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"Every forest has a story. Forest-scale sustainability monitoring needs to have enough of a common framework to tell the stories at each scale of the organization. In the end, the vital few Criteria and Indicators must be able to help us tell the stories."

Gary Larsen, Forest Supervisor
Mt. Hood National Forest

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Stewardship Challenges for the Mt. Hood National Forest

Mt. Hood is an Oregon icon. People care deeply about public lands in the Pacific Northwest. People in the greater Portland/Vancouver metropolitan area in particular, as well as those in surrounding urban and rural communities, recognize the important contribution Mt Hood National Forest makes to livability and sustainability of our communities. It is therefore no surprise that so many citizens are dedicated to learning about, protecting, and conserving our collective heritage and legacy of public lands and their associated natural resources.

The Mt. Hood National Forest as an organization and its employees are all similarly dedicated to protecting and conserving the Forest and its natural resources and to serving people. We are especially interested in developing a better understanding of the unique contributions the Forest can make to the livability and sustainability of the greater Portland/Vancouver metropolitan area as well as surrounding communities. We published a strategic stewardship plan on Earth Day, April 22, 2006, that frames and organizes the stewardship of Mt. Hood National Forest around a set of stewardship challenges. We have done so with the aim of better understanding and meeting the needs of citizens, fostering citizen stewardship, and providing a starting point for dialogue and

catalyst for learning and change on the part of the Forest Service and the citizens it serves to better care for the land.

The plan is formulated around three guiding principles:

- *Ecosystem Restoration:* Working actively to restore the forest's ecosystems, ecosystem processes, ecosystem functions, and recognizing people as part of the ecosystem.
- *Citizen Stewardship:* Engaging people in stewardship of their National Forest and its natural resources.
- *Economic Sustainability:* Securing economic sustainability of the Forest and its associated programs of natural resource management and management of peoples' use and occupancy of the Forest.

People all across the Pacific Northwest regard Mt. Hood and its environs as their own. The Forest hosts four and one-half million visitors every year. They greatly enjoy first hand experiences of the mountain and its natural resources through all forms of recreation and tourism. The forest's beauty reminds us all that we care about something greater than ourselves. We care about fish, wildlife, forests, and the watersheds in which we live. Ninety-eight percent of the Forest is somebody's municipal water supply. We stand in awe of the ebb and flow of natural processes in the ecosystem. For all these reasons and more, the Mt. Hood National Forest is truly the Peoples' Forest!

Citizens are increasingly recognizing that stewardship of the Forest is not the sole responsibility of government officials, but is instead a shared civic responsibility. And increasingly, citizens are recognizing that stewardship is more than a duty; it is a privilege and an honor. Over 1,000 people roll up their sleeves every year volunteering their time and effort to help take care of *their* National Forest. Citizens help maintain trails, administer Wilderness areas, maintain historic structures, conduct conservation education, improve fish passage on and off the Forest, teach mountaineering skills, and a myriad of other activities.

In addition, through business relationships—permits, contracts, partnership agreements, and memoranda of understanding—many more people help us deliver services to and for the public. Included among these are the many outfitter guides who operate on the Forest, five ski areas, the concessionaire who helps us run and maintain our campgrounds, Oregon Department of Transportation who cooperates with us in maintenance of roads, Portland State University, Portland General Electric, the City of Portland with whom we co-manage Bull Run Watershed to provide drinking water to the residents of Portland, and many many others.

As I look ahead to the next decades, I have come to recognize that the Forest faces significant challenges. These challenges are daunting. I believe citizen stewardship is the key to securing the Mt. Hood National Forest and its associated natural resources as a legacy for our children.

The Mt. Hood National Forest Strategic Stewardship Plan aims toward weaving together the environment, the people who care about the Forest, and the economic benefit of the flow of goods and services from the Forest, including environmental services. In the Plan, we offer the following stewardship challenges as a catalyst for learning and change on the part of the Forest Service and also for the citizens we serve to better care for the land.

We view these stewardship challenges as a starting point for dialogue between the agency and current and potential partners in designing opportunities for public lands stewardship — including other federal, state, and local agencies; citizens; state and local governments; corporations; and non-governmental organizations. These are also offered in recognition that many organizations, corporations, communities, and public agencies are becoming greener and desire to redeem their conservation responsibilities or take conservation initiatives. While we will be looking for opportunities for collaboration in joint stewardship for public lands, we will also be looking to design our own organization for the future which maximizes the efficiency of a much-smaller workforce that is still committed to meeting the demands of the public on our well-loved National Forest. The challenges articulated in the Strategic Stewardship Plan are shown in Table 1. The rationale behind the challenges is outlined below.

1. *The Forest is challenged to protect communities from wildfire through fuels treatments on public lands and in cooperation with local and state fire fighting agencies.* Fuel treatments need to be accomplished in the wildland urban interface, municipal watersheds, and other strategic locations on the Forest. Fire has been excluded from many eastside forest stands where ecosystem processes are dependent on relatively frequent natural fires. The result is that for the small number of fires that escape initial attack on the east-side, many stands are destroyed by fire rather than sustained—to the detriment of watershed, wildlife, and community values. The west-side forests are naturally characterized by much longer return frequency forest stand replacement fires. For the west-side, fuel management is aimed at protecting communities and providing anchors for strategic defense against large-scale fires. In both cases, protection of communities from fire is dependent on strategically designed and placed fuels treatments and strong cooperation and collaboration among all fire-fighting agencies for fighting wildfire.

2. *Public and private lands stream habitat restoration is critical to the recovery of aquatic species.* Many of Oregon's most important fish species have declined dramatically to the point where they are listed under the Endangered Species Act. While the Forest is endowed with much preeminent high quality fish habitat, some problem areas remain within the Forest, and many opportunities for restoration exist on public and private lands outside the Forest boundary. As an organization, the Forest is also endowed with high quality professional fisheries expertise. Every year we collaborate with citizens—volunteers and landowners, counties, watershed councils, sportsmen's associations, schools, conservation and environmental organizations, other agencies, and private companies, to find, assess, plan, and implement high priority stream habitat restoration projects.
3. *Forests must be managed sustainably in a way that fosters forest health and provides forest products for our use.* The 1994 Northwest Forest Plan, along with the Mt. Hood National Forest Plan, provides a policy framework for ecosystem management and maintaining a sustainable supply of timber and other forest products. In addition, the Mt. Hood National Forest, in collaboration with Portland State University, and Forest Service Headquarters in Washington D.C. is working on improving our understanding of the environmental, social, and economic dimensions of sustainability and its measurement through criteria and indicators.
4. *Public, private, and civic interests must work together to foster sustainable regional recreation which is essential to our spirits and our economy.* Tourism and recreation associated with the mountain not only reinvigorates peoples' spirits and brings families and friends closer together, but plays an important role in the regional economy. We estimate that tourism and recreation alone generate 34 million dollars of spending in the regional economy every year. Public lands recreation is an integral part of regional recreation and tourism—we must therefore ensure that (a) opportunities for public lands recreation are well-matched to both the capabilities of the land and regional demand so that people's needs are met and the natural resources upon which recreation depends are protected and conserved, (b) conflicts in all the many uses on public lands are minimized through good planning and active citizen engagement, and (c) public, private, and civic interests need to work together to ensure that information about recreation and tourism opportunities are readily available and accessible to all members of our communities.
5. *We face a continuing challenge of ensuring that public lands and the goods and services provided from them are relevant and important to an increasingly diverse society.* People who care about and recreate on public lands come from wonderfully diverse communities, but to protect our forests in the long term, we must all work to ensure the continuing relevancy of public lands for an increasingly diverse society. We have learned across the globe that the only forests that are protected in the long term are those forests that people care about because people have a stake in the goods or services forests provide. We must therefore reach out to ensure that provision of recreation opportunities and special forest products is culturally relevant, is done in a way that honors the diversity among us, and that it fosters long term understanding and belief in the notions of citizen stewardship.

Table 1. Stewardship Challenges from the Mt. Hood National Forest Strategic Stewardship Plan

Title	Stewardship Challenge
Community Wildfire Protection	Protect communities from wildfire using fuels treatments on public lands and working in cooperation with local and state fire fighting agencies. Fuel treatments need to be accomplished in the wildland urban interface, municipal watersheds, and other strategic locations.
Stream Habitat Restoration	Restore public and private lands stream habitat, which is critical to the recovery of endangered aquatic species.
Forest Health and Products	Manage the National Forest sustainably, in a way that fosters forest health and provides forest products for peoples' use.
Sustainable Recreation through Partnerships	Work together with public, private, and civic interests to foster sustainable regional recreation, which is essential to peoples' spirits and the economy.
Serve an Increasingly Diverse Society	Ensure that public lands and the goods, services, amenities, and environmental values provided are relevant and important to an increasingly diverse society.

The Oregon Board of Forestry created a Forestry Program for Oregon that embodies strategic intent on the part of the citizens of Oregon that all forests located within Oregon, including federal forests, be managed under the central theme of "conservation and sustainable management of Oregon's forests." The Program is based on three principles:

1. Widely recognized international criteria and indicators serve as a useful framework for discovering, discussing, and assessing the sustainability of Oregon's forests.
2. Sustainability requires maintaining a diversity of forestland ownerships and management objectives across the landscape and through time.

3. Cooperative, non-regulatory methods are strongly preferred in achieving public benefits on private lands.

The Board chose to use the seven sustainability criteria from the Montréal Process to articulate seven strategies for Oregon's forests. The Montréal Process criteria and indicators were developed by a working group of countries, including the United States, to measure the conservation and sustainable management of temperate and boreal forests. The Mt. Hood National Forest challenges articulated in the Forest's Strategic Stewardship Plan are closely related to the Board's seven strategies as indicated in Table 2 below.

Table 2. Relation of Mt. Hood National Forest Stewardship Challenges to Forestry Program for Oregon Strategies

Mt. Hood National Forest Stewardship Challenges	Forestry Program for Oregon Strategies						
	Legal System	Diverse Outputs	Maintain Productivity	Protect Soil and Water	Conservation of Diversity	Ecosystem Health	Carbon Storage
Community Wildfire Protection	(+)	+	+	+	+	+	+
Stream Habitat Restoration	(+)	+	+	+	+	+	
Forest Health and Products	(+)	+	+	+	+	+	+
Sustainable Recreation	(+)	+		+			
Serve an Increasingly Diverse Society	(+)	+					

Note: + indicates a strong correlation, (+) indicates that a variety of grants, agreements, permits, and contracts are employed to authorize collaborative activities in accordance with federal statutes.



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. The Forest is now in its seventeenth year of management under the Forest Plan direction. The current schedule calls for revision of the Forest Plan to begin in 2012, under the 2008 Planning Rule.

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 moves into the second decade since the adoption of the Forest Plan in 1991, the

Forest is beginning to switch the focus from short-term implementation monitoring to long-term outcomes of management with respect to key social, economic and ecological systems. This document highlights what the Forest is doing now and attempts to describe 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

Sustainable forest management . . . aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. Two conditions indicate sustainability for this definition:

1. ecosystem integrity is ensured/maintained; 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, Healthy Forest Initiative and new Strategic Plan. In addition, the 2008 National Forest Management Act planning rule affirms the overall goal for sustainability of forests, grasslands, and prairies including the ecological, social, and economic components. It is best achieved by optimizing the critical components of social, economic, and ecological systems.

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 giving a more holistic approach to management.

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 industrial 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 is transitioning 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 provides a way for studying the many competing influences on an area as one complete system in a sustainability context. It helps 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.

This year, as we continue with the transition, the monitoring report will be organized by the Oregon Board of Forestry's Seven Strategies for forest sustainability (see Figure 1.). Table 3 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 4 highlights the relationship of the Oregon Strategies and the Mt. Hood Forest Plan's Goals, as well as point out the Forest's desired future conditions and legal framework. Tables 3 and 4 provide further context in understanding how the Mt Hood National Forest's work relates to larger scale sustainability frameworks being used statewide and globally.

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, 19 indicators were introduced and endorsed by the Oregon Board of Forestry as tools to measure progress toward meeting sustainability goals.

Figure 1. Sustainable Forest Management



Table 3. Oregon Strategies/Mt Hood NF Criteria/Montreal Process Criteria Crosswalk.

Forestry Program for Oregon Strategies	Mt Hood NF/LUCID Project Criteria	Comparable Montreal Process Criteria
<i>Strategy A.</i> 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
<i>Strategy B.</i> 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.
<i>Strategy C.</i> 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
<i>Strategy D.</i> 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
<i>Strategy E.</i> 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
<i>Strategy F.</i> 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
<i>Strategy G.</i> 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

Table 4. Oregon Board of Forestry Strategies, Vision and Value Statements as related to the Mt. Hood National Forest's Goals, Desired Future Conditions, and Legal Framework.

Oregon Board of Forestry Strategies and Mt. Hood National Forest Goals July 18, 2008

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).
- 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).
- Provide a broad range of year-round, high quality dispersed recreation opportunities in an undeveloped forest environment (Goal 26).
- Consider the needs of physically challenged individuals in the design and maintenance of Forest facilities (Goal 3).
- Manage Forest recreational access to protect natural resources, provide for public safety, and minimize conflicts among the various users of the Forest (Goal 16).
- Maintain a Forest trail system designed, located, managed and maintained to consider users needs and other resource values (Goal 27).
- Manage the Forest to break down social and institutional barriers to legitimate use of the Forest by non-traditional groups (Goal 4).
- 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 Forest trail system for year-round use, including winter trails in snow zones consistent with other resource values (Goal 28).
- 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)
- Facilitate the exploration and development of energy and mineral resources on the Forest while maintaining compatibility with other resource values (Goal 18).
- Provide a Forestwide bicycle trail system integrated with other transportation systems and coordinated with other agencies (Goal 29).
- Provide law enforcement and search and rescue services that are responsive to public need. Provide support to other agencies and local officials (Goal 23).
- Integrate fishing and hunting as recreational activities on the Forest (Goal 31).

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. (continued)*

- Provide a broad range of year-round, high quality developed recreation opportunities (Goal 32).
- Provide for use and occupancy of the Forest by public and private interests when compatible with other resource objectives (Goal 36).
- 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).
- 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).
- 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).
- 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).
- Provide efficient management of administrative sites and facilities (Goal 35).

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).
- Manage vegetation and provide quality forage conditions for commercial domestic livestock. Prevent unacceptable damage to other resource values from commercial livestock grazing (Goal 33).
- 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).
- Reforest harvested areas with adequate stocking (Goal 20).
- 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).
- Product genetically improved seed for reforestation of selected tree species (Goal 45).
- Manage a genetic tree improvement program to enhance the growth and quality of crop trees (Goal 21).

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 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")

There are a large number of laws that affect the management and administration of the use and occupancy of National Forest System lands within Mt. Hood National Forest. Foremost among them are the following major pieces of legislation:

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 untrammeled 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.



Summary – 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 supports the conservation and sustainable management of forests. It includes the capacity to measure and monitor indicators (availability of up-to-date data), and the capacity to conduct and apply research and new technologies. Hence, the adequacy of these frameworks is of critical importance to social and forest sustainability.

The legal framework that provides the foundation for resource management on the Mt Hood National Forest is described on the previous page. 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 (MUYSYA)
- 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 Forest Service Handbooks. Other agencies partnered in various aspects of forest management on Forest include NOAA (National Oceanic and Atmospheric Administration) Fisheries, the US 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.

Institutions are 'the set of rules' or processes used by individuals to organize activities that produce outcomes. It guides people's interactions and provides 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.

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 provides 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.

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 includes indicators that involves citizens in forest management activities, builds community and forest sector capacity, and integrates various kinds of expertise in the decision-making process.

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 2007 season, 1,292 participants, accomplishing 26.18 person years of work, valued at over \$849,467 were involved in the Forest's volunteer, youth, and hosted programs. 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.

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.

The Northwest Economic Adjustment

Initiative, aimed at helping rural communities and businesses dependent on natural resources become sustainable and self-sufficient, brings the Forest Service together with eight other federal agencies, as well as with State and local governments, to fund projects that are community priorities for building long-term economic and social community capacity. An example is the Rural Community Assistance program on the Mt. Hood National Forest which provides technical and financial assistance to communities to address social, economic and environmental challenges.

The Mt. Hood Fuel/Vegetation Strategy

The Forest is continuing to assist and support communities in the development of Community Wildfire Protection Plans. Both Clackamas and Wasco counties completed their plans in fall of 2005. These community efforts provide the basis for on-going partnerships and future collaborative efforts to reduce wildland fire risk around homes and property.

The Mt. Hood Strategic Stewardship Framework

Mt. Hood National Forest's Strategic Stewardship Framework will establish direction and context for forest projects and programs by providing a business framework to use in decision making, and in building, strengthening and delivering relationships, internally and externally. This framework will provide the structure for citizen,

non-governmental organizations, corporations, state and local governments, and other federal agencies to become engaged in the stewardship of the Forest. This will set the stage for public interest and vision for decisions to be made in the Land and Resource Management Plan.

Community Engagement Action Team

In 2003, the Forest established the Community Engagement Action Team (CEAT) and Board to help place emphasis on partnership development, to engage community resources in Forest stewardship activities, and to move the Forest towards a wider community base of participation. In 2005, the CEAT organized a session called *"Engaging Citizens in Forest Stewardship through Volunteerism – Creating the Forest Service of the Future"* resulting in the development of a Citizen Stewardship Plan for Action in 2006. The Plan's objectives are to build a collaborative coalition Citizen Stewardship, enhance and improve existing volunteer programs, and to develop new tools for volunteer engagement.

River Keeper Program

The Mt. Hood National Forest has been a major catalyst in the River Keeper Program that promotes the stewardship of the Upper Sandy River and Fifteenmile River Basins through coordination of federal, state, county, and private restoration efforts.

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 collaborative group is made up of diverse stakeholders including county government, local environmental organizations, a college professor, and members of a hunting association. Due to their successful collaborative efforts, the Forest received authority for stewardship contracting and successfully advertised two separate stewardship contracts.

The restoration work outlined in these contracts included commercial thinning of 40 to 50 year-old plantations, wildlife enhancement work and precommercial thinning in Late Successional Reserves.

Sandy River Basin Agreement

The Sandy River Basin Agreement Team 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. Their focus is to develop a strategy to maintain and recover salmonids listed under the Endangered Species Act in the Sandy River watershed. In 2002, Portland General Electric and the Sandy River Basin Agreement Team partners signed off on a settlement agreement to decommission Marmot and Little Sandy dams. In 2004, these partners identified geographic areas in the Sandy River Basin important for the persistence and restoration of salmon and steelhead populations, known as the Anchor Habitats project from which restoration efforts will focus to restore salmon and steelhead habitat.

