Timberline – PCT	4,771	3,724	*	*	5,099
Tilly Jane	234	581	1,692	**	820
Vista Ridge	1,147	1,007	1,378	2,388	1,055
West Zigzag Mtn.	177	230	*	*	226
TOTALS	32,122	24,468			34,370

* Data not available at time of publication.

** Data included in Cloud Cap count.

*** Road 1825 was closed for most of the 2007 hiking season due to a bridge washout during November 2006. The use shown for the Ramona Falls trail represents users that probably forded the Sandy River or who hiked late in the year.

Table 7 and Table 8 Table 7 show use at popular trailheads in Salmon-Huckleberry and Mark O. Hatfield Wilderness areas from 2006 through 2010. Most of the trails in these wilderness areas have very little use with the exception of Salmon River Trail, Eagle Creek Trail, and Wahtum Lake Trail. Overall use at these trails was substantially higher in 2010 than in any of the previous years shown in the table.

Table 8: Comparison of Mark O. Hatfield Wilderness visits from 2006 through 2010. Data is from self-registration stations at trailheads. Sampling by Forest staff shows that approximately 93% of Mt. Hood National Forest wilderness visitors self-register. Total use includes overnight visits.

<i>Wilderness</i>	<i>Trailhead</i>	<i>Total Use (People) 2006</i>	<i>Total Use (People) 2007</i>	<i>Total Use (People) 2008</i>	<i>Total Use (People) 2009</i>	<i>Total Use (People) 2010</i>
S-H	Salmon River West	2,300	1,434	No Data	No Data	2,655
Hatfield	Eagle Creek	3,610	2,529	4,389	8,978	5,089
Hatfield	Whatum Lake	882	895	704	1,218	453
TOTALS		6,792	4,858			8,197

The 2009 Omnibus Public Land Management Act established three new wilderness areas and further expanded existing wilderness areas in Mt. Hood National Forest. The total estimated new wilderness is 124,200 acres. Trails that were incorporated into wilderness were not monitored for use in 2010.

Wild and Scenic Rivers

Goal: Outstandingly remarkable river values of all eligible, suitable and designated Wild and Scenic Rivers are being maintained or enhanced as required.

The national performance measure for Wild and Scenic River (W&SR) management is “Rivers Meeting Statutory Requirements.” The criteria for this performance measure are:

- Outstandingly Remarkable Values (ORV) described
- River sections classified
- Legal boundary established
- Comprehensive River Management Plan (CRMP) completed
- Water resource projects evaluated
- Water quality protected
- ORVs protected
- Recreation use managed
- Interagency relationships developed

None of the Wild and Scenic Rivers managed by Mt. Hood National Forest met all of the criteria in 2010. The ORVs for the five original W&SR (Clackamas, Roaring, White, Salmon, Sandy) have been established. An evaluation of the effects to ORVs was completed and submitted to the Regional Office for every in-stream project in 2010.

The 2009 Omnibus Public Land Management Act classified nine river segments in Mt. Hood National Forest as Wild and Scenic Rivers. These rivers traverse 81 miles.

Off-Highway Vehicles

Goal: Off-highway vehicle (OHV) opportunities provide a quality experience to the customers, ensuring their safety, and the safety of the general public. Conflicts are minimized between users, with wildlife (and their habitats), and resource damage is minimized – in areas that are suitable for each appropriate OHV use.

A Record of Decision was signed in August, 2010, that fundamentally changes OHV management in the forest. The Forest Plan was amended, shifting the Forest’s policy on access from “open unless signed closed,” to “closed unless designated open.” Designation of open routes (roads and trails) and areas will be depicted on the forest’s motor vehicle use map (MVUM) which will be published on an annual basis. The forest’s first MVUM will be published in early 2011.

The Record of Decision also designated 145 miles of roads and trails to be open to various classes of OHVs as shown in **Table 9**.

Table 9: Miles of OHV routes by class for each system in the Selected Alternative. Class I ATVs are quads and 3-wheelers; Class II ATVs are Jeeps, sand rails, and SUVs; Class III ATVs are motorcycles.

OHV System	OHV Class	Road Routes (miles)		Trail Routes (miles)		Total Route Miles by Location
		Convert to Trail	Motorized Mixed Use	Existing Trails	New Trail Construction	
LaDee Flats	Class I, II and III	4.2	9.2	0.0	0.3	25.4
	Class I and III	6.7	0.0	0.0	5.0	
McCubbins Gulch	Class I and III	7.3	3.2	25.6	0.7	60.1
	Class III	9.9	0.0	0.0	13.4	
Rock Creek	Class I and III	30.0	20.6	2.1	6.6	59.3

Total Miles	58.1	33.0	27.7	26.0	144.8
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Recommendations

In 2011, Mt. Hood National Forest should continue implementing the recreation facility analysis action plan (completed and approved in 2007):

- Work with Timberline permit holder to develop an approach to fee collection that more fairly distributes costs among the various users of the Lodge.
- Develop a strategy to manage weekend camping demand and market opportunities for midweek camping.
- Consider alternative uses for some developed recreation sites such as conversion of some campgrounds to group sites and dual use of State Snoparks to group use in the summer.
- By 2012, conduct a comprehensive analysis of costs to operate Timberline Lodge.
- By 2012, retire current deferred maintenance at all Recreation Enhancement Act sites forest-wide.

Expand concession operation of developed recreation sites through a new campground concession prospectus in 2011. Investigate including all eastside rustic campgrounds, Bagby Hot Springs site, Camp Cody, and Clackamas Lake Historic Ranger Station.

Complete the conversion of the Hwy 26/Hwy 35 High Impact Recreation Area (REA) to individual fee areas.

Heritage Resources

Monitoring Goal

The monitoring goal is to ensure that heritage resources are being managed, protected, and interpreted according to the Forest Plan's Standards and Guidelines. The Standards and Guidelines are designed to locate, protect, maintain and/or enhance significant prehistoric and historic sites for scientific study, public enjoyment, education and interpretation. A second monitoring goal is to ensure that American Indian rights are being protected on National Forest lands, and that appropriate coordinating activities are occurring. To accomplish these goals, four monitoring elements were identified in the Forest Plan.

Tribal Consultation

The Confederated Tribes of the Warm Springs (CTWS) are consulted in all projects located on tribal lands and usual and accustomed areas. The Barlow District Ranger is the Tribal contact for the Forest and meets on a regular basis with the CTWS to discuss a variety of resource issues. In addition to the formal NEPA scoping, the Forest has developed and maintains informal program-level contacts with the CTWS. Informal consultation was conducted with the Confederated Tribes of Grand Ronde and CTWS in 2010 for the proposed Road Decommissioning Increment II. The Forest Historian continues to consult with the Grand Ronde and CTWS on all projects involving cultural resources.

Historic Preservation Standards

Significant (National Register eligible) historic buildings and structures are maintained, stabilized, and repaired according to historic preservation standards, in consultation with the State Historic Preservation Office (SHPO). The following preservation projects were undertaken during Fiscal Year 2010:

Timberline Lodge (National Historic Landmark)

A Historic Building Preservation Plan was completed for Timberline Lodge in 1998. This plan provides managers credible alternatives for routine maintenance, rehabilitation and replacement of historic fabric throughout the building. Table 9 (below), lists projects approved under plan stipulations during fiscal year 2010 in consultation with SHPO.

Table 10: Approved Projects at Timberline Lodge

Project No.	Description	Finding
2010-060609-005	Timberline Lodge Public Restroom Remodel	Within Timberline Lodge Agreement Stipulation III.C.3.b.
2010-060609-008	Timberline Lodge Exterior Painting Strategy	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2010-060609-010	Timberline Way-finding Sign Project	Within Timberline Lodge Agreement Appendix A, No.12
2010-060609-012	Timberline Lodge Water Supply Improvement Projects	Within Timberline Lodge Agreement Stipulation III.B.8 & 12
2010-060609-013	Timberline Lodge Complex Repaving Project	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.4
2010-060609-016	Timberline Lodge Stair Refinishing Treatment Strategy	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2010-060609-017	Timberline Lodge Door Lock Replacement	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2010060609-20	Timberline Lodge Restroom Remodel Renovation Modification	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b

2010-060609-23	Timberline Lodge Corridor Doors, West Wing, Third Floor Window	Within the Timberline Lodge Agreement Stipulation III.C.2.a
2010-060609-025	Timberline Lodge Additional Light, Second Floor	Within the Timberline Lodge Agreement Stipulation III.C.2.a
2010-060609-31	Timberline Lodge DeVenco Venetian Blinds	Within the Timberline Lodge Agreement Stipulation III.C.1
2010-060609-45	Timberline Lodge First Floor Sign, West Wing	Within the Timberline Lodge Agreement Stipulation III.C.2.a
2010-060609-46	Timberline Lodge Blue Ox Bar Glass Mosaic Phase I	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2010-060609-053	Timberline Lodge Housekeeping Ceiling and Plumbing	Within the Timberline Lodge Agreement Stipulation III.C.3.b.
2010-060609-060	Timberline Lodge Exterior Masonry Repointing Specifications	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2010-060609-063	Timberline Lodge Weathervane/Chimney	Within the Timberline Lodge Agreement Stipulation III.C.2.a

Nominations to the National Register of Historic Places

In consultation with the State Historic Preservation Office, the Forest evaluated no historic resources for National Register eligibility during fiscal year 2010.

Interpretation and Public Involvement

Three methods are typically used to facilitate public involvement with the Heritage Resource Program: interpretation, education, and volunteerism. The successful interpretive program at Timberline Lodge reaches thousands of visitors every year. Frequent tours are conducted at the Lodge, and Friends of Timberline oversees changing exhibits and demonstrations relating to the history of the Lodge and recreation on Mount Hood.

Oregon Archaeological Society (OAS) volunteers participated in an archaeological survey and site testing project: Camas Prairie Archaeological Testing Project, assisting Heritage Program personnel. OAS volunteers also continued participation in the Site Stewardship Program, designed to ensure that particularly vulnerable prehistoric sites receive periodic monitoring and condition assessment. The program operates under the terms of a Memorandum of Understanding between the OAS, Mt. Hood National Forest, Gifford Pinchot National Forest, and Columbia River Gorge National Scenic Area. Training was provided by Heritage Program personnel.

Conclusions

The avoidance of impacts to heritage resources was a goal for all projects implemented during fiscal year 2010. Heritage Program staff routinely monitor the condition of heritage resources during and

after project activities to ensure that avoidance procedures and protective measures were effective. Adverse effects to the two historic recreation residences in FY 2009 were regrettable, but raised awareness about historic preservation issues involving privately-owned cabins in the Forest Service summer home tracts. In 2010, the Forest began development of a historic property management plan for the Mile Bridge tract, now managed as a National Register eligible historic district.

Recommendations

Heritage Program activities focused on the highest priority projects, mainly American Recovery and Reinvestment Act projects and resource protection efforts. A number of specific projects have been in progress for several years, and remain to be completed. The following projects are recommended for addition to the program of work for fiscal year 2010, depending on staff availability and workload priorities:

- Complete the consultation process for the Peeled Cedar Management Plan and execute a Memorandum of Agreement for this class of historic resources.
- Complete the management plan for Cloud Cap – Tilly Jane Historic District.
- Initiate assessments of historic buildings in the Mt. Hood Wilderness and Bull of the Woods Wilderness to determine management goals.

Transportation/Roads

Monitoring Goal

The monitoring goal is to provide safe and efficient access for those who use the transportation system for recreation or management of the National Forest.

Road Management

In spite of continuing reductions in funding for road maintenance, construction, and reconstruction, the Forest continues to advance towards its goals associated with roads.

Transportation management objectives being met are:

- The Forest is decreasing the size of the transportation system.
- The Forest is maintaining or improving 365 miles of mainline road system.
- The Forest is decommissioning, closing or downgrading the maintenance levels on the remainder of the 2,742-mile road system.
- The Forest's priority in road decommissioning continues to be decommissioning roads in unstable geological areas or roads with unacceptable environmental impacts.

Approximately 50% of the 3,107-mile road system is either closed to public access or classified as "available for closure or decommissioning." Many of these roads are being closed naturally by brush. Gates, barricades, and berms are used to close some roads.

Reductions of road densities in the thirteen key watersheds are a primary road objective of the Northwest Forest Plan. Road densities in twelve key watersheds have been significantly reduced since the Northwest Forest Plan was implemented in 1992. Road density in the thirteenth key watershed has remained unchanged since 1992.

Some effects of downsizing the road system are as follows:

- Only one main route will be maintained to access an area or developed campground for passenger car use instead of two or three.
- There will be a decreased amount of miles available for recreation opportunities that accommodate passenger car traffic. Recreation opportunities that accommodate high clearance vehicles would be increased.
- The increasing demand of Forest recreation use along with the decreased amount of miles available for passenger car traffic will result in more vehicle encounters, raising the probability of accidents occurring. Maintenance efforts, however, will be more focused on the mainline access roads.
- There will be less sediment reaching waterways.
- There will be less harassment to wildlife.

20010 Accomplishments

- Miles of Road at end of 2009..... 3,241 mi
- New Road Construction..... 0 mi.
- Miles of Road Decommissioned 134 mi.
- Miles of Road at end of 2008..... 3,107 mi.
- Total Miles of Passenger Car Roads Maintenance Level (ML) 3-5..... 365 mi.
- Passenger Car Roads ML 3-5 receiving maintenance..... 191 mi.
- % of Passenger Car Roads ML 3-5 receiving maintenance 52%
- Total Miles of High Clearance Roads Operational ML 2 2,296 mi.
- High Clearance Roads Operational ML 2 receiving maintenance 285 mi.
- % of High Clearance Roads Operation ML 2 receiving maintenance 12%

Road Maintenance

Funding for road maintenance has decreased in recent years while the aging road system deteriorated at an increasing rate. Most of the road system was constructed 30 to 50 years ago. Maintenance funding has decreased at a time when it should be increasing to keep pace with the road system’s increasing rate of deterioration. The trend of the road maintenance budget can be seen in the table below.

Table 11: Road Maintenance Budget

	FY89	FY05	FY06	FY07	FY08	FY09	FY10
Annual Road Maintenance Needs	\$5.2 million	\$2.0 million	\$2.1 million	\$2.2 million	\$5.5 million	\$3.0 million	\$3.0 million
Annual Road Maintenance Budget	\$3.8 million	\$0.6 million	\$0.5 million	\$0.4 million	\$0.97 million	\$1.0 million	\$1.0 million

Percent of Needs Met by Budget	73%	30%	24%	18%	18%	33%	33%
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The road maintenance budget has declined because of decreased timber sale road maintenance deposits and declining appropriated funding in the National Forest Service roads budget. The need for road maintenance has declined because of the declining heavy vehicle traffic use (i.e., log trucks), road closures, and a decrease in the prescribed level of maintenance on open roads. As the above table shows, however, the Forest Service has not been able to decrease the needs fast enough to keep pace with the decreasing budget. Out of necessity, the Forest Service has focused the limited road maintenance funds on the highest priority roads, primarily the low clearance passenger car roads that access major recreation destinations. Deferring road maintenance to future years will lead to additional unsafe or unusable roads. Three solutions to this spiraling increase in road maintenance needs are:

- Decrease the standard of the roads. Maintenance of passenger car roads is five times more expensive than maintenance of high clearance roads.
- Close or decommission more roads. Road decommissioning is typically two to three times more expensive than road closure when discounted over a ten-year period. For economic reasons, the Forest has been focusing on road closures.
- Seek alternative funding sources for road maintenance.

The Forest roads engineering department has aggressively pursued the first two alternatives listed above. The Forest has been less successful at generating additional funds for road maintenance, although partnerships have been helpful.

Range Management

Monitoring Goal

On lands determined as suitable and capable of producing range vegetation and within constraints imposed by Forest Plan Standards and Guidelines, provide forage for use by permitted domestic livestock.

Existing Condition

Approximately 155,625 acres or 15% of the total acres on the Mt. Hood National Forest comprise five active grazing allotments.

Vegetative composition within these allotments is a mosaic of grass and shrub lands, meadow complexes, timbered areas, and harvested timber lands. Harvested lands in these allotments generally produce forage for about twenty to thirty years before the overstory canopy (trees) re-grow and again dominate the site. This is called “transitory range.”

Economic goods and services are provided to communities through the issuance of grazing permits to local ranchers. A stable consistent supply of summer forage on National Forest land adds an element of economic viability to these ranch operations (base property). Notably, the base

property held in private ownership provides essential big game winter habitat for deer and elk and other wildlife species, which can be in critically short supply during winter.

Monitoring Questions, Activities, and Evaluation

Are AMPs (Allotment Management Plans) being implemented on the ground?

AMPs contain several important components, which have been implemented as follows:

1. Range improvements (fences) were constructed or maintained to gain better livestock control and ensure attainment of Forest Plan Standards and Guidelines related to riparian protection and allowable use of vegetation.
2. Pertinent Forest Plan Standards and Guidelines have been incorporated into every livestock grazing permit. Permittees are responsible for meeting the Terms and Conditions specified in these permits.
3. If a permittee does not comply with the Terms and Conditions, permit action can be taken against their permit which may involve anything from temporary partial suspension to complete permit cancellation.

Are we meeting Forest Plan objectives for range?

In the 1990 Mt. Hood Forest Plan, objectives for range were quantified and expressed as an output called "AUMs" (animal unit months) on page Four-14. The projected output for the first decade after this publication was estimated at 7,200 AUMs. The estimate for the was that approximately 4,600 AUMs would be permitted on this forest.

The total current permitted AUMs are 3,642. This is lower in part due to decisions such as construction of improvement projects (fences) and minor reductions in numbers to improve resource conditions. Also some permits have been retired due to permittees phasing out their cattle operations, resulting in local decisions not to reauthorize those AUMs.

Actual livestock use for the 2010 season was 1,660 AUMs. This number reflects that two out of six permittees took "non-use" for the grazing season.

Results of Monitoring

Long Term Vegetative Trends (Effectiveness Monitoring)

An important aspect of ecosystem function and productivity within grazing allotments is related to vegetation health. Studies to monitor existing condition (status) and long-term trend in vegetation have been established on all allotments. Numerous methodologies are authorized and approved for use as per direction in the Region 6 FSH 2209.21 – Rangeland Ecosystem Analysis and Monitoring Handbook.

The methodology selected typically requires that permanent plots are established and monitored once every 5 to 10 years. This data should record plant species composition and diversity, percent bare soil, plant vigor and other vegetative indicators, which in turn can help interpret trends, the direction of a trend, and/or changes over time. It is best to have a minimum of three separate readings in order to make an evaluation of direction of a trend. This would mean that after establishing a permanent monitoring plot, between 15-30 years could be needed in order to determine the direction of this trend, depending on the landscape in which it is established in. Under

the current methodologies utilized and along with other monitoring data, observations are that overall range vegetative conditions are stable to improving.

Short Term – Forage Utilization Studies (Implementation Monitoring)

Forage utilization Standards and Guidelines were developed to ensure that adequate vegetation is left after grazing to provide benefits for a multitude of resources. Plant health and vigor can be sustained if grazed properly. Utilization monitoring studies were conducted on all grazed allotments. These studies are used to monitor the consumption of the current years forage by both permitted livestock and wildlife. Of the fifteen established monitoring sites grazed this season, twelve sites (80%) met utilization standards and guidelines established. The other three (20%) did not.

Recommendations

Monitoring indicates the majority of acres within grazing allotments are meeting or moving toward Forest Plan objectives. While this is a desirable situation, there are interactions and relationships with other resources that merit discussion.

Compliance is vital to ensure that instructions given to grazing permittees are implemented on the ground. Funding to accomplish this task is becoming scarcer. Solutions to this problem need to be identified.

On allotments where transitory range makes up a substantial portion of the available forage, there is a concern that livestock will rely more heavily on meadows and riparian vegetation as these areas become reforested. Some of these meadows and riparian areas are also heavily used by recreationists and provide important wildlife habitat. These trends and potential conflicts need to be analyzed through the NEPA process as we proceed with updating AMPs, resulting in appropriate decisions that will result in beneficial outcomes to all resources as related to livestock grazing.

Minerals

Monitoring Goal

The monitoring goal is to determine whether the Forest Plan standards and guidelines support and encourage mineral resource activities on the forest that are compatible with other resource goals.

Existing Condition

This Forest has an abundance of salable minerals and a high demand for that material from the public. The development of this resource is limited to existing rock quarries to avoid conflicts with other resources. The forest has few locatable minerals and little public interest. Leasable minerals on this forest are limited to geothermal resources. Interest in geothermal varies greatly, mostly dependent on the price of energy.

Monitoring Questions, Activities, and Evaluations

- Are locatable and leasable mining activities following operation and reclamation plans?
- Are salable minerals being removed according to quarry operation or development plans?

- Are impacts to mineral resources being assessed during other project planning?

Results of Monitoring

There are no currently active locatable or leasable mineral developments on the forest. All 10 inquiries from the public regarding laws and guidelines covering locatable minerals on National Forest managed lands received responses. In FY10, the Mt. Hood National Forest signed a Record of Decision recommending to the Regional Forester that five parcels be made available for geothermal leasing on the Hood River and Barlow Ranger Districts.

Most of the minerals activity on the Forest was with salable (common variety) mineral resources. These resources were managed using the Mt. Hood National Forest Rock Resource Plan as a guide. There was one project where 5000 cubic yards of mineral materials were used by another government agency. There were 11 projects where a total of 29,530 cubic yards of mineral materials were used by the Mt. Hood National Forest. All of the major projects had operating plans and were field inspected for compliance with the plans. 100% of the transportation plans were reviewed. When necessary, operating plans were modified to adjust to changing conditions. Operators were not allowed to leave the source until all the requirements of the operating plan had been met. During FY10, there were 11 operating plans completed for current and future projects. There were 110 smaller projects where salable mineral materials were used by the public. These projects removed a total of 80 cubic yards. All the mineral activity took place in currently developed and designated rock quarries in a manner that did not conflict with other resource objectives.

Impacts to mineral resources were assessed during the planning phase of road decommissioning projects that could potentially restrict access to those resources.

Recommendations

The Forest continues to be able to supply high quality rock products to the general public, other government agencies, and for our own use. Rock is a non-renewable resource; however, this forest has large quantities of high quality rock and with proper resource management, should be able to satisfy demand for many years. Many of our quarries are being depleted of the easily accessible loose material by the continuing demand for "landscape rock" by the public. An effort needs to be made to inexpensively create additional loosened material at those quarries to meet the public demand for small quantities of salable mineral materials.

STRATEGY C

Maintain and enhance the productive capacity of Mt. Hood National Forest to improve the economic well-being of Mt. Hood's communities.

Forest Resources and Timber Supply

Goal

The goal is to sustain ecological conditions to provide a continuing supply of forest products, and to provide a positive economic return.

Background

The Forest Plan identified an allowable sale quantity (ASQ) of 189 million board feet per year (MMBF). The Northwest Plan, which amended the Forest Plan, predicted a Probable Sale Quantity (PSQ) of 67 MMBF. In 1995, the PSQ level was adjusted downward to 64 MMBF to reflect the need to protect 100 acre buffer areas around spotted owl activity centers. The current PSQ for the Forest is 64 MMBF.

Since the early 1990s and the listing of the spotted owl as threatened species, harvest levels of commercial forest products from the Forest have dropped significantly. In the recent past, nine to eleven local mills bought most of the timber sales. Today, there are approximately five local mills in existence. Potential bidders on today's timber sales come from as far away as Springfield, Oregon to the south, Willamina, Oregon to the west, Vancouver, Washington to the north and even as far away as La Grande, Oregon to the east. In FY 2010, a large portion of the wood harvested from the Forest ended up in local mills within Hood River and Clackamas County. These mills are efficient at processing the small logs generated from many of our recently sold timber sales. In FY 2010 all stewardship contracts included a provision, which would allow the purchaser or contractor to remove biomass if a market developed.

Monitoring Activities and Evaluation

The Forest Plan identified timber objectives to be monitored and evaluated to determine the Forest's capability to provide a continuing supply of wood products. Forest suitability, productivity and modeling assumptions used in determining sale quantity are monitored as well as meeting standard and guidelines for other resource objectives.

Catastrophic Change

The Forest Plan requires monitoring of catastrophic changes in the amount of standing timber inventory which may result from disturbances, such as fire, windstorms, and insect outbreaks. These large changes can affect the allowable sale quantity calculations and the ability to meet other resource objectives. The Forest Plan assumes up to 2% of the suitable landbase can be impacted by disturbances that result in a total loss of harvestable inventory and that no more than 10% of a management area working group would be affected. The purpose of monitoring is to maintain a record of cumulative changes of timber volume loss on suitable lands due to a total loss of timber inventory.

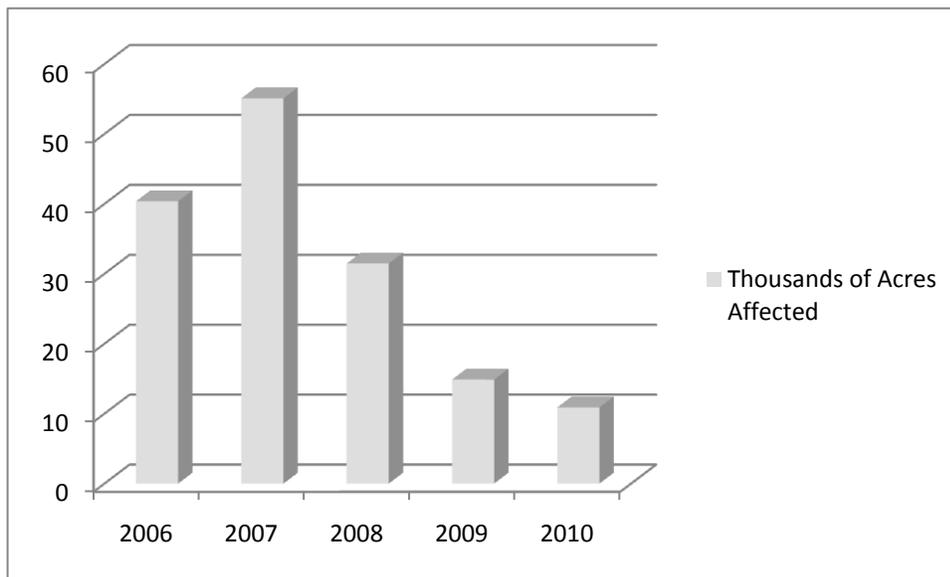
Annual Aerial Insect and Disease Detection Survey

Bark beetle outbreaks have caused significant amounts of tree mortality on the Forest and adjacent lands for the last ten years or more. Approximately 186,000 acres, or seventeen percent, of the Forest have significant levels of dead trees from bark beetle activity. There are approximately 316,000 acres of affected lands, including lands immediately adjacent to the Forest, namely the Confederated Tribes of Warm Springs Reservation.

Most of the mortality is comprised of lodgepole pine killed by mountain pine beetle (*Dendroctonus ponderosae*) and true firs killed by balsam woolly adelgid (*Adelges piceae*), fir engraver (*Scolytus ventralis*), and silver fir beetle (*Pseudohylesinus sericeus*). Mortality estimates are comprised, to a lesser extent, of other tree species including ponderosa pine, western white pine, whitebark pine, Douglas-fir, mountain hemlock and Engelmann spruce.

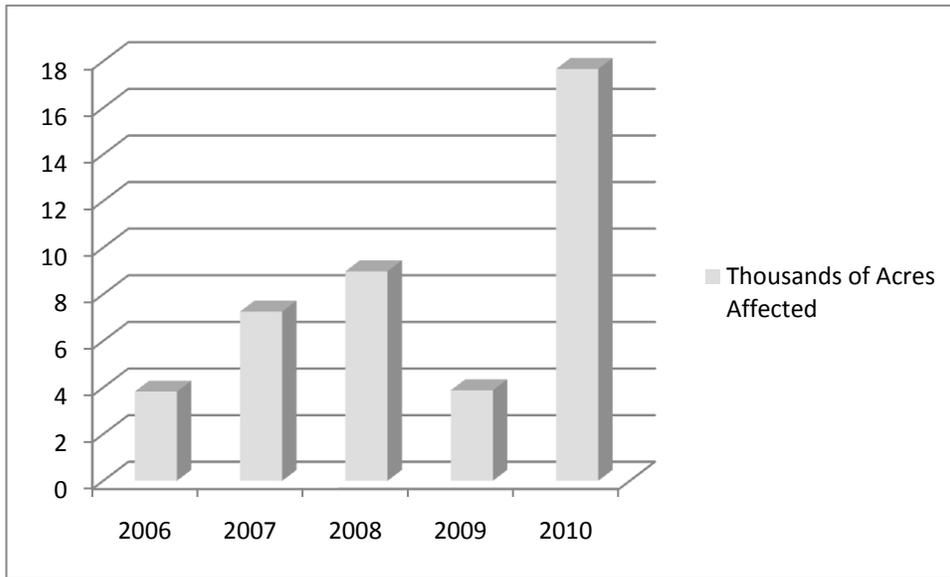
Mortality from mountain pine beetle is declining since the outbreak has killed most of the host habitat. Still, there are areas of lodgepole pine likely to be killed within the next year or two such as near Summit Lake and there was an increase in mortality near Government Camp. As the roots of the standing dead trees decompose, they will begin to fall and contribute to fuel loadings. Typically this begins ten to fifteen years after mortality and since the outbreak has been occurring for over ten years now, fuel loadings are expected to increase.

Figure 9: Acres with mountain pine beetle-caused mortality



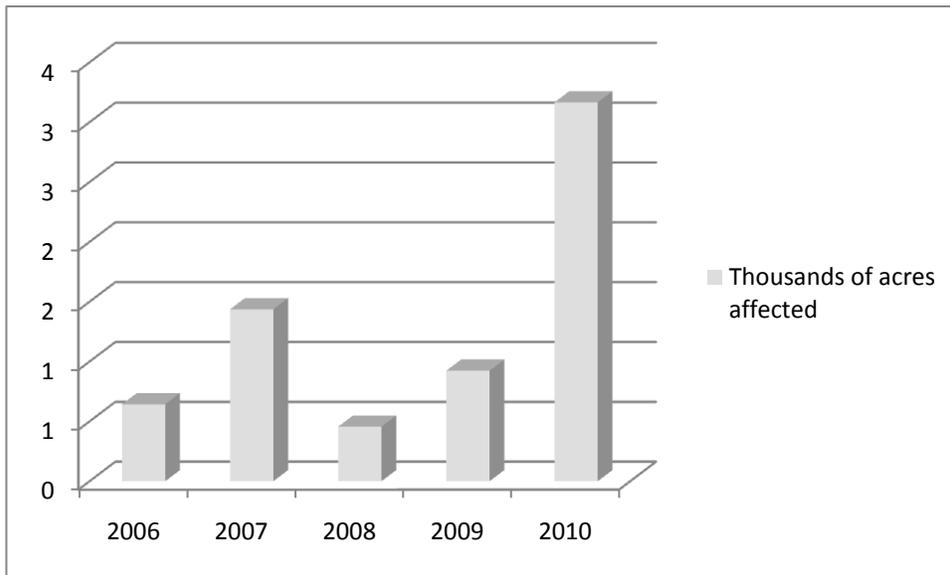
Although mortality from mountain pine beetle is decreasing, acres affected by the Balsam woolly adelgid are increasing. The balsam woolly adelgid is a European insect that was introduced to North America in the early 1900s. Any true fir can be a host, but subalpine fir in the higher elevations is the most susceptible species on the Forest. Feeding by this sucking insect causes branch gouting and flagging, growth loss, wood degradation, and eventual tree death. Twenty-three species of predators were introduced between 1957 and 1964 in order to control this insect. Five of these species are established but do not appear to be reducing the balsam woolly adelgid population in any significant way.

Figure 10: Acres with balsam woolly adelgid-caused branch flagging, top kill, and mortality



Acres with Douglas-fir beetle caused mortality also increased in 2010. Douglas-fir beetles commonly breed in blowdown Douglas-fir or in Douglas-firs that have been severely stressed by root disease, fire, heavy or repeated defoliation, or other damage. If substantial quantities of this breeding material are available the beetle population may build up to outbreak level, attacking and killing large, healthy Douglas-firs. Generally the largest trees are attacked first. Removing blown over or damaged trees before beetles emerge can significantly reduce the amount of damage done to healthy trees.

Figure 11: Acres with Douglas-fir beetle-caused mortality



The tree mortality map (located in Appendix E) summarizes the cumulative data from the annual aerial survey program to depict levels of insect-caused mortality that has occurred over the last ten

years. The number of acres in each mortality class for the Forest and adjacent lands are included in Table 10. Table 12 includes the number of acres in each mortality class for the Forest lands alone.

Table 12: Mortality class for Mt. Hood National Forest and adjacent lands.

Dead Trees per Acre	Acres
<= 5	202,646
> 5 and < 10	41,505
>= 10 and < 25	43,555
>= 25 and < 50	20,304
>= 50	7,829
Total	315,839

Table 13: Mortality class for Mt. Hood National Forest lands.

Dead Trees Per Acre	Acres
< = 5	122,292
> 5 and < 10	26,477
>= 10 and < 25	24,113
>= 25 and < 50	10,236
>= 50	2,799
Total	185,917

Field checks and a limited number of studies indicate that aerial surveys underestimate actual mortality by approximately one third. Thus, the number of dead trees per acre should be considered a conservative estimate. Additional detailed information, including annual maps, accompanying data, and how the aerial survey is conducted, is located at: www.fs.fed.us/r6/nr/fid/as/.

Productive Capability

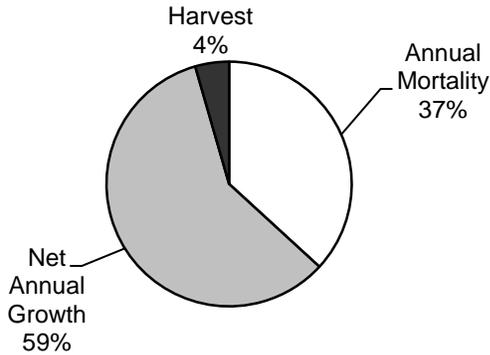
The productive capacity of a forest is critical to providing a continuing supply of wood products and is strongly linked to sustainability issues given the importance of the forest's contribution to carbon sequestration and climate change. The Forest Plan requires monitoring for accomplishments of management practices programmed to contribute to future sale quantity. Examples of these capital investments/management practices include reforestation and timber improvement activities which contribute not only to future sale quantity, but to long-term productive capacity, forest health, carbon sequestration, and other resource objectives which help to maintain sustainable conditions. Insects and disease are also monitored to determine trends and impacts to forest growth.

Forest Growth and Mortality

The Pacific Northwest Current Vegetation Survey (CVS), along with Forest GIS layers of land allocations, can be used to estimate the current standing inventory of the Forest and annual rates of growth and mortality. Tree growth rates can be used as estimates of productive capacity. Productivity includes storing energy from the sun via photosynthesis in carbon based biomass, and also includes secondary productivity via respiration. In addition, one measure of sustainability is whether the level of timber harvest is considered sustainable in terms of forest growth.

The pie chart (following page) displays the net annual growth, annual mortality and harvest for 2002. After the CVS plots are re-measured and the data processed, the chart will be updated, however percentages are expected to be relatively similar.

Figure 12: Net annual growth, annual mortality and harvest for 2010



Overall, annual growth is more than 13 times that of harvest and yearly mortality exceeds harvest by a factor of 8 to 1. On Matrix lands only (outside of Riparian Reserves), growth is almost 3.7 times the rate of harvest. This indicates that timber harvest, by removing trees from the Forest, is having a very small effect on net productivity while management practices, such as thinning and reforestation, are contributing to increasing growth rates.

The lack of harvest, however, may be contributing to increased mortality resulting in both positive and negative ecological benefits. In Oregon, tree growth exceeds harvest rates overall by a wide margin and the Forest follows a similar trend (Forest Fact Book, Oregon Forest Resources Institute, 2003 edition).

The mortality is comprised mainly of the smaller trees related to suppression. Mortality also includes larger trees that have died as a result of insects, disease, or other factors. Tree mortality contributes to nutrient cycling through decomposition of organic matter. The standing and downed wood is habitat for many species. Some mortality can be viewed as a loss of economic product and industrial based approaches to forestry attempt to capture potential loss of mortality via commercial thinning. Large amounts of mortality can become a hazardous fuels concern.

Stand Improvement Activities

Stand improvement activities are monitored as they contribute to the future allowable sale quantity and increase long-term capacity of forest land by promoting healthy stand conditions and growth. They include pre-commercial thinning, pruning, and fertilization. Pre-commercial thinning (PCT) can greatly influence the future trajectory of the stand in terms of species composition as well as horizontal and vertical arrangement. Prescriptions generally call for retention of minor species and a 25% or more variance in spacing. This allows for greater species and structural complexity in the stand.

In FY 2010, the Forest accomplished 1,676 acres of young stand thinning or PCT. The forest continues to fund pre-commercial thinning treatments primarily through the use of Stewardship Contracting authorities and Payments to the Counties funding. Many of the eastside thinnings are integrated with hazardous fuels reduction. Appropriated funding in the region has emphasized reforestation, notably after the large scale fires on other forests over the last several years. A stable

funding source will be necessary to maintain a productive young stand thinning program and reduce the backlog of acres needing thinning.

Modeling Assumptions

The Forest Plan relies on complex analysis to determine the amount of timber to harvest. Changes in land allocations, better knowledge of productive capacity acquired through project level planning, and cumulative effects may reveal a need for adjustments during the plan period. The purpose of monitoring harvest rates is to see whether modeling assumptions used to determine sale quantities and rotations lengths are appropriate and translate well to project level planning. Modeling assumptions strive to estimate the effect of standards and guidelines on harvest volume and monitoring will provide a foundation against which achievement of the standard and guidelines can be tested.

Harvest Rates by Management Allocation

In 2010, harvest occurred on 1833 acres, which equals less than one tenth of a percent of the total acreage on the Forest; a harvest rate well below the annual probable sale quantity. The harvest occurred within several Northwest Forest Plan land allocations to meet a diversity of resource objectives. Eighty eight percent occurred within Matrix, and twelve percent within Late Successional Reserves (LSR).

As displayed in the following tables, 51% of the 2010 harvest occurred in C1 timber emphasis and 46% occurred in “B” allocations where timber production is a secondary goal. For 2010, these include B2 scenic watershed, B6 special emphasis watershed, B10 winter range, and B1 Designated Wild and Scenic Rivers. 39% of the harvest occurred in C1 timber emphasis. In addition, 3% occurred in “A” allocations.

Table 14: Percent of acres harvested by management area category.

Fiscal Year	Mt. Hood National Forest Land Allocations			
	A	B	C	D
2000	2	29	69	0
2001	1	28	71	0
2002	0.	60	40	0
2003	13	37	50	0
2004	0	47	53	0
2005	5	25	70	0
2006	0	66	34	0
2007	0	59	40	0
2008	<1	71	29	0
2009	9	52	39	0
2010	3	46	51	0

Table 15: Acres harvested by Forest Plan Management Area in FY 2000-2010.

Management Area Category	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
A	73	11	0	149	0	126	0	0	2	68	49
B	960	223	374	371	422	625	1383	465	429	359	847
C	2257	574	246	509	485	1774	700	318	177	268	937
D	0	0	0	0	0	0	0	0	0	0	0
Total	3290	808	620	1029	907	2525	2083	783	608	695	1833

Compliance with Timber Standards and Guidelines

The overall objectives of the Monitoring Plan are to determine if programs and projects are meeting Plan direction and to keep the Plan viable. Standards and guidelines are monitored to see if they are being followed and whether they are effective in meeting their intent.

Harvest Methods

The Forest Plan tracks harvest methods being used to determine compliance with Forest Plan standards and guidelines which specifies a range of harvest methods should be considered and that resource objectives relating to harvest methods are being met.

In 2010, commercial thinning was the harvest method on 87% of the acres, group selection cuts mainly of root disease pockets, 9%, and selection harvest 4%. In the last decade, there has been an overriding shift from regeneration harvest to commercial thinning. Figure 13 and Table 16 display harvest methods utilized over the last ten years. For example, more salvage harvest occurred in the late 1990's due to an increase in Douglas-fir beetle caused mortality that occurred after several wind events. Selection harvest, shelterwood harvest with reserves and commercial thinning continue on the eastside of the Forest to lessen the susceptibility to forest insects and to reduce disease and hazardous fuels. On the westside, commercial thinning has increased as stands that were regenerated 30 or more years ago have grown to plantations of commercial size.

Figure 13: Acres treated by harvest method.

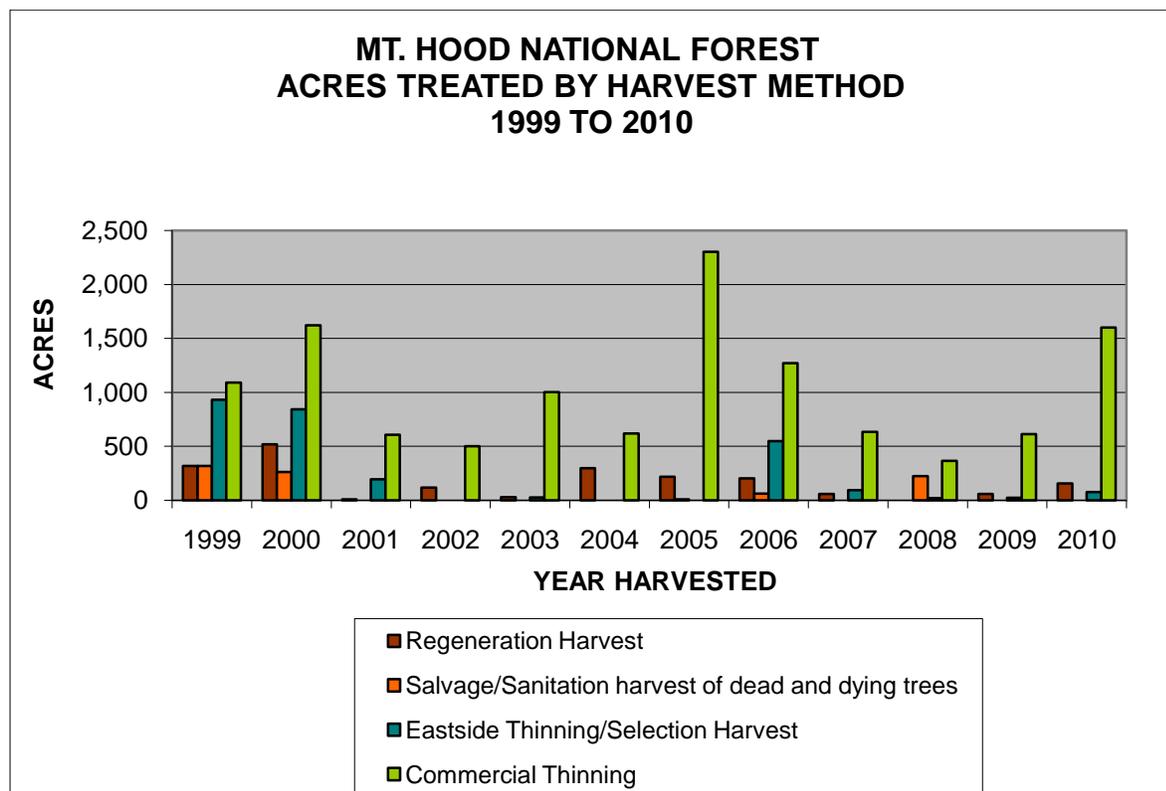


Table 16: Harvest method by year.

Year Harvested	Regeneration Harvest*	Salvage/Sanitation Harvest	Eastside Selection Harvest	Commercial Thinning
2001	8	0	194	606
2002	118	0	0	502
2003	30	0	26	1,003
2004	297	0	0	620
2005	216	8	0	2302
2006	203	549	61	1270
2007	59	0	92	634
2008	0	222	20	366
2009	59	0	23	612
2010	155	0	77	1601
10 Year Total	1,145 (10%)	779 (6%)	493 (4%)	9,516 (80%)

*Includes shelterwood harvest, group selection cuts, and regeneration harvest with reserves

Meeting National Forest Management Act Reforestation Requirements

Reforestation practices are monitored to ensure that areas harvested are adequately restocked within five years of a final harvest (36 CFR 219.27). Reforestation practices are also monitored to ensure that planted tree species maintains genetic diversity and provides for compositional diversity similar to that existing naturally for the planning area with considerations for natural regeneration.

The Forest accomplished 488 acres of reforestation in FY 2010. Reforestation continues on a downward trend which is directly related to the decreased level of regeneration harvest and the decreased level of timber harvest overall. All 488 acres of planting occurred on the eastside of the Forest and included small group openings mixed throughout harvest units. In addition, a portion of the Gnarl Fire outside of the Wilderness near Cloud Cap Inn was planted, including 37 acres of whitebark pine restoration. The westside of the Forest had no reforestation activities in 2010, primarily because commercial thinning is the only harvest method currently being utilized on the westside of the Forest.

A diversity of species was planted with additional species diversity expected from natural regeneration of shade-tolerant species, such as western hemlock. Species diversity increases resilience to host specific insects and disease and increases the structural diversity within a stand. Six conifer species were planted: Douglas-fir, ponderosa pine, western larch, western white pine, noble fir, and Engelmann spruce. In addition, western red cedar was planted for stream and road restoration projects. All of the acres planted were with seedlings from known seed sources and genetically diverse seed lots. The western white pine was planted from stock that is resistant to white pine blister rust, thus enabling restoration of this species. Whitebark pine seedlings are being grown and planted for post-fire restoration near Cloud Cap Inn and as part of the whitebark pine restoration strategy for the Pacific Northwest Region. These were planted in the fall of 2010 and survival exams will be conducted at the end of this summer's growing season.

The overall first-year survival of the planted seedlings was very high, from 97 to 100%, and third-year survival was exceptionally high as well at 94% - 97%. Based on initial survival stocking surveys and expectations for more seedlings to naturally seed in from surrounding stands, the five-year regeneration requirement should be met on all units. Some of the units on the eastside may need additional inter-planting due to pocket gophers, however minimum stocking levels should still be met. Districts are continuing to complete stocking surveys and certify units as adequately stocked.

Monitoring Results

Provide a Continuing Supply of Forest Products and Positive Economic Return

Timber Harvest

Over the last five years, the Forest has been providing a more "predictable" supply of forest products to the region than it has in the past (see **Appendix F**, Mt. Hood National Forest Volume Summary, 1994-2010). In FY 2010 the budget allocation scheduled the Forest to offer for sale approximately 35.1 MMBF (54.8% of PSQ). The Forest offered for sale approximately 32.2 MMBF, and awarded a total of 40.8 MMBF. The majority of this volume was awarded as stewardship contracts using "best value" bidding. These projects resulted in a revenue source which will accomplish restoration projects such as fuel reduction projects, road maintenance, road decommissioning, and wildlife habitat enhancement. The Forest also made significant progress on planning projects that accomplish

wildfire risk reduction objectives and commercial thinning in overstocked plantations. These planning efforts will result in timber sales and stewardship contracts in FY 2011 and 2012.

The best information we have at this time projects the Forest to plan and sell approximately 30 MMBF per year for FY 2011 through 2012. The Forest is striving to provide a predictable level of forest products to the regional economic systems. Nationally and regionally the Forest Service is addressing planning issues that contribute to an unpredictable supply of forest products. Locally, the Forest is addressing planning issues that affect the economic viability of timber sales, which results in sales with no interested bidders. In FY 2011 to 2012 we expect to provide a diverse mix of species, sizes and quality, though the majority will be from smaller sized trees less than 28 inches in diameter. Most of these products will be sold using stewardship contracts due to the support of a wide array of diverse interest groups on the Forest. The Forest continues to plan, prepare and administer timber sales and stewardship contracts using some of the most environmentally restrictive land management guidelines in the world. We are striving to set a global example for sustainable forest management.

Special Forest Products

Over the past ten years the Forest has been able to supply moderate levels of firewood and Christmas trees to the local communities as well as the greater Portland area. The Forest has also been able to supply other special forest products for both commercial and personal use. These have included boughs for holiday wreaths, greenery for floral arrangements, mushrooms and others such as carving stock and transplants. Due to the adjacent large population and the high value products available such as noble fir boughs, the Forest has a very large and efficient Special Forest Products program. While these products do not contribute relatively large dollar value to the regional economic system, they do provide for a considerable amount of employment for local workers. In addition, the gathering of firewood, Christmas trees, huckleberries and mushrooms for personal use, is considered by many to be a recreational opportunity, which does provide regional economic benefits. In 2010, the Forest sold 6,500 special forest product permits, generating over \$125,705 in receipts.

Table 17: Special forest products sold in FY10

Special Forest Product	Units Sold	Value
Firewood Permits	2526	\$65,620
Beargrass Permits	685	\$21,055
Christmas Tree Harvested – Vendor & Non-Vendor	3372	\$16,480
Carving Stock	62	\$12,095
Mushroom Permits	181	\$5,845
Salal/Forest Greens	126	\$2,830
Transplants	7	\$906
Bough Permits	6	\$320
Free Use Mushroom Permits	1531	

Future budget levels for the Special Forest Product programs are expected to be similar to FY 2010. Demand for these products, which provide recreational opportunities, are expected to increase as the nearby population grows. The Forest is attempting to increase firewood availability through roadside harvesting of dead and down material. The Forest is looking for ways to continue to provide firewood.

Christmas trees and bough harvesting opportunities are expected to be limited in the future due to less regeneration harvesting. In other words, the trees planted in the clearcuts 10 to 20 years ago are getting too big to be cut for Christmas trees or produce high quality boughs.

The Forest expects to continue looking for opportunities to supply special forest products as the demand arises. Recent indicators suggest that harvesting of plants for bio-research may expand in the near future. However, our ability to provide these opportunities is dependent on budget allocations, which directly relates to the number of employees assigned to this task.

Insect and Disease Concerns

Significant amounts of tree mortality, primarily from bark beetle outbreaks on the Forest and adjacent lands, have accumulated over the last ten years. Approximately 186,000 acres, or seventeen percent of the Forest landbase, has experienced bark beetle activity contributing to an increased fuel loadings and increased concern over hazardous fuels. Mortality from mountain pine beetle is declining since the outbreak has killed most of the host habitat. Still, there are areas of lodgepole pine likely to be killed within the next year or two such as near Summit Lake and Government Camp. Acres affected by the Balsam woolly adelgid and Douglas-fir beetle are increasing in 2010.

The past outbreak (1983 to 1993) of western spruce budworm (*Choristoneura occidentalis*) affected large acreages of Douglas-fir and true firs and caused some tree mortality, especially in the understory. These trees have now fallen and are contributing to increased fuel loadings. In some places, this is occurring where there is overstory mortality from bark beetles. As a result, there are continuous ladders of high fuel loadings from the forest floor to the standing dead fuels.

At the higher elevations, many of the whitebark pines are dying due to a combination of a non-native pathogen, white pine blister rust, *Cronartium ribicola*, and mountain pine beetle, resulting in severe decline of the whitebark pine populations. Many of the whitebark pines are in designated Wilderness Areas on the Forest. There are efforts in the west to select for and propagate rust resistant seedlings for restoration in some areas. Rust resistant seedlings are not available as yet, and it is very difficult to plant and grow these trees at high elevations. Whitebark pine seedlings are currently being planted for post fire restoration near Cloud Cap Inn and as part of the whitebark pine restoration strategy for the Pacific Northwest Region.

The northern-most part of the range of sugar pine is located on the Clackamas River Ranger District. A survey of these sugar pine populations was completed during the summer of 2006. In summary, the sugar pine exhibit severe decline due to blister rust and mountain pine beetle. There is very little regeneration, and the surviving regeneration is infected with blister rust. Re-establishing a new population with blister rust-resistant seedlings has been recommended by the Area Geneticist.