Basin-wide Aquatic Habitat Restoration Strategies

In 2006, two collaborative working groups completed two basin-wide aquatic habitat restoration strategies: the Sandy River Basin and Hood River Basin Aquatic Habitat Restoration Strategies. The purpose is to address aquatic habitat restoration needs for recovery and long-term persistence of fish populations in the basin. Using a holistic watershed view, the strategy is intended to guide investments over the long-term, completing high priority restoration actions in the highest priority watersheds, thereby achieving benefits at the watershed scale. The strategies look at restoring connectivity, long-term physical and biological processes, ecological function of riparian areas, and short-term in-stream habitat conditions.

Customary and 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 consultation of projects located on these accustomed areas. In 2007, consultation with the Confederated Tribes of the Warm Springs (CTWS) was completed on all projects located on tribal lands and usual and accustomed areas. Informal consultation was initiated with the Confederated Tribes of Grand Ronde for the proposed Palomar Pipeline project.

Forest Certification

Forest certification, or “green certification,” is a voluntary, non-regulatory system for identifying forestland that is managed for long-term sustainability. For land managers, certification provides a means to demonstrate their commitment to environmentally responsible, sustainable forest management. It is also a marketing tool that rewards environmentally responsible forest management by labeling products from certified forestland so that consumers can choose wood and paper products originating from sustainably managed forests. In 2006, the Pinchot Institute for Conservation, working with the Forest Service in a pilot test, reviewed forest management practices on the Mt Hood National Forest using the standards of the Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI) certification. The overall purpose of the certification evaluation was to assess the potential consistency of forest certification with the Forest Service’s mission to conserve and manage federal public lands in a sustainable manner; to understand to what degree the management of the selected national forests aligns with existing requirements of the FSC and SFI programs; and to identify specific management system changes the agency might consider to enhance efficiencies and/or effectiveness

in sustainability management. Members of the public were invited to provide feedback on the management practices of the Mt Hood National Forest. The 2007 final report showed the Mt Hood NF met or exceeded most standards except those dealing with capacity for road maintenance, addressing forest health and harvesting of type 1 and 2 old growth. The report can be found at:

http://pinchot.org/NFCertificationStudy_PIC.pdf

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 need of societies. 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, and providing for cultural, social, and spiritual needs and values are also included. 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

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.

Using this analysis, as well as professional judgment and assessment of ability to meet current and future demand, the Forest documented a proposed 5-year program of work. The forest is proposing future management of 169 developed recreation sites through RFA. 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. On the Mt. Hood National Forest, the backlog of deferred maintenance is over \$11,800,000.

Visitation to the Mt. Hood Wilderness in 2007 was significantly lower than in 2006, continuing a downward trend in visitation. During most of this decade, annual visitation has been between 33,000 and 40,000 people. Some of the reduction may be attributable to the closure of the 1825 road and the loss of motor vehicle access to the Ramona Falls trailhead. Also, the Timberline Trail was not a loop trail in 2007 because of a severe washout at Eliot Creek. The area around Eliot Creek Crossing was administratively closed for public safety.

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. During 2007, monitoring of heritage resources showed no adverse impacts from project activities. Historic buildings and structures were maintained, stabilized and repaired. Historic preservation efforts focused on Timberline Lodge, Cloud Cap Inn and Bagby Guard Station. In 2007, there were no 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. In May 2007, the ZigZag Ranger District hosted a *Passport in Time* public archaeology project allowing volunteers to survey, map, test excavate, and conduct on-site oral history interviews. Volunteers from Oregon Archaeological Society participated in a project near Rock Creek Reservoir. In September 2007, the Barlow Ranger District repeated a popular interpretive program on emigrant use of the Barlow Road at White River Station Campground.

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 Mt. Hood National Forest continues to advance toward the goals of the Forest Service Roads Agenda. The size of the Forest's transportation system is decreasing. The Forest is maintaining or improving mainline road system while decommissioning or closing unneeded roads. In 2007, approximately 50% of our 3407 mile road system is either closed to public access or classified as "available for closure or decommissioning". The priority in road decommissioning continues to be roads in unstable geological areas or roads with unacceptable environmental impacts. Due to the high cost of road decommissioning, the Forest focused efforts on storm proofing and closing roads, rather than decommissioning a few roads at a high cost. The Forest is maintaining or improving 461 miles of our mainline road system.

Campgrounds

Visitation and utilization data were reported by permit holders for concessionaire managed campgrounds in 2007. The Hwy 26 and Clackamas River Complex campgrounds were managed more efficiently in 2007, and the concessionaire reported its best year to date. While total campsites occupied in the Hwy 26 corridor was lower than in 2006, percent occupancy increased. The number of campsites occupied in Clackamas River Complex campgrounds was identical to 2006 in spite of an increase in campsite fees in 2007. Party size was slightly higher at Clackamas River campgrounds. Lost Lake and East Fork Complex campgrounds saw a 13% increase in site occupancy in 2007 compared to 2006. Like similar older recreation complexes throughout the National Forest System,

the 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, Mt. Hood National Forest has more developed camping capacity than demand.

Trails

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. With diminished funding, actual accomplishment is less than 10 miles per year. During 2007, the Forest awarded a contract for reconstruction of 4.2 miles and relocate approximately 0.8 miles of the Timberline Trail, from Cloud Cap to Elk Cove.

Ski Areas

Use of the Mt. Hood National Forest's five alpine ski areas during the 2006/2007 season was 3% higher than use during the previous season, bucking the regional trend which showed an overall decrease in skier visits.

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

Sustaining a predictable supply of forest products to the region's economic system provides jobs at both the local and regional scales, and reduces the demand for imported forest products. 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.

In FY 2007, the budget allocation scheduled the Forest to offer for sale approximately 37.9 million board feet (MMBF) (59.2% of probable sale quantity [PSQ]) which was a 55% increase over FY2006. The Forest successfully offered for sale approximately 37.0 MMBF (57.8% of PSQ). This was accomplished using nine stewardship contracts, which will also generate approximately \$3.7 million for restoration projects. 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 fiscal year 2008 & 2009.

Special Forest Products

Over the past 10 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 one of the largest and most efficient Special Forest Products programs in the Nation. 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. Future expectations are that Christmas trees, bough

harvesting, and firewood opportunities will be limited due to less regeneration harvesting as demand for these products increases.

Range

The Forest Plan goal is to provide quality forage conditions for commercial domestic livestock and to prevent unacceptable damage to other resource values. Approximately 15% of the total acres on the Mt. Hood National 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. In 2007, actual livestock use was 1,671 head months out of a total of 3,684 head months under permit. Monitoring of existing vegetation conditions and long-term trends are in place on all allotments using a photo trend methodology. These measurements indicate that overall range condition is stable or improving and moving towards Forest Plan objectives. Monitoring of twenty-seven established sites showed 100% compliance with utilization standards and Forest Plan standards and guidelines. 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.

2007 accomplishments included updating the Badger Allotment's Allotment Management Plan, construction of a drift fence in the Long Prairie Allotment, construction of the Camas Meadow enclosure within the White River Allotment, and continued partnership with Catlin-Gable High School to complete riparian restoration projects.

Minerals

The Forest Plan goal is to facilitate exploration and development of energy and mineral resources while maintaining compatibility with other resource values. The Mt. Hood National Forest continues to be able to supply high quality rock products to the general public, other government agencies, and for their own use. 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 monitors 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 Forest Plan projected levels, and cumulative effects.

Productive Capacity

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 2007, the Forest accomplished 2,606 acres of young stand thinning. This is a decrease from fiscal year 2006 due to available funding sources. The forest continues to fund pre-commercial thinning

treatments primarily through the use of Stewardship Contracting authorities and Payments to the Counties funding. A stable funding source will be necessary to maintain a productive young stand thinning program and reduce the backlog of acres needing thinning.

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

Lincoln, Boxshall and Clark (1982)¹ defines 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. 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.

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

With continued implementation of Best Management Practices, watershed restoration, and the Northwest and Mt. Hood National Forest Plans, water quality and watershed conditions are expected to be maintained and in some areas show an improving trend. The 2007 watershed cumulative effects analysis, completed for several projects, 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. In order to monitor condition and trends in water quality, permanent monitoring stations have been installed on the Clackamas River (Carter Bridge below Fish Creek), Alder Creek (Forest boundary), and Eagle Creek (fish hatchery). The Clackamas and Alder Creek watersheds serve as a municipal water supply. The water monitoring stations continuously monitor turbidity and flow depth.

In 2007, various streams monitored forest-wide did not meet one or more of the recently adopted (March 2, 2004) and more stringent Oregon Department of Environmental Quality (DEQ) water temperature standards even though these same streams, in most cases, provide very good water quality for fish. A record-setting heat wave affected Oregon and most of the Western U.S. 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. In some cases, the elevated water temperatures are naturally high, while in others a past fire or timber harvest activity may be partially responsible. 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.

The Federal Clean Water Act requires DEQ to develop a plan with goals and pollution control targets for improving water quality in the watersheds where water quality standards are not met. DEQ is doing this by establishing Total Maximum Daily Loads (TMDLs) for each pollutant entering the water. A TMDL describes the amount (load) of each pollutant a waterway can receive

while maintaining compliance with water quality standards. TMDLs for water temperature have been completed by the DEQ and approved by the Environmental Protection Agency for the Sandy (March 14, 2005) and Hood River Basins (January 1, 2002).

The Mt. Hood National Forest will address water temperature TMDLs for any streams listed as "impaired" for water temperature by implementing the Northwest Forest Plan Temperature TMDL Implementation Strategies. Approved by DEQ in September 2005, the TMDL Implementation Strategies provide guidelines for riparian shade management.

Stream Function and Condition

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; (1) the Mt. Hood Stream Inventory Program, and (2) the Aquatic and Riparian Effectiveness Monitoring Program.

The Forest's Stream Inventory Program collects 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. This provincial program, which includes the Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area, evaluates trends and determine if the Forest is meeting aquatic habitat standards and guidelines.

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. Watersheds are sampled each year over a 5-year rotation. In 2007 sampling included a resurvey of High Rock Creek watershed and an initial survey on the Upper Hot Springs Fork watershed on the Clackamas River Ranger District.

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 matters in the form of large wood on the forest floor or smaller woody material, including the litter layer, are important sources of organic carbon. Maintenance of carbon cycling through conservation of large wood material is addressed through the standard 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.

In 2007, no harvest units were monitored. However, on a forest-wide basis, monitoring results from the last several years suggest that progress is being made in reducing the number of harvest units where soil damage has exceeded the Forest Plan standards. This trend is likely due to the decline in timber harvest levels over the last decade, the efforts of sale administrators and operators to continue to minimize damage, and with improved equipment technology. Where stands have been entered for the first time, regardless of the silviculture prescription, designated skid trails have been effective in limiting soil resource impacts.

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 tenant of any conservation effort. This criteria looks at 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 provides information on the diversity and pattern of land cover types that provide wildlife habitat, filter and maintain water quality, and provide connectivity. With fire suppression and 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. The limited forage availability for deer and elk populations is becoming a concern on the Forest. Also, there is a concern that the increase in dense mid-seral stands on the eastside and backlog of stands needing some level of stocking control, such as precommercial thinning, will contribute to the potential for large disturbances such as wildfire, windthrow, or insect outbreaks. This concern extends to the plantations within Late Successional Reserves.

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.

The Forest, in collaboration with other agencies and Tribal partners, monitor fish production in each basin. Monitoring information is used to better understand life history stages of different populations, and focus recovery efforts for listed ESA fish. On the Forest, the actual utilization of habitat by various fish species is far below the overall productive capacity of rivers and streams. The overall abundance of anadromous fish and bull trout are low in those streams and rivers monitored on the Forest.

In 2006, Oregon Department of Fish and Wildlife led an effort to update the status of bull trout in the Hood River system. Preliminary results predict less than 100 bull trout adults in the Hood River basin. Salmon populations continue to show large fluctuations in size. The most extensive and complete data set on the Forest is in the Clackamas River. The twelve-year data set has shown general trends of increasing numbers of steelhead smolts and decreasing numbers of Coho smolts. Forest Service fish biologists continue to work in partnership with watershed councils across the Forest to assist in all fish recovery aspects at the whole river basin level.

Similar to fish habitat, there are some concerns with wildlife habitat. With reduction in regeneration harvest on the Forest and the suppression of fire, there is a concern that forage habitat for early seral dependent species such as deer and elk is declining. Forage is a limiting factor for much of the Mt. Hood National Forest, especially for winter range areas. It is inevitable that populations of deer and elk will decline. Road densities especially in key areas like winter range areas are barriers to

connectivity. Other habitat concerns for wildlife include increasing pressure on unique or sensitive habitats from recreation uses, roads and grazing.

Special Habitats

Fisheries special habitats are habitats that provide a critical function during a certain life stage or time of the year, for example, off-channel rearing areas for juvenile salmonids during winter storm flows. In 2007, the Zigzag Ranger District continued maintenance on high-value side-channel habitats totaling 1.25 miles in length.

Species of Concern

The small populations of bald eagle and peregrine falcon appear to be stable. The USDI Fish and Wildlife Service delisted the American bald eagle in June of 2007 because the eagle population has been expanding and is no longer considered threatened. The peregrine falcon was delisted in 1999. 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.

Ecological Legacies

Ecological legacies, such as remnant snags, large down woody debris and caves are important components of the environment that persist through multiple phases and successional changes in an ecosystem. 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 and are increasing over time. On harvest units, however, down and woody materials are falling below current guidelines.

Threatened, Endangered and Sensitive (TES) 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, and recreational activities. Species that grow in forested habitats appear to be stable at this time and implemented mitigation measures for ground disturbing activities have been effective in maintaining the integrity of sensitive plant sites. From 2000-2006, monitoring efforts were focused on non-forest habitat sensitive plant species. Data collected will be used to develop management recommendations and/or conservation strategies for species that appear to be at risk.

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 from natural regeneration.

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. 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/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 pattern and plant community dynamics have been altered by fire suppression. This raises sustainability questions about what are the effects of the current fire regimes and management activities towards achieving desired 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. It estimates that 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) with implementation of standards and guides. To date, the number of human-caused fires and acres burned are below Forest Plan estimates. The biggest change in 2007 occurred with the July 2007 Ball Point fire resulting in 1237 (out of 1251) burned acres as a result of lightning. The occurrences of large lightning fires over the last few years have increased the five year average total acres burned.

Changes in vegetative conditions, however, 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 variation.

Changes in stand structure, species composition, and accumulated fuels have predisposed extensive areas to insect infestations, disease, and high-intensity wildfires that may threaten nearby communities, watersheds and key ecological components. It is expected that resource damage and value lost will increase.

These altered disturbance regime areas are specifically targeted by the 10-Year Cohesive Strategy and the Mt. Hood 5-year strategy for

integrating fuels and vegetation treatments. 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 2007, the Forest completed hazardous fuel treatment of 2,396 acres all of which were in located in the Wildland Urban Interface mostly adjacent to the City of The Dalles municipal watershed.

The Healthy Forest Restoration Act (HFRA) passed in 2003, the related Healthy Forest Initiative (HFI), and the Tribal Forestry Protection Act of 2004 developed new administrative and legislative tools to help restore healthy ecosystems and assist in executing core components of the National Fire Plan that will accelerate treatments designed to restore healthy ecosystems. In 2004 and 2005, the Forest started planning projects under HFRA and HFI.

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 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

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. Timber and wood fiber production continues to be a principal forest activity. However, 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. In 2007, harvest occurred on 783 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 the riparian and late successional reserves. Forty-one percent of harvest occurred on the Mt. Hood Forest Plan land allocation C1- timber emphasis with 59% occurring on B allocations where timber production is a secondary goal. Commercial thinning was the harvest method on 81% of the acres, selection harvest on 12%, and shelterwood harvest with reserves 7% of the acres.

Current and potential future forest health issues continue to be a concern on the Forest. This includes a backlog of 18,985 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 2006, the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for Preventing and Managing Invasive Plants in the Pacific Northwest Region (October 2005) adds invasive plant management direction to all Forest plans in the Pacific Northwest Region. Management direction includes invasive plant prevention and treatment/restoration standards.

Currently, the total area of inventoried noxious weed infestation on the Forest is approximately 3,000 acres. This underestimates actual total infested acres, which have not been inventoried. Currently, only targeted weeds are monitored and resources are lacking for a forest-wide systematic survey. Untreated hawkweeds and Japanese knotweed sites are continuing to spread and new infestation sites are being detected.

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 303 acres of noxious weeds were treated on the Forest in 2007.

Emphasis continues to be placed on the detection of satellite populations of non-native hawkweeds and Japanese knotweed that are continuing to spread on the Forest. Hawkweeds displace native forage species, which has an impact on the health of elk populations. Knapweed is well-entrenched and established across the eastside of the Forest but because of a combination of control efforts and its habitat preferences, it has not become widespread on the westside. Houndstongue continues to spread into new areas on Barlow but appears to be limited to this portion of the Forest.

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 148,000 acres on the Forest and an additional 118,000 acres including adjacent lands, namely the Warm Springs Reservation have been affected. . This is roughly a 30% increase in affected acres over FY 2006. The primary species affected have been lodgepole pine and true firs. Beetle activity remains high on the eastside of the Forest and along the high plateau of the Cascade Crest and is expected to continue for the next few years until the host habitat is depleted.

In addition, 40 year-old ponderosa pine stands on the eastside are becoming imminently susceptible to bark beetle attack due to high stocking densities. The 1983-1993 western spruce budworm (*Choristoneura occidentalis*) outbreak is now contributing to increased fuel loadings as trees have fallen.

While the beetle killed trees provide a temporary food source for some bird species and homes for small cavity nesting birds, the large scale infestation will likely increase fuel loadings and concerns over hazardous fuels. In appropriate land allocations, the salvage of beetle killed trees can provide wood products, firewood or biomass for energy production.

Field surveys were completed for both the high elevation whitebark pine, and the northern most 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 to pursue restoration activities and re-establishment of new populations with blister rust resistant seedlings.

Hillslope Processes/Geologic Resources

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, with management activities designed to maintain long-term stability. Since monitoring began in 1991, no acceleration or initiation of earthflow movement has been measured or suspected as a result of timber harvest or road building activities on earthflow areas.

On November 7, 2006, storm induced debris flows swept down five channels draining Mt. Hood, destroying two Forest Service bridges, damaging State Highway 35, and reminding all observers of one of the geologic hazards associated with large active volcanoes. The debris flows removed public access to the Old Maid Flat area for about six months and closed State Highway 35 for about 1 month. Debris flow frequency has increased on Mt. Hood since a regional climate change that occurred in 1995. Large debris flows in the stream channels that drains Mt. Hood are likely to continue, threatening public safety and transportation routes. Interagency efforts are underway to redesign stream crossings or relocate roads to minimize the damage from these natural events.

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. 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 Mt. Hood National Forest remained in compliance throughout the monitoring period (October 2006 – September 2007).