Recommendations

- The vegetation management program should continue planning efforts to meet desired land management objectives and to provide a predictable supply of commercial forest products. Over the next five years, the vegetation management program will be focusing on projects that address the following environmental and ecological needs:
 - decline in quality and/or quantity of diverse plant community, including enhancement of huckleberry and whitebark pine habitat and habitats in Late Successional Reserves
 - departure of vegetation condition class and fuels build-up/fire hazard

- dense forest stands in plantations and/or general forest areas
- degraded river, stream, lake, and/or riparian habitat
- significant forest insect or disease outbreak
- include thinning commercial size plantations on the westside that both provide forest products and increase the biodiversity and complexity of the stands
- Continue integrated planning of silvicultural and fuels treatments to reduce hazardous fuels, modify wildland fire behavior, and restore ecological conditions. Include those areas where there are high levels of insect caused tree mortality that are contributing to hazardous fuels concerns.
- Pursue additional funding sources for young stand or non-commercial thinning. This may include further use of Retained Receipts from Stewardship Contracting or competitive sources such as Forest Health Protection funds.
- Continue active restoration of whitebark pine populations consistent with the Whitebark Pine Restoration Strategy for the Pacific Northwest Region, 2009-2013.
- Conduct an updated forest-wide analysis of successional structure and annual rates of growth and mortality and include new Wilderness allocations.

STRATEGY D

Protect, maintain, and enhance the soil and water resources of the Mt. Hood National Forest.

Water Resources

Goal

A key goal of the Forest Plan, as amended by the Northwest Forest Plan, is to protect and maintain the character and quality of water, providing for long-term sustained production resulting in favorable flows from the watersheds on the Forest. In addition, the unique and valuable characteristics of floodplains, riparian areas, and associated riparian and aquatic ecosystems are to be protected.

Background

Water quality Best Management Practices (BMPs) and related Forest Plan and Northwest Forest Plan Standards have been developed to achieve compliance with the Clean Water Act and State water quality regulations. A Memorandum of Understanding between the Oregon Department of Environmental quality and the Forest Service recognizes BMPs as the primary mechanism for achieving water quality standards. Water resource-monitoring activities are designed to collect data on water quality trends, assess Forest Service's compliance with the Clean Water Act, and monitor the effectiveness of watershed restoration work, such as road decommissioning.

Monitoring Activities & Evaluation

The Forest Plan identified water quality objectives to be monitored and evaluated to determine the Forest's capability to provide for a long-term sustained production of clean water. Forest Plan standard and guidelines for water quality including Best Management Practices (BMPs), cumulative effects, lakes and wetlands are monitored for implementation and effectiveness.

Water Quality Standards and Guidelines

Road Decommissioning

During the summer of 2010, watershed and fisheries specialists conducted implementation monitoring on road decommissioning projects in the Little Sandy, Still Creek, Lower Salmon River, Clear Creek, and Clear Fork (Sandy River). On the East Side of the Mt. Hood National Forest roads were decommissioned in the Fifteenmile Creek watershed. The purpose of the implementation monitoring visits was to evaluate whether Best Management Practices (BMPs) for road decommissioning projects were being implemented as designed. Extent of road surface decompaction and proper implementation of erosion control work such as seeding and mulch coverage were also evaluated. Watershed specialists found that implementation of BMPs for road decommissioning was being adequately implemented during 2010, but from time to time minor recommendations for improving BMP implementation were made.

Eastside Zone Road Decommissioning Project

In September 2010, the 2840 0630 road decommission project was monitored. The 630 road consisted of 1.8 miles of active decommission and an additional 1.6 miles of passive decommission. The active section included waterbars every 100 to 200 feet, removal of two stream crossings, 700 feet of side-cast stabilization, leveling of berms, and blocking the road entrance.

The goals of this monitoring included: 1) monitor the specific project for both implementation and effectiveness; 2) develop a thorough and efficient monitoring methodology that could be used consistently on road decommissioning projects. The National draft Best Management Practices (BMP) Evaluation protocol for Completed Road Decommissioning projects was used for this monitoring. The protocol involves a review of the implementation for consistency among the planning documents, contract specifications, and the actual work accomplished. In addition, the effectiveness of the decommissioning is evaluated in qualitative terms of soil erosion at stream crossing and other sections of the road prism.

There was a fairly high degree of consistency between the EA, the contracting documents, and the implementation for most aspects of the project. Implementation varied from the original contract in a number of elements, which were modified into the contract just before implementation. Examples of this include additional leveling of berms and side-cast fill stabilization. Soil compaction craters were also included in the original contract but were removed by the inspector prior to implementation because the road was a native surface with only moderate compaction. In a few instances, waterbars were adjusted in the field and spaced more than 200 feet apart because of low erosion concerns.

Overall, the road decommissioning project appeared to be highly successful. It should be noted that monitoring occurred only one year following the treatment, and no extreme precipitation events had occurred. The project did appear to eliminate motorized traffic. The side-cast stabilization appeared to be highly effective. One short section of cracked fill was left untreated and probably should have been treated by fill pullback. All waterbars were intact and functioning. There was minor erosion at a stream crossing related to cut-slope runoff that was routed over a slope that was laid back by the culvert removal. The grass seed vegetation treatment was not successful at one of the stream crossings, but native plants were already recolonizing the area.

Based on our field review of the project, some recommendations for future road decommission projects on the eastside of the forest were developed. First, because of the vulnerability of recently re-contoured stream crossings, a waterbar should be placed approximately 50 feet up the road to protect the area from road runoff. Second, straw and grass seed on waterbars that are not adjacent to streams is doing little to prevent sediment from reaching streams. The provisions could be reserved for the area around stream crossings only and not applied to upland waterbars or soil craters.

Water Quality Trend Monitoring

Trend monitoring is conducted to monitor water quality (temperature, turbidity, pH, etc.) flowing from larger watershed areas over time. Water quality data collected during trend monitoring is not designed to determine whether BMPs are effective for a specific project, but rather to provide information that may be helpful in assessing whether Forest Plan, as amended by the Northwest Forest Plan, standards and guidelines are protecting water quality in a watershed where various resource management and restoration activities have been conducted over a period of time. Trend monitoring also provides important information to determine whether water quality is being maintained or improving over time.

Water Temperature

Water quality standards are regulatory tools used by the Oregon Department of Environmental Quality (DEQ) and the federal Environmental Protection Agency (EPA) to prevent pollution of waters. States are required to adopt water quality standards by the Federal Clean Water Act. States submit their standards to EPA for approval. New, more stringent DEQ water temperature standards went into effect on March 2, 2004.

Stream temperature was measured during the summer on 20 sites on the Zigzag Ranger District. In most cases, water temperature was recorded every hour with an Onset brand data logger. This is down from the summer of 2009, when 12 of the 16 stations monitored exceeded state standards. The number of water temperature monitoring stations not meeting water quality standards in 2010 is about the same as during the summer of 2008, when 6 of the 19 stations monitored did not meet state standards.

Water temperature was also monitored on 12 sites in the Clackamas River Watershed. Several of the monitoring sites were on streams being considered for re-introducing Bull Trout. The maximum water temperatures were generally reported July 25, 2010 through August 18, 2010. The State standards for core cold water habitat (60.8°F or 16.0°C) was not met at 4 out of the 12 sites monitored during 2010. This is down from the previous year when 13 out of the 14 sites monitored during Water Year 2009 exceeded the core cold water temperature standard. During the summer of Water Year 2009 there was an extreme heat wave in late July and early August, which resulted in high stream temperatures.

Water temperature was monitored on 2 sites in the Mill-Columbia 5th field watershed, 2 sites in the Eight Mile Creek 5th field watershed, and 1 site in the Fifteenmile 5th field watershed. These water temperature monitoring sites were part of an 18 site water temperature monitoring network required as part of the Oregon DEQ TMDL for the Mile Creeks watershed. The Oregon Department of Fish and Wildlife (ODFW), Soil and Water Conservation District (SWCD), and, Columbia River Keepers

are collecting water temperature data in the lower reaches of the watershed. All applicable water temperature standards were met for the period of time water temperature was being monitored for all of the monitoring sites on the Forest.

As described above, various streams monitored did not meet one or more of the DEQ water temperature standards, even though these same streams in most cases provide very good water quality for fish. There is some uncertainty if the streams that do not meet one or more of these standards would have met these standards prior to the onset of various resource management activities. Where past management activities did result in stream shade removal, these areas are rapidly recovering stream shade, which will eventually result in lower water temperatures.

Continuous Water Monitoring Stations

Clackamas River (Carter Bridge)

The Carter Bridge water monitoring station was established in December 1999 to record the water quality of the Clackamas River as water left the Forest and to provide the downstream water providers an early warning of turbidity problems. The station is located on the Clackamas River at Carter Bridge one half mile below the confluence of Fish Creek. Data is recorded at 30 minute intervals for date and time of collection, turbidity, water temperature, depth, specific conductivity, and pH. In March 2005, the U.S. Geological Survey (USGS) began operating this monitoring station with funding provided by the Clackamas River water providers. Water quality data for this monitoring station is available on-line at the following website:

http://waterdata.usgs.gov/or/nwis/uv/?site_no=14209710&PARAMeter_cd=63680.00400.00095.00010.00300

Average monthly water quality data through September 2010 (end of USGS water year) are listed in the table below. Average turbidity at this monitoring site is relatively low throughout the year, with average values less than 4.0 Nephelometer Turbidity Units (NTUs) during all months except March and June of 2010, when the monthly mean turbidities were 4.9 and 4.3 NTUs respectively. During non-storm periods, turbidity is normally between 0.2 and 2.0 NTUs. During stormy periods when the river rises, instream turbidities can increase to about 600 NTUs. The maximum recorded turbidity in Water Year 2009 was 318 NTUs during a high flow event (2 year) on January 2, 2009. During Water Year 2010 the maximum turbidity was 59 NTUs on March 29, 2010. This is lower than previous years, perhaps because of lower peak flows associated with the El Nino weather pattern.

Once the turbidity levels peak after a storm, they begin to drop back to normal levels along with a decrease in streamflow. The high levels of turbidity during peak runoff events are due to various factors, the primary causes being mobilization of stored in-channel sediments, erosion of stream banks and the toes of earthflows. In some cases landslides occurring during high stream flows can also cause high turbidity levels.

Instream average monthly pH ranged from 7.6 to 8.0, within the DEQ standard (6.5 – 8.5). Daily maximum pH values reached 8.0 on three days in August 2010 and one day in September 2010.

The peak water temperature reached about 61.3° F. on July 25, 2010. The seven day average high water temperature was about 60.3° F on that day. The peak water temperature was cooler than the peak water temperature of 63.5° F. on July 31, 2009. Water temperatures in 2009 were affected by the fact that air temperatures were greater than normal during the summer months. The State standards for core cold water habitat (7 day average high, 60.8° F or 16.0°C) was met at this site for Water Year 2010, but not met in 2009 due to much warmer air temperatures. Overall, water quality is very good at this particular monitoring site on the Clackamas River.

Table 18: Water Year (WY) 2010 Clackamas River (Carter Bridge) monthly water quality parameter averages.

Month	WY 2010 Water Quality Parameters (monthly averages)			
	Turbidity	Water Temperature (° F)	pH	Conductivity microS/cm
October	1.3	46.9	7.8	62
November	2.4	42.8	7.7	49
December	3.8	37.4	7.6	47
January	3.7	41.0	7.6	40
February	1.8	41.7	7.7	45
March	4.9	42.2	7.8	45
April	3.6	42.9	7.7	42
May	2.2	45.9	7.7	41
June	4.3	50.0	7.6	44
July	1.0	55.9	7.8	59
August	0.5	55.8	8.0	66
September	1.0	52.2	7.8	65

Eagle Creek

An automated water monitoring station was installed in December 2001 on Eagle Creek, just a short distance upstream of the U.S. Fish and Wildlife Service fish hatchery and approximately 4.0 miles downstream of the National Forest boundary. The monitoring station was located as close to the National Forest boundary as possible, but potential influences on water quality from lands in other ownerships downstream of the National Forest boundary may exist. One of the key objectives of this monitoring station is to quantify water quality downstream of National Forest lands on Eagle Creek.

Turbidity, water temperature, pH, conductivity, and flow depth are continuously monitored at 15 minute intervals. Data is incomplete for Water Year 2010 due to problems with the data sensor. Average monthly water quality data for Water Year 2010 are listed in the table below.

Average turbidity at this monitoring site is relatively low throughout the year (based on previous monitoring), with average values of 1.5 NTUs or less, except for the month of June 2010, when the average turbidity was 3.0 NTUs. The peak turbidity in water year 2010 was 65 NTU's on June 2, 2010 that occurred during a peak flow event (< than 1 year event). Storm events with a recurrence interval of one year or greater result in stream bed and bank erosion which reduce water clarity. Small landslides adjacent to or near stream channels can also occur during heavy rainfall events when soils are saturated. In some cases, measured peak turbidity values may be affected by Eagle Creek Fish

Hatchery personnel cleaning leaves and other debris off the intake structure a few feet upstream from the monitoring station.

Instream average monthly pH ranged from 7.4 to 8.0 (for the months measured) with maximum pH of 8.18 on July 22, were within the DEQ standard (6.5 – 8.5).

The peak water temperature reached about 67.2° F. on August 16, 2010. The average water temperature during the summer of 2010 ranged from 48.4 ° F in June to 58.3. ° F in August. The State standards for fish core cold water habitat (60.8° F or 16.0°C) was not met for a number of days at this site for Water Year 2010. Other than a reasonably small deviation from the water temperature standards, water quality is very good at this particular monitoring site on Eagle Creek.

Table 19: Water Year (WY) 2010 Eagle Creek monthly water quality parameter averages.

Month	WY 2010 Water Quality Parameters (monthly averages), Eagle Creek			
	Turbidity (NTU)	Water Temperature (°F)	pH	Conductivity microS/cm
October*	0.5	47.4	7.7	42.7
November	---	---	----	----
December*	0.6	37.8	7.4	32.1
January	1.5	42.0	7.4	35.0
February	0.5	41.6	7.4	33.4
March	0.5	43.8	7.5	34.4
April	----	---	---	---
May*	1.3	44.5	7.5	30.1
June	3.0	48.4	7.5	29.0
July	0.4	56.7	7.8	38.7
August	0.5	58.3	8.0	42.4
September	0.5	53.4	7.9	39.9

*Note: No data in a cell indicates an equipment problem. Monitoring Station operated 9 days in October, 12 days in December, and 9 days in May.

Instream Bacteriological Sampling

Instream sampling for E. coli has been done off and on for several years on Camp Creek at the Mirror Lake trailhead on the Zigzag Ranger District. The monitoring was initially done cooperatively with students and faculty from the University of Portland. Elevated levels of E. coli have been found in the past at this site, so the purpose of the monitoring is to gather baseline data, and then try and identify the upstream source of the bacteria if elevation levels of E. coli are present. This past year the monitoring was done from July 6, 2010 to September 8, 2010. The coliscan E. coli count was less than 80 through August 9th, but peaked at 340 in early September. The Oregon DEQ numeric criteria for E. coli organisms is 406 E. coli organisms per 100 milliliters, so all samples taken during 2010 are well within the numeric criteria. Sampling will continue during the summer of 2011.

Mt. Hood Meadows Water Quality

Baseline data for the Mt. Hood Meadows Ski Area continues to be collected on the East Fork of the Hood River and Mitchell Creek on the Hood River Ranger District. This effort consists of two monitoring stations owned and operated by the Mt. Hood Meadows ski area, which have been operating for about eighteen years. Turbidity, water temperature, conductivity, and stage are monitored continuously. Total suspended solids are also sampled once each day. The Mt. Hood Meadows staff checks the monitoring equipment approximately once each week, and reviews the monitoring data for abnormal readings.

Stream Discharge (Outside of Bull Run)

The Forest watershed staff has re-established a discharge measurement gage at a previously decommissioned USGS gauging station on the Upper Clackamas River at Big Bottom. This site will also be used to characterize the hydrology of the watershed, and the data is sometimes used for special studies in the watershed.

Cumulative Watershed Effects Analyses

Hydrologic function and watershed condition, like other landscape function indicators, provide us information about the watershed's ability to resist and recover from disturbances and to filter and maintain water quality. Hydrologic condition describes an analysis of watershed characteristics focused on physical and ecological processes affecting the timing, quantity, and quality of stream flow. The Forest Plan relies on cumulative effects analyses which incorporate watershed characteristics to determine watershed conditions and hydrologic recovery. Effectiveness of modeling tools use to predict watershed conditions and hydrologic recovery and implementation of standard and guidelines are monitored for effectiveness in minimizing potential adverse effects from disturbances.

During 2009 and early 2010, a watershed cumulative effects analysis was completed for the Huckleberry Thin Environmental Assessment on the Clackamas River Ranger District and the Bear Springs Plantation Thin on the Barlow and Hood River Districts using the Aggregate Recovery Percentage (ARP) methodology. A non-ARP cumulative effects analysis was completed for the Forest-wide OHV management plan, Clackamas River Road decommissioning for habitat restoration, increment 2, Zigzag Road decommissioning for habitat restoration, increment 2, and the Sportsman's Paradise Hazardous Fuels Reduction Project on the eastside of the Mt. Hood National Forest.

The watershed cumulative effects analysis for all the above listed projects which included an ARP analysis indicates the post project ARP would be within the guidelines set forth by Forestwide standard and guidelines FW-063 and FW-064 pertaining to cumulative watershed effects.

Recommendations

- Continue implementation of the Best Management Practices Evaluation Process (BMPEP), and implementation/effectiveness monitoring of road decommissioning projects.

- Continue both baseline water temperatures monitoring Forestwide. For those streams identified as exceeding state water quality temperature standards, do additional monitoring in 2011 as opportunities arise, and funding permits, to determine if the water temperatures are naturally elevated. If the elevated water temperatures are a result of management activities or wildfire, evaluate restoration options. Cooperate, when funding permits, with the Oregon DEQ for monitoring water temperature as part of the TMDL implementation process. Continue operating the continuous water quality monitoring station on Eagle Creek.

Soil Resources

Goal

The primary goal of soil management is to maintain or enhance soil productivity while conducting forest management activities.

Background

Monitoring and evaluation of soil resource conditions, both before (soil disturbance generated by previous management activities) and following management activities, is an important component of establishing soil management objectives, developing soil management prescriptions, and in determining how effective our practices are in meeting Forest Plan standards and guidelines. Soil quality standards are used to guide the selection and design of management practices and prescriptions on a watershed scale. Cumulative effects on ecosystem sustainability and hydrologic function are evaluated with the addition of proposed actions.

Organic carbon is an important energy source for the microbiological component of the soil ecosystem. Organic matter in the form of large wood on the forest floor or smaller woody material, including the litter layer, is important sources of organic carbon. Maintenance of carbon cycling through conservation of large wood material is addressed through the Forest Plan standards and guidelines identified for wildlife habitat needs. The results of monitoring for large wood are presented in the wildlife section.

Monitoring Activities & Evaluation

The Forest Plan identified soil objectives to be monitored and evaluated to ensure the productive capacity of the soil resource is being maintained through time. Standards and guidelines in the Forest Plan address the physical and biological aspects of soil productivity which include percent soil disturbance within an activity area, effective soil surface cover, litter layer consumption after a fire, and total above soil organic matter content. Standards, specific to maintaining physical soil quality properties, require that no more than 15% of an activity area is to be in a degraded condition from the combined impacts of compaction, displacement, or severe burning.

As in previous years, two needs guided the direction for soil monitoring. First, there is a need to continue to monitor those areas that have been impacted so that cumulative effects can be documented. Second, there is a need to use monitoring data to evaluate planning areas and specific stands proposed for timber harvest/fuel reduction activity so that effects can be better predicted.

No harvest units were monitored in 2010. New monitoring in existing planning areas was not needed because previous years monitoring data was already available and adequate.

Recommendation

Monitoring results for FY11 will be provided in next year's report as harvest units are completed and become available for evaluation using the same techniques as in previous years. New planning areas in FY11 will result in potential need to gather existing condition data.

STRATEGY E

Contribute to the conservation of diverse native plant and animal populations and their habitats in Mt. Hood National Forest.

Fisheries Program

Goal

There are two primary goals identified in the Forest Plan for the Fisheries Program. They are:

1. To protect, maintain, or enhance the natural characteristics and functions of rivers and streams, floodplains, wetlands, and riparian areas to assure the long-term sustainability of diverse, native fish and aquatic species assemblages across the Forest; and
2. To maintain or increase fish habitat capability and assure long-term, sustained aquatic ecosystem health.

Background

The Forest is situated in the mid- and upper headwaters of several key watersheds that provide a home for anadromous (ocean-going) fish, such as salmon, steelhead, and lamprey as well as resident species, such as trout, whitefish, and sculpins. There are over 1,600 miles of fish-bearing streams on the Forest with approximately 300 miles supporting anadromous (i.e., ocean-going) populations of salmon and steelhead. The primary river basins on the Forest include:

- Clackamas River Basin
- Sandy River Basin
- Hood River Basin
- Fifteenmile Creek Basin
- White River Basin (Deschutes River system)

The federal lands, predominately Forest Service, comprising these river basins make up the vast majority of land ownership in the mid and upper watershed, with urban areas located in the lower watersheds. Federal lands, on average, comprise from two-thirds to three-quarters of the total land ownership in these river basins, thereby emphasizing the critical importance of the aquatic habitat conditions on the Forest and the important role the Forest provides for the conservation and restoration of aquatic species. The aquatic resources monitoring program is the starting point to track the status of populations of concern, such as the Endangered Species Act (ESA) listed fish; develop long term data sets on migration and population trends; and for conducting effectiveness monitoring

for restoration projects designed for habitat recovery and long term sustainability of fish populations. Federally-listed fish species on the forest include steelhead, coho, Chinook, and bull trout.

Monitoring Activities and Evaluation

The overall objectives of the Monitoring Plan are to determine if programs and projects are meeting Forest Plan direction and to keep the Forest Plan viable. Standards and guidelines are monitored to see if they are being followed and whether they are effective in meeting their intent. For the fisheries program, Standards and Guidelines, as amended by the Northwest Forest Plan, were designed to maintain or enhance aquatic habitat complexity and fish habitat capability.

Aquatic Habitat Complexity

The Fisheries Program monitoring activities provide information upon which to evaluate the trend in aquatic habitat conditions over time and to track the status (abundance, diversity, and distribution) of individual fish populations of concern. Watershed scale (fourth field watersheds, such as the Sandy River Basin; and fifth field watersheds, such as the Salmon River) monitoring is completed through two programs; (1) the Mt. Hood Stream Inventory Program, and (2) the Aquatic and Riparian Effectiveness Monitoring Program.

Provincial-level Stream Inventory Program

The Mt. Hood National Forest Stream Inventory program is a part of a provincial program that includes the Gifford Pinchot National Forest, and Columbia River Gorge National Scenic Area. Annual stream inventories are completed to collect information on stream conditions, including habitat typing (e.g., pools, riffles, glides), riparian and upland vegetation, management activities near the stream, streambed composition, and fish species presence. Each year, fish biologists on the forest evaluate monitoring and information needs, such as project level planning or updating a Watershed Analysis document, and choose the streams to be inventoried. This information is compiled into a report for each stream to give fisheries biologists a snapshot of aquatic habitat conditions and, over time, a tool to evaluate trends and determine if the Forest is meeting aquatic habitat standards and guidelines.

Table 20: Miles stream surveyed in 2010 by the Lower Columbia provincial program.

Forest	District	Stream Name	Aquatic Inventory and Aquatic Biota (in Miles)
Mt. Hood	Zigzag	Little Sandy River	15.2
	Clackamas River	Pink Creek	1.0
Gifford Pinchot	Mt. Adams	Layout Creek	4.3
	Mt. Adams	Crater Creek	1.8
	Mt. Adams	Compass Creek	2.6
	Mt. Adams	Martha Creek	2.9
	Cowlitz	Big Creek	11.7
	Mt. St. Helens	EF Lewis River	9.6
CRGNSA		Cedar Creek	2.4
		Bridal Veil Creek	5
Totals			56.5

Aquatic and Riparian Effectiveness Monitoring Program

The Aquatic and Riparian Effectiveness Monitoring Program (AREMP) is a multi-federal agency program developed to assess the effectiveness of the Aquatic Conservation Strategy (ACS) of the Northwest Forest Plan. The objective of the ACS is to maintain or restore the condition of watersheds in the Northwest Forest Plan area. AREMP tracks changes in watershed condition over time; and reports on the Forest Plan's effectiveness across the region.

Invasive species have been identified as one of the four critical threats to the Nation's ecosystems by the Chief of the USDA Forest Service. A broad geographic area sample provides an excellent opportunity to detect the presence or absence of "high concern" invasive plants and animals (Table 21) on federal lands while surveying stream reaches in randomly-selected watersheds in the Northwest Forest Plan area (NWFP; "west of the Cascades" from Point Reyes, California north to the Canadian Border). During the 2010 field season (June through September) AREMP crews surveyed 185 sites in 28 watersheds across Washington, Oregon, and California for invasive species. Crews recorded 8 detections of invasive terrestrial plant species in 5 watersheds. Two of the detected invasive species were in Washington, 6 out of the 8 detections occurred in Oregon, and no detections occurred in California. More detailed information, including maps of watersheds surveyed, can be found at the following web link: <http://www.reo.gov/monitoring/reports/watershed/AREMP%20Aquatic%20Invasive%20Species%20Report%202010.pdf>

Table 21: Invasive species of high concern

Type	Common Name	Genus Species
Aquatic Invertebrates	New Zealand mudsnails	<i>Potamopyrgus antipodarum</i>
	Zebra mussels	<i>Dreissena polymorpha</i>
	Quagga mussels	<i>Dreissena rostriformis bugensis</i>
	Rusty crayfish	<i>Orconectes rusticus</i>
	Red swamp crayfish	<i>Procambarus clarkia</i>
	Ringed crayfish	<i>Orconectes neglectus</i>
	Northern crayfish	<i>Oronectes virilis</i>
Aquatic Plants	Yellow flag iris	<i>Iris pseudacorus</i>
	Hydrilla	<i>Hydrilla verticillata</i>
	Parrot feather watermilfoil	<i>Myriophyllum aquaticum</i>
	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
	Giant reed	<i>Arundo donax</i>
	Brazilian elodea	<i>Ergeria densa</i>
	Didymo	<i>Didymosphenia geminata</i>
Terrestrial Vertebrates	Feral swine	<i>Sus scrofa</i>
Terrestrial Plants	Japanese knotweed	<i>Fallopia japonica</i>
	Cultivated knotweed	<i>Polygonum polystachyum</i>
	Giant knotweed	<i>Polygonum sachalinense</i>
	Old man's beard	<i>Clematis vitalba</i>
	Garlic mustard	<i>Alliaria petiolata</i>
	Giant hogweed	<i>Heracleum mantegaz-zianum</i>
	Himalayan blackberry	<i>Rubus discolor</i>
	English ivy	<i>Hedera helix</i>
	Reed canary grass	<i>Phalaris arundinacea</i>

Fish Habitat Capability

Anadromous fishes have complex life histories, which include freshwater, estuarine, and ocean phases. Monitoring information is used to better understand life histories of different populations; assess population abundance and distribution; and focus recovery efforts for ESA-listed species. Monitoring activities to track the status of individual fish populations of concern are conducted in partnership with other federal, state, and tribal governments. Specific biological monitoring of individual fish populations is coordinated at the river basin scale across land ownership boundaries to ensure collection of meaningful data on population characteristics and demographics specific fish species that are migratory (anadromous or fluvial) in nature.