Nitrogen is the pollutant of most concern on the Mt. Hood National Forest. Lichens are used to monitor air pollution on the Forest. In 1994-1997, with re-measurements in 2004 and 2005, Mt. Hood botanists surveyed lichens and collected common species for chemical analysis. Lichen monitoring has shown that nitrogen concentrations have increased regionally due to increasing population and fossil fuel combustion, most notably along the northern boundary of the Mt. Hood National Forest and in the Columbia River Gorge. The Clean Air Act has successfully held industry contributions of nitrogen oxides and sulfates steady. Sulfur deposition, although not increasing, continues to be elevated above natural levels on the eastern part and western boundary of the Forest and in the Columbia River Gorge corridor. The Mt. Hood Wilderness, a Class I airshed, has very high air quality and remains unaffected by regional increases in nitrogen.

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 forest 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 increase carbon sequestration in forests, help forest to 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 enhancing 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 consider climate in their landscape prescriptions, including anticipating changes in disturbance regimes and managing for health and resiliency.

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 will be made as the need arises. The Mt. Hood Forest Plan is currently scheduled for revision beginning in 2012 following the 2008 Planning Rule.



Strategy A:

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

Partnerships and Volunteers

Volunteers and partnerships are an integral part of management of the Forest and are as varied as the work they accomplish. Some partnerships simply help the Forest Service get the work done, while others are involved in major collaborative and stewardship roles becoming advocates helping to implement the natural resource agenda at the local level. Partnerships reconnect people with natural resources as they enable participants to get involved, make a difference, and learn more about their environment and their National Forests. The volunteers may work as part of an organized group or may contribute their hours alone. They come from all over the country and serve from a few hours a week to those who come back year after year and stay for months at a time.

The following is a brief sampling of partnerships that occurred during the last year. **Partners are shown in bold text.** *Those long-term partnerships that have spanned a decade or more are shown in bold italics.*

Our *Youth, Volunteer and Hosted Program* opportunities resulted in:

- 1,292 participants;
- Accomplishing 26.18 person years of work;
- Valued at over \$849,467 in FY07.

Two Forest Service operated **Youth Conservation Corps (YCC)** non-residential crews employed 15 eastside youth as a result of the Forest pooling resources with:

- **Hood River County Juvenile Department;**
- ***Oregon Youth Conservation Corps;***
- **Trust Management Services;**
- **Wasco County Payment to Counties, Title I and III; and,**
- **Mid-Columbia Council of Governments.**

These partners contributed 100 percent of the funding needed for the YCC program. During the eight-week summer program, the youth accomplished needed work for the Forest, developed skills, earned money, and in many cases gained high school credit or a post high school education award. Recruitment information was available in both English and Spanish. The Forest has been proud to make it a priority to provide opportunity for youth through a YCC program for all except six years since the passage of the YCC legislation in 1973.

Hosted Programs are programs where the manpower, job training, and development programs run by other organizations that the Forest Service “hosts” on the Forest by providing a worksite. Included are hosted arrangements with organizations and local government agencies such as:

- *Clackamas County Education, Training and Business Services*;
- *MacLaren Youth Correction Facility*;
- *Multnomah County Department of Juvenile and Adult Community Corrections*;
- *Northwest Youth Corps*;
- *Reynolds School District, Multnomah Youth Cooperative*;
- *Wasco County Department of Youth Services*;
- *Student Conservation Association*; and,
- *Americorp/Northwest Service Academy*.

As a result of these hosted programs, Forest roads and trails have been brushed, riparian fencing built, facilities maintained, fire breaks constructed, bridges built, and invasive plants removed. A seven-person Northwest Service Academy trail crew was stationed at Zigzag for the summer providing invaluable assistance with trail maintenance and construction and the improvements to the Cross Town Ski Trail surrounding the community of Government Camp. They constructed seven new bridges that are able to support heavy cross country trail grooming equipment all within a two week window.

Four AmeriCorp Interns, one on each district, served as Community Stewardship Coordinators in 2007. These outstanding individuals helped increase the numbers of children receiving conservation education messages, increased public awareness of Forest activities at trade shows, campgrounds, and through the internet. They assisted project managers with on the ground volunteer supervision and became a district resource for volunteering at each unit.

Volunteers include both individuals and organized groups. Individual volunteers contributed their time and effort to positions, such as:

- Timberline Lodge Interpretative Specialists;
- Clackamas Lake Guard Station Visitor Information Specialist;
- Hickman Butte Fire Lookout;
- Winter Snow Trails Specialists; and,
- Wilderness Stewards.

Others participated in one-time events or a specific project, such as:

- Fishing Clinics;
- Festival of the Forest;
- Geologic Surveys;
- Trail Maintenance Work Days;
- *PIT (Passport in Time)* Archeological Survey Projects;
- Fish and Wildlife Surveys and Habitat Improvement Projects;
- *HawkWatch International* (birds of prey migration surveys); and,
- *Cascadia Wild* (tracking surveys).

Sponsored groups provide a significant percentage of volunteer accomplishment. 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.

The 2007 Forest Partners and Volunteers Recognition Picnic hosted 125 volunteers and partners who had contributed their time or resources to Forest work. The event was given at the Mt. Hood Cultural Center and Museum in Government Camp.

Enhanced Recreation Opportunities

Playing a significant role in trail maintenance on the Forest, are organized groups who provided volunteers such as:

- *Backcountry Horsemen of Oregon*;
- *Marion County Posse*;
- *Mazamas*;

- *Mt. Hood Snowmobile Club*;
- *Mt. Scott Motorcycle Club*;
- *Oregon Equestrian Trails*;
- *Oregon Muleskinners*;
- *Oregon Nordic – Portland, Teacup and The Dalles Chapters*;
- *Pacific Crest Trail Association – Mount Hood Chapter*;
- *Portland United Mountain Pedalers (P.U.M.P.)*; and,
- *Discovery Bike Shop*.

Other sponsored volunteer groups helped to maintain and restore recreation sites. They included:

- *Izaak Walton League – Washington County Chapter*;
- *Oregon Equestrian Trails*;
- *Oregon State Federation of Garden Clubs*;
- *Sierra Club*; and,
- *Youth organizations, such as Boy and Girl Scout troops*.

The Friends of Timberline and *Friends of Silcox Hut* continued their strong stewardship roles in support of these unique, historic facilities. Winter sport enthusiasts reaped the benefits of several partnerships involved in grooming of snow trails. The *Mt Hood Snowmobile Club*, in cooperation with the *Oregon Department of Transportation*, utilizes a portion of the snowmobile licensing fees to groom a wide array of snowmobile trails in the Frog Lake and Skyline Road area. Additionally, a local volunteer groomed cross-country ski trails in the Trillium Lake Basin. Donations from the community, local organizations and retailers as well as the trail system users covered the cost of the equipment rental.

Wilderness Stewardship

In 2001, Wilderness Co-Stewardship agreements emphasizing Leave No Trace education as well as monitoring and restoration were developed with several organizations including *Mazamas* and *Oregon Equestrian Trails*. As a result, 15 volunteer

wilderness stewards, both equestrians and hikers, served as on site stewards in wilderness sites with higher visitation. The stewards reached an estimated 1,500 wilderness visitors.

Financial Review

The purpose of this monitoring item is to track funding levels necessary to achieve the outputs predicted in the Forest Plan. The following display compares expenditures proposed in the 1990 Forest Plan with actual expenditures for FY 2007. All figures are rounded to the nearest thousand dollars.

The total budget predicted for full Forest Plan Implementation was \$21,759,718; actual funds expended in FY 2007 were \$21,549,262. Overall funding levels have remained fairly flat over the past three years. Additional funding was received in FY 2007 for roads, trails and bridges. Also, additional funding was received for salvage and timber to attain the timber targets and to prepare for FY 2007 and FY 2008 projects. Multiple combinations of funding categories have occurred during the last few years, which makes tracking specific program areas difficult. General trends in major resource areas, however, are evident. The following table identifies the major expenditure groups and does not reflect total cost incurred on the Forest.

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. Figures 2 and 3 show a significant change as related to the total Forest budget and workforce (Full Time Equivalent = FTE) since 1990.

All resource areas are experiencing a funding shortfall from those projected in the Forest Plan. Unit costs are being scrutinized annually to keep costs as low as possible and to provide flexibility for prioritization and accomplishment for as many projects as possible.

The heaviest programs impacted by budgetary shortfalls are in the areas of timber and associated engineering programs. In those cases where a budget shortfall is a material factor causing the Forest Service to move more slowly to meet Forest Plan objectives, it is noted in the narratives for the specific program.

Recommendations

- Continue to scrutinize unit costs, staffing levels and charge-as-worked given declining budgets since 1990.

Figure 2

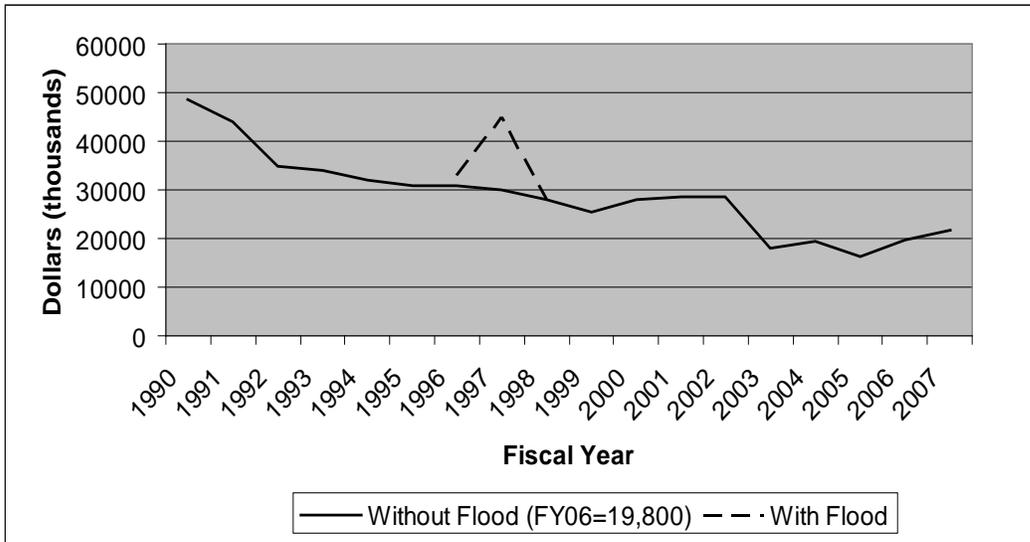
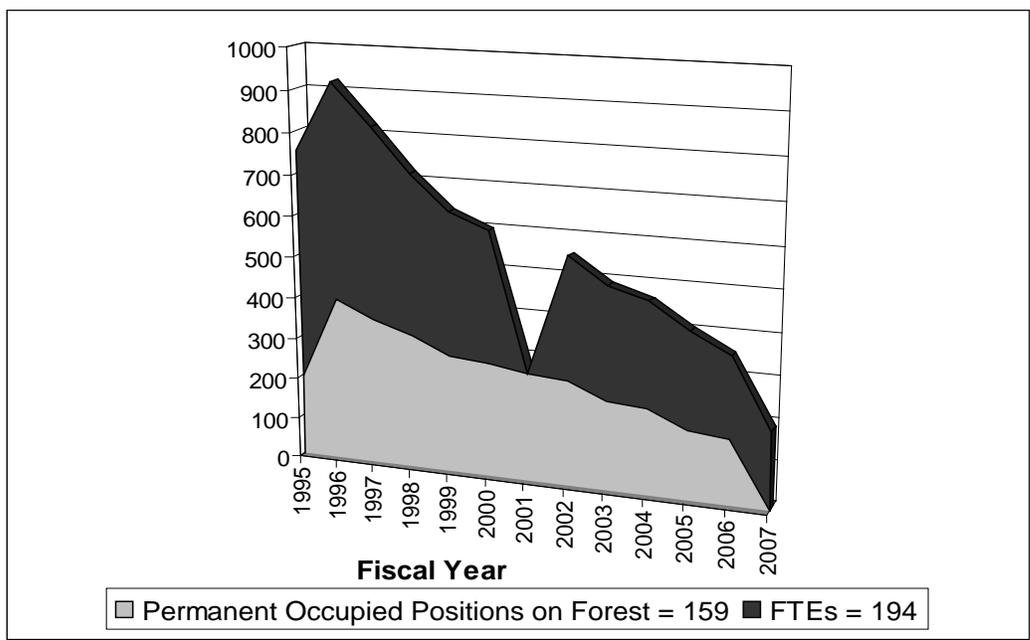


Figure 3



2008 Annual Monitoring Report

Table 5. Budget Levels Predicted/Actual (Partial List).

Activities	*Forest Plan Predicted (thousands/yr)	** Actual Expenditures (thousands)									
	1990	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07
Fire											
Brush Disposal	3,056	426	547	346	402	228	256	273	238	276	141
Fire Fighting Fund	2,118	2,187	2,173	2,227	2,535	2,949	2,040	2,139	1,888	1,975	2,010
Engineering											
Timber Roads	2,709	586	1,015	930							
Facilities Maintenance	478	264	375	357							
Recreation Roads	1,381	104									
General Purpose Roads	118	16									
Recreation Facilities	1,751	599	152	419							
Trail Construction	1,279	346	383	174	698	484	424	711	609	522	449
Road Maintenance	4,079	965	943	747	2,270	1,795	2,613	1,729	1,938	1,191	1,437
Rec and Eng Facilities					1,042	1,201	1,828	1,117	828	732	570
Timber											
Salvage Sale Funds						737	752	789	772	888	775
KV Funds		2,501	2,950	4,346	3,827	1,268	553	477	612	1,298	834
Forestland Vegetation				1,241	709	756	570	614			
Genetic Tree Improvement	9,602	2,925	2,890	1,820							
Restoration/Timber Stand Improvement	2,792	1,855	1,481	1,170							
Timber Sale Management	5,270	3,798	2,909	2,210	2,071	3,660	1,250	1,110	1,191	1,521	1,870
Sale Administration											
Sale Preparation											
Silvicultural Exams											
Administration	3,318	1,479	1,095	898							
General Administration											
Recreation/Lands											
Land Acquisition	50	23	8								
Cultural Resources	459	90	83	59							
Land Line Location	10										
Recreation	5,924	2,021	1,640	1,983	1,865	2,111	1,508	1,282	1,158	1,318	1,161
Fish/Wildlife/Range/Soil/Water											
Fish-Anadromous	986	557	584	667	1,412						
Fish-Inland	365	141	161	110							
Wildlife	809	256		302	237						
Threatened, Endangered Species	642		188	155							
Range Betterment	4		1		1	1					
Soil Inventory	112		128	69	120					965	563
Range Vegetation Mgmt	73	23	27	31						49	38
Soil/Water Administration	1,726	296	271	108							
Ecosystem Management		888	439	846	1,242	1,077	746	1,053	989	690	536
Fish/Wildlife/Soil/Water					1,657	1,381	1,049	1,125	1,068	1,083	

* Not adjusted for inflation.

** Additional costs are incurred in a variety of areas including Forest Health, Highway Administration, Quarters Maintenance, Agricultural Research, etc.

Forest Plan Amendments

As the Forest continues to implement the Forest 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 *Mt. Hood Land and Resource Management Plan* will be reviewed in accordance with the National Forest Management Act (NFMA) regulations and the Northwest Forest Plan Standards and Guidelines.

Amendments

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, 2005, fourteen amendments have been made to the Forest Plan. Five amendments reflect changes made during Wild and Scenic River planning; two 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.

Two additional amendments have been proposed. Amendment thirteen has been proposed, but the implementing decision was recalled during the appeal process and has not yet been reissued. This amendment would modify Standards, Guidelines and Management actions related to the use and management of the Mt. Hood, Salmon-Huckleberry, and Hatfield Wildernesses. Amendment sixteen has been proposed, but the implementing decision has not been finalized; the decision is expected in spring 2008. This amendment would allow for careful and targeted herbicide use to treat invasive plants.

The sixteen 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.

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.
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.

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.
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.
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).
13. 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.
14. October 11, 2005. ***Pacific Northwest Region Invasive Plant Program – Preventing and management 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.

15. 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.

Monitoring has disclosed significant disparity between the amended 1994 Forest Plan projections and existing forest conditions that would currently warrant a revision at this time. The Forest Service will continue to make non-significant amendments to the Forest Plan as needed as the Forest Service looks forward to a full Forest Plan revision.

16. *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.

Note: The implementation decision has not been made; the decision is expected in spring 2008.



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

Social System – Social and Cultural Values

Recreation Program Niche

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.

Two public workshops were held in Hood River and Sandy to familiarize the public with the recreation facility analysis. The workshops included facilitated "sense of place" charettes to generate public

input to and ownership in the Forest's recreation program niche statement. Participants were also asked to discuss and document what kinds of facilities are "needed" to help them have a good experience while on the Forest. Approximately 130 citizens attended the two workshops.

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.

Wilderness Use

Wilderness areas in the Mt. Hood National Forest are smaller than many other Northwest wildernesses, with visitors' trip duration being generally shorter. The average duration of a visit to the Mt. Hood National Forest is seven hours (2003 National Visitor Use Monitoring). People seeking multi-day or week long wilderness treks usually seek larger, more remote wildernesses. Currently, about 78% of the use on all popular wilderness trails is day use, a statistic that is slightly lower than the previous year. For the Mt. Hood Wilderness alone, day use as a percentage of total use is virtually unchanged.

Table 6 shows use in Mt. Hood wilderness areas in 2007 measured at entry points (trailheads). Most of the trails have high day use, especially on weekends. The Ramona Falls trailhead, usually the most popular portal, was not accessible by motor vehicle because the 1825 road bridge over the Sandy River was washed out in November 2006. It was not repaired until the fall of 2007. The most heavily used wilderness portal in 2007 was the Pacific Crest National Scenic Trail (PCT) accessed at Timberline Lodge.

Visitation to the Mt. Hood wilderness in 2007 was significantly lower than in 2006, continuing a downward trend in visitation. During most of this decade, annual visitation has been between 33,000 and 40,000 people. Some of the reduction may be attributable to the closure of the 1825 road and the loss of motor vehicle access to the Ramona Falls trailhead. Also, the Timberline Trail was not a loop trail in 2007 because of a severe washout at Eliot Creek. The area around Eliot Creek Crossing was administratively closed for public safety. Table 7 shows use at popular trailheads in the Salmon-Huckleberry and Mark O. Hatfield Wilderness areas in 2007. Most of the trails within the Salmon-Huckleberry and Hatfield Wilderness areas have very little use with the exception of the Salmon River, Eagle Creek and Wahtum Lake trails.