Forest-level habitat monitoring as well as fish population-scale monitoring also occurs annually on the Forest. The table below lists broad-scale monitoring programs by fourth field watershed which track long-term trends of aquatic species and their habitats on the Forest. In 2010, salmon, steelhead, and bull trout populations were monitored in the Fifteen-mile, Hood River, Clackamas, and Sandy River basins.

Table 22: Multiple year fish monitoring projects for the Forest. 2010 projects with completed reports are in bold.

Fourth Field Basin Name	Project Name	Objective
All watersheds on the Mt. Hood NF	Water Temperature Monitoring	Stream temperatures are monitored to determine compliance with state standards, including specific standards for anadromous fish and bull trout persistence.
Fifteenmile Creek	Steelhead Spawning Surveys	Long-term monitoring of steelhead spawning levels and trends
Clackamas River	Smolt production estimates of coho and steelhead in Fish Creek, Oak Grove Fork, Roaring River, North Fork Clackamas, Eagle Creek, Clear Creek and Deep Creek	Long-term population monitoring of out-migrating salmon and steelhead smolts
	Baseline Food Web Assessment of the Upper Clackamas River Basin Prior to Reintroduction of Bull Trout	Baseline predator-prey (food-web) monitoring to be able to chart the effects due to the reintroduction of extirpated bull trout to their historic habitat in the Upper Clackamas River, planned for 2011
Hood River	Bull Trout Population Monitoring	Establish and document changes in bull trout populations within the Hood River basin
Sandy River	Spawning Surveys	Long-term monitoring of Chinook salmon spawning levels and trends
	Smolt production estimates of coho and steelhead in the upper Sandy River tributaries	Long-term population monitoring of out-migrating salmon and steelhead smolts

Steelhead population monitoring (spawning surveys) in the Fifteenmile Basin

Oregon Department of Fish Wildlife (ODFW) and the Mt. Hood National Forest (MHNF) has cooperated since the late 1980's to complete spawning surveys in the Fifteenmile Creek Basin. However, until 2003 surveys were somewhat sporadic in terms of stream reaches surveyed as well as survey timing. Beginning in 2003, both agencies agreed to a new survey protocol, based on the ODFW coastal survey protocol (2003), designed to assess the entire basin. Our objective was to evaluate conditions across the entire basin with results that could be used to better estimate adult escapement and run timing. With this information both agencies will be better able to monitor the adult population in the long-term and use this information to frame future land and fisheries management decisions.

Spawning surveys for Distinct Population Segment (DPS) Middle Columbia River steelhead trout (*Oncorhynchus mykiss*) have been conducted by various agencies since 1985 but the surveying effort was sporadic and lacked a consistent protocol or coordination between the agencies. In 2003 a standardized protocol for conducting spawning surveys in the Fifteenmile Creek drainage was developed cooperatively between personnel from both MHNF and ODFW and was based on a protocol previously established by ODFW.

The methodologies for the 2010 surveys were the same methods as used during all the other years after 2003 except for in 2010 reach lengths were doubled in length. This was done by combining two adjacent subreaches (average was about 1 river mile in length) into one 2 mile subreach. This was done in order to reduce overhead costs of completing the survey while still achieving the minimum desired 25 river miles (one pass lengths) surveyed in the watershed. When a steelhead redd was encountered it was marked with a colored rock and its location was recorded with a GPS unit (when possible). The colored rocks were removed after all passes were completed. All adult steelhead seen during the survey were counted and categorized as Wild, Hatchery, or Other. All Pacific lamprey (*Entosphenus tridentatu*) redds were counted and GPS (when possible) with adults just counted. All hatchery carcasses had their snouts removed and given to ODFW for PIT tag recovery.

The reaches were to be surveyed three times between the dates of April 14th and June 15th. The main focus on the first two passes were steelhead redds and the third pass main focus was on lamprey redds. Thirteen of the 21 subreaches were surveyed twice and eight of the 21 subreaches were surveyed once. No reach was surveyed for a third pass. The second and third passes didn't take place due to either bad water conditions, personnel issues, or the upper reaches did not have short-term upstream migration access to adults as in the case with Ramsey Creek. Since about 2004 there has been a tremendous increase in beaver activity in the lower reaches of Ramsey Creek which has prevented upstream migration for adult steelhead. Therefore, it was not given as high of a priority to complete a second or third pass as some of the other subreaches that did not have the same issue.

Table 23: Results of 2010 surveys

Stream Surveyed	Total Subreaches Surveyed	Date Surveyed	River Miles Surveyed (One pass Effort)	Total Redds/Mile Surveyed	Total Redds Surveyed Off MHNH/ On MHNH	Adults Seen (S-Steelhead, L-lamprey)
Fifteenmile	10	4/12-5/11	20.17	8.33	168/11	40S/0L
Eightmile	6	4/13-5/13	11.75	3.66	43/0	10S/0L
Ramsey	3	4/13-5/24	5.97	0	0	3S/0L
Fivemile	2	4/13-4/14	4.05	0	0	2S/L
Total	21		41.94		200/11	54S/0L

Smolt production monitoring in the Sandy River Basin.

Monitoring goals include the assessment of annual smolt production of Lower Columbia River (LCR) steelhead, and coho salmon in Still Creek, Zigzag River, Salmon River, Clear Fork of the Upper Sandy River Basin and Little Sandy River. LCR Chinook are also present in the basin, but do not exhibit a smolt life history stage in great numbers. It is believed the majority of LCR Chinook out-migrate from the upper basin as fry, either rearing lower in the Sandy River Basin or perhaps the Columbia River estuary. Out-migrant smolt monitoring through three rotary screw traps operated from April-June each spring. Fish are enumerated, weighed, measured, and mark for attaining annual smolt population estimates.

Beginning in the spring of 1992, employees from the Zigzag Ranger District Fisheries Department, Mt. Hood National Forest (ZZRD) began a multi-year steelhead trout and coho salmon smolt monitoring study on Still Creek in the Upper Sandy River Basin. Using a six-foot diameter rotary screw trap, out-migrating smolts have been enumerated, weighed, and measured and annual population estimates have been achieved through a mark-recapture protocol.

Since the 1998 signing of the Sandy River Basin Agreement, the FS along with several federal, state, county and local governments and non-governmental organizations formed the Sandy River Basin Partners (SRBP). The goal of the SRBP is to restore native fish populations within the Sandy River Basin. The SRBP collaborates in strategic scientific monitoring and restoration actions that will ultimately accomplish the goals of the agreement. This monitoring report is part of a tiered, 50-year plan that has been developed by the SRBP to better understand fish use, abundance and distribution throughout the Sandy River basin. As part of this plan, smolt trapping will include up to six traps per year rotated around the basin in a strategic fashion.

Table 24: Rotary screw trap locations on streams in the Upper Sandy Basin from 1991 through 2010.

	1991 to 2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Still Cr	X	X	X	X	X	X	X	X	X	X	X
Lost Cr		X	X							X	
Clear Fork				X	X	X	X				X
Salmon						X					X
L. Sandy								X	X		
Clear Cr										X	

Zigzag											X
Camp Cr											

Population Estimates

Not surprisingly, the Salmon River produced more steelhead and coho smolts than the other three streams combined. Overall the coho smolt estimates were larger than the steelhead smolt estimates with the exception of the Zigzag River which produced no coho smolts at all in 2010. The Still Creek steelhead estimate is not considered accurate because the trap was not fished until May 8th, which is about a month later than trapping usually begins. It is assumed that the beginning and peak of the steelhead migration was not captured in our data. Coho estimates were more precise than steelhead estimates as a result of higher species-specific trap efficiencies. Both Clear Fork and the Zigzag River had too few steelhead captured to calculate a population estimate (Table 25).

Table 25: Steelhead and coho smolt population estimates and 95% confidence intervals.

95% CI	Steelhead Estimate	95% CI	Coho Estimate	95% CI
Salmon River	3,419	77%	11,077	27%
Still Creek	138 ^b	102%	3,911	12%
Clear Fork	4 ^c	NA	1,646	51%
Zigzag River	5 ^c	NA	0	NA

^aConfidence intervals are expressed as percentages of the associated estimates.

^bThe Still Creek steelhead estimate is uncharacteristically small because the trap was not fished until May 8th, presumably past the peak steelhead migration.

^cNo estimate could be calculated for Zigzag River smolts and Clear Fork steelhead smolts due to low overall captures. The actual number of captures is given

The 2010 smolt population estimates for Still Creek were 3,911 coho salmon and 138 steelhead. The Zigzag Watershed Analysis Revision 2004 estimated the smolt-to-adult survival rates of 3% and 6% for coho salmon and winter steelhead, respectively. It should be noted these estimates are largely based on literature, as there is no empirical data for the Sandy River Basin. Estimated average adult escapement for Still Creek based on this data is: 117 coho salmon and 8 steelhead. Correlations of smolt production from the Still Creek trap and adult spawning surveys are inconclusive at this time as there has not been an official review of ODFW's coho and steelhead spawning survey numbers by ZZRD personnel. The loss of Marmot Dam as a fish enumeration facility has made collecting such data more difficult.

The 2010 smolt population estimates of the Salmon River were 11,077 coho salmon and 3419 steelhead. The Salmon River Watershed Analysis does not include estimated smolt-to-adult survival rates for coho salmon or winter steelhead, so no adult escapement estimate can be made at this time.

The 2010 smolt population estimate of Clear Fork was 1,646 coho salmon. There were not enough steelhead smolts captured to generate a population estimate. The Sandy River Watershed Analysis does not include estimated smolt-to-adult survival rates for coho salmon or winter steelhead, so no adult escapement estimate can be made at this time.

This was the first year the ZZRD attempted to run a trap on the Zigzag River. The trap was placed in a pool just below the confluence of Camp Creek and the Zigzag River. The trap was only fished 16 days this season due to trap maintenance issues, high flows, and running out of ESA "take" for Chinook fry. We did not capture enough fish to generate a population estimate, but we did gather enough information to develop a vague picture of what species of fish we are likely to see during

future trapping seasons. For instance, we caught equal amounts of steelhead smolts and cutthroat smolts, perhaps indicating the Zigzag River and/or Camp Creek have a larger searun Cutthroat population than other streams in the basin. Over a thousand Chinook fry were caught in the trap, which is not surprising considering many redds were documented upstream of the trap site during the 2009 September Spring Chinook spawning season.

Steelhead smolt production per mile and per unit surface area was highest in the Salmon River. The Zigzag River and Clear Fork had the lowest steelhead smolt production per unit of stream length because only a handful of smolts were caught in those two traps (Table 26 & Table 27)

Coho smolt production per mile was highest in the Salmon River, but production per unit surface area was highest in Still Creek. Clear Fork had the lowest coho smolt production per mile and unit surface area. The Zigzag River did not produce any coho smolts in 2010 (Table 26 & Table 27).

Table 26: Available anadromous habitat at each trapping site.

	Salmon River	Still Creek	Clear Fork	Zigzag River
Approximate mileage of anadromous habitat upstream of trap locations.*	11.4 miles	8.5 miles	4 miles	4.6 miles

*Mileages calculated by subtracting the number of river miles below the trap locations from the total amount of anadromous habitat miles in each stream.

Table 27: Steelhead and coho smolts per mile and smolts per 1000ft².

	Steelhead		Coho	
	Smolts/mile	Smolts/1000ft ²	Smolts/mile	Smolts/1000ft ²
Salmon River	300	0.6	972	1.9
Still Creek	16	0.1	460	2.0
Clear Fork	1 ^a	0	412	0.4
Zigzag River	1 ^a	0	0 ^b	0

^aNo estimate could be calculated for Clear Fork and Zigzag River steelhead due to low overall captures. The actual number of captures was used to calculate a minimum number of smolts per mile.

^bNo coho were captured in the Zigzag River.

Mean Lengths

Mean lengths of coho and steelhead smolts were similar between Still Creek, Clear Fork, and the Salmon River (Table 28).

Table 28: Coho mean fork lengths and fork length range in the Salmon River, Still Creek, and Clear Fork in 2010. The Zigzag River trap did not capture any coho.

	N	Mean Fork Length (mm)	Minimum (mm)	Maximum (mm)
Salmon River	461	107	51	170
Still Creek	690	101	61	144
Clear Fork	149	105	55	136

Figure 14: Coho smolt fork length frequency distributions for the Salmon River, Still Creek, and Clear Fork in 2010.

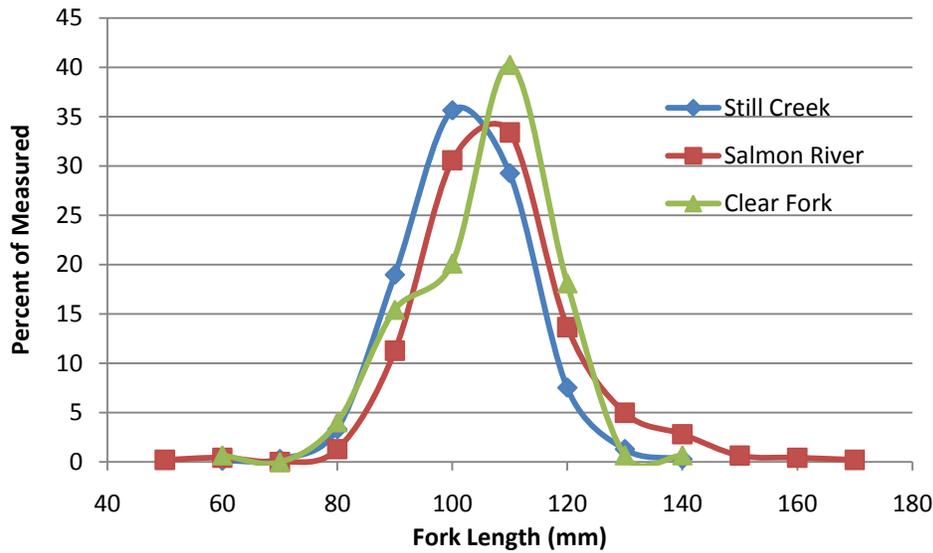
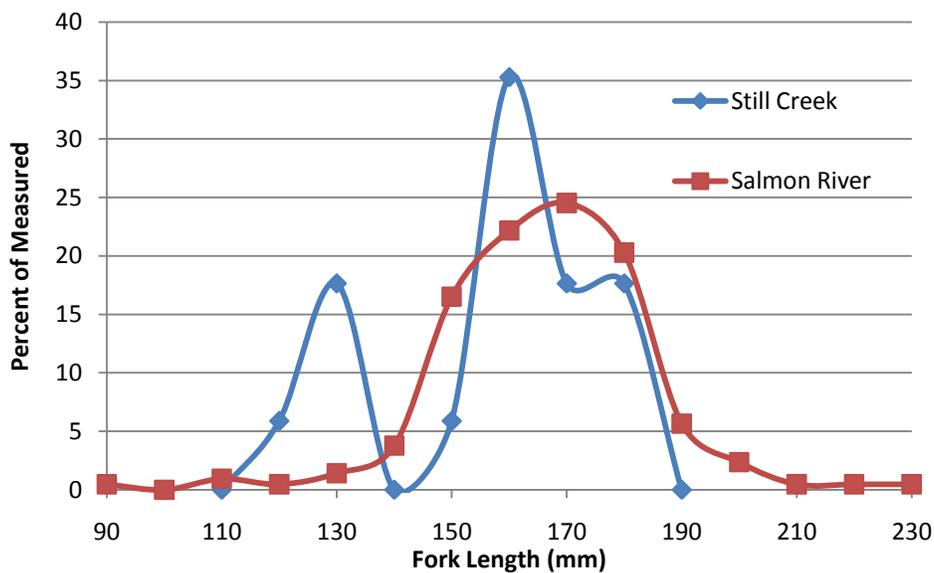
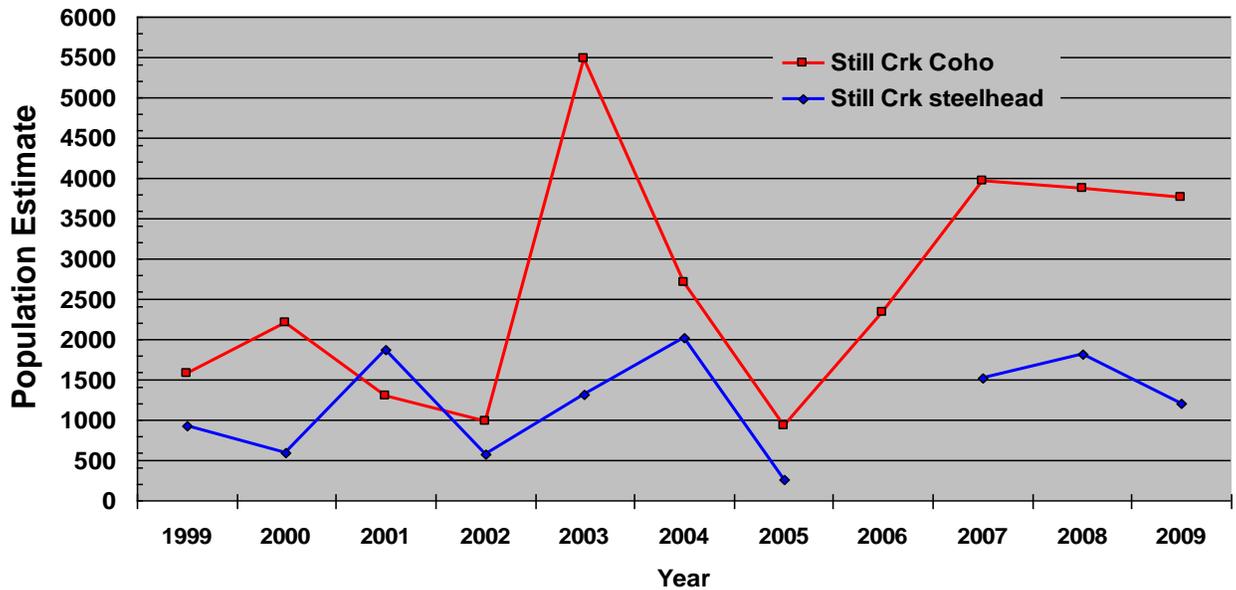


Table 29: Steelhead mean fork lengths and fork length range in the Salmon River, Still Creek, Clear Fork, and the Zigzag River in 2010.

	N	Mean Fork Length (mm)	Minimum (mm)	Maximum (mm)
Salmon River	212	166	91	230
Still Creek	17	156	120	180
Clear Fork	4	164	142	178
Zigzag River	5	160	132	186

Figure 15: Steelhead smolt fork length frequency distributions for the Salmon River and Still Creek in 2010.





Out-migration Timing by Date and Temperature

The Still Creek coho smolt outmigration peaked on May 28th, the Salmon River coho outmigration peaked one day later on May 29th, and the Clear Fork coho outmigration peaked five days later on June 2nd (Figure 16: Coho smolt outmigration numbers by date (April 20th through June 18th 2010). Represents the total number of coho smolts caught on a given day at the Salmon River, Still Creek, and Clear Fork screw traps. Only days in which the trap was actually fished are represented.). The Salmon River steelhead smolt outmigration peaked on May 15th (Figure 17). It is assumed that the Still Creek steelhead out-migration peaked prior to the beginning of trapping on May 8th, 2010 because the most smolts that were caught in a single day were 4. Previous years of trapping steelhead at Still Creek determined the peak emigration to be in late April or early May.

Figure 16: Coho smolt outmigration numbers by date (April 20th through June 18th 2010). Represents the total number of coho smolts caught on a given day at the Salmon River, Still Creek, and Clear Fork screw traps. Only days in which the trap was actually fished are represented.

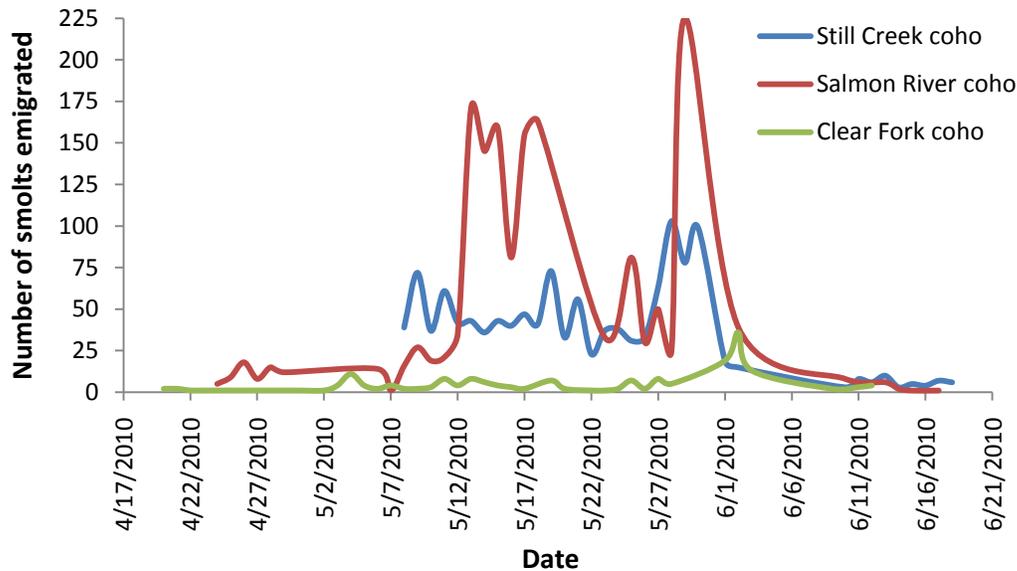
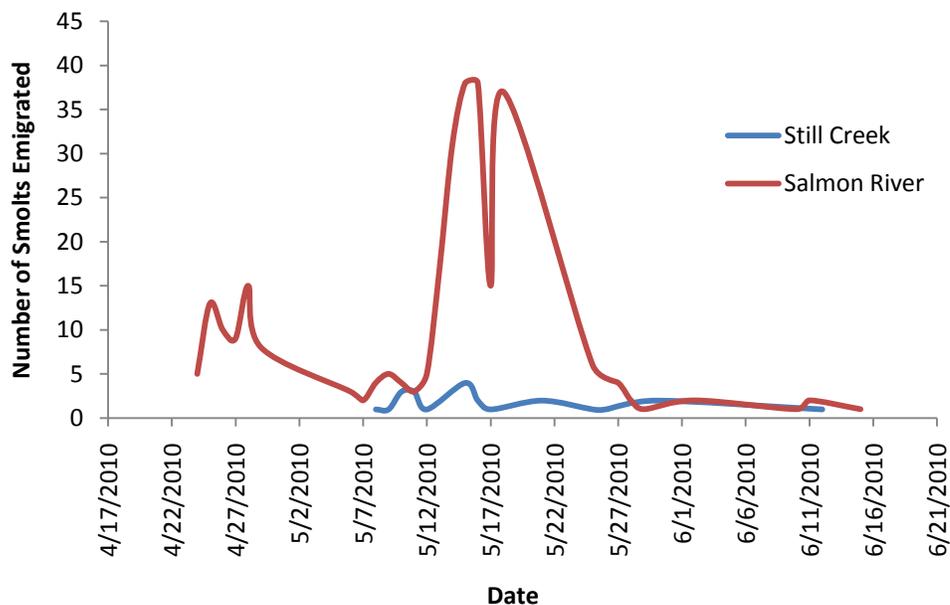


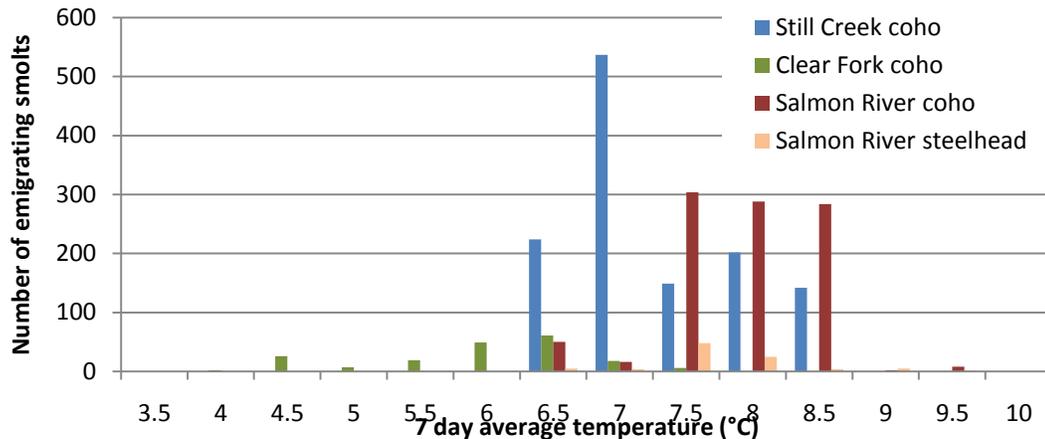
Figure 17: Steelhead smolt outmigration numbers by date (April 24th through June 15th 2010). Represents the total number of steelhead smolts caught on a given day at the Salmon River and Still Creek screw traps. Only days in which the trap was actually fished are represented.