Economic System – Built Capital

Developed Recreation Sites

The Mt. Hood National Forest participated in a national recreation facility analysis (RFA), which is a systematic evaluation of developed recreation sites. The RFA process involved several steps: gathering inventory and financial data; identifying the Forest recreation niche; evaluating each developed recreation site against established national criteria (including conformance with the forest niche, financial efficiency, and environmental and community sustainability); and ranking the recreation sites according to those criteria. Using this analysis, as well as professional judgment and assessment of our ability to meet current and future demand, the Forest documented a proposed 5-year program of work. The established national criteria included:

- Conformance to the forest niche (see Social Systems – Social and Cultural Values section of this report for forest program niche statement) and amount of recreation use (35%);
- Financial efficiency (35%); and,
- Environmental and community sustainability (30%).

The Forest is proposing future management of 169 developed recreation sites through RFA. We want to provide healthy, safe, and well-maintained recreation opportunities that are important to local communities and visitors to the area. Through the RFA process, the overall goals of our developed recreation program are to:

- Focus resources on the most appropriate recreation opportunities to meet changing public desires and demands;
- Maintain or enhance visitor satisfaction with the sites and services provided;
- Meet quality health and safety standards at all developed recreation sites;
- Be financially sustainable;
- Be environmentally sound; and,
- Maintain community sustainability.

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Table 6. Mt. Hood wilderness visits from May 15 through October 15, 2007. 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.

Trailhead	Total Use People	Total Use Groups	Overnight People	Overnight Groups	% Day Use	Dogs	Horses
Burnt Lake North	18	7	0	0	100%	0	0
Burnt Lake South	1,569	652	534	197	66%	212	0
Cast Creek*	0	0	0	0	N.A.	0	0
Castle Canyon	294	140	5	4	98%	49	0
Cloud Cap	3,055	1,182	595	189	81%	166	0
Elk Cove	366	140	195	72	47%	3	0
Elk Meadows North	131	58	30	11	77%	17	2
Elk Meadows South	1,577	701	311	134	80%	190	4
Hidden Lake	627	262	18	9	97%	110	3
Horseshoe Ridge*	0	0	0	0	N.A.	0	0
Mazama	475	212	78	37	84%	65	0
McGee Creek	1,440	644	468	189	68%	141	0
Muddy Fork Top Spur	3,485	1,407	266	108	92%	424	7
Newton Creek	206	80	191	80	7%	9	0
Pinnacle	375	125	85	32	77%	50	0
Paradise Park	47	20	2	2	96%	4	0
Ramona Falls*	391	168	98	38	75%	42	0
Timberline – Climb	4,870	1,487	241	125	95%	11	0
Timberline – PCT	3,724	1,548	888	373	76%	241	4
Tilly Jane	581	259	80	39	86%	52	0
Vista Ridge	1,007	442	324	130	68%	129	0
West Zigzag Mtn.	230	101	16	5	93%	51	0
TOTALS	24,468	9,635	4,425	1,774	82%	1,966	20

* Note: 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. Mark O. Hatfield and Salmon-Huckleberry Wilderness area visits from May 15 through October 15, 2007. 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.

Trailhead	Total Use People	Total Use Groups	Overnight People	Overnight Groups	% Day Use	Dogs	Horses
Salmon-Huckleberry							
- Salmon River West	1,434	614	245	96	83%	211	5
Mark O. Hatfield							
- Eagle Creek	2,529	1,055	1,344	546	47%	140	0
- Whatum Lake	894	321	405	140	55%	8	3
Total Hatfield	3,423	1,376	1,749	686	49%	148	3

The 5-year 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. On the Mt. Hood National Forest, the backlog of deferred maintenance is over \$11,800,000.

RFA groups operational and structural changes at developed sites into 13 categories referred to as "Management Option Code" categories. Table 8 summarizes the proposed changes to Mt. Hood National Forest recreation facilities by Management Option Code category.

Table 8. Management Option Code Summary for Mt. Hood National Forest Recreation Facility Analysis, 2007.

Management Option Code Category	Option Code Count	Percent of Total
A - Decommission	12	4.1%
B - Closure	0	0.0%
C - Change Season	65	22.4%
D - Remove or Eliminate Cost Source or Service Season	33	11.4%
E - Reduce Service Frequency	22	7.6%
F - Increase/Improve Services	13	4.5%
G - Construct a New Area	1	0.3%
H - Change Operator	46	15.9%
I - Change Fees	7	2.4%
J - Change Capacity	4	1.4%
K - Site Conversion	42	14.5%
L - Replacement/Repair	0	0.0%
NC - No Change	45	15.5%

Table 9. Financial results expected from implementing the Recreation Facility Analysis at 169 Mt. Hood National Forest developed recreation sites.

Result	Baseline Condition	Program of Work Changed Condition	Percent Change
Appropriated Funds Available ¹	\$78,834	\$78,834	0%
Fee Receipts Available	\$304,015	\$102,635	-66%
Other Funds Available ²	\$881,000	\$881,000	0%
Annual Operating Costs	\$164,439	\$92,975	-43%
Annual Maintenance Costs	\$1,007,024	\$939,070	-7%
Deferred Maintenance Costs	\$11,843,336	\$8,945,355	-24%
PAOT Days Managed to Standard ³	824,627	2,366,119	187%
Annual O&M Costs/PAOT Day	\$0.46	\$0.44	-6%

¹Appropriated funds available are reflected using FY 2007 as the baseline funding year, with the assumption for this analysis that developed recreation funding will remain flat (subject to forest and regional priorities).

²Other Funds Available include funding from partnerships, grants, and other funding made available that are not appropriated funds or fee receipts.

³PAOT = People at One Time (or capacity of a site at any one time). PAOT Days equate to the number of days in a season where sites are managed to standard multiplied by total PAOT.

Table 9 summarizes the results that can be expected by implementing the management options and the 5-year program of work. These particular results focus specifically on financial sustainability, reduced deferred maintenance, and meeting quality health and safety standards at all developed recreation sites.

Campground Use

Visitation and utilization data was reported by permit holders for concessionaire-managed campgrounds in 2007 (Table 10). The Highway (Hwy) 26 and Clackamas River Complex campgrounds were managed more efficiently in 2007, and the concessionaire reported its best year to date. While total campsites occupied in the Hwy 26 corridor was lower than in 2006, the percent occupancy increased. The number of campsites occupied in Clackamas River Complex campgrounds was identical to 2006 in spite of an increase in campsite fees in 2007. Party size was slightly higher at Clackamas River campgrounds (4.1 people per site in 2007 compared to 4.0 people per site in 2006).

Table 10. Mt. Hood National Forest campground use in 2007 by number of campers, number of sites occupied, and percent occupancy. No data were available for Olallie Complex campgrounds by publication date.

Campground Complex	No. Campers	No. Sites Occupied	Percent Occupancy
Hwy 26	106,948	27,394	37%
Clackamas River	46,461	11,422	26%
Lost Lake and East Fork	No Data	7,970	32%
Olallie	No Data	No Data	Not Calculated

The reduction in Hwy 26 Complex campground site occupancy coincided with the season-long closure of McNeil, Riley horsecamp and Lost Creek campgrounds because of the loss of the 1825 road bridge during November 2006 flooding. The bridge was not repaired for motor vehicle traffic until fall 2007. The number of sites unavailable in these campgrounds largely accounts for the

reduction in site occupancy. The other Hwy 26 campgrounds did not see a significant increase in occupancy.

The data suggests campers displaced by the closure of McNeil, Riley horsecamp and Lost Creek campgrounds did not choose another Hwy 26 campground. They either went somewhere else, or they did not go camping.

Lost Lake and East Fork Complex campgrounds saw a 13% increase in site occupancy in 2007 compared to 2006. Perhaps some of the increase can also be attributed to displacement from the three closed Hwy 26 complex campgrounds. The percent occupancy in Lost Lake and East Fork complex campgrounds was essentially the same in 2007 as in 2006 suggesting that the increase in campers equaled the increase in campsite capacity. There was increased capacity in the East Fork campgrounds in 2007. In 2006, Sherwood and Nottingham campgrounds were closed in the height of the season because of the Bluegrass Fire.

Occupancy data for eastside rustic campgrounds was collected in 2007. For Hood River Ranger District campgrounds, approximately 423 campsites were occupied during the camping season, which equates to 8% occupancy. For Barlow Ranger District campgrounds, approximately 2,220 sites were occupied, which equates to 13% occupancy.

The Forest Plan projected reaching capacity in Forest Service developed sites 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 2007, 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, and may be shrinking. 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.

In 2007, the Mt. Hood National Forest engaged in recreation facility planning (RFA). With public involvement, the Forest examined supply, demand, and cost to operate and maintain developed recreation facilities. This examination day-lighted some hard choices and trade offs in order to effectively manage developed recreation facilities. Recommended management actions were documented in a proposed 5-year program of work that will be available for public review and comment during 2008. Carrying out the 5-year program of work will allow us to carefully and wisely manage recreation facilities and programs that meet current and future public needs and ensure recreational activities provide the right opportunities in the right places.

Ski Areas

National Climatic Data Center information shows a roughly average snowpack at Mt. Hood ski areas during the 2006-2007. The pre-season precipitation was generally above normal region-wide. However, the overall pre-season totals were skewed by a record-setting November. Incessant rainfall continued through the first part of December. The latter half of December through January was relatively dry, followed by a wet February. Springtime precipitation was generally below normal (NOAA, Portland Fire Weather, 2007 Annual Report).

Record-setting November precipitation produced a snow depth of 55 inches at Government Camp by November 28th. Precipitation declined in December, with the snow depth dropping to around 35 inches by the end of the month. A big early-January storm resulted in an increase from 29 inches on January 3rd, to 61 inches on the 7th. The snow depth remained fairly constant, around 50 inches, through the 22nd, but then fell to 36 inches by the end of January. A mild February brought the snow depth down to a minimum of 19 inches on the 18th. A series of colder storms in late February and early March increased the snow pack to a seasonal high of 63 inches on March 3rd. Typically, mountain snow pack reaches a peak in March, and 2007 was no exception. However, the rest of March turned out warm and relatively dry. As a result, the Government Camp snow depth dwindled to just 10 inches by the 31st. Snow depth fell to zero in early April, but reached 10

inches on the 19th. The snow pack was short-lived. Government Camp recorded zero inches on April 23rd. Snow cover usually persists through early June (NOAA, Portland Fire Weather, 2007 Annual Report).

Use of the Mt. Hood National Forest’s five alpine ski areas during the 2006/2007 season was 3% higher than use during the previous season, bucking the regional trend which showed an overall decrease in skier visits (Table 11). According to the Pacific Northwest Ski Areas Association 2006/2007 Annual Visitation Report, Mt. Hood Meadows had 460,328 visits, 42,767 visits fewer than the previous year (a 9% decrease). This decrease was greater than for the region as a whole, which showed a 5% decrease from the previous year. Timberline reported 251,617 visits, 18,453 more visits than the previous year (an 8% increase). Cooper Spur reported 19,604 visits, a 14% decrease in use from the previous year. Mt. Hood Ski Bowl had another good year and had a sizable bump from the previous year with a total of 370,922 visits (66,023 visits more than the 2005-2006, a 22% increase). Summit Ski Area reported 14,484 visits, roughly equivalent to the 1995-1996 season.

Table 11. Mt. Hood National Forest ski area visits in winter 2006-2007. Data from Pacific Northwest Ski Areas Association. Timberline includes summer skiing.

Ski Area	2004-2005	2005-2006	2006-2007	10-Yr Avg.
Cooper Spur	915	22,906	19,604	10,181
Mt. Hood Meadows	190,722	503,095	460,328	368,337
Ski Bowl	146,833	304,899	370,922	179,903
Summit	No Report	14,347	14,484	7,380
Timberline	196,856	233,164	251,617	252,273

Trails

The Forest Plan 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 less than 10 miles. During 2007, the Mt. Hood National Forest awarded a contract to reconstruct 4.2 miles and relocate approximately 0.8 miles of the Timberline Trail, from Cloud Cap to Elk Cove.

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.

Recommendations

Beginning in 2008, the Mt. Hood National Forest should begin implementing RFA (recreation facility analysis):

- Work with Timberline permittee 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 to group sites and group use at snoparks in the summer.
- By 2012, retire \$2 million in deferred maintenance at Timberline Lodge.
- By 2012, conduct a comprehensive analysis of costs to operate Timberline Lodge including a facility condition survey.
- By 2012, retire current deferred maintenance at all Recreation Enhancement Act sites forest-wide.

Heritage Resources

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.

1. 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 contacts with the CTWS. Informal consultation was initiated with the Confederated Tribes of Grand Ronde in 2007 for the proposed Palomar Pipeline project. Efforts were begun to establish a protocol for future project consultation.

2. 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 Officer (SHPO). The following preservation projects were undertaken during FY 2007.

Timberline Lodge (National Historic Landmark)

A Historic Building Preservation Plan (HBPP) 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 12 lists projects approved under plan stipulations during FY 2007 in consultation with the State Historic Preservation Officer (SHPO). In addition to these projects, plans for a new removable snow entry structure were developed in consultation with the SHPO and were subject to public review. Designed for visual compatibility, the new structure will replace the corrugated metal "Quonset Hut" entry used seasonally since the 1950s. The snow entry project is being funded by Friends of Timberline, and fabrication of the new structure is planned for late 2008.

Table 12: Approved Projects at Timberline Lodge

Project No.	Description	Finding
2007-060609-004	Installation, Basement Door Closer	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2007-060609-012	Headhouse Door Repair	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2007-060609-026	Handrail replacement, west wing stairwell	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2007-060609-027	Repair of Steps, Front Entry	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b
2007-060609-041	Reconstruction of Chimneys	Within Timberline Lodge Agreement. No Adverse Effect. Stip. III.C.3.b

Cloud Cap Inn

Constructed in 1898 as an inn for guests of mountaineering expeditions on Mount Hood, the structure consists of a large, irregular shaped rustic log building. The property is listed in the National Register of Historic Places. The Hood River Crag Rats, a search and rescue organization, began managing and maintaining the structure as a base of operations in the 1950's. Numerous restoration and rehabilitation projects have been developed and implemented in consultation with the SHPO. In 2007, the Forest received a large Capital Improvement Projects (CIP) grant for continued rehabilitation work on the structure. In 2007, work continued on the east wing of the structure, including replacement of exterior logs and windows, and the addition of a foundation.

Bagby Guard Station

Built in 1913 to serve as headquarters for the Bagby District, Bagby Guard Station consists of a rustic log cabin and associated storehouse associated with a popular hot spring. The property is listed in the National Register of Historic Places. In partnership with Northwest Forest Conservancy (NFC), a private, non-profit organization, the Forest executed a Memorandum of Understanding in 2006 for historic preservation activities involving the guard station. NFC continued implementation of the first phase of treatments, repair, and rehabilitation work in 2007. In consultation with SHPO, a "No Effect" ("No Historic Properties Affected") determination was made for the proposed project work (2006).

3. Nominations to the National Register of Historic Places

There were no nominations to the National Register in 2007. The last nomination was for Bagby Guard Station, listed in the National Register of Historic Places in September 1999.

In consultation with the State Historic Preservation Office, the Forest evaluated several historic resources for National Register eligibility during fiscal year 2007. Eligible resources include Bear Creek Cabin No. 1 (1927), owned by the City of Portland and located on Forest Service land in the Bull Run watershed and Olallie Lake Resort (1932), privately owned and under Special Use Permit to the Forest Service. The Eliot Branch Irrigation Ditch (1907), within the Hood River watershed, was evaluated and determined not eligible.

4. 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.

Public archaeology and restoration activities have been particularly successful ways to involve volunteers in the management and interpretation of heritage resources. In May and June 2007 Zigzag Ranger District hosted a *Passport in Time* public archaeology project at the site of CCC Camp Zigzag. Volunteers participated in survey, mapping, and test excavations at the site of the camp, and conducted on-site oral history interviews with former CCC enrollees.

Oregon Archaeological Society (OAS) volunteers participated in an archaeological survey project near Rock Creek Reservoir, in Wasco County, assisting the District Archaeologist. 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.

In September, the Barlow Ranger District repeated a popular interpretive program on emigrant use of the Barlow Road at White River Station Campground, one of the historic sites within the Barlow Road Historic District. The District Archaeologist staffed an interactive public archaeology station as a part of the week-long volunteer driven event, held during Oregon Archaeology Month. Over 500 visitors attended the event. As previously noted, Northwest Forest Conservancy volunteers continued restoration and rehabilitation efforts at the historic Bagby Guard Station.

Conclusions

The avoidance of impacts to heritage resources was a goal for all projects implemented during FY 2007. 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. No adverse effects were reported during the year.

Recommendations

Heritage Program activities focused on the highest priority projects and resource protection efforts. A number of specific projects were still in progress at the end of the year, and remain to be completed. The following projects are recommended for addition to the program of work for fiscal year 2008, 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

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 toward the objectives of the Forest Service Roads Agenda.

Transportation Management Objectives:

- The Forest is decreasing the size of the transportation system.
- The Forest is maintaining or improving 461 miles of mainline road system.
- The Forest is decommissioning, closing or downgrading the maintenance levels on the remainder of the 2,946 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.
- Due to the high cost of road decommissioning, the Forest has been focusing efforts on storm-proofing and closing roads.

Approximately 50% of the 3,407 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.

2007 Accomplishments

Miles of Road at end of 2006	3,389 mi
New Road Construction	0 mi.
Miles of Road Decommissioned	0 mi.
Miles of Road at end of 2007	3,407 ^{1*} mi.
Total Miles of Passenger Car Roads Maintenance Level (ML) 3-5.	461 mi.
Passenger Car Roads ML 3-5 receiving maintenance	240 mi.
% of Passenger Car Roads ML 3-5 receiving maintenance	52%
Total Miles of High Clearance Roads Operational ML 2	2,394 mi.
High Clearance Roads Operational ML 2 receiving maintenance	81 mi.
% of High Clearance Roads Operation ML 2 receiving maintenance	3%

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.

^{1*} This increase in mileage compared to the previous year reflects corrections made in the Forest Service Infrastructure (Infra) Database, which is the database system used for the storage and analysis of information in the transportation atlas for the agency.

Table 13. Road Maintenance Budget.

	FY89	FY04	FY05	FY06	FY07
Annual Road Maintenance Needs	\$5.2 million	\$1.8 million	\$2.0 million	\$2.1 million	\$2.2 million
Annual Road Maintenance Budget	\$3.8 million	\$0.5 million	\$0.6 million	\$0.5 million	\$0.4 million
Percent of Needs Met by Budget	73%	28%	30%	24%	18%

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 2-3 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

Goal

The monitoring goal is to provide forage for use by permitted domestic livestock on lands determined as suitable and capable of producing range vegetation and within constraints imposed by Forest Plan Standards and Guides.

Existing Condition

Approximately 155,625 acres, or 15% of 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 System lands adds an element of economic viability to these ranch operations. Notably, the ranch land in private ownership provides essential big game winter habitat for deer and elk, which is in critically short supply.