Still Creek coho smolt out-migration peaked when the seven day average temperature was 7°C. Clear Fork coho smolt out-migration peaked when the seven day average temperature was 6.5°C. Both Salmon River coho and steelhead smolt out-migrations peaked when the seven day average temperature was 7.5°C (Figure 18). Although the temperature data was recorded using calibrated temperature loggers that stayed in the streams for several months, the data may not accurately reflect the relationship between temperature and smolt out-migration for a few reasons. First, the traps were not operated for a minimum of nine days (Still Creek) and a maximum of twenty-one days (Salmon River) during the season (Table 24). It is possible that the days the traps were not fished

may have represented the peak out-migration days. Second, the temperature logger in the Salmon River was out of the water for approximately thirteen days. Unfortunately it was within those thirteen days that the coho and steelhead out-migration numbers peaked, therefore we cannot be certain what temperatures correspond with the highest number of emigration smolts.

Figure 18: Coho smolt outmigration by water temperature for Still Creek and Clear Fork in 2010. Coho and steelhead smolt outmigration by water temperature for the Salmon River in 2010. Still Creek and Clear Fork had too few steelhead smolts to warrant analysis. Temperatures were rounded up to the nearest half degree.



Discussion

The coho smolt population estimates for 2010 are proportional to the size of the river systems they originate from (Table 24). For instance, the Salmon River is the largest (by volume of water) and the longest (by rivermile) system in which smolt out-migration is monitored in the upper basin and it produced the greatest number of coho smolts and therefore the largest population estimate. Still Creek has been documented as a consistently productive large stream, though it is not of the same order of magnitude as the Salmon River. Clear Fork only has about four miles of available anadromous habitat, and its lower smolt population estimate reflects this fact. The Zigzag River has almost the same amount of available habitat as Clear Fork, but the results of the 2010 trapping effort did not result in the capture of a single coho smolt. It cannot be assumed that no coho spawn above this point in the system, but our initial assumption is that the amount of coho spawning and rearing above this point is likely minimal.

This was the first year that a trap was operated in the Zigzag River and because it captured so few fish it did not reveal much about the fish populations in the upper Zigzag River or Camp Creek. However it can be seen as a reconnaissance of this particular trapping site and it should prove to be a good spot for a trap in the future, especially if that trap has a functioning debris cleaner and perhaps a way for fry to escape. If we had captured a high number of smolts in the trap we would have had a difficult time knowing for sure if they had originated from the Zigzag River or Camp Creek, because the trap is located at the confluence of the two. If this trap catches a large number of smolts in the future we may consider operating a trap in Camp Creek to enumerate its fish production separately from the Zigzag River.

Setting up stream flow gages on all creeks in the trapping rotation would provide hydrographs that may illuminate the effect of stream flow on smolt migration. Plans are in the works to install these gages in 2011.

Clackamas River Bull Trout Re-introduction: Food web baseline assessment project 2010

This project continues to develop baseline data and food web modeling frameworks for evaluating the effects of the planned (2011) bull trout re-introduction on anadromous and resident salmonids and other key species in the upper Clackamas River basin. This is a 2009-2010 cooperative project between the Mt. Hood National Forest, U.S. Fish and Wildlife Service, Portland General Electric, and Oregon Fish and Wildlife Department. Field work began in May 2009 and continued through January of 2010. Erin Lowery and David Beauchamp of the Washington Cooperative Fisheries and Wildlife Unit, School of Aquatic and Fisheries Sciences, University of Washington implemented the baseline data gathering in the Clackamas sub-basin. Detailed goals and objectives for this monitoring project can be found at: <http://www.fs.fed.us/r6/mthood/publications/documents/ClackamasRiverBullTroutReintroductionFeasibilityAssessment.pdf>, and <http://www.fws.gov/oregonFWO/Species/Data/BullTrout/ReintroductionProject.asp>

Study locations were at North Fork Reservoir on the Clackamas River (including river/reservoir transition zone), the Oak Grove Fork of the Clackamas River, three sampling sites in the Big Bottom channel complex area of the Upper Clackamas River, and Pinhead Creek. Methods explored and utilized for the monitoring in the reservoir include hydro-acoustics, reservoir gill netting, vertical plankton tows, vertical profiles of light, temperature, and depth-integrated turbidity. Survey methods in the mainstem and tributaries included temperature logging in mainstem and tributaries, standardized snorkeling for large and small fishes, standardized electro-fishing for small fishes, and angling for larger fishes. Study questions were:

1. How does the upper Clackamas River (North Fork Reservoir to headwaters) food web currently function?
2. Where are the primary growth habitats for protected salmonids (coho and Chinook)?
3. Who is eating protected salmonids?
4. Who is eating the same things as those salmonids?
5. How will an introduced bull trout population integrate into the food web?

Answers from the 2010 field season are:

1. Piscivory (fish getting consumed) primarily occurs in the North Fork Reservoir; there is low piscivory in tributaries (aquatic insects are primary food source for sculpin, cutthroat, coho and Chinook). There is marked differences in food patterns over the four seasons, as well as between age classes of the same species.
2. North Fork Reservoir is important growth habitat for Chinook salmon, but less for coho salmon.
3. Brown trout are primary predator for protected salmonids while in the reservoir.
4. Species with similar feeding strategies as protected salmonids are mostly sculpins, as well as cutthroat trout.
5. Postulate that re-introduced bull trout will be highly migratory and generalist consumer that will consume the most abundant prey; sculpin, whitefish, dace, and migrating Pacific salmon (seasonally).

Answers from the 2010 field season are:

1. North Fork Reservoir is heavily utilized by rearing spring Chinook salmon juveniles. Chinook salmon in the reservoir primarily consumed aquatic invertebrates with *Daphnia* zooplankton being 73% of the total biomass.

2. It also revealed for the first time that an estimated 400 large (>300mm) naturally produced brown trout are occupying the reservoir and may be consuming over 26,000 juvenile Chinook salmon annually. Coho salmon while present in North Fork Reservoir are much less common and appear to use the reservoir only during winter and spring in any numbers. Large scale suckers were also found to be very abundant in North Fork Reservoir and were the most commonly captured fish during net sets. The hydroacoustic surveys indicated seasonal fish use of the reservoir and vertical and horizontal distributions of small fish (15-300 mm). Distributions varied considerably by season with abundance increasing two fold.
3. Piscivory (predators consuming fish as prey) levels were different between stream and reservoir habitats. Piscivory was uncommon in tributaries and the river/reservoir transition zone, with the primary food items in stream habitats being immature aquatic insects for all species. Rainbow trout in the transition zone consumed unidentified salmonids and sculpin during summer. In this same location during winter, larger rainbow trout only preyed on sculpin. At the different tributary sites and the transition zone the study showed that mountain whitefish, dace, and sculpin were identified prey items. In North Fork Reservoir piscivory was more prevalent, especially by brown trout, which were found to prey on unidentified salmonids in spring and juvenile Chinook, sculpin, and mountain whitefish during summer and autumn. For most fishes in the reservoir, aquatic insects and *Daphnia* species were the most important food items.

Hood River bull trout population monitoring

This is the only known population of bull trout currently existing on the Forest. Although bull trout use areas downstream of the Forest, the only known spawning area is located on the Forest, within the Middle Fork of the Hood River, largely in Clear Branch Creek and Pinnacle Creeks. The overall goal of this monitoring project is to determine the most effective and reliable adult bull trout population assessment method(s) above and below Clear Branch Dam in the Upper Middle Fork Hood River (MFHR) 6th field watershed. To accomplish the above goal the ODFW, in collaboration with the Mt. Hood National Forest (Forest), established the following objectives:

1. Determine the migratory life history of Hood River bull trout and assess the potential impacts of flow diversions and two new falls on the MFHR (created by the November 2006 glacial outburst flood), on bull trout migrations. In 2010, this objective was relevant to two important fish passage projects that were completed in the Hood River basin: passage at the upper falls on the MFHR was restored by the Confederated Tribes of the Warm Springs (CTWS) in July, and Powerdale Dam on the main stem Hood River at approximately River Mile (RM) 3 was completely removed by PacifiCorp in August and September.
2. Determine current distribution of bull trout reproduction and early rearing in historical and potential bull trout streams in the Hood River subbasin.
3. Determine the juvenile and adult life history of the Clear Branch local population and develop a statistically reliable and cost-effective protocol for monitoring the abundance of adult Clear Branch bull trout.

The objectives above were established in 2006 by ODFW's Native Fish Investigations Project, and their study was concluded in 2009. 2010 marks the first year that ODFW's district office in The Dalles and the Hood River Ranger District, took the lead on implementing monitoring protocols established during the Native Trout Investigations Project's four year study.

Objectives of the project:

Objective 1: This portion of the overall study continues PIT tag monitoring that has taken place each year since 2006. In 2010, the USFS and the ODFW placed full-duplex tags in juvenile and adult bull trout that were captured in downstream migrant screw traps placed in the following locations: Clear Branch below Clear Branch Dam (operated May 6-June 31), and in the MFHR between the two new falls. Adults moving upstream over Powerdale Dam were also given full-duplex tags. The USFS and ODFW worked together to fish the trap in Clear Branch and to summarize the data, and ODFW fished the MFHR trap and the trap at the Powerdale Dam fish ladder. Also, in an effort to obtain trap efficiency using mark-recapture at the trap below Clear Branch Dam, all rainbow and cutthroat trout captured were given full-duplex tags.

The USFS was responsible for installing, maintaining, and downloading data from half-duplex PIT tag antenna sites operated from March – November at the mouth of Clear Branch below the dam and in the MFHR near Dee (see map). Note that half-duplex tags were used from 2006-2009 when approximately 380 tags were put in fish above the dam, and about 30 tags were put in fish below the dam. Full-duplex tags were used starting in 2010. A full-duplex antenna array was installed at the mouth of the Hood River by ODFW in the fall of 2010, and the USFS will install an Allflex antenna, capable of detecting both half- and full-duplex tags, at the mouth of Clear Branch and in Coe Branch in 2011.

Objective 2: Spawning surveys began on August 16 and continued until November 3 in Clear Branch and Pinnacle Creek above the lake, and passes were made every two weeks. At least one of three specific surveyors from the USFS and ODFW were present on every survey to ensure consistency in redd identification, particularly in light of the fact that spawning surveys will be used as a long-term monitoring method. ODFW found through their survey efforts 2006-2008 that redd identification is difficult in Clear Branch and Pinnacle Creek and that there is possible confusion with relict cutthroat redds. Thus, “zero count” surveys were conducted in both Clear Branch above the lake and in Pinnacle Creek before bull trout spawning began to count cutthroat redds that were still visible. The CTWS conducted Chinook and bull trout spawning surveys in Clear Branch below the dam approximately every three weeks starting September 2 and ending November 2. They also surveyed the lower mile of both Tony Creek and Bear Creek every two-three weeks starting August 27 and ending October 12. Spawning surveys are designed to achieve the following goals:

- Monitor long-term trends in redd numbers as an index of adult abundance (see **Objective 3**).
- Determine bull trout spawning run timing.
- Identify stream reaches that are key areas for spawning.

The CTWS also conducted day and night snorkel surveys in Clear Branch below the dam and in Tony and Bear Creeks in August to detect presence/absence.

Objective 3: To assess life history patterns (movement in and out of the reservoir, length of time spent in Clear Branch, etc.) two methods were used. PIT tag readers placed about 0.3 miles upstream of Laurance Lake, at the confluence of Coe and Clear Branch, and in the MFHR near the confluence with the East Fork Hood River monitored the movement of bull trout over 100mm that were PIT tagged by ODFW 2006-2009. Also, a downstream migration screw trap was placed in Clear Branch below Clear Branch Dam from May 6 – June 31. A population estimate of adult bull trout (>180mm in fork length) was not made via maintaining an upstream-migrant weir trap or by snorkeling in Clear Branch above the lake in 2010. However, the USFS and ODFW plan to install the weir and conduct mark/recapture night snorkel surveys to calibrate redd counts to adult abundance in 2012.

Results

Approximately 52 miles of stream were surveyed in multiple spawning survey or snorkel survey passes.

Seven adult bull trout were captured moving upstream over Powerdale Dam in June, 2010. Of these, only 1 had a half-duplex PIT tag, but technical problems with the tag reader may have caused some tags to be missed.

One untagged juvenile bull trout was caught in the screw trap below Clear Branch Dam in 2010. Although 7 fish (all rainbow or cutthroat trout) were recaptured, trap efficiency below the dam was not determined because it was found to be inappropriate to use the recaptured fishes' movements as surrogates for bull trout. One untagged juvenile and 1 untagged adult bull trout were captured in the MFHR screw trap.

Two bull trout were detected at the MFHR PIT-tag antenna array. Four fish were detected at the array at the mouth of Clear Branch below the dam. One of these fish was originally tagged in Clear Branch above the lake in 2007, and 3 were tagged at the screw trap at the base of the dam in 2008 and 2009. Twenty-three bull trout were detected at the array in Clear Branch above the dam. Ten of these fish were adults when they were tagged (2006-2008) and all ten were detected every year since tagging, indicating that adult bull trout migrate from the lake to spawn in Upper Clear Branch annually.

Twenty-four bull trout redds total were counted during spawning surveys in Clear Branch above Laurance Lake, and 2 redds were counted in Pinnacle Creek. The CTWS counted three bull trout redds in Clear Branch below the dam, and none in Tony or Bear Creek. The CTWS also did not observe any bull trout in their snorkeling surveys of those creeks. Based on monitoring efforts over the last several years (trapping, electrofishing, snorkel surveys) it appears redd surveys are the least invasive and easiest method to annually index adult bull trout population trends in Clear Branch and Pinnacle Creek. These spawning surveys will be correlated with adult population estimates conducted every 3-5 years, starting in 2012.

The Hood River Bull Trout Working Group, consisting of all stakeholders including Middle Fork Irrigation District (MFID), the U.S. Fish and Wildlife Service (USFWS), ODFW, CTWS, Trout Unlimited, the Northwest Flyfishers, and the Hood River Watershed Group, met in April and December of 2010. The Group decided to develop an Action Plan that will incorporate the goals of both the USFWS's Recovery Plan and the Fish Management Plan for MFID, finalized in May, 2010. The Action Plan will identify specific activities related to these goals for the years 2011-2020, including who will implement the activities and how they will be funded.

Further information and reports for Hood River bull trout studies are posted here:

<http://oregonstate.edu/dept/ODFW/NativeFish/HoodRiverBullTrout.htm>

Recommendations:

- Based on stream inventory results, the aquatic habitat conditions for streams and rivers on the Forest appear to be stable and improving. Continued aquatic restoration projects, implemented in collaboration with partners and stakeholders, will further improve conditions

and ensure an abundance of high quality habitat on the Forest for conservation and recovery of many fish species in the local region.

- The overall abundance of anadromous fish and bull trout is quite low in many of the stream and rivers on the Forest. Hood River bull trout populations are considered to be at high risk of extinction. Actual utilization of habitat by these species is well below the productive capacity of rivers and streams on the Forest. Managers should work with state, federal, and tribal fish managers to:
 - Address and correct other non-habitat related limiting factors, (i.e., hatcheries, harvest, and hydroelectric practices) affecting migratory and anadromous fish population levels in the five major river basins on the Forest.
 - Continue to exercise the Wyden authority to utilize federal resources for making improvements in aquatic habitat conditions in rivers and streams on non-federal lands off-Forest within the five major river basins.
 - Continue assisting in collaborative fish population monitoring with other agencies and partners.

Wildlife and Plants

Monitoring Goal

The emphasis continues to be on maintaining persistent and viable populations of native and desirable nonnative wildlife and plant species by:

- Protecting and restoring the biological and physical components, function and interrelationships of forested ecosystems;
- Protecting and restoring rangeland ecosystems;
- Providing quality recreation experiences with minimal impacts to ecosystem stability and condition; and,
- Conserving populations of threatened, endangered and sensitive species through recovery and management efforts.

Monitoring Activities and Evaluation

The Forest Plan identified wildlife and plant objectives to be monitored and evaluated to ensure plant and animal diversity is maintained and/or enhanced. Threatened, Endangered, and Sensitive species, ecological indicator species, and sensitive species populations and habitats are monitored as well as implementation of standard and guidelines requiring site protection and special management considerations.

Threatened, Endangered, and Sensitive Wildlife Species

Northern Spotted Owl

The northern spotted owl is listed as threatened by the U.S. Fish and Wildlife Service. The monitoring needs for the spotted owl have decreased with the implementation of the site protection and special management considerations such as the Northwest Forest Plan's 100 acre Late Successional

Reserves (LSRs) for *known* northern spotted owl sites and restricted operating season. It is assumed these measures are sufficient to maintain a persistent and viable population of spotted owls. In addition, an interagency demographic study, designed to be statistically significant in monitoring the owl population across its range, has replaced monitoring on individual Forests. The demographic study reported a decline in spotted owls of 2.8% per year for Oregon.

In 2010, Portland General Electric began surveys for their proposed Cascade Crossing Transmission Project. Surveys were conducted along PGE's proposed right-of-way near the southern end of the Forest, and found the following:

- 7 locations for spotted owls
- 1 pair with unknown nesting status
- 1 single spotted location
- 34 locations of barred owls (probably 4 pairs)

Out of 7 known spotted owl locations in the survey area, only one was found occupied by a pair of spotted owls. Barred owls appeared to be occupying the territories of the other known sites.

Lynx

Lynx is listed as threatened in Oregon by the U.S. Fish and Wildlife Service. The Forest currently has no mapped lynx habitat. The criteria for identifying lynx habitat is based on the Lynx Conservation Assessment and Strategy of at least ten square miles (6,400 acres) of primary vegetation (i.e., subalpine fir plant associations) should be present within a lynx analysis unit to support survival and reproduction. The Forest has approximately 1,270 acres of subalpine fir plant associations. Therefore, the Forest lacks the minimum criteria to identify lynx habitat and develop a lynx analysis unit.

Based on trapping records, the Oregon Department of Fish and Wildlife feels this species has been extirpated from Oregon or never existed in the State. Surveys for lynx were completed in 2001 by the Forest Service. No lynx were documented on the Mt. Hood, Gifford Pinchot, Willamette, or Deschutes National Forests. If lynx are present on the Forest, their numbers are extremely limited. Over the past several years, however, there have been about 13 unconfirmed lynx sightings across the Forest. Most, if not all lynx sightings on the Forest, were probably bobcats that have been misidentified as lynx or transient individuals that have left good habitat due to population crashes of snowshoe hares.

Sensitive Wildlife Species

A management goal of the sensitive species program is to ensure that viable populations and genetic variability of sensitive animal species are maintained through time.

Bald Eagle

The bald eagle was de-listed as threatened by the U.S. Fish and Wildlife Service in 2007. The eagle population has been expanding and is no longer considered threatened, but it is considered a Forest Service "sensitive" species. Bald eagles are primarily a winter migrant on the Forest and there is evidence of past nesting. The Forest Plan designates areas on the Forest for existing and established winter communal roost areas.

In 2003, a new bald eagle nest was identified located near Rock Creek Reservoir. The site was occupied and with young in 2003, but not in 2004 - 2008. In 2009, the pair failed at their nesting attempt. It is suspected that the reason for failure is due to high amount of public use at the boat ramp and picnic area near the nest. In 2010 the pair nested there again. Signing to inform the public

to reduce harassment has proved successful and there are currently two chicks being cared for at the nest. In addition, a new nest was created by the Forest Service and a contractor to provide a location with less public traffic in hopes that the new location will be utilized in the future. The Clear Lake pair did not nest at Clear Lake in 2004 - 2008. A new nest at Timothy Lake, however, is suspected to be the same pair. They did not fledge young in 2004 or in 2005. There was one eagle fledged from the Timothy Lake nest in 2006, 2007, 2008. The nest was reported to be active in 2010 but no count of the number of chicks that were fledged is recorded.

Peregrine Falcon

In 1999, the peregrine falcon was delisted and is no longer considered threatened or endangered by the U.S. Fish and Wildlife Service. The Forest Service will continue to manage peregrines as a sensitive species. Potential nesting habitat for the peregrine occurs on all Ranger Districts. Monitoring for peregrine nesting in 2010 was confined to the two known nest sites. Both nest sites failed. Ronald Escano, retired wildlife biologist who monitored the sites, was not positive about the failure at the Big Cliff site but it was his professional evaluation that the nest did fail in 2010.

One of the peregrine sites has been gated and fenced to protect the site from disturbance. A management plan was completed for one site and is in draft form on the other. There have been no current efforts to establish presence or absence on new sites. In addition, there are insufficient personnel to survey all of the potential sites.

The following table shows the nest success trends for these two sites.

Table 30: Peregrine falcon nest success trends.

Historic Nesting Information		
	Raab Cliff	Big Cliff
2010	Failed	Failed
2009	Fledged 1	Fledged 1
2008	Failed	Failed
2007	Fledged 1	Failed
2006	Failed	Fledged 2
2005	Fledged 2	Fledged 3
2004	Fledged 3	Fledged 2
2003	Fledged 2	Fledged 3
2002	Occupied; unknown outcome	Occupied; unknown outcome
2001	Unknown status	Unknown status
2000	Fledged 2	Occupied; unknown outcome
1999	Fledged 2	Fledged 2
1998	Failed	Fledged 3
1997	Failed	Fledged 2
1996	Fledged 2	
1995	Fledged 3	
1994	Fledged 3	
1993	Occupied; unknown outcome	

Summary:

percent surveyed *	83%	79%
average # fledged **	1.40	1.60
percent successful ***	67%	73%

- * percent surveyed is the percent of years with known outcomes
- ** average # fledged is the average number of young fledged (>34 days of age) per year of known outcome
- *** percent successful is the percent of years with known outcomes that fledged young

Harlequin Duck

Harlequin Ducks were not surveyed in 2010. No incidental sightings of the ducks were reported.

Cope's Giant Salamander

Annual surveys for Cope's giant salamander are conducted on the Forest by volunteers from the Wetland Wildlife Watch. The report for Wetland Wildlife Watch for 2010 does not have any records for Cope's Giant Salamander. There were no reports of Cope's by a fisheries biologist for 2010.

Wolverine

No aerial surveys for wolverine tracks were conducted in 2010 and no individuals were observed. Instead, there was a tracking project led by a Mt. Hood Partner, Cascadia Wild, which was aimed at identifying the presence of forest carnivores on the Forest. No rare carnivores (e.g., wolverine, lynx, or fishers) were observed in 2010.

Common Loon

The common loon was removed from the Regional Forester's Sensitive Species List in FY 2001. Surveys were conducted by the Wetland Wildlife Watch coordinator and a Forest Service biologist in 2010. One loon was observed in the Bull Run Watershed and one at Rock Creek Reservoir. Nest platforms have been installed on Upper and Lower Bull Run Reservoirs, but no nesting has occurred at this time. This result is repeated for 2010. There was a common loon during the summer at Rock Creek Reservoir in 2010 but it was a single bird and no known nesting has occurred there.

Ecological Indicator Species

Primary Cavity Excavators

Primary cavity excavators are indicator species for dead and defective tree habitats across all forest types. These bird species actively excavate nest and roost cavities in dead and defective trees providing habitat for a wide variety of secondary cavity nesting animals. The Northwest Forest Plan standards and guidelines provide for snags and down woody materials which include retention of dead and defective trees in timber harvest units. The purpose of monitoring is to ensure implementation and effectiveness of these standards and guidelines and to monitor wildlife use.

Inventories on Clackamas River Ranger District indicate compliance with standards and guidelines and indicate that snags are surviving harvest activities. Surveys appear to indicate that wildlife trees are being used by cavity users, but probably not at the same rate as naturally created snags due to a difference in the way rot occurs in the trees.

Additional snag inventories were implemented in 2006 to verify snag counts from insect and disease aerial survey estimates. The results of this study indicate that aerial surveys underestimate snag densities on the eastside of the Forest by approximately a third. Westside data indicate that snag estimates from aerial surveys are poor predictors of actual snags for a variety of reasons.

The results of current vegetation survey (CVS) monitoring plots indicate that snag numbers are increasing over time due to the reduced harvest of insect and disease prone areas and continual outbreaks of insects. These naturally created snags are more desirable from a wildlife perspective than man-made snags because they are more prone to heart rot and, therefore, provide more cavities.

No snag inventories were completed in 2010 due to lack of funding for a survey crew. However, an inventory using Gradient Nearest Neighbor methodology for satellite imagery was completed and gave a good estimate of snags and down wood for the entire Forest. This was compared to DecAid Analysis baseline levels for the range of historic variability and gives a good picture of the health of each watershed in terms of snags and down wood.

Pine Marten and Pileated Woodpecker

Pine Marten and pileated woodpeckers are ecological indicator species for mature and old growth coniferous forests. The Northwest Forest Plan standards and guidelines provide for management areas to provide adequate amount, quality, and distribution of mature/old growth forest for maintenance of viable populations of species dependent on this habitat. Populations and habitats are monitored as well as implementation of standard and guidelines requiring site protection and special management considerations.

Tracking efforts and camera surveys were done in partnership with the Portland-based Cascadia Wild Tracking Club. The current effort recorded carnivore species occurrence. Three species, wolverine, fisher, and American marten, were the primary targets of the survey. Of the three mustelid species, the marten was recorded numerous times. No wolverine or fishers were recorded. Cascadia Wild's efforts were invaluable to the success of this survey, providing valuable data and involving the public in the inventory process. This effort has been continued into FY 2010 with 970 person hours estimated to accomplish the surveys. The following table summarizes the results of the past survey efforts for 2009. A report has not been generated from the 2010 field season yet.

Late Successional Reserves, Riparian Reserves, and designated Wilderness Areas are providing sufficient habitat and anecdotal evidence indicates the populations appear viable. Remote camera and tracking surveys have shown good populations of marten. There have been no surveys for pileated woodpeckers although there are regular sightings during field visits. Snag monitoring on Clackamas River Ranger District provides anecdotal evidence that populations of pileated woodpeckers seem adequate. There is an increasing amount of snags and down wood that is a result of decreased harvest and an increase in insect and disease activity. The former B5 pileated woodpecker and pine marten habitat areas on the Forest retained in watersheds with limited habitat appear to be functioning as good habitat for these two species, however, activity is very low. Thinning activity is occurring in some LSR plantations and overstock stands to develop late successional habitats more rapidly. This will delay snag recruitment to some degree and some snag creation has been implemented to speed the process for cavity users.

Deer and Elk Summer and Winter Range

Deer and elk habitat is typically characterized as summer or winter range depending on the season of use. Optimal cover, thermal cover and forage are important habitat components for deer and elk. In the Forest Plan, harvest activities were expected to help maintain stable populations by providing a consistent quantity of foraging areas and early seral plant communities. With a reduction in regeneration harvest, suppression of fire and dense nature of the habitats in the western cascades, less forage is being produced for deer and elk making forage a limiting factor on the Forest. Winter range areas continue to move away from early seral stages and forage opportunities continue to decline. In the interest of ecosystem health, the Forest has reduced the amount of non-native grass and forbs it plants for forage. It is inevitable that populations of deer and elk will decline unless some method of creating or maintaining openings for these species is implemented.

In addition, road densities in winter range in most watersheds are above the standard suggested by the Forest Plan. Efforts are being made to remedy this where possible. A watershed restoration project is being planned that will reduce road densities. In several sub-watersheds the decommissioning will bring the road densities within plan standards of 2.0 miles/square mile of road in mapped winter range.

The following are the professional assessments of the current deer and elk situation.

Barlow Ranger District

Summer range forage has been decreasing for the last seven years because of reduced regeneration harvest. Winter range is stable to increasing on the eastside of the Forest with the increased use of underburning methods. Deer populations are stable to increasing. Elk populations appear stable to slightly declining. This is based on anecdotal data from biologist field observations. No underburning was accomplished in 2010.

Clackamas Ranger District

Winter and summer ranges have remained constant. Populations appear to be stable. This is based entirely on anecdotal data from biologist field observations. Video technology has been used to monitor forage projects and permanent openings to determine effectiveness. A moderately rainy summer reduced the extent of these fires but did allow some forage creation. One substantial fire occurred in 2010 in the Ollalie Lake area during this year.

Hood River Ranger District

The trend on Hood River is toward more cover and less forage in both summer and winter range. The populations of deer and elk appear stable. This is based on anecdotal data from biologist field observations. A good amount of forage is expected in the area of the Gnarl Ridge fire that occurred in 2008. However, a field review of this burn indicated that the heat of this fire and the amount of soil damage created a condition where vegetation is not returning as quickly as expected. The reduction in canopy closure on the Hood River Ranger District from insect and disease areas should improve forage for ungulates on the eastside of the Forest. Deer telemetry studies conducted by Oregon Department of Fish and Wildlife on the Hood River Ranger District show a consistent migration pattern from the winter range on county lands to the Forest.

Zigzag Ranger District

There is very little timber harvest on the Zigzag Ranger District, in part as a result of management of the Bull Run Watershed Management Unit. As such, the amount of cover is increasing and forage is decreasing. In the District biologist's opinion, the populations of deer and elk are stable on this District.

Threatened, Endangered and Sensitive (TES) Plants

The Regional Forester's Sensitive Species List for plants was last revised in January, 2008. The list includes 114 vascular and non-vascular plant lichen and fungi species that are documented from or are suspected to occur on the Forest. There is one federally listed threatened plant, *Aquatilis howellii*, which is found in the Columbia Gorge and suspected to occur on the Hood River District.

Sensitive plant inventories have been conducted for all ground disturbing activities and implemented mitigation measures have been effective in maintaining the integrity of sensitive plant sites. Threatened, Endangered and Sensitive plant standards and guidelines are being implemented.

Several non-forest Sensitive plant species have been monitored since 2000:

Agoseris elata – Yellow agoseris is endemic to Washington, Oregon, and California. It is known to occur at three wet meadow sites on the Forest. A search was conducted to relocate plants at a historic site at Clackamas Meadows. For the third year in a row, none were found and it is now believed that *Agoseris* is likely extirpated from the site. A site at Brooks Meadow was revisited; the population appeared to be stable and has spread into wet areas in the upper meadow. A site at Bottle Prairie has been visited and is in good condition.

Arabis sparsiflora var. *atrorubens* – Sickie-pod rockcress is known from Oregon, southeastern California, and Idaho to Utah. There are several populations on the Forest; all are east of the Cascade Crest. Monitoring was conducted at a site along Mill Creek Ridge adjacent to The Dalles Watershed/Research Natural Area and at a site on Surveyors Ridge. Invasive plants (knapweed and thistle) have been hand-pulled annually at both sites. The invasive plant control has been effective particularly along Mill Creek Ridge. Both populations appear to be stable. There are plans to visit several other known sites this year to verify presence.

Bridgeoporus nobilissimus – In 2009, increment cores were collected from numerous trees and stumps adjacent to known *B. nobilissimus* sites (where conks are present) on Wildcat Mountain (Zigzag Ranger District) to determine if *B. nobilissimus* DNA may be present in trees and stumps that do not have *B. nobilissimus* conks growing on them. The cores were then processed in a laboratory and tested for *B. nobilissimus* DNA. Preliminary results show the presence of *B. nobilissimus* inoculum (fungal hyphae) in adjacent trees and stumps. The work is part of a DNA study funded by the Regional Office to determine if *B. nobilissimus* can be detected in forest stands where the polypore conk is absent (or has not been found) by sampling wood and using DNA molecular techniques in place of, or in addition to, field surveys. A report on the study's results has been submitted by the contractor. Two new *B. nobilissimus* sites were recently found on Wildcat Mountain (Zigzag Ranger District), a "hotspot" for *B. nobilissimus*, in a proposed commercial thinning timber sale by an amateur mycologist. The sites will be protected with protection (no-harvest) buffers.

Calamagrostis breweri – Shorthair reedgrass is known from only a few sites at timberline on Mt. Hood. The sites were monitored on the Mt. Hood and found stable. One issue identified is user created trails through the meadow where the plant occurs. A conservation assessment was completed for this species and it requires review and comments.

Catillija thompsonii – Surveys at Flag point confirmed presence and indicated a stable population there.

Coptis trifolia – Three-leaf goldthread populations have been documented in the Virgin Islands, Japan, Siberia, the northeastern and eastern United States, Alaska, and Oregon. On the Forest, only two sites are known, both in wet fen locations. One site has been reported adjacent to the Forest boundary on Confederated Tribes of the Warm Springs Reservation. Monitoring was conducted at one site where it was found that permitted cattle had caused some damage to plants by trampling and dislodging soil cut-banks adjacent to a stream where plants were growing. Some herbivory of *Coptis* also was observed. There is some thoughts that grazing may or may not be detrimental to this plant. Historically there was more grazing than is currently being practiced.

Corydalis aquae-gelidae – Coldwater corydalis is a riparian species presently known to occur only on the Mt. Hood, Willamette, and Gifford Pinchot National Forests. Most Forest populations of coldwater corydalis are located on the Clackamas River Ranger District. Monitoring was completed in 2003 for those populations within the Oak Grove Fork and Stone Creek Hydroelectric Projects. For the Stone Creek Project, monitoring to determine project effects have produced preliminary results that show population numbers to be stable; however, there may have been a reduction in the number of adult plants producing flowers and an increase in non-flowering individuals. A monitoring plan for the Oak Grove Fork populations as part of Portland General Electric's stewardship program has been finalized.

Delphinium nutalli – The population at Brook's Meadow was visited and a presence was confirmed.

Erigeron howellii – In 2009, botanists from the Berry Botanic Garden and the westside zone botanist relocated a population of Howell's erigeron near the summit of Mt. Lowe on the Clackamas River Ranger District. Seed was collected and will be preserved at the Berry Botanic Garden seedbank. The E. howellii site was not revisited in 2010. The Berry Botanic Garden moved to Portland State University in 2010 and its seedbank collection is now housed there.

Fritillaria camschatcensis – Kamchatka fritillary or black lily is known from Alaska, Washington, and Oregon. The single known population on the Forest occurs in a wet meadow on the westside of the Forest in the Bull Run watershed. Monitoring of black lily through a challenge cost-share agreement with the Portland chapter of the Native Plant Society of Oregon has found the population to be stable at this time. In 2007, a graduate student from the University of Washington visited the site with the westside zone botanist and collected data on *Fritillaria* plants and their habitat. Her Master's thesis compares populations and habitat characteristics of *F. camschatcensis* at several sites in Oregon and Washington. In the summer of 2010, a group of interested plant ecologists from the University of Washington visited the site with Angie Kimpo, invasive species coordinator for the City of Portland Water Bureau.

Lomatium watsonii – Watson's lomatium is endemic to Oregon and Washington. The single known population of this species on the Forest is located in an open cobbled slope on Hood River Ranger

District. Knapweed plants have been hand-pulled annually to reduce competition with the Watson's lomatium and limit the amount of weed seed produced around the habitat. Invasive plant encroachment continues to be a problem; hand-pulling invasive plants at the site is a continuing effort. There was also a threat from off-road vehicles, but the placement of boulders as barrier has been successful and the population is stable.

Ophioglossum pusillum – Northern adders-tongue is circumboreal, occurring in North America from Alaska, British Columbia, and the northern United States south irregularly to Florida, California, and Mexico. Two sites are known in wet meadow habitat on the Clackamas River Ranger District. Monitoring was conducted at both sites and a complete census taken. Compared to the original habitat notes from 1989, a greater number of plants were found in 2005, indicating that the population is stable. More plants were found at one site than previously observed. In 2010 and found several hundred plants. They estimated population size, collected GPS coordinates, and took photos. The invasive plant, Canada thistle (*Cirsium arvense*) was found to be encroaching at both sites. Continued encroachment of thistle, an aggressive invader, could negatively affect the adder's-tongue populations in the future. The thistle at the two sites has been identified for herbicide treatment in the Forest's *Final Environmental Impact Statement Site-Specific Invasive Plant Treatments* (completed in 2008).

Peltigera pacifica – Over the last few years, a sizable number of new sightings for this lichen have been found on the Forest on moss-covered rocks or on moss-covered decaying logs in (1) the summer home tracts near Zigzag-Rhododendron and (2) in a number of proposed commercial thinning timber sale projects on the Clackamas River Ranger District. Although regionally rare, *P. pacifica* appears to be “uncommon” on the west side of the Forest. The Gifford Pinchot and Willamette National Forests also report a sizable number of sightings for this moss.

Potentilla villosa parviflora—Surveys were conducted in 2010 but no plants were found. The plant is presumed to be extirpated by the Hood River Botanist.

Schistostega pennata – This moss can be found on mineral soil on upturned root wads in moist and usually shaded areas. The habitat/substrate is short lived, generally a few years, so there is need for occasional new wind thrown trees or root wad “tip-overs” to maintain habitat. Populations can be expected to develop or disappear over time. The populations near Brook's Meadow and along the Barlow Road, north of the Cedar Burn Road, were relocated and monitored in 2008. The site at Brook's Meadow was revisited in 2010 and the wind-throw trees were providing enough habitat to compensate for the declining populations on some root wads.

Suksdorfia violacea – Suksdorf's violet is endemic to Oregon and Washington with reported historic sightings in western Idaho and Montana. Until 2006 only one known population of Suksdorf's violet was known on the Forest, on the Hood River Ranger District. In 2006, a sub-population was found a few miles away. The main population represents the southern-most extent of the species' geographical range and is one of approximately seven known sites in Oregon. The site is a popular recreational rock climbing area. Cooperative management of violet Suksdorfia with a local rock climbing association continued through 2009. A new MOU was written with the rock climbing association and is awaiting signatures. Posting of signs and public education have reduced adverse impacts, and informal census shows the population at this site is currently stable and has increased in one area of the rock face where public access is restricted from climbing. Three additional signs were produced for posting in the climbing area in 2008. New signs are being posted this year.

Sisyrinchium sarmentosum – Pale blue-eyed grass is restricted to the Pacific Northwest. The common name is a misnomer: the species is actually an iris. There are only 24 known occurrences of this species, the majority on the Gifford Pinchot National Forest, ten on the Mt. Hood National Forest, and one on the Okanogan-Wenatchee National Forest. In June-July 2005, the Forest collaborated with Berry Botanic Garden on a study to differentiate the rare *S. sarmentosum* from the more common *S. idahoense* based on morphological characters and DNA analysis. The two species appear to hybridize. In 2007, Berry Botanic Garden submitted a report of their findings, including DNA analysis (Raven, A. 2007. *An exploration of possible hybridization between pale blue-eyed grass and Idaho blue-eyed grass in Washington and Oregon*. Unpublished report.). A Conservation Assessment has been completed and, in early 2011, the Conservation Strategy (CS) for the species was completed and submitted to the U.S. Fish & Wildlife Service. In 2010, the westside zone botanist visited all of the *S. sarmentosum* sites on the Forest, collected GPS coordinates, estimated population sizes, and evaluated threats to the species at each site. The CS calls for the management and protection of all sites and specifies a number of management actions to be taken to protect the species at each site in 2011, 2012, 2013, and so forth. In 2011, the populations at Little Crater Meadow (LCM) will be mapped using GPS technology and population sizes estimated. Existing fences at LCM will be repaired or new fencing erected to exclude livestock grazing during “turn-out” in late June-early July and during “gather-up” in September. Grazing effects will be monitored each year and assessed to determine if current management of livestock grazing at LCM needs to be changed.

Tholurna dissimilis – Only one known site on the Forest is known for this rare lichen. This cryptic species occurs on tree branches in timberline environments. The site at Paradise Park on the west side of Mt. Hood was not revisited in 2010.

Usnea longissima – Over the last few years, many new sites for this rare circumboreal lichen have been found on the Forest in (1) the summer home tracts near Zigzag-Rhododendron and (2) in a number of proposed commercial thinning timber sale projects on the Clackamas River Ranger District. This species can be described as “uncommon,” rather than rare, on the west side of the Forest, occurring in riparian zones in the Clackamas and Sandy River corridors as well as riparian zones for tributaries to these rivers. Although found throughout western Washington and Oregon, populations of this medicinal lichen species have been greatly reduced in other parts of the world (e.g., Scandinavia).

Recommendations

- Continue to monitor peregrine falcon and bald eagle nesting.
- Continue use of prescribed fire to enhance big game forage areas on eastside districts.
- Implement additional surveys for Wolverine and Fisher to verify sighting reports.
- *Agoseris elata* - Continue efforts to relocate the Clackamas Meadow population. If no plants are found, assess why the population is likely extirpated and determine if management options exist to bring it back, including reintroduction. Revisit the Brooks Meadow site to continue monitoring population stability.
- *Arabis sparsiflora* var. *atorubens* – Continue to develop management options for *Arabis* habitat enhancement including the possible use of prescribed fire in selected habitat areas along Mill Creek Ridge.
- *Atragalus tyghensis*- Revisit historic sighting at the edge of a quarry near the White River to verify identification of the species and document the status of the population if it is present. It is so far

from the population at Juniper Flat and so different in habitat that the new sighting may be a misidentification.

- *Bridgeoporus nobilissimus* - Continue monitoring known sites on the Forest and search for new sites. Continue working with Regional Office personnel on developing DNA testing for *B. nobilissimus* inoculum in trees and stumps without *B. nobilissimus* conks.
- *Castilleja thompsonii* –Revisit historic sites near the eastern edge of the Mt. Hood National Forest boundary to verify identification of the species and document the status of the populations if they are present.
- *Calamagrostis breweri* – Revisit sites on the north and northwest slopes of Mt. Hood that were initially monitored in 1995 to document the status of the populations in meadow areas that are transected by recreation trails. Revisit high-priority sites in the Mt. Hood Meadows Ski Area to prepare baseline monitoring as recommended in the draft Conservation Strategy (final expected to be signed in 2010). Forest botanists and Berry Botanic Garden will visit the Mt. Hood Meadows sites in the fall to collect seed, which will be stored at the Berry Botanic Garden seedbank.
- *Coptis trifolia* – Work with the grazing permittee to develop methods to avoid impacts to *Coptis*, including the use of a rest-rotation grazing system or some other means (e.g., to permit grazing during a less sensitive time of the year) to protect plants. Any developed mitigations should be included in the Allotment Management Plan.
- *Corydalis aquae-gelidae* – A long-term monitoring plan is included in the new Oak Grove Fork Hydroelectric Project license. Continue monitoring potential effects of the Stone Creek Hydroelectric Project.
- *Delphinium nuttallii*- Revisit historic sightings on the Hood River and Barlow Ranger Districts to verify identification of the species and document the status of the populations if they are present.
- *Fritillaria camschatcensis* – Continue to work with the Native Plant Society of Oregon and City of Portland Water Bureau to monitor black lily.
- *Lomatium watsonii* – Continue to manually remove invasive plants from the Watson’s lomatium site and monitor habitat trends. Continue protection for off-highway vehicles (OHVs). Extend surveys up to similar suitable habitat areas on the summit of Bald.
- *Ophioglossum pusillum* – Revisit the *O. pusillum* sites, assess the status of the populations and the threat of invasive plants (e.g., Canada thistle, birdsfoot-trefoil [*Lotus corniculatus*]), and consider the pro’s and con’s of potential herbicide treatment in 2011 or 2012.
- *Peltigera pacifica* – Continue surveying for new sites and protect extant sites.
- *Suksdorfia violacea* –Outreach for new partners to participate in updating the existing Memorandum of Understanding with the Forest Service. Install new signs to mark the “no-climbing” areas on either side of the main climbing walls. Install new environmental education signs near the trailhead. Continue to distribute environmental education pamphlets in drop-boxes along the trail and at climbing stations.
- *Potentilla villosa var. parviflora* – Revisit historic sighting on Mt. Hood to verify identification of the species and document the status of the population if it is present. *Phlox hendersonii*- Revisit historic sighting on Mt. Hood to verify identification of the species and document the status of the population if it is present.
- *Sisyrinchium sarmentosum* – Revisit all of the known *S. sarmentosum* sites on the Forest and assess their status. Implement management actions specified in the recently completed Conservation Strategy (CS), 2011, to comply with the agreement reached with the U.S. Fish & Wildlife Service to protect all known occurrences/sites. Continue monitoring the effects of livestock grazing (“turn-out” in late June-early July and “gather-up” in late September) at Little Crater Meadow (LCM) and working with the grazing permittee to protect *S. sarmentosum*

populations in the meadow. Continue revising and refining management actions specified in the CS, if need be, based on monitoring of the site in 2011, 2012, 2013, and so on. Incorporate recommendations in the Allotment Management Plan to reduce impacts by cattle during “turn-out” and “gather-up” in LCM that contain populations or contain potential *S. sarmentosum* habitat. Continue to assess if current grazing practices allowed at LCM are compatible with the CS objectives to protect *S. sarmentosum*.

- *Tholurna dissimilis* - Revisit historic sighting of this cryptic timberline lichen species on Mt. Hood to verify identification and document the status of the population if it is present.
- *Usnea longissima* – Continue surveying for new sites and protect extant sites.

Wildlife Sustainability

Wildlife Habitat

Many wildlife species depend on either or both late and early seral habitats. Examples of late seral species are northern spotted owls or red tree voles. Examples of early seral species are elk, blue birds, and Townsend’s solitaires. The Northwest Forest Plan manages for late seral habitats across the landscape in designated Late Successional Reserves, Congressionally Withdrawn Areas, Riparian Reserves, and designated Wilderness Areas. Most wildlife biologists believe that late seral habitat is sufficiently protected to sustain late seral species. Late seral habitat is difficult to create and it takes many years to produce the size and structure that it takes to sustain late successional-dependent species.

Early seral habitats are much easier to produce and also can be produced by naturally occurring disturbances, such as fire, windstorms, insect outbreaks, and by manmade events, such as timber harvests. A continuous supply of quality early seral habitat well-distributed across the landscape would be optimum to sustain good populations of early seral obligate species. With the emphasis on protecting late seral habitats, invasion by noxious weeds, normal succession, effective fire suppression, and the changes in timber harvest practices, quality early seral habitats are becoming increasingly more valuable and in demand by wildlife. To sustain these early seral obligate species, there should be increased awareness and planning to allow naturally and fire created openings to seed in naturally, placing less emphasis on controlling wildlife damage to young trees, and conducting regeneration harvests instead of thinnings. Openings created by timber harvest should be planned to provide a continuous rotation of openings adjacent to mature areas. Given the emphasis on managing the land for late seral habitat, the expected trend is a shift of the federal landscape to mature and late seral habitats. To ignore this early age structure is to ignore the majority of species using the Forest.

Riparian Habitat

Riparian habitat has the highest wildlife use of all habitats on the Forest. With the practice of managing for Riparian Reserves, this habitat is well protected and there should be very little concern for sustainability of species requiring this habitat.

Wetlands

Wetlands are very important to the species that use them. Several sensitive species use these habitats on the Forest. Oregon spotted frogs and sandhill cranes (sensitive in Washington only) utilize wet meadows. Many other species also use these wetlands for breeding, foraging, and nesting. In order to sustain populations of these species, efforts should be made to reduce disturbance in these habitats. Major disturbances to the species using these wet meadows include grazing, roads, and campgrounds located adjacent to wetlands. Every effort should be made to reduce cattle grazing in these areas. One effort was finished in 2007 to install a buck and pole fence to reduce cattle use in the Camas Prairie Meadow on the Barlow Ranger District. This area is the only known location on the Forest where spotted frogs occur. Campgrounds, such as the North Arm of Timothy Lake, Little Crater, and Bonney Meadows, should be moved to less sensitive sites. The presence of campers adjacent to the meadows reduces the wildlife opportunity and use in the wetland. These areas also should be avoided as fire staging and camp sites. Invasive plant species threaten these sites and increased vehicle and animal use in these meadows increases the opportunity for the introduction of invasive plant seed.

Unique Habitats

Unique habitats are a diverse group of habitats. Caves, mines, talus, and cliffs are examples of these habitats and they can be important to bats, raptors, and small mammals, such as pika. Caves and mines are the most sensitive of these habitats because roosting and maternal colonies of bats whose energy requirements are very high and can be affected by human disturbance. Most of these habitats have been protected in one form or another by road closures or bat gates.

The bat gate at Townsend's big-eared bat hibernaculum continues to be vandalized. Efforts are being made to fortify this structure. The original number of bats found at this site was 21 in the 1990s. The recent survey found 11 bats at the site. The reason for the decline is unknown. There was evidence of bats hibernating there this year that could be seen from the entrance, but people continue to open the gate and access the mine during critical times for the bats. Both from a disturbance standpoint and the threat of introducing white nose syndrome (a fungal epidemic that is threatening bats in the eastern part of the US) there will be increased efforts to ensure the gates are blocked from intrusion.

High Elevation Species

At one time high elevation species were not threatened by human intrusion. This is habitat that has been used for breeding for species such as gray-crowned rosey finch, horned larks, American pipits, American marten, and wolverine. For some species, such as wolverine, this was a last strong hold for their populations.

Back-country use and high elevation recreation are intruding more and more into these habitats. This is placing an increasing pressure on these high elevation species. It has been estimated that 10,000 people per year climb Mt. Hood. This is only part of the recreational use around these high elevation habitats. Some of these species will be affected by the increasing use of their habitat. This creates a concern for the sustainability of some of these species. An increased effort should be made to monitor these populations and to limit the amount of intrusion. At some point, it may be necessary to utilize a back-country permit system to control the amount of disturbance caused by hikers, skiers, and snow mobile users. Fortunately, snow mobile use is not allowed in designated Wilderness Areas so they are not as great a concern at the highest elevations.

Habitat Connectivity

Stable wildlife populations require intact and healthy ecosystems. Moreover, a number of wildlife species - especially the keystone top predators - need to be able to move across great distances to maintain viable populations. Some migrate seasonally, while others simply require extensive territories to hunt and disperse successfully, and still others rely on long-distance migration to maintain the genetic diversity that is critical to long-term population viability. The Northwest Forest Plan provides for connectivity of late successional species that should be adequate to sustain populations and ensure genetic viability across the Cascade Range.

Forest fragmentation has been a major concern of ecologists for many years. There are many detrimental effects of forest fragmentation. Increased predation, nest parasitism, microclimate changes, and insufficient habitat to maintain some species populations are all the result of fragmentation. Habitat fragmentation is recognized as a major threat to biodiversity and a primary cause of the decline of species worldwide. In addition, global climate change will alter ecosystems and force wildlife to shift their range, underscoring the need for functional pathways where wildlife can move uninhibited across the landscape, including wildlife crossings such as underpasses, overpasses, redesigned fish ladders and culverts that allow animals to safely cross roads to access the habitat that supports them on either side. Maintenance of large contiguous blocks on the landscape will ensure fragmentation effects are minimized. At the same time, small isolated blocks of timber are valuable to less mobile species in order to maintain viability until larger adjacent stands can develop sufficient maturity to allow emigration. These blocks can also serve as dispersal habitat for species as they leap frog from large block to large block.

Transportation infrastructure in particular is a principal cause of habitat fragmentation, creating barriers to wildlife movement and resulting in animal-vehicle collisions. Many species are sensitive to vehicle traffic and just the traffic alone would act as a barrier. Those individuals that try to cross are more than likely to be hit in the road. This concern has been addressed in Europe and in Canada with very expensive and elaborate road crossing areas for wildlife. Most of the Forest roads are not a barrier to wildlife passage. Only a few Forest roads can be considered barriers. The highway 26/35 corridor is the road system of highest concern on the Forest. If the Forest wants to sustain all of the populations then this road system will need to be addressed and wildlife crossings will need to be installed at critical points. This is currently being reviewed. Road decommissioning is being implemented on the Forest based on priorities identified as part of a watershed strategy. The reduction of roads has increased the usability of habitat by deer and especially elk. Studies of elk continue to show that elk tend to avoid roads in order to avoid harassment and hunting pressure. The trend to increase road closures is making habitat more useable to elk.

People's Influences on Populations

People have a substantial impact on the sustainability of wildlife populations through their presence and activities in the Forest. People like to boat, fish, hike, hunt, ski, snowboard, camp, drive, run cattle, use off-road vehicles, harvest timber, gather wood, cut Christmas trees, or collect mushrooms, to name a few. All of these things have an influence on wildlife habitat and reproductive success. Due to the proximity of the Forest to the Portland metropolitan area, this Forest gets a higher proportion of use and thus influence on wildlife than other more rural forests.