Monitoring Questions

- *Are AMP's (Allotment Management Plans) being implemented on the ground?*

AMP's 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. Permittee's 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 may be taken against their permit which may involve anything from temporary partial suspension to permit cancellation.
- *Are we meeting Forest Plan objectives for range?*

In the Forest Plan, objectives for range were quantified and expressed as an output called "animal unit months" (p. four-14). The current Forest Service measurement of this output is called "head months". Actual livestock use for the 2007 season was 1,671 head months (HM's) out of a total 3,684 HM's under permit.

Monitoring Range Ecosystem Function and Productivity

Long-Term Vegetative Trends

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 at one time on all allotments using photo trend methodologies. These methodologies are currently being evaluated for their effectiveness at meeting these objectives, per Region 6 direction in the "Rangeland Ecosystem Analysis and Monitoring Handbook" (FSH 2209.21). Once a methodology is selected, the protocol typically requires that permanent plots are established and monitored once every five to seven years. This data will record plant species composition and diversity, percent bare soil, plant vigor and other vegetative indicators, which in turn can help interpret trend, the direction of that trend and/or changes over time. Under the current methodologies utilized and along with other monitoring data, indications are that overall range vegetative condition is stable to improving.

Short-Term Forage Utilization Studies

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 active allotments. These studies are used to monitor the consumption of the current years forage by both permitted livestock and wildlife. Of the twenty-seven established monitoring sites, which are visited annually, nineteen are located within riparian areas. All nineteen (100%) met utilization standards established. The remaining eight sites are located within the uplands, and 100% (8 sites) met Forest Plan Standards and Guidelines.

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 to 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.

As discussed in the Timber section of this monitoring report, numbers of acres harvested have dropped significantly over the past several years. This results in fewer acres of "transitory range" (as mentioned above) and therefore, less forage. This trend is expected to continue. 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. Some of these meadows and riparian areas are also heavily used by recreationists and provide important wildlife habitat. These trends and conflicts should be analyzed through the NEPA process as we proceed with updating allotment management plans so that appropriate resource decisions can be made.

Accomplishments

The Rescission Act of 1996 generated throughout the agency a list of grazing allotments that needed updating of their AMP's through the NEPA process. This forest so far to date has accomplished updating three out of their five active allotments. The third accomplishment on this list occurred this last fiscal year of 2007. The Badger Allotment was updated through the authorized use of a Categorical Exclusion (CE). The outcome from that analysis was that the vegetative condition and trend was in a "stable to upward" state. This decision identified continuation of the current level of grazing management.

There were two major structural accomplishments for range that occurred in the 2007 season. One was the implementation of a fencing project identified within the Long Prairie Allotment Environmental Analysis. This decision identified construction of a drift fence in the southern portion of the allotment. The construction of just over one mile of fence was completed this last fall. The entire project calls for three miles to be constructed. The other structural improvement was construction of the Camas Meadow enclosure within the White River Allotment. This enclosure was needed for more effective implementation of grazing management along with protection for meadow resources since they provide special habitat for wildlife species such as the Sandhill Crane and the Cascade Spotted Frog. The size of this enclosure is 2-3 miles in length.

Another accomplishment is the long-term partnership with a riparian restoration objective that has been developed with Catlin-Gable High School. Students and staff work together on ecosystem restoration projects, generally with a fisheries focus, incorporating components of environmental education and monitoring. Many of these restoration projects have been done within grazing allotments, such as fencing riparian areas to control livestock use. An example is a major portion of the Camas Meadow enclosure mentioned above, was constructed by Catlin-Gable. The students (and Forest Service) learn a great deal, accomplish needed restoration work, and most importantly, give the students an understanding of the resource conservation issues they as the "next generation" will be managing in the future. This important partnership should receive priority so it will continue.

Minerals

There were no commercial leasable or locatable mineral development activities on the Mt. Hood National Forest in FY 2007. Locatable mineral activities were limited to minor sampling and exploration on the Forest. Two Notice-of-Intent forms were submitted to the Forest. In all cases, the planned activity was limited to mineral exploration. There were 14 inquiries from the public regarding laws and guidelines covering locatable minerals on National Forest System lands. The Forest responded to 100% of these inquiries.

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 were two projects where 95,500 cubic yards of mineral materials were used by other government agencies. There were three projects where a total of 4,100 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 FY 2007 there were five operating plans completed for current and future projects. There were 778 smaller projects where salable mineral materials were used by the public. These projects removed a total of 277 cubic yards.

All the mineral activity took place in currently developed and designated common variety mineral material sources in a manner that did not conflict with other resource objectives. Not all the existing sources have completed formal long-range development plans. No new development plans were completed, although several remain nearly completed.

The Mt. Hood National 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 sources 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 sources 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.

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 assumptions used in determining sale quantity are monitored as well as meeting standard and guidelines for other resource objectives.

Ecological Integrity– Landscape Function, Structure and Composition

Landscape patterns can be defined in terms of vegetation community types present, the seral stage (or age) of these vegetation types, and their vertical and horizontal structural characteristics. The vegetation patterns or mosaics help us to look at

the implications of vegetation management on attaining landscape-desired conditions.

Timber harvest influences vegetation patterns by affecting the distribution of seral stages across the landscape. In 2007, harvest occurred on a very small portion of the overall landscape. Harvest occurred on 783 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. Eighty-eight percent, or 690 acres, of the harvest occurred on lands designated as Matrix in the Northwest Forest Plan. Most scheduled timber harvests that contribute to probable sale quantity occur in the Matrix land allocation. In addition, harvest occurred on 79 acres within the Riparian Reserves and 3 acres in Late Successional Reserves (LSR) to meet the objectives of those land allocations.

Ecological Integrity – Ecosystem Function, Structure and Composition

The objective for timber resources is to produce a continuing supply of wood products at sustainable levels consistent with other resource values and economic efficiency. The productive capacity of a forest is critical to providing a continuing supply of wood products. Productivity is also strongly linked to sustainability issues given the importance of the forest's contribution to carbon sequestration and climate change.

Timber Inventory, 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 following pie chart (Figure 4) 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.

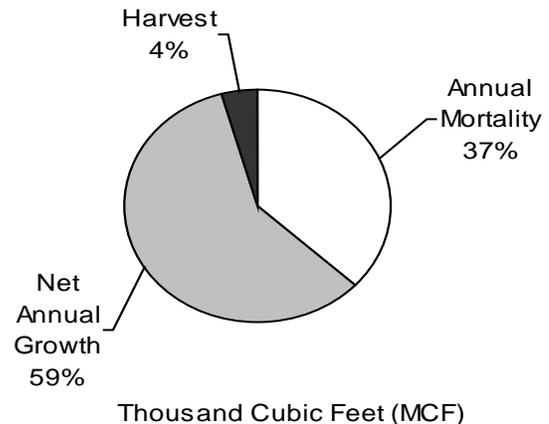
Overall, annual growth is more than 13 times that of harvest and yearly mortality exceeds harvest by a factor of 8 to 1. On Matrix lands only (outside of Riparian Reserves), growth is almost 3.7 times the rate of harvest. This indicates that timber harvest, by removing trees from the Forest, is having 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.

Figure 4. Growth, Mortality and Harvest on Mt. Hood National Forest.



Change in Inventory of Standing Timber - Disturbance from Forest Insects and Diseases

The Forest Plan monitors catastrophic changes in the amount of standing timber inventory which may result from disturbances, such as fire, windstorms, and insect outbreaks. In addition, annual review of current insect and disease survey maps are used to determine trends and effects on tree growth and mortality. Cumulative loss of harvestable growing stock is monitored and tracked.

Annual Aerial Detection Survey

Bark beetle outbreaks have caused significant amounts of tree mortality on the Forest and adjacent lands for the last several years. Approximately 148,000 acres of the Forest have significant levels of dead trees from bark beetle activity. There are approximately 266,000 acres of affected lands, including lands immediately adjacent to the Forest, namely the Confederated Tribes of Warm Springs Reservation. This is roughly a 30% increase in affected acres over FY 2006 indicating there is still host material (i.e., dense lodgepole and mixed conifer stands available for the mountain pine beetle outbreak to continue).

There is an increase in both the number of acres affected and the amount of dead trees per acre. The following map (Map) 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 map and data have been changed to include a ten year period from 1998-2007, (the previous map depicted 2001-2006); however most of the mortality has occurred over the last six to seven years.

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*), silver fir beetle (*Pseudohylesinus sericeus*), and western balsam bark beetle (*Dryocoetes confusus*). 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.

The number of acres in each mortality class for the Forest and adjacent lands are included in Table 14. Table 15 includes the number of acres in each mortality class for the Forest lands alone.

Table 14. Mortality Class for Mt. Hood National Forest and Adjacent Lands.

Dead Trees per Acre	Acres
<= 5	178,139
> 5 and < 10	21,132
> = 10 and < 25	38,695
> = 25 and < 50	21,372
> = 50	6,407
Total	265,745

Table 15. Mortality Class for Mt. Hood National Forest Lands.

Dead Trees per Acre	Acres
< = 5	103,744
> 5 and < 10	11,064
> = 10 and < 25	21,083
> = 25 and < 50	10,519
> = 50	1,674
Total	148,084

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/.

Insect and Disease Concerns

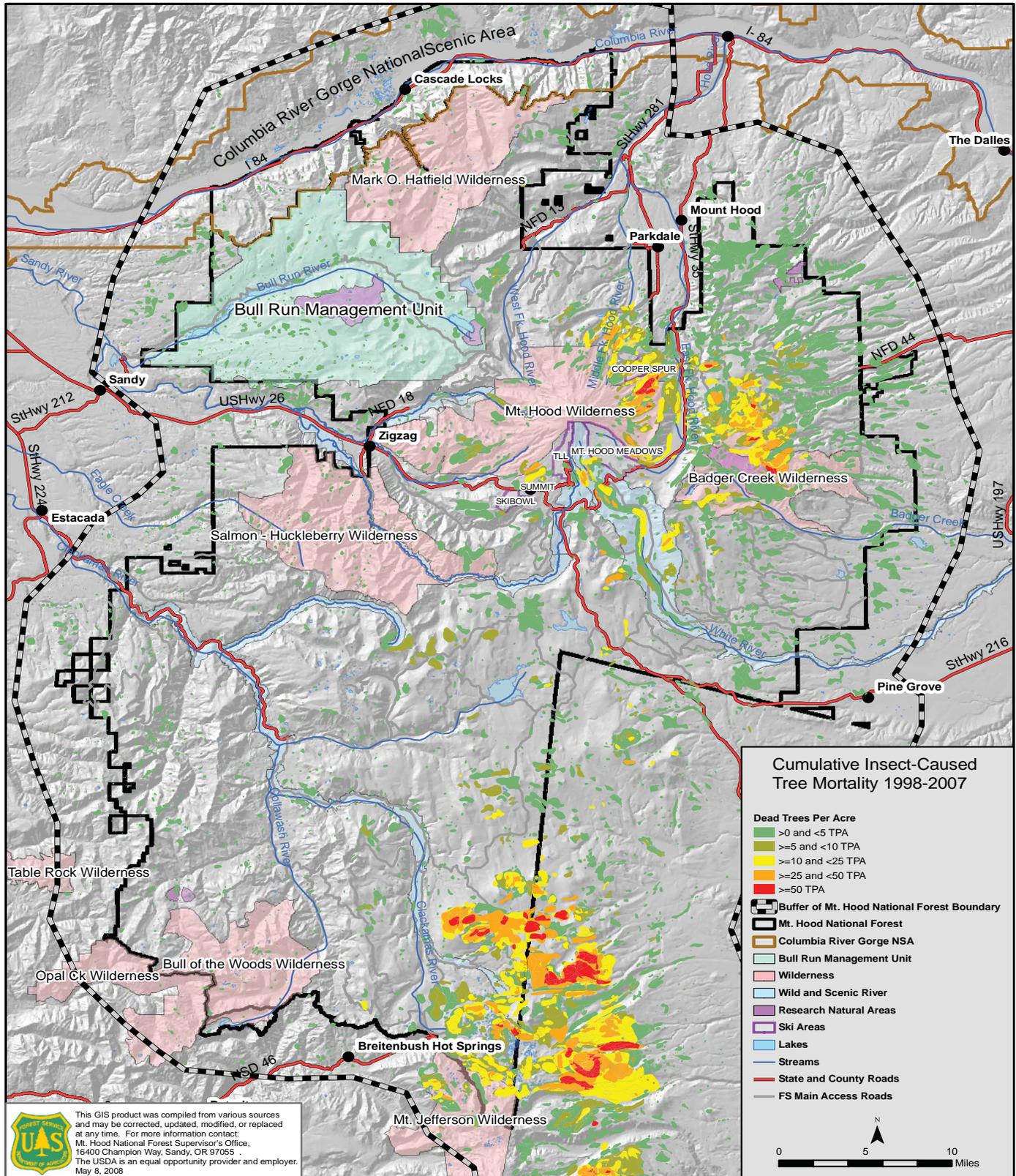
The Forest has large amounts of susceptible host habitat of lodgepole pine and mixed conifer stands that regenerated after fire at the turn of the century. Beetle activity on the eastside remains high and is increasing along the western flank and the high plateau of the Cascade crest. There has been a continued increase in the acres affected by the mountain pine beetle, not only in lodgepole pine, but in ponderosa pine and whitebark pine as well. Over the next few years, it is likely that additional stands of host trees will be killed by bark beetles until the host habitat is depleted.

Beetle killed lodgepole can provide a short-term food source for species, such as the black-backed woodpecker, which feeds on both the mountain pine beetle larvae and secondary wood borer larvae. The excavations are then used by small, cavity nesting birds. Large-scale infestations can also result in increased fuel loadings and increased concern over hazardous fuels. In appropriate land allocations, the salvage of beetle killed trees can provide wood products, firewood or biomass.

In addition, there are many acres of second growth ponderosa pine stands on the eastside of the Forest, which are at or above maximum stocking densities. These 35 to 40 year old ponderosa pine stands on the eastside are becoming imminently susceptible to bark beetle attack or will become susceptible within the next five to ten years. There was an increase in ponderosa pine mortality from mountain pine beetle in 2007. Other bark beetles, such as the fir engraver and Douglas-fir beetle, affected an increase in acres in 2007. Mortality from the fir engraver substantially increased, likely due to continued overstocking of eastside, mixed conifer stands.

Map 1. Tree Mortality Map 1998-2007.

Cumulative Insect-Caused Tree Mortality 1998-2007



In some areas large, old overstory ponderosa pines are at risk of being attacked and killed by western pine beetles, *Dendroctonus brevicomis*. In the last year or so, the yellowed crowns of dying, large ponderosa pines have been noticed on the eastside of the Forest.

These large ponderosa pines are particularly at risk if they are in areas with high stand densities due to lack of understory tree removal by either harvest or periodic fires. Thinning in these areas is necessary where this large structure is important on the landscape.

The western spruce budworm (*Choristoneura occidentalis*) is a defoliating insect that affected large acreages of Douglas-fir and true firs from approximately 1983 to 1993. Although there is no significant current budworm activity, the past outbreak 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.

Defoliation in western larch along Road 44 near Bottle Prairie continues. This defoliation is caused by a combination of an insect, larch casebearer (*Coleophora laricella*), and two needle diseases, larch needle cast (*Meria laricis*) and larch needle blight (*Hypodermella laricis*). The effects of these defoliating agents are highly visible in the spring yet typically do not cause mortality; however, radial growth and resistance to other disturbance agents is reduced. Mortality can, and is occurring, with the repeated defoliation in this particular area. 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.

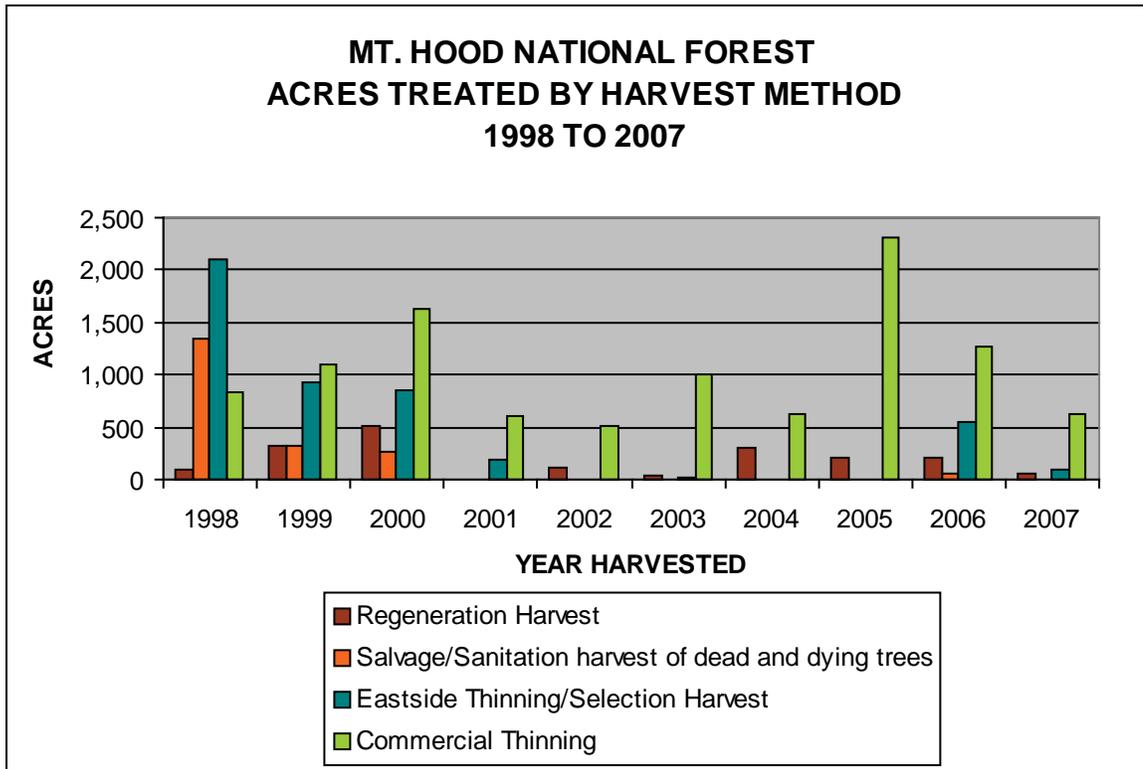
Also at higher elevations, balsam woolly adelgid, a non-native insect, is slowly killing the subalpine firs and significantly changing the makeup of these habitat types. The 2007 aerial survey showed an increase in tree mortality caused by the balsam woolly adelgid. There are no viable management options to reduce the effects of this insect on the subalpine fir habitats.

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. Sugar pine seedlings need to grow into full sun before they reach sapling size. Natural or created openings in the forest, as well as areas of very low tree stocking, could provide sufficient sunlight for planted seedlings.

Economic – Natural Capital

The natural capital of forests refers to the quantity and also quality of the forest resource. Changes in the quantity or condition of forest resource assets affects sustainability of the surrounding social and economic environment by affecting uses of the land and the types of jobs and income resulting from them. Capital investments and their management can greatly influence the short- and long-term impact a national forest can have on local communities. The Forest Plan monitors accomplishments of management practices programmed to contribute to future sale quantity. Examples of these capital investments/ management practices includes harvest methods, reforestation and timber improvement activities which contribute not only to future sale quantity, but to long-term productive capacity, timber growth, and other resource objectives which help to maintain sustainable conditions.

Figure 5. Acres Treated by Harvest Method.



Year Harvested	Regeneration Harvest*	Salvage/Sanitation Harvest	Eastside Selection Harvest	Commercial Thinning
1998	87	1,353	2,095	829
1999	319	319	931	1,090
2000	519	261	843	1,622
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	2,302
2006	203	549	61	1,270
2007	59	0	92	634
10 Year Total	1,856 (10%)	2,482 (13%)	4,242 (22%)	10,478 (55%)

*includes shelterwood harvest and regeneration harvest with reserves

Harvest Methods

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

Thinning is a cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality. The stands are thinned from below which removes trees from the lower crown classes leaving the tallest, largest, and fastest growing trees to meet desired objectives. To enhance biodiversity, the Forest is increasing the use of variable density thinning which includes species and structural diversity. Variable density thinning creates small openings, leaves unthinned patches, and varies the spacing between leave trees. Increased sunlight to the forest floor provides for a greater diversity of understory vegetation. Thinning prescriptions also emphasize retention of minor tree species, including the retention of some trees with elements of wood decay and live trees adjacent to key snags.

Shelterwood harvest is a type of regeneration method in which some overstory trees are retained to provide a moderated environment for regeneration of a new age class. Typically, this method is used on the harsher sites of the Forest along the Cascade Crest, or on the drier sites on the eastside of the Forest. In a shelterwood with reserves, the overstory shelter trees are retained indefinitely to meet the green tree retention standards of the Northwest Forest Plan or to meet other objectives, such as visual quality.

Group selection is another type of regeneration method in which trees are removed and new age classes are established in small groups. This approach is often used in areas that have root disease and a change in host species is needed to reduce the effects and spread of the disease. Also, it is used for regeneration of shade intolerant species.

In 2007, commercial thinning was the harvest method on 81% of the acres, selection harvest 12%, and shelterwood harvest with reserves 7% of the acres. In the last decade, there has been an overriding shift from regeneration harvest to commercial thinning. Figure 5 displays 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 years ago have grown to plantations of commercial size.

National Forest Management Act Reforestation Requirement

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 trees 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 285 acres of reforestation in FY 2007. 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. Some eastside units require a second inter-planting in addition to the initial planting, which is included in the accomplishment.

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:

1. Douglas-fir,
2. ponderosa pine,
3. western larch,
4. western white pine,
5. noble fir, and
6. lodgepole pine.

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.

The overall first year survival of the planted seedlings varied widely from a low of 44% for Douglas-fir on the eastside to a high of 97% for noble fir on the Westside. The overall survival was still quite good, 80% or higher for all species.

Based on initial survival and stocking surveys, and expectations for continuing in-growth from natural regeneration, the five-year regeneration requirement should be met on all units; although, some of the sites on the eastside will need continuing pocket gopher control or additional inter-planting. Districts are continuing to complete stocking surveys and certify units as adequately stocked.

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% variance in spacing. This allows for greater species and structural complexity in the stand.

Pre-commercial thinning needs continue to increase on the Forest as stands regenerated 10 to 20 years ago have grown to the size where thinning treatments are needed. In FY 2005, and as requested by Congress, each National Forest reviewed, validated and signed a Certification of Data Accuracy for their young stand improvement and reforestation needs. The stand improvement need for the Forest amounted to 18,985 acres. Fertilization and pruning needs were decreased to reflect the funding priority to PCT and changes in management emphasis. Fertilization for bough production was included because there is a strong market for boughs as a special forest product.

In FY 2007, the Forest accomplished 2,606 acres of young stand thinning or PCT. This is a decrease from fiscal year 2006 due to available funding sources. The forest continues to fund pre-commercial thinning treatments primarily through the use of Stewardship Contracting authorities and Payments to the Counties funding. 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.

Economic – Providing a Sustainable and Predictable Supply of Forest Products

Harvest Rates by Management Allocation

The Forest Plan monitoring report tracks the amount of acres harvested within each of the management areas to help determine if Forest Plan assumptions used to estimate the effects of standards and guides on timber harvest are appropriate. As displayed in the following tables, 41% of the 2007 harvest occurred in C1 timber emphasis and 59% occurred in category B allocations where timber production is a secondary goal. For 2007, these include B2 scenic viewshed, B6 special emphasis watershed and B8 earthflow area (see Tables 16 and 17).

Table 16. Percent of Acres Harvested by Management Area Category.

Fiscal Year	Mt. Hood National Forest Land Allocations			
	A	B	C	D
1998	11.0	41.0	48.0	0.0
1999	0.0	33.7	66.3	0.0
2000	2.0	29.0	69.0	0.0
2001	1.0	28.0	71.0	0.0
2002	0.0	60.0	40.0	0.0
2003	13.0	37.0	50.0	0.0
2004	0.0	47.0	53.0	0.0
2005	5.0	25.0	70.0	0.0
2006	0.0	66.0	34.0	0.0
2007	0.0	59.4	40.6	0.0

Supply of Commercial Forest Products

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.

In FY 2007 the budget allocation scheduled the Forest to offer for sale approximately 37.9 MMBF (59.2% of PSQ), which was a 55% increase over FY2006. The Forest successfully offered for sale approximately 37.0 MMBF (57.8% of PSQ). This was accomplished using 9 stewardship contracts. The 9 stewardship contracts “best value” bid, resulted in the revenue source which will accomplish approximately \$3.7 million in restoration projects such as fuel reduction projects within The Dalles watershed as well as road maintenance, road decommissioning, OHV damage repair, precommercial thinning and wildlife habitat enhancement on the Clackamas River RD. 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 2009 and 2009.

Mt. Hood National Forest

Table 17 - Acres Harvested by Forest Plan Management Area in FY 1998-2007

Management Area		98	99	00	01	02	03	04	05	06	07
A4	Special Interest Area	372	0	19	0	0	0	0	0	0	0
A5	Unroaded Recreation	0	0	0	0	0	149	0	0	0	0
A6	Semi-primitive Roaded Recreation	0	0	0	0	0	0	0	0	0	0
A7	Special Old Growth	95	0	0	0	0	0	0	0	0	0
A9	Key Site Riparian	0	0	15	11	0	0	0	126	0	0
A10	Developed Recreation	14	0	0	0	0	0	0	0	0	0
A11	Winter Recreation Area	0	0	0	0	0	0	0	0	0	0
A12	Outdoor Education Area	0	0	0	0	0	0	0	0	0	0
A13	Bald Eagle Habitat	0	0	39	0	0	0	0	0	0	0
B1	Designated Wild & Scenic Rivers	0	0	0	0	0	0	0	0	0	0
B2	Scenic Viewshed	876	206	80	70	182	280	189	106	741	184
B3	Roaded Recreation	0	0	1	0	0	0	0	0	0	0
B4	Pine Oak Habitat Area	366	282	62	0	0	0	0	60	0	0
B6	Special Emphasis Watershed	169	191	64	0	95	0	0	14	545	247
B8	Earthflow Area	191	106	238	74	23	0	151	123	76	34
B9	Wildlife/Visual Area	0	0	0	0	0	0	0	0	0	0
B10	Winter Range	156	112	163	0	0	0	0	181	0	0
B11	Deer and Elk Summer Range	23	0	352	79	74	91	82	141	21	0
B12	Back Country Lakes	0	0	0	0	0	0	0	0	0	0
C1	Timber Emphasis Area	2,104	1,762	2,257	574	246	509	485	1,774	700	318
DA1	Bull Run Physical Drainage	0	0	0	0	0	0	0	0	0	0
DA3	Bull Run Research Natural Area	0	0	0	0	0	0	0	0	0	0
DB8	Bull Run Earthflow Area	0	0	0	0	0	0	0	0	0	0
DC1	Bull Run Timber Emphasis Area	0	0	0	0	0	0	0	0	0	0
Total		4,366	2,659	3,299	808	620	1,029	917	2,525	2,083	783

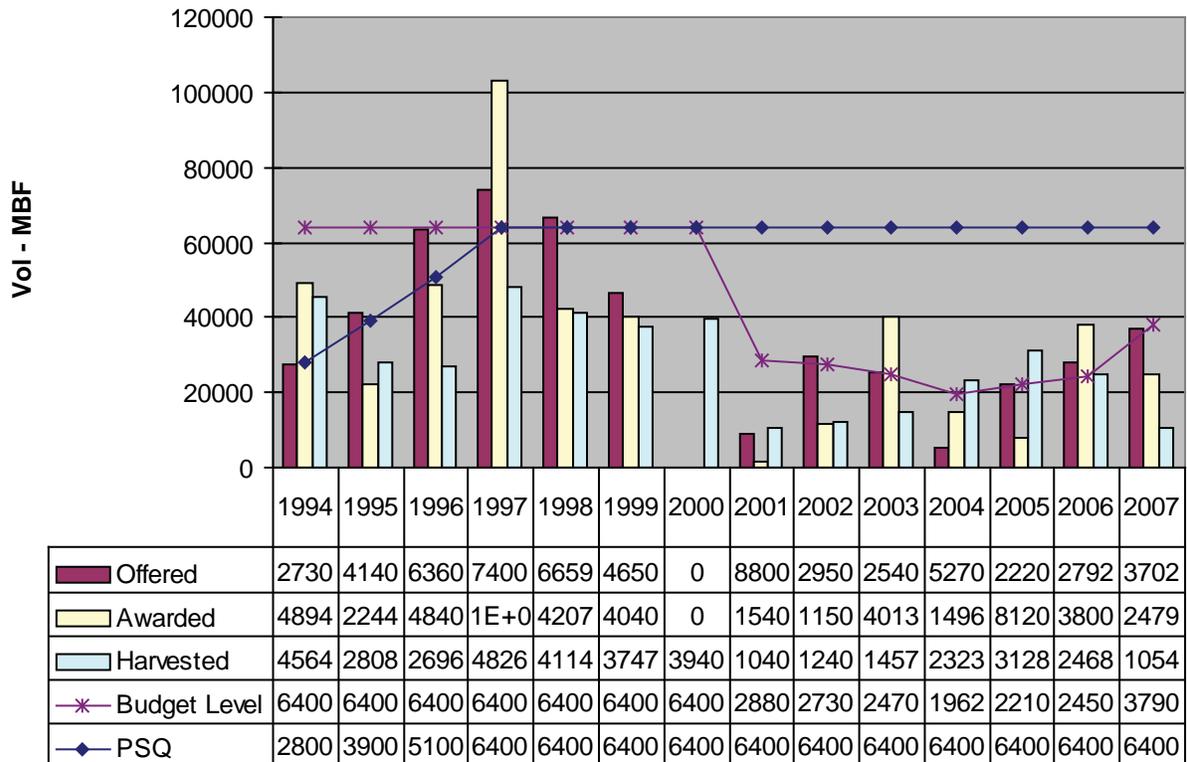
Regional Economic System

Since the early 1990's and the listing of the spotted owl and as threatened species, harvest levels of commercial forest products from the Forest have dropped significantly. There used to be 9 to 11 local mills that bought most of the timber sales. Today, there are approximately 5 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 addition, many of our purchasers are log buyers or loggers who do not own mills themselves. In FY 2007, 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 2007 all stewardship contracts included a provision, which would allow the purchaser or contractor to remove biomass if a market developed.

Timber sales from the Forest have been contributing a wide variety of logs to the region in terms of both diverse species and a variety of sizes and quality. Over the last four years the Forest has been providing a more "predictable" supply of forest products to the region than it has in the past.

Figure 6. Mt. Hood National Forest Volume Summary



Future Expectations – Providing a Sustainable Supply of Forest Products

Sustaining a predictable supply of forest products to the region's economic system through silvicultural treatments such as thinning and fuel reduction treatments is interrelated to the ecological system. Thinning and fuel reduction operations maintain healthy forest, reduce fire hazard/fuel build up, improve wildlife habitat, and restore riparian habitat. These operations are also interrelated to the social system. They provide jobs at both the local and regional scales as well as reduce the demand for imported forest products. They may also provide biomass for energy production in the future.

The best information we have at this time projects the Forest to plan, and sell approximately 30 to 35 MMBF per year for FY 2008 through 2009. 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 2008 to 2009 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 Mt. Hood National 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.

Supply of Special Forest Products

Over the past 10 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 one of the largest and most efficient Special Forest Products programs in the Nation. 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 and is interrelated with the local and traditional social values.

Table 18. Special Forest Products Sold and Harvested in FY07

Number of Firewood Permits Sold	1781
Value	\$26,840.00
# of Christmas Trees Harvested	3319
Value	\$16,349.00
# of Bough Permits	14
Value	\$1,037
# of Commercial Bough Sales	4
Value	\$88,000
# of Beargrass Permits	1354
Value	\$41,795

Future Expectations – Providing a Sustainable Supply of Special Forest Products

Future budget levels for the Special Forest Product programs are expected to be similar to FY 2007. 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 bioresearch 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.

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. This includes salvage harvest of mortality from bark beetles, thinning or small group selection harvest of eastside stands with insect and disease concerns; thinning of stands in Late Successional Reserves to accelerate development of late successional structure; and thinning commercial size plantations on the westside that both provide forest products and increase the biodiversity and complexity of the stands.
- Continue to assess areas on the eastside where stand conditions have changed over time due to fire suppression. Continue integrated planning of silvicultural and fuels treatments to reduce hazardous fuels, modify wildland fire behavior, and restore ecological conditions.
- Assess those areas where there are high levels of insect caused tree mortality and pursue salvage sales or fuels reduction activities where appropriate.
- Reduce stocking of ponderosa pine stands imminently susceptible to bark beetles.
- Continue to pursue a mix of funding sources to accomplish the back-log of young stand thinning since appropriated funding region-wide will continue to be prioritized for post fire reforestation.
- Consider active restoration of sugar pine and whitebark pine populations.



Strategy D:

Protect, maintain, and enhance the soil and water resources of 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.

Monitoring Activities & Evaluation

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.

The Northwest Forest Plan prescribed various standards and guidelines for resource management activities, many of which are more stringent than those prescribed in the Forest Plan. A good example is the Northwest Forest Plan standard for riparian reserve widths, which are typically one or two site potential tree heights. These widths are more than adequate for protecting practically all stream shading. As a result, water temperature monitoring for the effectiveness of riparian reserves to protect stream temperature at the project level is no longer needed. Monitoring funds for water temperature are now being used for water temperature trend monitoring at about 36 sites across the Forest, to gather data on existing water temperature conditions, water temperature recovery in certain watersheds, and compliance with State water quality standards for temperature.

Ecological Integrity - Landscape Function

Hydrologic Function and Condition

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.

Cumulative Watershed Effects Analyses

During 2007 and early 2008, a watershed cumulative effects analysis was completed for the Upper Clackamas Thin and Cascade Crest Shaded Fuel Break Environmental Assessments on the Clackamas River Ranger District using the Aggregate Recovery Percentage (ARP) methodology.

On the eastside of the Forest, the ARP was evaluated as part of the Billy Bob Hazardous Fuel Reduction and The Dalles Watershed Hazardous Fuels Reduction Environmental Assessment. A non-ARP cumulative effects analysis was completed for the Badger Grazing Allotment on Barlow Ranger District.

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

Ecological Integrity – Ecosystem Structure and Composition

Water Quality

Healthy forests and wetland systems provide a host of watershed services, including water purification, ground water and surface flow regulation, erosion control, and streambank stabilization. The amount and characteristics of water determine the capacity of ecosystems to sustain forest, forest economies, and forest-dependent societies. Water condition, therefore, serves as an indicator of factors that may lead to impacts on the overall biodiversity of forest ecosystems.

Implementation Monitoring

Clackamas Stewardship Partners (CSP) Implementation Monitoring

The Clackamas Stewardship Partners (CSP) is a group of diverse stakeholders dedicated to restoring ecological function of the Clackamas River Basin while benefiting local economies.

Discussions of forming a collaborative group began in the summer of 2004, when members of the Clackamas Ranger District of the Mt. Hood National Forest, the Clackamas River Basin Council, and members of the Clackamas County Economic Development Commission began to explore the possibilities of using the new Forest Service stewardship authorities to drive restoration and create jobs in Clackamas County. Additional information about the CSP group can be found on the following webpage: <http://clackamasstewardshippartners.org/node/38>

Implementation monitoring of commercial thinning projects is being done by an independent third party, funded through Forest Service stewardship authorities. Effectiveness monitoring will be initiated after the thinning projects have been implemented. Implementation monitoring reports are available on-line on the following web page: <http://clackamasstewardshippartners.org/list/surveys>

During 2007, implementation monitoring was done on the Hot Thin, K-9 Thin, Quarry Thin, and Rod Thin timber sales. The monitoring found that riparian reserve prescriptions were clearly outlined in the field as outlined in the project assessment, except small sections along one streams in the K-9 Thin where additional riparian protection is needed. Additional riparian protection will be delineated where necessary along the stream in the K-9 thinning project in Units 20 and 22.

Timberline Express Project (BMP Monitoring)

Implementation and effectiveness of several BMPs were visually monitored in July 2007 during construction associated with the Timberline Express Project (the project includes the installation of a new lift and the creation of approximately 63 acres of skiable terrain). Work was done according to project requirements, meeting ground cover objectives or erosion control measures were implemented. No impacts to anadromous fisheries are expected.

BMP Form T03: Suspended Yarding: Helicopters were used to remove felled trees on steeper portions of the ski run. Monitoring indicated that the

helicopter yarding work was done according to the project requirements, with residual protective ground cover meeting objectives.

BMP Form T04: Skid Trails: Felled trees on portions of the ski run with gentler slopes were removed with ground based equipment. The project guidelines called for using a feller/buncher over a bed of slash to remove the trees. Instead, the trees were removed with excavators and tractors over mostly bare ground. This resulted in some minor rill erosion on less than 20% of the skid trails, and skid trails disturbing more than 15% of the harvested area. This was addressed through the implementation of project erosion control measures including seeding with native seed at the rate of at least 50 pounds per acre and covering exposed soils with straw mulch to a minimum depth of 3 inches.

BMP Form T01: Riparian Reserves: Monitoring of delineated riparian reserve areas indicated that project implementation guidelines for riparian ground-cover were met. There was very minimal disturbance to stream banks, and only a minor amount of sediment had entered the stream channel from ditch lines and the landing. There is no anticipated impact to downstream anadromous fisheries from this minor disturbance. This was addressed by hand cleaning the ditch lines, seeding and mulching the cut slopes adjacent to the ditch lines, providing for drainage from landings away from stream courses and seeding and mulching the landings.