Recreation and off-highway vehicle plans should consider the influence on wildlife populations. Some seasonal restrictions may need to be incorporated in some sensitive areas. Limiting or reducing

campgrounds in unique habitat areas would allow better utilization and, therefore, sustainability of wildlife that depend on them. In 2010, a planning effort was completed that should reduce the impact of off-highway vehicles throughout the Forest and limit them to designated use areas.

STRATEGY F

Protect, maintain, and enhance the health of Mt. Hood National Forest's ecosystems, watersheds, and airsheds within the context of natural disturbance and active management.

Fire

Goal

The overall goal of fire management is to support land and resource management goals and objectives. This program includes all activities for the protection of resources and other values from wildland fire. Fire and fuels programs are to be implemented consistent with Forest Plan Standards and Guidelines, Management Prescriptions, and the Pacific Northwest Forest Plan.

Background

The 2010 Fire Season

A total of 60 fires were reported in 2010, 15 of which were lightning ignitions and 45 were human caused. Reported burned acres totaled 4,646 acres. No fires from industrial operations occurred in 2010. Table 23 displays the number of fires and acres by statistical cause.

Table 31: Number of fires and acres by statistical cause for the 2010 fire season.

Statistical Cause	Number of Fires	Acres
Lightning	15	4,630
Equipment	0	0
Smoking	3	1
Campfire	25	3
Incendiary	2	0.2
Children	3	0.3
Miscellaneous	12	11
Total	60	4,646

Monitoring Activities and Evaluation

The Forest Plan identifies fire protection and use objectives to be monitored and evaluated in determination of fire management's capability to attain other land and resource management objectives. Fire protection and use activities have direct effects to the environment, including air quality and vegetation patterns. Monitoring effects of these activities over time will help determine changes in the physical, biological, and social environment and ultimately, the program's ability to meet fire management direction for each management area.

The Forest Plan monitors the numbers of human caused wildfires and the number of, size of, and intensity of wildfires based on five years of data. The Forest Plan standards and guidelines estimate an average annual acreage burned by wildfire to be 408 acres per year and human-caused occurrence would average 559 fires per decade and 56 per year with no more than 20% departure from the expected number per decade for both objectives. Presently, the Forest is averaging 46

human-caused fires per year with an average 26 acres impacted by wildfire. The Forest average for ignitions from all causes is 70 fires and 2,512 acres. This is a considerable increase over the 408 acres per year expected in the Forest Plan. The large-acreage fires have been the result of lightning ignitions in wilderness and remote poorly accessed areas of the Forest. Table 32 displays the number of fires and acres for the five year period for all causes.

Table 32: Number of fires, acres, and causes for five years.

Statistical Cause	Year 2006		2007		2008		2009		2010	
	Number of Fires	Acres	Number of Fires	Acres	Number of Fires	Acres	Number of Fires	Acres	Number of Fires	Acres
Lightning	38	2737	6	1238	59	3825	3	0.3	15	4630
Equipment	0	0	0	0	0	0	1	1	0	0
Smoking	2	0.2	3	3	1	0.1	1	0.1	3	1
Campfire	40	29	30	6	22	32	38	5	25	3
Incendiary	6	27	1	0.1	1	0.1	4	0.4	2	0.2
Children	1	0.9	0	0.1	1	0.1	3	1	3	0.3
Debris Burn	1	0.5	1	0.2	2	0	0	0	0	0
Miscellaneous	5	1	7	3	2	0.6	10	1	12	11
Total	93	2796	48	1251	88	3859	60	9	60	4646

As part of the total fire and fuels management program, the Forest also monitors desired fuel residue profiles with an objective to treat an average of 800 acres annually. All units reported that they had met the profiles with less than a 10% deviation from what was stated in the environment analysis or other Forest standard. For the current reporting period, 3,791 acres of natural hazardous fuels were treated exceeding the 800 acre annual estimate by the Forest Plan. Since integration of the Forest's fuels and vegetation management programs, the Forest has easily been able to exceed the 800 acres estimation.

Recommendations

- Reduce hazard exposure to firefighters and the public during fire suppression activities.
- Prioritize hazardous fuels reduction where the negative impacts of wildland fire are greatest.
- Ensure communities most at risk in the wildland-urban interface and municipal watersheds receive priority of hazardous fuels treatment.
- Continue to focus attention on condition class 2 and 3 in the short interval fire regimes.

Noxious Weeds

Noxious weeds or invasive plants are monitored because they displace native vegetation, alter species composition of vegetation, reduce the productivity of desired commodities, reduce species diversity, and adversely affect recreational quality. Monitoring is conducted on weed control treatments, known infestations, and new infestations. Monitoring weed control treatments gives us information to determine the effectiveness of treatments and how best to allocate financial and personnel resources. Monitoring weed infestations provides us with important information on their impact (e.g., location, acres infested, and rate of spread) and makes it possible to prioritize treatment

sites. For example, treating a newly discovered, small infestation of aggressive non-native hawkweed now will prevent a large costly effort in the future.

Goal

The Forest Plan goal is to control noxious weed infestations and prevent their spread through a combination of efforts including prevention, education, inventory, treatment, and monitoring.

Background

The Record of Decision (ROD) and Final Environmental Impact Statement (FEIS) for Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon (March 2008); the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for Preventing and Managing Invasive Plants in the Pacific Northwest Region (Oct. 2005), Executive Order 13112 (1999), and the Mt. Hood National Forest Land and Resource Management Plan (1990) provides direction for the noxious weed program. The Forest cooperates with the Oregon Department of Agriculture, Wasco County and Hood River County Weed Departments, and Bonneville Power Administration to conduct inventories and treat noxious weeds. The Forest also participates and coordinates with the recently formed Garlic Mustard working group, the Columbia Gorge Cooperative Weed Management Area (CGCWMA), the Four County CWMA, and the Wasco County weed board. These groups are made up of many different cities, counties, state agencies, landowners, and interested citizens to coordinate our weed education and control efforts across multiple ownerships. Noxious weed control efforts are accomplished using the early detection and rapid response strategy which includes biological control, inventory and survey, assisting the public and cooperators through technology transfer and noxious weed education, maintaining noxious weed data and maps for priority listed noxious weeds, and working with cooperators on integrated weed management projects.

The primary goal is accomplished through a combination of efforts including prevention, education, inventory, treatment, and monitoring.

Prevention moved forward with implementation of 36 CFR 261.50 (a) requiring the use of weed free forage on all Forest Service lands in the Region 6. In 2010, 38 "Weed Free Forage Required" signs were installed along primary Forest roads. Smaller signs were placed at key recreation sites and trailheads. Local vendor's continued marketing and selling weed free forage. Clauses were added to Special Use Permits with this requirement.

Education is a critical element of invasive species management. A statewide effort, known as Weed Awareness Week (proclaimed by the Governor for the State of Oregon) provided an opportunity to distribute educational posters in local communities near the Forest. Six information kiosks constructed by Hood River County (using Title II Payments to Counties funds) were placed at strategic locations to display information about how to recognize invasive species, where to report sightings, and how to prevent spread. Invasive plant displays were featured at local county fairs and Ranger District open house events. Sandy Basin Weed Watchers Early Detection Rapid Response training was held in Forest Headquarters Office for the third year and was well attended.

Treatments were applied to control diffuse and spotted knapweed (*Centaurea diffusa* and *C. maculosa*), hound's tongue (*Cynoglossum officinale*), common toadflax (*Linaria vulgare*), Japanese Knotweed (*Polygonum cuspidatum*) and tansy ragwort (*Senecio jacobaea*) east of the crest of the

Cascade Range. This was accomplished under Agreements with Wasco and Hood River Counties, and Oregon Dept. of Agriculture (ODA). 1105 acres were treated with herbicides, including roadsides, rock quarries, administrative and other disturbed sites. Handpulling was done on 8 sites.

West of the Cascade Crest, diffuse and spotted knapweeds, Japanese knotweed, Himalayan blackberry, and non-native hawkweeds (*Hieracium aurantiacum* and *H. pratense*) were treated. This was accomplished under Agreements with Oregon Dept. of Agriculture (ODA), Oregon Dept. of Transportation (ODOT), and The Nature Conservancy (TNC). 253 acres were treated with herbicides, including road and power line rights-of-way and administrative sites. A small (1/4 acre) site of false brome (*Brachypodium sylvaticum*) was hand-pulled for the third year. Solarization treatment was continued on a reed canarygrass (*Phalaris arundinacea*) site.

Table 33: Acres of Noxious Weed Treatment in FY2007 through FY2010

Acres Treated by Method				
	2007	2008	2009	2010
Chemical	298	366	473	1358
Manual & Mechanical	5	102	85	105
Biological	0	0	0	0
Total	303	468	558	1463

Monitoring Activities and Evaluation

The Forest currently monitors only targeted weeds (priority weeds identified in by ODA for prevention and control). Lack of funding prevents a forest-wide systematic survey.

- *Are known untreated weed sites continuing to spread?*

A thorough, systematic inventory of noxious weeds across the Forest has not been completed to answer this question quantitatively. However, the Region 6 Final Environmental Impact Statement (FEIS) for Preventing and Managing Invasive Plants in the Pacific Northwest Region (Oct. 2005), estimates that invasive plants are currently spreading at a rate of 8 -12% annually.

Noxious weed populations were noted during a 2010 monitoring assessment of decommissioned roads in several watersheds. No new weed species were found, but weeds common to the Forest were present.

Observations indicate non-native Yellow and Orange Hawkweed (*Hieracium aurantiacum* and *Hieracium floribundum*) may be spreading. Satellite populations have been detected up to ten miles from the one main population on Zigzag Ranger District.

Although treated in 2010, profuse infestations of spotted and diffuse knapweed in the Lake Branch area (1310 road system) of Hood River Ranger District will need several years of re-treatment to contain the infestation. Adjacent County and private lands have varying levels of infestation.

- *Are new infestations occurring?*

Yes. New infestations of Sulfur cinquefoil (*Potentilla recta*) were found on Barlow and near Hood River Districts. A relatively new invader, Garlic Mustard (*Alliaria petiolata*), which has established

itself in parts of the Columbia River Gorge and some Portland parks, has the potential to spread on to the Forest and is being closely watched.

- *Are biological control agents controlling the spread of noxious weeds?*

Biological controls do not eradicate weeds. They reduce population densities by decreasing plant vigor. Biological controls are approved for release through a process regulated by Animal and Plant Health Inspection Services (APHIS) and must be proven not to negatively impact native plants or commercial crops.

- *Are mitigation measures to reduce the risk of noxious weed establishment being implemented for all ground-disturbing activities?*

The R6 Final Environmental Impact Statement (FEIS) for Preventing and Managing Invasive Plants in the Pacific Northwest Region (Oct. 2005), specifies Goals and Objectives, as well as Standards which were adopted into every Forest Land and Resource Management Plans in the Pacific Northwest Region (R6). This direction is expected to result in decreased rates of spread of invasive plants.

Ground-disturbing activities requiring NEPA analysis include a noxious weed risk analysis prepared by the botanist or noxious weed coordinator. The risk analysis discloses known infestations near the project area, the likelihood of spread due to project activities, and recommended mitigation measures. Vehicle wash stations have been utilized during wildfires on Forest. Botanists and weed coordinators have also been certifying rock sources as “free of noxious weeds” before they are hauled to the Forest for use in road maintenance or restoration work.

Mitigation measures are also in place for activities not considered ground-disturbing such as backcountry horse use where weed-free hay and straw are required.

- *Do herbicide treatments for noxious weeds follow direction set in the R6 Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for Preventing and Managing Invasive Plants in the Pacific Northwest Region (Oct. 2005) and the Record of Decision (ROD) and Final Environmental Impact Statement (FEIS) for Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon (March 2008)?*

Yes. All herbicide applications are done by certified applicators. All Project design criteria are followed. A treatment form is completed by the applicator for every site. Each site is monitored by a Forest Service official. Required information is transferred from these forms to FACTS database for upward reporting.

Chemical control methods have been effective in reducing the number of noxious weeds. However, plants germinating from seed already deposited in the soil will necessitate treatment in future years until the seed bank is depleted. Eradication may not be possible on large, well established populations. Treatment has been effective in controlling satellite populations and preventing the establishment of large, costly infestations.

Surveys continue to locate satellite populations of hawkweed associated with the primary infestation along the Big Eddy-Ostrander transmission line from Lolo Pass west to the Forest boundary. These populations have been small and can be controlled; however, there is a possibility that some small infestations may be overlooked and grow to a size where eradication is difficult. Highway 35 and the 1310 Rd. system, including Raker Pit rock quarry on Hood River Ranger District were targeted as high priority for chemical treatment prior to Highway reconstruction, timber sale activity and road decommissioning, which began in 2010 and will continue in 2011.

Knotweed sites associated with summer homes on Zigzag Ranger District and Parkdale Work Center were chemically treated for the second time with implementation of the Invasive species Environmental Impact Statement (EIS) for Mt. Hood NF and Columbia Gorge National Scenic Area (2008), which authorized a broader spectrum of methods for noxious weed control and conducted site specific analysis.

The population of knapweeds on treated roadsides has been greatly reduced on Barlow Ranger District. Grasses have re-established and help to minimize re-infestation of knapweed.

Recommendations

- Hwy. 35 should be a high priority for Roadside weed treatment in 2011.
- Implement a systematic weed-free rock source inventory and database accessible to all Forest employees (similar to Olympic NF).
- Continue participating with cooperative weed management areas (CWMA's) and species specific working groups.
- Encourage Bonneville Power Administration to fund treatment of the primary hawkweed infestation within the Big Eddy-Ostrander power transmission corridor.
- Special Use permittees who construct and maintain power lines, fiber optic lines, gas lines, or any other ground disturbing activity MUST take responsibility for controlling invasive species. Pertinent clauses must be incorporated into their permits.
- Survey for new infestations of Garlic Mustard and satellite populations of Knotweed. Treat with "Early detection rapid response" strategy.
- Continue Agreements with Wasco and Hood River Counties, TNC, Clackamas River Basin, ODOT, and ODA to treat weeds, conduct inventories, monitor, and educate the public. Identify additional sources of funding.
- All projects that result in ground disturbance must have mitigations in place to reduce the risk of noxious weed infestation and spread. These mitigations should be reviewed following implementation of the project to determine effectiveness.
- Continue to work with Oregon Department of Agriculture to establish biological controls on the Forest.
- Monitor Forest activities to ensure that standards outlined by the Regional Forester in the Record of Decision for invasive plant management are being fully implemented.
- Obtain funding and/or partner with interested groups to conduct a systematic invasive species inventory across the National Forest. All data must be entered into NRIS-TESP/INVAS.

Geology

Goal

The monitoring goal is to insure that the Forest Plan standards and guidelines for geology are adequate to prevent the activation, reactivation, or acceleration of movement of unstable hillslopes as a result of forest management activities.

Background

The primary geologic hazard on the Mt. Hood National Forest is landslides. The types of landslides common on this forest are: earthflows, slumps, debris flows, debris slides, and rockfall. These landslide types can be natural or human-induced. Landslides have some beneficial effects, such as delivering large woody debris to streams, but can also deliver unwanted fine sediment to streams. Many areas of the forest are susceptible to landslides. The areas most at risk for landslides are portions of the Clackamas River watershed, where dormant-to-active earthflow complexes cover many square miles, and the area around Mt. Hood, where all the major drainages are subject to periodic massive debris flows.

Monitoring Questions, Activities, and Evaluations

The Forest Plan identified geologic objectives to be monitored and evaluated to ensure protection of unstable areas. Mapping of earthflow risk areas and implementation of standards and guidelines which restrict area and size of created openings on earthflows, landslides, and debris slides/flows are monitored.

Results of Monitoring

During the planning process, proposed units were reviewed by slope stability specialists and either dropped, modified, or determined to have no measurable effect on earthflow stability. In 2010, there were three timber harvest units on land mapped as moderate-risk earthflow. Those units totaled 19 acres. All timber harvest units on B8 (earthflow) land were commercial thinnings that temporarily reduced the crown closure to less than 70%. It is estimated that recovery to 70% crown closure will occur in approximately 10 years. No roads were constructed on B8 (earthflow) land. There were no timber harvest units on mapped landslides other than B8 land. No roads were constructed on mapped landslides other than earthflows.

Mapped earthflow risk areas are being modified during project-level work as more detailed evaluations of slope stability occur. No acceleration or initiation of earthflow movement has been measured or suspected as a result of timber harvest or road building activities on B8 land since monitoring began in 1991.

Recommendations

Continue measurements during 2011 at established earthflow monitoring stations to provide valuable information to guide future management activities on earthflows. These measurements are primarily for existing slope movement rates. Measurements have been made annually since 1993 and are showing movement rates ranging from zero to several feet per year. Much additional effort is still

needed in verifying the scientific validity of the standards and guidelines for earthflows, particularly those covering hydrologic recovery.

Additional efforts in 2011 should be focused on continuing the review of the risk classification system for earthflows, and continuing the field verification of the earthflow and landslide boundaries.

Air Quality

Goal

The overall goal is to support State and national goals to improve air quality on the Forest and within the region.

Background

Under provisions of the federal Clean Air Act, the Wilderness Act, the Organic Act, and the Regional Haze Rule, the Forest Service has responsibilities and authorities to mitigate potential air quality impacts on all national forest system lands. Monitoring activities include monitoring prescribed fire emissions and criteria pollutants, including their deposition and effects on visibility, precipitation chemistry, cultural resources, and forest ecosystems. Fire management activities must meet State Implementation Plan (SIP) requirements for particulate emissions and visibility as well as Forest Plan Standards and Guidelines. In addition, public health and environmental quality considerations will be incorporated into fire management activities.

The Clean Air Act established National Ambient Air Quality Standards for criteria pollutants (i.e., sulfur dioxide, nitrogen oxides, ozone, carbon monoxide, lead, and particulate matter < 10 um and < 2.5 um). Criteria pollutants are monitored for the purpose of helping forest managers ensure permits for new sources will not cause significant deterioration of air quality in Class I areas, such as the Mt. Hood Wilderness. The New Source Review provision of the Clean Air Act provides the process and assigns responsibilities to federal land managers for this determination.

The Forest Service Air Resource Management Program, in collaboration with the National Park Service and other agencies, maintains two instrumented networks: the National Atmospheric Deposition Program (NADP) (which monitors acidity and chemistry of precipitation) and the Interagency Monitoring for Protected Visual Environments Program (IMPROVE) (which monitors visibility impairments in Class I airsheds, such as national parks, wildernesses and wildlife refuges). In 2003, the NADP monitor was removed from its location on the Mt. Hood National Forest to Mt Zion near Stevenson, WA and its data is accessible from <http://nadp.sws.uiuc.edu>. IMPROVE data can be accessed at <http://vista.cira.colostate.edu/improve>.

Biomonitoring remains the primary method by which the Forest monitors air quality. A network of approximately 2,500 forested sites in Oregon and Washington, primarily on the 5.4 km FIA grid of permanently marked inventory plots, for detecting and quantifying ecological effects from air pollution and climate change. About 1,500 sites are in western Oregon and Washington. There are 152 biomonitoring sites on Mt. Hood National Forest including 11 sites in Mt. Hood Wilderness, a Class I area. Lichens, sensitive to nitrogen- and sulfur- containing pollutants, are the primary indicator in the

biomonitoring network allowing early detection of adverse effects. Monitoring data is accessible at the Northwest Region Air Resource Management website <http://gis.nacse.org/lichenair>.

Monitoring Activities and Evaluation

Prescribed Fire Emissions

The overall goal is to manage prescribed fire emissions to meet the requirements of the State Implementation Plan (SIP) for the Clean Air Act. In addition, public health and environmental quality considerations will be incorporated into fire management activities undertaken for the hazardous fuels management program from the planning process forward.

The management activities that affect air quality by the Mt. Hood National Forest remained in compliance throughout the monitoring period. No deviations from the State's Smoke Management Plan occurred and compliance with all Forest Service and State Air Quality Guidelines were maintained. A total of 575 acres were treated during the course of the period. No intrusion into smoke sensitive areas occurred as a result of Forest management activities. Visibility in the Mt. Hood Wilderness Class I area was not impaired as a result of management activities. All burning operations were properly recorded and submitted to Salem Smoke Management for approval and record purposes using the FASTER system. The Forest Service continues to reduce emissions from burning activities. The goal of the Forest Plan is to reduce emissions 63% by the end of the first decade of the Plan and that goal has been achieved and consistently maintained.

Air Pollutants

Air pollutants of most ecological concern to the Forest are nitrogen oxides (NO_x), sulfur dioxide (SO₂), ammonia (NH₃), toxic metals, and ozone. Emissions of nitrogen oxides from fossil fuel combustion and ammonia from agriculture are the primary source of eutrophying air pollutants causing adverse effects to water quality, fish, aquatic communities, altered soil chemistry and reduced tree growth rates. Because forest ecosystems of the Cascades are generally adapted to low nutrient inputs, too much nitrogen can cause shifts in species composition favoring those with higher N requirements—usually weedy species—over endemic and ecologically important species.

Monitoring Results

1. Precipitation chemistry. During 21 years of precipitation chemistry monitoring at Bull Run, no significant change was observed in pH, or levels of nitrates and ammonia in precipitation. Sulfates decreased at Bull Run, consistent with regional decreases attributed to point source controls required by the Clean Air Act. Unpolluted rain is typically between pH 5.1 and 5.6; mean pH at Bull Run was 5.22, a little low compared to other regional NADP monitors. Levels of ammonia in precipitation (mg/L) were high; a recently published critical level of 0.04 mg/L—protective of sensitive epiphytes—was exceeded most years. Total nitrogen deposition (kg/ha/yr) was also higher than expected for western Oregon and Washington, but not quite exceeding critical loads. The Portland/Vancouver Metropolitan area can be considered the primary source of the pollutants.
2. Visibility monitoring. Since monitoring began in 2000, visibility at the Mt. Hood Wilderness IMPROVE site has neither worsened nor improved. Overall visibility (deciviews) and particulates from forest fires are largely comparable to other clean sites in the Oregon Cascades. Decreases in sulfates observed at the NADP monitor through 2003 do not appear to have continued to 2008,

but appear to have leveled and are only slightly higher than other clean sites. Mean ammonium nitrate levels in fine particulates were conspicuously high, about two-fold higher at the Mt. Hood IMPROVE site than the Three Sisters IMPROVE site, consistent with elevated nutrient nitrogen in precipitation chemistry, and elevated nitrogen concentrations in epiphytic lichens and mosses (see AQRV monitoring, next).

3. AQRV Monitoring.

- a. Ozone effects on sensitive species. No evidence of ozone damage to ozone-sensitive vascular plant species was detected at any of the sites on the Forest monitored by FIA-FHM program from 1997-2002. Indicator species in Oregon were Ponderosa pine, thimbleberry, quaking aspen, Scouler's willow, mountain snowberry, huckleberry, Pacific ninebark, blue elderberry, and chokecherry.
- b. Nitrogen and Sulfur effects on sensitive species. Monitoring of the ecological effects of acidifying and eutrophying (fertilizing) air pollutants on sensitive non-vascular plants occurred from 1994-1997 and 2004-2005. Lichen community survey data from 10-year revisits to 52 lichen biomonitoring sites on the Forest indicated that air quality improved at about 30% of sites and did not change at 50% of sites. Slightly worse scores (favoring species of more eutrophic conditions) were observed at about 20% of sites but in no obvious pattern. Because most sites improved or did not change, no general concern is warranted.
- c. Spatial and temporal trends nitrogen, sulfur, and metals accumulated by vegetation.

Nitrogen

Slight increases in atmospherically deposited nitrogen were observed in lichen thalli at most sites (consistent with regional trends) but the new levels were still within expected 'clean-site' ranges for lichen vegetation at all sites except those on the Forest boundary closest to Portland and the Columbia River, and the eastern most sections of the Forest.

Sulfur

Sulfur deposition also increased at about half the sites, and about 25% of sites are now close to or above 'clean site ranges'. Sulfur is associated with marine aerosols and these increases, which contrast with decreases observed in much of the region, might be explained by higher storm intensity. Highest sulfur concentrations were observed at mid to high elevations in the Cascades and at Forest boundary closest to Portland and the Columbia River. These findings contrast with regional declines recorded NADP monitors (all at low elevations) and warrant further analysis.

Toxic Metals

Decreases were observed in chromium, nickel, lead and titanium levels in lichen vegetation, possibly a long-term environmental benefit of improved vehicle emission controls and removal of lead from gasoline. Cadmium, zinc, and vanadium increased at most sites. Cadmium is associated with marine aerosols and may be related to climate change driven increases in storm intensity. No explanation is available yet for increased vanadium or zinc. Vanadium increases appear to be especially localized along the southeastern sections of the Forest, suggesting the possibility of a new source east of the Cascades. Climate warming in the Cascades may explain migration of some metals to higher elevations.

Implications for Management

Of all the national forests in Oregon, the Mt. Hood National Forest is most vulnerable to air pollution because of its proximity to the Portland/Vancouver metropolitan area to the west, and, to the east, the intensively agricultural counties of Hood River, Wasco and the Columbia Basin. It is a tribute to state and federal environmental policies that, despite a marked increase in state population since 1982, air quality on the Forest has generally stayed the same, improved, or is still within clean site ranges for most monitored pollutants. The condition, species diversity and abundance of the most air-pollution sensitive vegetation, so far indicates an overall steady state or slight improvement in air quality. Visibility in the Mt. Hood Wilderness is comparable to other Class I Wildernesses in Oregon, as are fine particulates from forest fires. However, a few areas are worrisome. Concentrations of ammonia (mg/L) in precipitation consistently exceeded critical levels for sensitive epiphytes in the Bull Run watershed from 1982 through 2003, when monitoring ceased. Total nitrogen deposition (kg/ha/yr) was two-three times background level during the same period. Sensitive, nitrogen fixing lichens and some epiphytic mosses are sparse in this area and the Mark Hatfield Wilderness in general. Although lichen-community based air quality scores were still below published response thresholds in the Wilderness, it may be that slightly acidic deposition is preventing a shift toward eutrophic species which are typically present at sites with poor air scores. Decreases in sulfates documented during the 1980s and 1990s by the NADP monitor at Bull Run appear to have leveled off—as indicated by no change in ammonium sulfate in fine particulates measured by the Mt. Hood IMPROVE site since 2000, and no change in sulfates in precipitation at the Columbia River Gorge NADP monitor near Stevenson, WA.