BMP Form T06: Special Erosion Control and Revegetation: Monitoring of identified special erosion control measures on bare soils indicated that cutslopes that were used as landings received minimal erosion control (less than 80 % of objective), resulting in some direct sediment deposition to ditchlines. No impacts to anadromous fisheries are expected. This was addressed by hand cleaning the ditchlines and seeding and mulching the cutslopes adjacent to the ditchlines

BMP Form T04: Landings: Monitoring of the landing that project requirements for the location, size, and rehabilitation of the landing were met, but the drainage control measures were not adequate.

Some sediment was running down Westleg Road from the landing towards Still Creek. Sediment was trapped by ground-cover and vegetation in the riparian area, but did not enter the stream. This was addressed by providing for drainage from the landing away from Still Creek and road ditchlines and seeding and mulching the landings.

Effectiveness Monitoring

Blister Fire and Mt. Hood Fire Complex Burned Area Rehabilitation Monitoring

Several monitoring field trips to the Blister Fire area were carried out during 2007 to determine the effectiveness of the Burned Area Rehabilitation and Fire Suppression rehabilitation work.

Various firelines were surveyed to evaluate the effectiveness of post-fire erosion control work. Waterbars constructed to divert water off the fireline were generally effective, and minimizing surface erosion. Monitoring of a road (7010-140) re-opened during the fire identified road drainage work that needed to be done. Monitoring above a culvert on the 7010 Road identified a large log felled during fire suppression partially blocking the inlet of a large culvert. In October 2007, the approximately 1.3 miles 7010-140 Road was waterbarred, seeded, and mulched where necessary with a wood straw product. At the same time, the large log partially blocking the culvert on the 7010 Road was moved out of the active stream channel, restoring the full remaining flow capacity of the culvert.

During October 2006, portions of the Blister Fire area were aerially seeded with Madsen wheat. In addition, PAM-12, a new product designed to chemically bind bare soil was also applied to the same area. No significant post fire surface erosion was found in the areas treated with aerial seeding and the PAM-12 product. Germination of the Madsen wheat was spotty in many places, perhaps because the seeding was done just before the first snowfall. One area where native blue wild rye was used had fairly good grass coverage, and seemed to be helping stabilize the burned soil. Additional monitoring of these areas will be done during the 2008 field season.

In July 2007, aerial seeding and straw wattle installation was evaluated during a field trip to portions of the Mt. Hood Complex area. In the areas visited, the Madsen wheat germinated, but the coverage of the grass was not optimum, primarily because seeding was done at the end of the growing season. Many native plants have become re-established on the burned area, and are expected to help minimize surface erosion during the winter of 2007 and 2008. Some surface erosion in the seeded burned areas was observed during the monitoring visit. Straw wattles and contour felling installed in a limited area is trapping some post-fire surface erosion. Additional monitoring of the burned area will be done during the 2008 field season.

Two culverts were also removed following the Mt. Hood Complex incident because analysis indicated post-fire peak flows posed a threat to these drainage structures. The stream sites where the culverts were removed appear to be stable, but stream banks at one of the sites are too steep. During 2008 the over-steepened stream banks will be pulled back, and any needed erosion control measures installed.

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 Monitoring

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 and in some cases year-round sites on the Forest. In most cases, water temperature was recorded every hour with an Onset brand data logger. No water temperature monitoring was done in Fish Creek on the Clackamas River Ranger District, since sampling is only done there every other year. On the Hood River Ranger District, 2 out of 7 streams did not meet the 12.0°C Bull Trout water temperature standard ranging from 77 to 102 days, while on the Barlow Ranger District 4 out of 10 streams did not meet the standards ranging from 4 to 43 days, and 11 of the 17 streams on the Zigzag Ranger District did not meet either the fish spawning (13.0°C) or core cold water habitat (16.0°C) standard.

As described above, various streams monitored Forest-wide do 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. A record-setting heat wave affected Oregon and most of the Western United States. 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.

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. The Northwest Forest Plan riparian area management standards direct that riparian reserves be left along streams and reserves during resource management activities, in order to enable maintaining existing stream shade conditions and current water temperatures.

Table 19. Water Year (WY) 2007 Clackamas River (Carter Bridge) Monthly Water Quality Parameter Averages

Month	WY 2007 Water Quality Parameters (monthly averages), Carter Bridge, Clackamas River			
	Turbidity (NTU)	Water Temperature (°F)	pH	Conductivity microS/cm
October	0.6	47.1	7.6	65
November	37.5	43.7	7.4	42
December	13.9	40.1	7.4	40
January	5.7	38.3	7.4	43
February	4.5	39.9	7.3	44
March	3.9	42.1	7.3	40
April	1.8	44.6	7.6	42
May	1.3	49.5	7.5	47
June	0.2	53.6	7.6	58
July	0.3	58.3	7.7	66
August	0.5	55.6	7.9	67
September	0.3	51.8	8.0	67

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. Water quality data is available via telephone at various Forest and Clackamas River water providers' offices. In March 2005, the U.S. Geological Survey (USGS) began operating this monitoring station with funding provided by the Clackamas River water providers.

Average monthly water quality data through September 2007 (end of USGS water year) are listed in Table 19 below. Average turbidity at this monitoring site is relatively low throughout the year, with average values of near or less than 2.0 NTUs from April through October 2006. From January through March, the average turbidity was slightly higher, ranging from 3.9 to 5.7 NTU's. These levels of turbidity are also low, since water filtration for domestic water supplies is only necessary if turbidity levels are greater than 5 NTU's. 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 2007 was 641 NTUs during a high flow event on November 5, 2007. 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 7.3 to 8.0, within the DEQ standard (6.5 – 8.5). Daily maximum pH values did reach 8.5 on several days during August, 2008.

The peak water temperature reached about 64.2° F. on July 13, 2007. The average water temperature during the summer of 2007 ranged from 51.8 ° F in September to July with 58.3° F. Overall, water quality is very good at this particular monitoring site on the Clackamas River.

Mt. Hood Meadows Water Quality: Baseline data for the Mt. Hood Meadows Ski Area continues to be collected 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 twelve years. Turbidity, water temperature, conductivity, and stage are monitored continuously. The Mt. Hood Meadows staff checks the monitoring equipment periodically, about every two weeks, and reviews the monitoring data for abnormal readings.

Stream Discharge (Outside of Bull Run): Mt. Hood National 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 and on the Zigzag River. These sites will also be used to characterize the hydrology of the watershed, and the stream gage on the Zigzag River will serve as an “early warning” indicator for activating road storm patrols on the Zigzag Ranger District.

Recommendations

- Continue implementation of the Best Management Practices Evaluation Process (BMPEP).
- Continue the process of providing interpretations and guidelines for implementing Forest Plan standards and reflecting the findings and recommendations of ongoing research efforts. The objective is to develop consistent approaches across the Forest. Additional work is needed to compare the current watershed condition with established thresholds of concern for various watersheds.

- Continue both baseline and project-related water temperature monitoring Forestwide. For those streams identified as exceeding state water quality temperature standards, do additional monitoring in 2008 as opportunities arise, 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. Continued water temperature data collection will most likely be required as part of the Implementation Plan for the recently released Total Maximum Daily Loads (TMDL) for the Hood River Basin. Continue implementing the program to monitor turbidity at key locations on the Forest as funding permits, focusing on streams/watersheds which are source areas for domestic/municipal water supplies.

Soils

Goal

The primary goal of soil management is to maintain or enhance soil productivity while conducting forest management activities. Standards in the Forest Plan address the physical and biological aspects of soil productivity. 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, are important sources of organic carbon. Maintenance of carbon cycling through conservation of large wood material is addressed through the standard identified for wildlife habitat needs. The results of monitoring for large wood are presented in the wildlife section.

Accomplishments

As in previous years, two needs guided the direction for soil monitoring in 2007. First, there is the need to continue to monitor those areas that have been harvested so that cumulative effects can be documented. Second, there is the need to use monitoring data 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 2007. New monitoring in existing planning areas was not needed because previous years monitoring data was already available and adequate.

Recommendations

New planning areas in FY 2007 will result in potential need to gather existing condition data. Monitoring results for FY 2008 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.



Strategy E:

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

Fisheries Program

Goal

The goals of the Fisheries Program are to maintain or increase fish habitat capability and assure long-term aquatic ecosystem health.

Monitoring Activities and Evaluation

The Mt. Hood National Forest is home to several populations of salmon, steelhead, and resident trout. 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
- Fifteenmile Creek Basin
- Hood River Basin
- Sandy River 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. 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.

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 (fourth field, such as the Sandy River Basin; and fifth field, 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.

Ecological Integrity – Stream Function & Condition

Stream Inventory Program

The Mt. Hood Stream Inventory Program (see Table 20) collects 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.

In 2006, the Mt. Hood National Forest Stream Inventory program expanded to form a provincial program including the Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area. Surveys are then compiled into reports. The reports give fish biologists a current year snapshot of conditions and, over time, a tool to evaluate trends and determine if the Forest is meeting aquatic habitat standards and guidelines.

Table 20. FY 2007 Aquatic Inventory Program Mt. Hood National Forest

Stream Name	Aquatic Inventory (in Miles)	Aquatic Biota (in miles)
Fish Creek	13.7	13.7
Wash Creek	6.4	6.4
Happy Creek	3.3	3.3
Unnamed tributary to Happy Creek	0.7	0.7
Camas Creek	2.3	2.3
Total	26.4	26.4

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. The AREMP

program is sampling ten sixth field watersheds on the Mt. Hood National Forest. In 2007, sampling included a resurvey of High Rock Creek (HUC 170900111304) and an initial survey on the Upper Hot Springs Fork (HUC 170900110202) on the Clackamas River Ranger District. Watersheds are sampled each year over a five-year rotation. Models evaluating the data are still under refinement. Information regarding the AREMP program is found at www.reo.gov/monitoring/watershed.

Special Habitats

Fisheries special habitats are habitats that provide a critical function during a certain life stage or time of the year, for example, off-channel rearing areas for juvenile salmonids during winter storm flows. In the Sandy River Basin, the Forest has actively pursued restoration of special habitats on both federal and private lands.

Restoration of side channel habitat in the Salmon River Watershed is a high priority action outlined in the Sandy River Basin Partners' aquatic habitat restoration strategy (see www.sandyriverpartners.org). The project includes a conservation education component to highlight the collaborative partnership work and ecological improvements (including salmon ecology, watershed restoration, and stewardship) that are occurring within the Sandy River Basin.

In 2007, the Zigzag Ranger District continued maintenance on high-value side-channel habitats totaling 1.25 miles in length. Seven miles of the lower Salmon River were inventoried by Sandy River basin partners, including the Forest Service, for out-year restoration planning and implementation. In addition, the Sandy River Basin Watershed Council and the Wilderness Volunteers planted 1,530 willow cuttings and conifers on 2.5 acres after the heavy equipment work was completed.

Table 21: FY 2007 broad scale monitoring programs listed by fourth field watershed which track long-term trends of aquatic species and their habitats on the Mt. Hood National Forest

Fourth Field Basin Name	Project Name	Objective
Clackamas River	Smolt trapping and population 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
	Salmon Carcass Nutrient Restoration	Nutrient level and biological response to salmon carcass additions
Hood River	Bull Trout Population Monitoring	Establish and document changes in bull trout populations
Fifteenmile/White River	Spawning Surveys	Long-term monitoring of spawning success and trends
	Fifteenmile Riverkeeper	Monitor response to large-scale watershed restoration
Sandy River	Spawning Surveys	Long-term monitoring of spawning success and trends
	Smolt trapping and population estimates of coho and steelhead in Still Creek, Clear Fork and Salmon River	Long-term population monitoring of out-migrating salmon and steelhead smolts
	Salmon Carcass Nutrient Restoration	Nutrient level and biological response to salmon carcass additions

Ecological Integrity - Population Function, Structure and Composition

Population Viability

Anadromous fish have a complex life history, which includes freshwater, migration and saltwater phases. Monitoring information is used to better understand life history stages of different populations, and focus recovery efforts for listed ESA fish. Salmon, steelhead and bull trout production continue to be monitored in the Clackamas, Fifteenmile, Hood River, and Sandy River basins. Forest Service personnel, in collaboration with government and non-government and Tribal partners, monitor fish production in each basin. 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.

Monitoring of smolt production occurs in the Clackamas and Sandy River Basin. In the Sandy River basin on Still Creek, salmonid population and structure have been monitored since 1992. Each year, juvenile and ocean going smolt populations are estimated using a smolt trap at the Still Creek site. In 2007, populations estimates in Still Creek for coho were 3,965 and the steelhead population estimate was 1,527.

The overall abundance of anadromous fish and bull trout are low in the streams and rivers monitored. In 2006, Oregon Department of Fish and Wildlife led an effort to update the status of bull trout in the Hood River system. Results continue to be discouraging. A bull trout population was estimated at 513 (plus or minus 61%) adults and juveniles on Clear Branch Hood River (located on the Mt. Hood National Forest). Only four fish were captured greater than 200 mm in length. Preliminary results predict less than 100 bull trout adults in the Hood River basin. The spawning adult population above Laurance Lake dam was estimated in 2006 to be 46 and in 2007 to be 93 ± 5 spawning adults (95% confidence interval).

Below the Laurance Lake dam significantly fewer fish were captured. Also captured was a 370 mm smallmouth bass, an invasive species that could be significantly impacting bull trout in Laurance Lake.

Fifteenmile Creek Spawning Surveys

Monitoring reproductive success is commonly used to monitor fish populations. Winter steelhead spawning data has been collected in the Fifteenmile River basin since 2003. In 2007, a total of 12 steelhead redds (egg nests made in stream gravel beds) were counted in the Fifteenmile Creek system. This is a precipitous drop since 2003, when 159 redds were counted in the Fifteenmile Basin. At this time, there is no known single cause for the decline, and local biologists continue to try and discern the cause.

Invasive Aquatic Species

Non-native, invasive fish species, such as brook trout and small-mouth bass have been documented on the Forest. Fisheries biologists have developed a long-term monitoring plan for the ESA listed bull trout which includes assessment of impacts and interactions of small mouth bass and bull trout. For other non-native, invasive species, biologists continue to monitor changes in their distribution.

Social Well-Being – Collaborative Stewardship

As an urban forest, nearby cities and their inhabitants have a profound influence on management of the Forest. Dedicated citizens, conservation groups, schools, and local governments and agencies all play important roles as partners.

Basin-wide Aquatic Habitat Restoration Strategies

In 2006, two collaborative working groups completed two basin-wide aquatic habitat restoration strategies. The purpose is to address aquatic habitat restoration needs for recovery and long-term persistence of fish populations in the basin. Using a holistic watershed view, the

strategy is intended to guide investments over the long term, completing high priority restoration actions in the highest priority watersheds, achieving benefits at the watershed scale. The strategies looks at restoring connectivity, long-term physical and biological processes, ecological function of riparian areas, and short-term in-stream habitat conditions.

Sandy River Basin Aquatic Habitat Restoration Strategy

This anchor habitat-based, aquatic habitat restoration strategy focuses on salmon and steelhead populations in the Sandy River Basin. "Anchor" habitats are those streams or rivers that provide relatively good to excellent aquatic habitat conditions in large watersheds (20-50 mi²). Restoring anchor habitats protects the remaining high quality, productive habitats in a watershed and moves it more readily towards restored condition assuring intact aquatic habitat is maintained over the long term.

Hood River Basin Aquatic Habitat Restoration Strategy

This aquatic habitat restoration strategy addresses restoration needs for resident and anadromous fish species, while addressing the needs for streamflow and water quality improvements. Five of the six anadromous species population have been listed under the Endangered Species Act.

Riverkeeper Program

The Mt. Hood National Forest has been a major catalyst in the Riverkeeper program that promotes the best stewardship of the Upper Sandy River Basin through coordination of federal, state, county, and private restoration efforts. An anadromous, fish-bearing tributary of the Wild and Scenic Salmon River is being restored through the efforts of:

- The Resort at the Mountain,
- Trout Unlimited,
- Wilderness Volunteers,
- US Fish and Wildlife Service,
- Oregon Department of Fish and Wildlife, and
- A variety of individual volunteers.

The Sandy River Basin Anchor Habitats Project

The Sandy River Basin Anchor Habitats Project continues to lead the integrated systems management fisheries program on the Forest. A consortium of stakeholders from conservation groups and government representatives, concerned about the future of the Sandy River Basin, convened in 1999. A product of their meetings was the "Sandy River Basin Agreement", which called for a "strategy that is consistent with state and federal efforts to maintain and recover salmonids listed under the ESA (Endangered Species Act) in the Sandy River Watershed." In 2004, many of the partners involved in the Sandy River Basin Agreement came together again to identify geographic areas in the Sandy River Basin important for the persistence and restoration of salmon and steelhead populations. These interested stakeholders identified the key areas, known as Anchor Habitats, from which a technically sound and scientifically rigorous strategy for restoring salmon and steelhead habitat. The stakeholders involved are listed below.

- State of Oregon - Dept. of Fish & Wildlife
- Clackamas County
- Association of Northwest Steelheaders
- Oregon Trout
- Native Fish Society
- The Nature Conservancy
- Sandy River Basin Watershed Council
- Salem BLM
- Fish & Wildlife Service
- NOAA Fisheries
- Mt Hood National Forest
- City of Portland Water Bureau

Other restoration projects completed with partners include:

- Stop Invasive Weeds Now!: In cooperation with The Nature Conservancy, treatment of the invasive plant Japanese knotweed was targeted for control in the Sandy River and Clackamas River. The project is integrated, combining weed control projects (such as glyphosate injections) with community-based outreach on prevention of invasive plant infestations on a watershed scale.
- Fifteenmile Creek Riverkeeper: In cooperation with Oregon Department of Fish and Wildlife, Natural Resources Conservation Service, and the Oregon Watershed Enhancement Board, the goal this project is to improve the quality and quantity of the water, stream channel, and riparian areas in order to retain the natural range of aquatic and riparian habitat conditions in the Fifteenmile Creek basin.
- The Catlin Gabel School: In its seventeenth year of a long-term partnership with the Barlow Ranger District, the Catlin Gabel School has helped plan and implement various watershed restoration and protection projects in the Rock Creek and surrounding drainages. In 2007, the primary project was construction of 1,000 feet of buck and pole fencing and 3,000 feet of barbed wire fencing at Camas Prairie.

Conservation Education

The Forest sponsors and participates with partners on several effective conservation education programs and events throughout the year. The following are some examples:

- Oxbow Salmon Festival
- Salmon Watch
- Fishing Clinics
- Salmon Watch

Wildlife

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.

Threatened, Endangered, and Sensitive Species

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. 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 located near Rock Creek Reservoir. The site was occupied and with young in 2003, but not in 2004, 2005 or 2006. In 2007 the pair attempted to nest, but the nest fell apart and they abandoned nesting. The Clear Lake pair did not nest at Clear Lake in 2004, 2005 or 2006. 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 and again in 2007.