Small increases in sulfur accumulated in epiphytic vegetation were actually documented across many sites in the Forest, and about 20% of sites exceeded expected background ranges for this element. Continued increases in sulfates could adversely affect species distribution and abundance of sensitive vegetation. Cadmium, vanadium, and zinc levels in vegetation, are still low, but appear to be increasing. The concentration of sites with increased vanadium and sulfur concentrations in the eastern sections of the Forest indicates new sources or increased emissions from existing sources east of the Cascade crest. Although no trends data are available yet, mercury contamination of forested ecosystems is increasing nationally and also warrants monitoring. Increases in some contaminants may be due to increased Pacific storm intensity which could be bringing larger amounts of marine aerosols deeper into the Forest via the Columbia River; increases in trans-Pacific transport are also possible, as is the possibility that warmer climates in the Cascades are causing some metals to be transported to higher elevations. But, in general, local and regional emission sources can be expected to explain most contaminants. Continued monitoring and further analysis of existing data is recommended, especially with regard to the status of epiphytic lichens and mosses in the Mark Hatfield Wilderness. The addition of air quality objectives to the next revision of the Forest Plan is recommended.

Recommendations

Continue to look for opportunities to further reduce emissions or increase acres treated without increasing emissions.

- Develop and promote efficient biomass residue uses consistent with management objectives in agency land management plans.
- Strengthen rural economic sustainability and increase opportunities to diversify local economies, such as through removal and use of biomass residues to reduce air quality impacts.

STRATEGY G

Enhance carbon storage in Mt. Hood National Forest and forest products.

Climate change cuts across every major resource area in forest management – fire, fuels, invasive species, water resources, forest health, endangered species, recreation, and more. One of the biggest opportunities available to the Forest Service in meeting Strategy G is to increase carbon sequestration in forests, help forests adapt to climate change, and provide options for reducing carbon emissions through the use of forest products, biofuels, and sustainable operations. The 2008 Forest Service Strategic Framework for Responding to Climate Change and the 2010 Roadmap for Responding to Climate Change identifies actions to incorporate adaptation, mitigation, sustainable consumption, and education objectives in our existing programs and policies and to build strong partnerships with other agencies, tribes, States, communities, and citizens to ensure that national forests and private lands are conserved, restored and made more resilient to climate change.

Many of the individual resource reports address more than one of the seven strategies and so are not repeated here. Here is a summary of which reports and how the resource program contributes to carbon storage:

Volunteers, Partnerships, & Collaborative Efforts

Our existing relationships and collaborative efforts with other agencies, organizations, partners, and private landowners provides a means to collectively work on restoration, and helping private landowners deal with effects of climate change by keeping lands forested, healthy, and prepared for the future.

Timber and Silvicultural Practices

Managing forest resources strongly addresses carbon storage by helping forests to adapt by improving resiliency, and maximizing landscape and biological diversity.

- Healthy forests store carbon. Stand improvement activities, such as thinning, increase growth and promote healthy stand conditions across forest, range, and aquatic ecosystems. Managing forest vegetation is an opportunity for restoring the functions and processes that forests evolved with on a watershed scale. The Forest Plan also directs activities to maintain genetic diversity of forest stands to maintain forest health through genetic resiliency.
- Wood products store carbon. Wood products substitute for manufactured products offsetting fossil fuel emissions. Forests can provide renewable biofuels that replace fossil fuels and heat homes, generate electricity, and power cars.
- On the Mt. Hood National Forest and generally the west Cascades, a relatively small proportion (<1%) of the land is being harvested and the area as a whole is accumulating carbon.

- Rapid reforestation after catastrophic events also helps move an area from a carbon source to a carbon sink.

Soils

Conservation of soil productivity and large deadwood material helps to store carbon and is important in maintaining resilience of forest ecosystems. Forest Plan standards address the conservation of these resources.

Fire

Catastrophic fires release carbon that has been stored in trees into the atmosphere. Climate changes in temperature and in the timing, form, and amount of precipitation deeply affect hydrological functions, as well as drought and fire regimes. A Forest Service strategy is avoidance of wildfire emissions. In altered disturbance regimes, the Forest Service and the Forest are treating fuels designed to restore healthy ecosystems, to reduce fire risk and severity, and provide small diameter material for biomass co-generation plants. In addition, through collaboration with State, local landowners, Tribal, and local entities, the Forest is working to reduce risk of wildland fires to communities with fuel treatments on both side of the National forest boundaries and development of community fire plans.

APPENDIX B: MT. HOOD DRAFT CRITERIA AND INDICATORS

Criteria and indicators is an approach that provides a way to integrate social, ecological, and economic concerns with people and places from the very beginning of the planning process. They provide a common language to identify the conditions and processes necessary to sustain the social, ecological, and economic systems that sustain us. By focusing on the linkages between these systems we can increase our understanding of sustainability and make better decisions for the future. The following draft criteria and indicators, developed during the LUCID test, provide a first approximation relevant to describing sustainability for the Mt. Hood National Forest and will be further refined and adapted through a collaborative process as the Forest moves into plan revision. The Oregon Board of Forestry has articulated strategies for the forestry program for Oregon that fit under the Montreal Process Criteria, as displayed in Table 3. The LUCID criteria were independently developed, but also have a correspondence to the Montreal Process Criteria, as shown in Table 3.

Principal 1 - Social Well- Being	Principal 2 – Ecological Integrity	Principal 3 – Economic Well-Being
<p>Collaborative Stewardship Citizen Involvement Local area empowerment Collaborative decision making Civic science</p> <p>Community Resilience Social capital – Built relationships Civic competence at the community level Civic enterprise</p> <p>Institutional Adequacy Rules of the game Tenure Legal framework Authority structure</p> <p>Social and Cultural Values Sense of place Aesthetic values Recreational values Access Civil rights Environmental justice Worker safety Cultural heritage</p> <p>Community Livability Community health Settlement pattern</p>	<p>Landscape Function Disturbance processes Hydrologic function Hillslope Processes Long-term Plant Community Dynamics</p> <p>Landscape Structure/Composition Vegetative composition Human developed landscape features Landscape patterns</p> <p>Ecosystem Function Nutrient cycling Water quality Air quality</p> <p>Ecosystem Structure Ecological legacies Special habitats Riparian systems</p> <p>Population Function Alien species Community structure and diversity</p> <p>Population Structure Species of concern</p> <p>Genetic Function/Structure Artificial selection Migration Drift</p>	<p>Sustain Minimum Capital Stock Natural capital Human capital Built capital</p> <p>Deliver Market or Market-related Goods and Services Commercial forests products Energy flows Recreation use values</p> <p>Supply Other Goods and Services Water flows and quality</p> <p>Seek Benefit and Cost Distributional Equity Marketed forest goods and services Non-marketed goods and services Workforce distribution Local revenue sharing</p> <p>Maintain trade balance Exports of goods and services Imports of goods and services Ability for local community to meet employment requirements</p>

APPENDIX C: FOREST GOALS, VISION STATEMENTS, AND VALUE STATEMENTS

Oregon Board of Forestry Strategies and Mt. Hood National Forest Goals

Strategy A: *Promote a sound legal system, effective and adequately funded government, leading-edge research, and sound economic policies.*

- Honor treaty rights and privileges of Native Americans. Protect and preserve Native American ceded rights and privileges to access and use the Forest for traditional religious values (Goal 2).
- Manage land ownership within the Forest considering other resource goals and management efficiency (Goal 34).
- Provide a drug free work environment (Executive Order 12584, Sept. 15, 1986) (Goal 37).

Strategy B: *Ensure that the Mt. Hood National Forest provides diverse social and economic outputs and benefits valued by the public in a fair, balanced, and efficient manner.*

- Provide all persons equal opportunity to use the Forest regardless of race, color, creed, sex, marital status, age, handicap, religion, or national origin (Goal 1).
- Consider the needs of physically challenged individuals in the design and maintenance of Forest facilities (Goal 3).
- Manage the Forest to break down social and institutional barriers to legitimate use of the Forest by non-traditional groups (Goal 4).
- Assess and document all cultural resources. Protect, maintain and/or enhance prehistoric and historic sites, buildings, objects and antiquities of local, regional or national significance (Goal 5).
- Provide a broad range of year-round, high quality developed recreation opportunities (Goal 32).
- Manage Forest roads to consider deer and elk as a resource for recreational hunting, i.e. consider habitat access, movement patterns and dispersal of recreational hunters (Goal 14).
- Manage Forest recreational access to protect natural resources, provide for public safety, and minimize conflicts among the various users of the Forest (Goal 16).
- Provide safe, efficient access for the movement of people and materials involved in the use and management of the Forest. Provide for construction and maintenance of roads, at a level that will minimize environmental damage (Goal 17).
- Provide a broad range of year-round, high quality dispersed recreation opportunities in an undeveloped forest environment (Goal 26).
- Maintain a Forest trail system designed, located, managed and maintained to consider users needs and other resource values (Goal 27).
- Provide a Forest trail system for year-round use, including winter trails in snow zones consistent with other resource values (Goal 28).
- Provide a Forestwide bicycle trail system integrated with other transportation systems and coordinated with other agencies (Goal 29).
- Integrate fishing and hunting as recreational activities on the Forest (Goal 31).

Strategy B (continued)

- Provide Forest visitors with visually appealing scenery. Manage all Forest lands to attain the highest possible visual quality commensurate with other resource values (Goal 33).
- Provide efficient management of administrative sites and facilities (Goal 35).
- Facilitate the exploration and development of energy and mineral resources on the Forest while maintaining compatibility with other resource values (Goal 18).
- Provide law enforcement and search and rescue services that are responsive to public need. Provide support to other agencies and local officials (Goal 23).
- Provide for use and occupancy of the Forest by public and private interests when compatible with other resource objectives (Goal 36).
- Use the National Recreation Strategy to bring the American people into direct contact with their national forests by providing opportunities for agency/private partnership to be developed (Goal 39).
- Develop interpretive services programs for the Mt. Hood National Forest that will meet the needs of: Portland metropolitan people, rural population adjacent to the Forest and national and international visitors (Goal 40).
- Manage the Forest to provide for the many significant values of old growth Forest for present and future generations recognizing that the amounts of old growth to be protected may range from large ecologically significant stands to small designated areas for public visitation and appreciation (Goal 41).
- Protect and enhance the river and river related values for designated and candidate (eligible) Wild and Scenic Rivers (Goal 42).

Strategy C: *Maintain and enhance the productive capacity of Mt. Hood National Forest to improve the economic well-being of Mt. Hood's communities.*

- Produce wood fiber at sustainable levels consistent with other resource values and economic efficiency (Goal 19).
- Reforest harvested areas with adequate stocking (Goal 20).
- Manage a genetic tree improvement program to enhance the growth and quality of crop trees (Goal 21).
- Manage vegetation and provide quality forage conditions for commercial domestic livestock. Prevent unacceptable damage to other resource values from commercial livestock grazing (Goal 33).
- Integrate the activities of implementing the Mt. Hood National Forest Plan with activities of local dependent communities to: 1) improve employment opportunities, 2) improve incomes and well-being of the nation's rural people, and 3) strengthen the capacity of rural America to compete in the global economy (Goal 38).
- On acres allocated to timber production, increase net annual increment of usable wood fiber produced per acre of commercial forest land. Increase wood quality. Shorten time for stands to reach culmination of mean annual increment (Goal 44).
- Produce genetically improved seed for reforestation of selected tree species (Goal 45).

Strategy D: *Protect, maintain, and enhance the soil and water resources of Mt. Hood National Forest.*

- Protect, maintain or enhance the character and quality of water. Provide long term sustained production of water. Provide a favorable condition of water flow from the Forest for both on-Forest and off-Forest users (Goal 7).
- Protect, maintain and/or restore soil productivity throughout the Forest; stabilize and/or restore damaged or disturbed soil areas (Goal 9).
- Provide management and maintenance of active landslides and large, slow moving earthflow areas (Goal 10).

Strategy E: *Contribute to the conservation of diverse native plant and animal populations and their habitats in Mt. Hood National Forest.*

- Protect, maintain or enhance the characteristics of floodplain, wetland and riparian plant communities. Maintain or increase aquatic and terrestrial habitat complexity and diversity within the riparian zone. Assure long term provision for riparian associated wildlife and plant species within the full spectrum of riparian zones across the Forest (Goal 6).
- Maintain or increase fish habitat capability and assure long term sustained production of fish (Goal 8).
- Maintain viable populations of native and desirable non-native wildlife and plant species in perpetuity (Goal 11).
- Protect, maintain or enhance habitat quality for wildlife. Maintain or enhance plant and animal habitat diversity (Goal 12).
- Provide summer and winter habitat conditions sufficient to support deer and elk populations at levels consistent with Oregon Department of Fish and Wildlife's herd management objectives (Goal 13).
- Protect or enhance habitat for threatened, endangered and sensitive plants and animals. Assist with population recovery of all listed threatened, endangered and sensitive. Re-established peregrine falcon and bald eagle as nesting species on the Forest (Goal 15).

Strategy F: *Protect, maintain, and enhance the health of Mt. Hood National Forest's ecosystems, watersheds, and airsheds within the context of natural disturbance and active management.*

- Provide fire protection, fuels treatment and pest management programs that are responsive to land and resource management goals and objectives (Goal 22).
- Cooperate with other Federal, State and local regulatory agencies to protect air quality and minimize impacts on smoke sensitive areas (Goal 24).
- Ensure Forest Service management activities do not degrade air quality in Class I Wilderness, Class II Wilderness and general Forest. Ensure that resource values in the Wilderness are protected from the effects of air pollutants (Goal 25).
- Emphasize "Pack-In/Pack-Out," "Tread Lightly," and "No-Trace Camping" educational programs (Goal 30).
- Maintain genetic diversity of forest stands. Maintain the health of forest stands through genetic resilience, thus reducing the impact of disease, animal, insect, or climatic damage (Goal 43).

Strategy G: *Enhance carbon storage in Mt. Hood National Forest and forest products.*

Desired Future Condition of Mt. Hood National Forest (“Vision Statements”)

The Forest in Fifty Years: After the Forest has been managed for 50 years as provided by the Mt. Hood National Forest Land and Resource Management Plan (hereafter referred to as the Forest Plan) (USDA Forest Service 1990), as amended, its present appearance will change to a more managed appearance. For example, it will be obvious that timber in certain areas will have been intensively harvested while wildlife habitats will have been preserved in other areas. Recreation use will intensify.

Timber: After 50 years, many stands suitable and programmed for timber production will have been harvested. In areas intensively managed for timber, many of the existing mature and overmature stands have been harvested and replaced with more vigorous and faster growing, managed stands. Emphasis on stocking level control measures will increase. More of the total wood fiber in trees will be utilized if markets exist for it, resulting in less residue available for firewood.

Fish, Water and Wildlife: Aquatic habitat capability over the long term is stable and improving. Standards to manage fish and water resources efficiently are in full effect. The implementation of rehabilitation and improvement programs will increase fish populations. Wildlife habitat diversity is moderate with identifiable tracts of mature and old growth stands managed for species depending on them. The majority of population levels will stabilize or decrease. Deer and/or elk populations may decrease.

Recreation: Recreation in the Forest 50 years from now will depend to a significant extent on sites privately developed and operated. As demands for winter sports, organizational activities, and overall developed recreation opportunities increase, they will be met by concessionaires or permittees. Primitive and semi-primitive recreation opportunities are limited primarily to Wilderness, Special Interest Areas, and some Unroaded Areas where natural conditions will be maintained. In Wilderness, heavily used trails, trailheads, and campsites have been returned to a more primitive state. As the demand for dispersed recreation in an unroaded setting begins to exceed capacity, systems to limit usage such as reservations, fees, or other methods may be initiated.

Visual Corridors: Visual corridors along popular travel routes should appear near-natural. Small openings and a variety of vegetation are visible along with improvements in viewpoints and vistas. Visitors who travel on roads outside main transportation corridors pass a mosaic of timber-cutting patterns. These vary in size, shape, and arrangement. These areas appear as part of an intensively managed forest.

Air Quality: Vegetation and fuel management require less use of prescribed fire as timber harvesting changes from regeneration harvest to commercial thinning. The number of acres requiring prescribed fire is approximately half the number in the first decade of the plan. The amount of suspended particulates emitted will subsequently be reduced proportionately. Hence, visibility continues to be improved.

Local Communities: Each community will have capitalized on its uniqueness and involved its citizens in the development of a desired future. The activities associated with the Pacific Northwest Strategy will continue to support the goals and plans of resource-dependent communities.

Mt. Hood National Forest's Legal Framework (“Value Statements”)

Organic Administration Act of 1897: Authorized the President of the United States may set apart and reserve public land bearing forests to secure favorable conditions of water flow and to furnish a continuous supply of timber for the citizens of the United States.

Clean Water Act of 1948 and reenacted by the Federal Water Pollution Control Act of 1972: An act whose purpose is to restore and maintain the chemical, physical, and biological integrity of the Nations waters.

Clean Air Act of 1955: An act whose purpose is to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population.

Multiple-Use Sustained-Yield Act of 1960: Declared that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes.

Wilderness Act of 1964: Established a National Wilderness Preservation System of federally owned lands designated by Congress as wilderness areas, where the earth and its community of life are untrammelled by man and where man is only a visitor.

National Historic Preservation Act of 1966: Authorized the Secretary of Agriculture to expand and maintain a National Register of Historic Places that are significant in American history in order to preserve the Nation's historical and cultural foundations as a living part of our community life.

Wild and Scenic Rivers Act of 1968: Instituted a national wild and scenic rivers system where certain rivers designated by Congress are managed to preserve their free flowing characteristics and to protect their outstandingly remarkable values.

Endangered Species act of 1973: Declared that all Federal departments and agencies shall seek to conserve threatened and endangered fish, wildlife and plant species.

Forest and Rangeland Renewable Resources Planning Act of 1974 as amended by the National Forest Management Act of 1976: Directed the Secretary of Agriculture to develop, maintain and as appropriate revise land and resource management plans for units of the National Forest System. Established the plans would be developed using a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences.

Healthy Forests Restoration Act of 2003: An act whose purpose is to improve the capacity to conduct hazardous fuels reduction projects on National Forest System lands aimed at protecting communities, watersheds, and certain at-risk lands from catastrophic wildfire.

APPENDIX D: LIST OF PREPARERS & PHOTO CREDITS

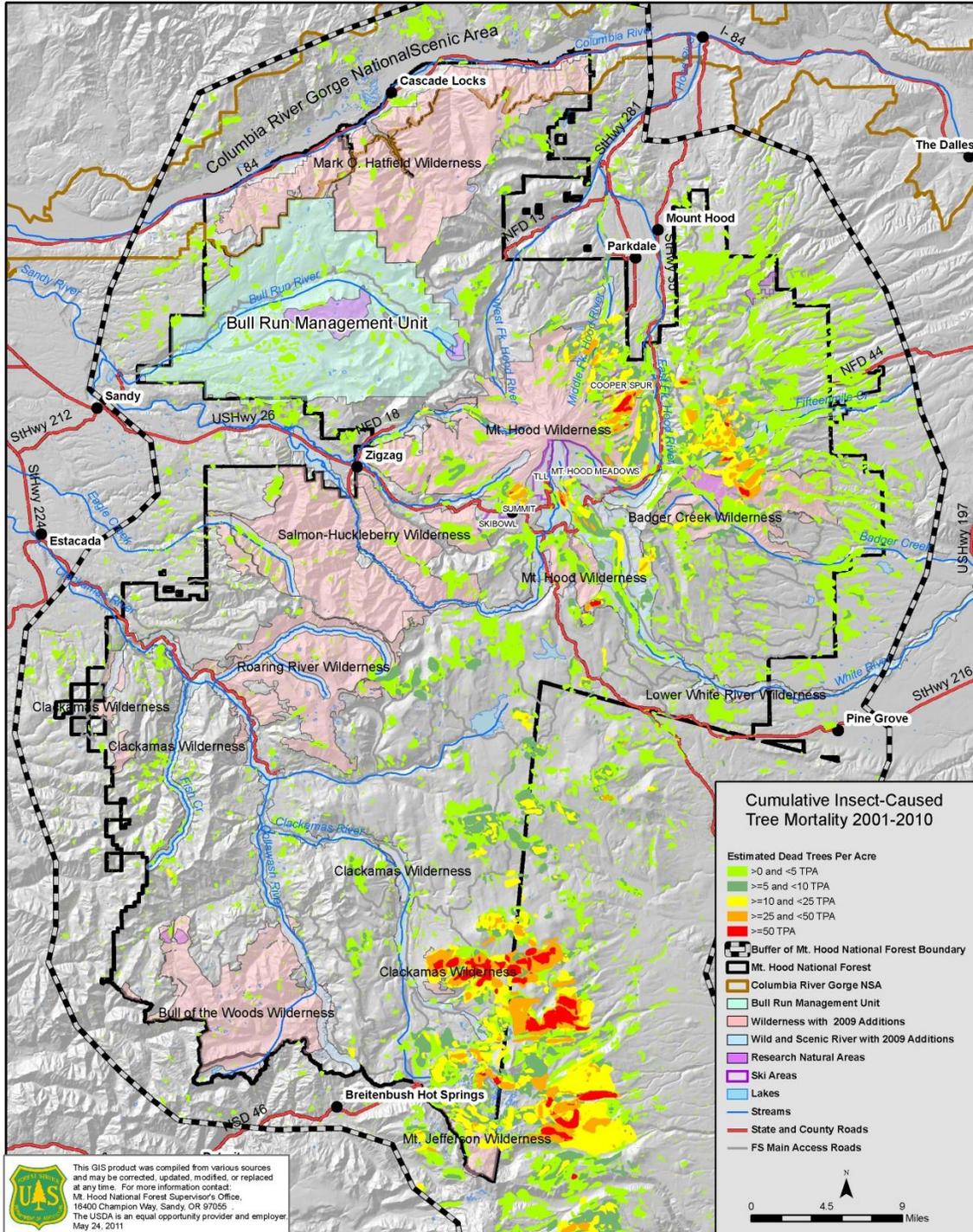
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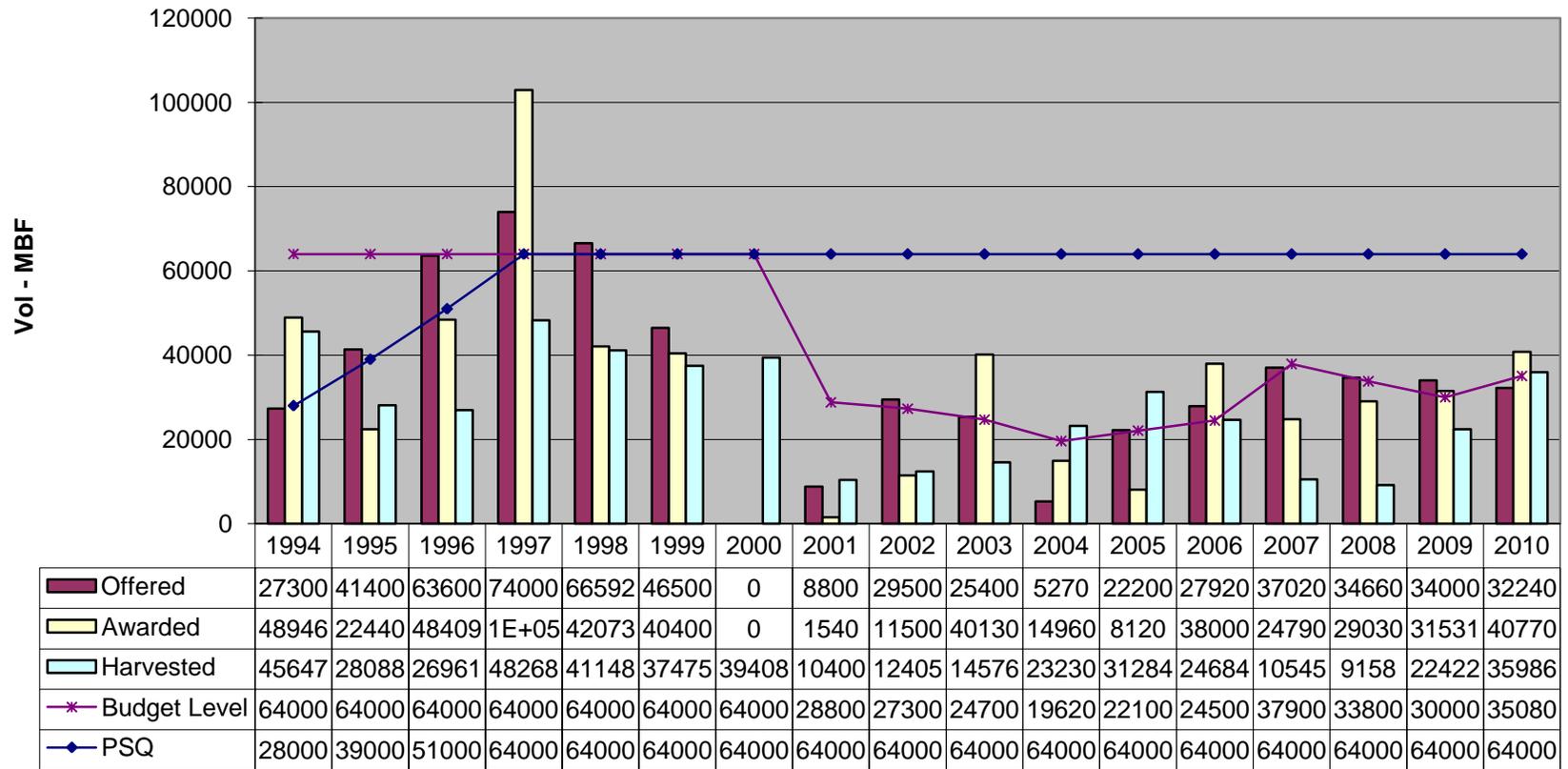
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Figure 7, page 29: Kristen Chadwick
All other photos: Kristy Boscheinen

APPENDIX E: CUMULATIVE INSECT-CAUSED TREE MORTALITY, 2001-2010



Appendix F: MT. HOOD NATIONAL FOREST TIMBER VOLUME SUMMARY 1994-2010



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