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* northern spotted owl sites. Monitoring needs by the Forest have decreased with the assumption that management activities that maintains required habitat and operates outside of critical periods are sufficient to maintain a persistent and viable population of spotted owls. An interagency demographic study has replaced monitoring on individual Forests. The demographic study is designed to be statistically significant in monitoring the owl population across its range. The demographic study reported a decline in spotted owls of 2.8% per year for Oregon. In 2007, the Barlow Ranger District accomplished owl calling for the SF Mill Fuel Break project. There were 19 spotted owl calling stations that accomplished 6,080 acres called for the first year visit. No spotted owls were reported from this calling effort. The Hood River Meadows Parking lot project had two calling stations to cover 15 acres and there were no owl responses.

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 2007 was confined to two known nest sites. For the last four years Ronald Escano, retired wildlife biologist, has performed the monitoring at the two sites. In 2007, only one of the sites successfully fledged young. 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 a *draft* management plan for the other site. There have been no current efforts to establish presence or absence of new sites. In addition, there are insufficient personnel to survey all of the potential 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. An independent study of snow conditions was initiated on one District, but no evidence of lynx was found. Surveys for lynx were completed in 2001 by the Forest Service in cooperative effort with Cascadia Wild and Teachers in the Woods. 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

Harlequin Duck

Harlequin Ducks were not surveyed in 2007. No incidental sightings of the ducks were reported. A fisheries biologist did report two harlequin ducks on the Middle Fork of Hood River.

Cope's Giant Salamander

Annual surveys for Cope's giant salamander are conducted on the Forest by volunteers from the Wetland Wildlife Watch. The 2007 report indicated that there were two locations for Cope's giant salamander. These same locations have consistently yielded records of this species.

Wolverine

No aerial surveys for wolverine tracks were conducted in 2007 and no individuals were observed. Instead, there was a tracking project that was aimed at identifying the presence or forest carnivores on the Forest. No rare carnivores (e.g., wolverine, lynx, or fishers) were observed.

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 2007. One loon was observed in the Bull Run Watershed. Nest platforms have been installed on the Upper and Lower Bull Run Reservoirs, but no nesting has occurred at this time.

Snags and Down Woody Material

The Northwest Forest Plan provides standards for snags and down woody materials. All recent timber harvest units retain quantities of snags throughout to meet the needs of most primary cavity nesters with a few exceptions. 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 2007 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 CVS (current vegetation survey) 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.

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 five 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. This is based entirely on anecdotal data from biologist field observations.

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 small amount of increase in forage was experienced for 2007 in the area of the Blister Creek fire. This area is mostly summer range.

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 entirely on anecdotal data from biologist field observations. A small amount of forage is expected in the area of the Mt. Hood Complex Fire that occurred in 2006. This forage is in both summer and winter range for elk and deer. That combined with 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 an area of the Mt. Hood.

Zigzag Ranger District

There is very little timber harvest on the Zigzag Ranger District 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.

Pine Marten and Pileated Woodpecker

Tracking efforts and cameras 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 2007. The following table summarizes the results of the past survey efforts.

Table 22. Species Observed from Mt. Hood National Forest Remote Camera Transects (FY 2003-2005).

	Sessions		
	I/II	III	IV
Black Bear	11	22	0
American Marten	50	7	0
Bobcat	15	3	41
Flying Squirrel	16	4	0
Pygmy Owl	0	1	0
Turkey Vulture	3	4	0
Fisher	0	0	0
Wolverine	0	0	0
Spotted Skunk	25	0	80
Striped Skunk	0	0	0
Deer	5	0	0
Elk	3	0	0
Chipmunk	25	0	0
Douglas Squirrel	5	0	0
Vole/Mouse	2	0	0
Clark's Nutcracker	3	0	0
Gray Jay	70	0	0
Raven	41	0	0
Red Tailed Hawk	2	0	0
Steller's Jay	32	0	0
Varied Thrush	2	0	0

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. Snag monitoring on Clackamas River Ranger District provides anecdotal evidence that populations of pileated woodpeckers seem adequate.

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. Very little activity has occurred in these retained habitats. Very little management activity is occurring in the Late Successional Reserves, Riparian Reserves and designated Wilderness Areas.

In the fall of 2005, the remote camera project was dropped and Cascadia Wild implemented snow tracking because of the efficiency of covering more ground. Some hair snag traps were deployed but the results of these traps have yet to be analyzed. This snow tracking continued in 2007 and it was a difficult year due to heavy snow.

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.

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 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.

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. 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. In addition, these blocks serve as dispersal habitat for species as they leap frog from large block to large block.

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 campsites. 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.

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, snowmobile use is not allowed in designated Wilderness Areas so they are not as great a concern at the highest elevations.

Connectivity Issues

Most of the connectivity issues for aquatic species are being resolved by correcting construction errors in fish ladders and replacing culverts with fish and amphibian friendly passage ways. This is a major benefit for both a fish and wildlife sustainability. The two other areas of connectivity that must be addressed is connectivity of habitat and road passage. The Northwest Forest Plan has been designed to provide connectivity of late successional species along the Cascades. This Plan was well thought out and should be adequate to sustain populations and ensure genetic viability across the Cascade Range.

That leaves one area of concern – connectivity across roads. 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 roads can be considered barriers. The roads are barely passable to wildlife due to the large amount of traffic, and will only become less passable in the future. This is only a problem when the species in question has a population that drops below a critical point. At that time, connectivity across the roads can be a major issue. The Route 26/35 corridor is the road system of highest concern on the Forest. 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. 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.

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 (OHV) 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.

Threatened, Endangered and Sensitive (TES) Plants

The Regional Forester's Sensitive Species List for plants was last revised in 1999. The List includes thirty-four plant species that are documented from, or are suspected to occur on, the Forest. From 2000 to 2007, monitoring has focused on nine non-forest Sensitive species. Included are yellow agoseris (*Agoseris elata*), sickle-pod rock cress (*Arabis sparsiflora var. atrorubens*), goldthread (*Coptis trifolia*), cold water corydalis (*Corydalis aquae-gelidae*), black lily (*Fritillaria camschatcensis*), Watson's lomatium (*Lomatium watsonii*), Adder's-tongue (*Ophioglossum pusillum*), violet Suksdorfia (*Suksdorfia violacea*), and pale blue-eyed grass (*Sisyrinchium sarmentosum*). Recently, several new sites have been found for two Sensitive lichens: Fringed pelt lichen (*Peltigera pacifica*) and Methuselah's beard (*Usnea longissima*).

Results

Agoseris elata – *Agoseris* is endemic to Washington, Oregon, and California. On the Mt. Hood National Forest 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.

Arabis sparsiflora var. atrorubens – Sickle-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 handpulled annually at both sites. The invasive plant control has been effective particularly along Mill Creek Ridge. Both populations appear to be stable.

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 Mt. Hood National 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.

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. Plans for monitoring the Oak Grove Fork as part of Portland General Electric's stewardship are being finalized.

Fritillaria camschatcensis – Kamchatka fritillary is known from Alaska, Washington, and Oregon. On the Mt. Hood National Forest, the single known population occurs in a wet meadow in the Bull Run watershed; the population represents the southern most extension of this species' range. 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.

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 cobbly slope on Hood River Ranger District. Knapweed plants have been handpulled 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. On the Forest, 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. An 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 site-specific invasive plant treatments EIS.

Peltigera pacifica – Recently, several new sites for this lichen have been found on the Forest: (1) the summer home tracts near Zigzag-Rhododendron; and (2) two proposed timber sale areas on the Clackamas River Ranger District (No Whiskey and 2007 Plantation Thinning). Although regionally rare, *P. pacifica* may be uncommon to relatively common on the west side of the Forest.

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 2007. 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. In 2007, three additional signs were produced for posting in the climbing area in 2008.

Sisyrrinchium sarmentosum – This species is known to occur on the Mt. Hood and Gifford Pinchot National Forests. In June to July 2005, the Forest collaborated with Berry Botanic Garden on a study to differentiate *S. sarmentosum* from *S. idahoense* based on morphological characters and DNA analysis by examining both species. The two species appear to hybridize. Berry Botanical Garden plans to publish a report or scientific paper on the differences and hybridization between the two species sometime this year. A botanist on the Gifford Pinchot National Forest recently completed a Conservation Assessment for the species, which is currently being reviewed. Recently, two new populations of *S. sarmentosum* were found on the Forest: one on the Barlow Ranger District and the other in a meadow in the Collawash River drainage on the Clackamas River Ranger District.

Usnea longissima – In the last year, several new sites for this rare circumboreal lichen have been found on the Forest: (1) the summer home tracts

near Zigzag-Rhododendron; and (2) two proposed timber sale areas on the Clackamas River Ranger District (No Whiskey and 2007 Plantation Thinning).

Forest Plan Monitoring Guidelines

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.

Recommendations

- ***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. atrorubens*** – 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.
- ***Castelleja thompsonii*** – Revisit historic sites near the eastern edge of the 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 2008).

- ***Coptis trifolia*** – Work with the grazing permittee to develop methods to avoid impacts to ***Coptis*** including the use of a rest-rotation system or other means to graze during a less sensitive time of the year to 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 population if they are present.
- ***Fritillaria camschatcensis*** – Continue to work with the Native Plant Society 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*** – Investigate the herbicide treatment of Canada thistle to help maintain habitat for the known sites for this species.
- ***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*** – Continue monitoring the effects of grazing and working with the grazing permittee to protect this species. Develop mitigations to be included in the Allotment Management Plan to reduce utilization of vegetation by cattle within the wet meadows that contain ***Sisyrinchium*** or utilize these areas during a less sensitive time of the year when impacts can be minimized.
- ***Tholurna dissimilis*** – Revisit historic sighting of the 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.



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 Plan.

The 2007 Fire Season

The March snow pack for the 2006 – 2007 winter was 90 to 129% of normal. The precipitation summary for the period October 2006 through May 2007 showed 129 – 150% of average. At the first of May, the Palmer Drought Index indicated near normal conditions in this area. At the first of September, the Drought Index was showing Moderate to Severe Drought conditions in the Cascades and the western portion of the state.

A total of 48 fires were reported in 2007: six lightning and 32 human-caused fires. Reported burned acres totaled 1,251. The majority of these

acres occurred on the lightning ignited 1,237-acre Ball Point fire in July. No industrial operations fires occurred in 2007.

The Forest was successful in supporting the National fire fighting efforts, dispatching a total of 134 personnel to other Regional and National assignments.

Monitoring Activities and Evaluation

The Forest Plan identified fire protection and fuel treatment objectives to be monitored and evaluated in determination of fire management's capability to attain other land and resource management objectives. For each objective, information is collected annually and results reported annually or every five years.

Fire Protection Objectives Monitored

Two fire protection objectives are monitored in relation to levels considered in the Forest Plan. They relate to number of human-caused wildfires and the number of, size and intensity of wildfires based on five years of data.

The threshold of concern is, “no more than 20% departure from the expected number per decade”. The Forest Plan anticipated that the human-caused occurrence would average 56 fires per year and an estimated average annual acreage burned by wildfire of 408 acres (MHF-LRMP Chp. 4, p. 25) based on five years of data. For the period 2003 - 2007, the average was 43 fires per year and 122 acres per year burned. These numbers are for human caused fires only and are below the break points of 56 fires per year and 408 acres established in the Forest Plan. The average number of fires and acres per year for all causes for the last five years are, 59 fires per year and 821 acres per year burned. Table 2-1 displays number of fires and acres by cause.

Another area of concern is the number of, size of, and intensity of wildfires and are they within the levels considered in the plan. Table 2-2 displays acres by size class and Fire Intensity Level. Total acres burned increased by 893 acres from the previous five-year period (2002-2006). The number of fires decreased by six fires for the five-year period. This large increase in acres is a result of several large lightning caused fires that have occurred on the forest the last few years.

Fuel Treatment Objectives Monitored

Two fuel treatment objectives are monitored to see if they meet expected levels identified in the Forest Plan. They are desired residue (fuel) profiles and acres of hazardous fuels treated annually.

As part of the total fire and fuels management program, the Forest continued to meet the desired fuel residue profiles. All districts reported that they had met the profiles with less than a 10% deviation from what was stated in the environmental analysis or other forest standard.

The goal for the hazardous fuel program is to coordinate a sound, collaborative approach for reducing wildland fire risk to communities, and to restore and maintain forest health within fire-prone areas. The Forest had projected to treat 800 acres annually of hazardous fuels. The 10-Year

Comprehensive Strategy Implementation Plan will provide the appropriate performance measures to determine success of fuel treatments.

For the reporting period, there were 1,400 acres planned for hazardous fuels treatment. The Forest accomplished 2,396 acres. All of the acres accomplished were in the Wildland Urban Interface and 95% of these acres were adjacent to the City of The Dalles municipal watershed. Localized benefits will be realized as treatments are completed. Documentation of changes to broad long-term trends including risks to people and property, native species, watersheds, air quality, and long-term site degradation will take time. Prolonged decline of condition class especially in short interval Fire Regimes and around Urban Interface areas will show an increase in size and severity of fires. The resource damage and value lost will be expected to increase as well.

Benefits from treatment of hazardous fuels include:

- Improvement in the resiliency and sustainability of wildland components such as water quality, air quality, wildlife and fisheries habitat, and threatened, endangered, or other special status plant and animal species or habitat.
- Reduction in the amount of lands severely degraded by uncharacteristic wildland fire or by other disruptions to natural fire regimes.

The Forest has placed a priority on planning and implementing landscape scale fuels and vegetation management projects along National Forest boundaries. The Forest has entered into cooperative efforts with State and local landowners to provide for fuels management treatments on both sides of the National Forest boundary. Through collaboration with State, Tribal, and local entities, implementation of these projects will:

- Increase wildland fire safety to the public and firefighters;
- Reduce risk of unwanted wildland fire to communities;
- Reduce risk to recreational opportunities and associated wildland attributes, viewsheds, cultural and historical resources and landscapes;

- Strengthen rural economic sustainability and increase opportunities to diversify local economies, such as through the use of biomass residues, which also reduce air quality impacts;
- Increase public education and understanding for the importance of implementing hazardous fuel risk reduction activities on both Federal and private lands; and,
- Help local communities with the development of Community Fire Plans.

Recommendations

- Continue to coordinate a sound collaborative approach for reducing the wildland fire risk to communities, and to restore and maintain ecosystem health within fire-prone areas.
- Continue to collect and consolidate data to support the assessment of ecological conditions in the context of the Range of Natural Conditions for fire dependent ecosystems.
- 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 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 on forest and range lands, reduce the productivity of desired commodities on national forest land, 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

To prevent new infestations and control the spread of existing noxious weeds in accordance with the Mt. Hood National Forest Noxious Weed Plan, the 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 Mt. Hood National Forest Land and Resource Management Plan. Executive Order 13112 (1999) directs Federal Agencies to reduce the spread of invasive plants.

Existing Program

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

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.

In 2007, the Forest is in its second year of a five-year challenge cost-share agreement between The Nature Conservancy (TNC), Mt. Hood National Forest, and the Columbia Gorge National Scenic Area. The TNC conducted inventories for knotweed (*Polygonum spp.*) in several drainages on the Forest. TNC also treated known infestations on adjacent private lands in the Sandy River basin using stem injection methods. Site restoration and post treatment monitoring are also done under this Agreement. See <http://tncweeds.ucdavis.edu> for more information.

A new challenge cost-share agreement was developed with Clackamas River Basin Council to work cooperatively with Mt. Hood National Forest to maintain and restore healthy, functioning ecosystems through watershed restoration projects, including treatment of noxious weed infestations in the Clackamas River basin. Work completed includes invasive plant inventory, mapping, and treatment in the lower basin.

Education is a critical element of invasive species management. During the spring of 2007, The Nature Conservancy hosted a series of "Weed Watcher" workshops to educate the public on invasive species identification and how to report a finding. The Forest participated in this effort, along with several other agencies and members of the public. Weed Awareness Week, proclaimed by the State of Oregon, provided an opportunity to distribute educational posters in the local communities near the Forest. Four thousand interpretive postcards were printed for distribution in 2007 at trailheads along Lolo Pass, requesting that trail users report suspected non-native hawkweed sightings.

Treatments were applied to control diffuse knapweed (*Centaurea diffusa*), hound's tongue (*Cynoglossum officinale*), common toadflax (*Linaria vulgare*), and tansy ragwort (*Senecio jacobaea*) east of the crest of the Cascade Range. This was accomplished under an Agreement with Wasco County. The County treated 55 sites, including roadsides, rock quarries, and other previously disturbed sites. West of the Cascade crest, diffuse and spotted knapweeds and non-native hawkweeds (*Hieracium aurantiacum* and *H. pratense*) were treated. This was accomplished under an Agreement with Oregon Dept. of Agriculture (ODA). ODA treated 11 sites, including weeds within a power line right-of-way as well as roadside areas. ODA monitored three sites, which were treated in previous years, and no weeds were found during the 2007 visit. A small (1/4 acre) site of false brome (*Brachypodium sylvaticum*) was handpulled.

Table 23. Acres of Noxious Weed Treatment in FY07

Acres Treated by Method	
Chemical	298
Manual & Mechanical	5
Biological	0
Fire	0
Total	303

Monitoring Questions

- *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 R6 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.

ODA and personnel from the Confederated Tribe of Warm Springs have noted increasing populations of diffuse knapweed (*Centaurea diffusa*) along Highway 26 and Highway 35 corridors in the Forest.

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

Japanese knotweed (*Polygonum cuspidatum*), giant knotweed (*Polygonum sachalinense*), and hybrid bohemian knotweed (*Polygonum X. bohemicum*) populations in the Sandy, Zigzag, and Clackamas River drainages also appear to be increasing.

Both hawkweed and knotweed form dense populations, displacing native plants. There is great concern that if any of the non-native hawkweeds become established in wet meadows they would overwhelm those habitats. Wet meadows are relatively uncommon in the area and are biologically important. Rare plants (Region 6 Sensitive) that are associated with meadow habitats are also at risk from encroachment of non-native hawkweed species. Current hawkweed populations are mostly within a power line transmission corridor that is managed for low-growing vegetation to provide a safe distance between the wires and vegetation. The corridor provides habitat where hawkweed thrives.

Knotweed forms aggressive, dense stands 6 to 8 feet tall along streams, displacing native vegetation and degrading habitat for riparian-associated birds, mollusks, fish, insects, and mammals. Knotweed has a weak root system and does not bind the soil well like native riparian vegetation, leading to increased erosion during peak stream flows in the spring. There is also concern that knotweed can change nutrient input to streams, further affecting aquatic organisms. The result may be degraded fish habitat in important anadromous fish-bearing streams.

Currently, known sites for Japanese knotweed are at lower elevations along the Salmon River, Still Creek, and Bear Creek on the Zigzag Ranger District and at the Timber Lake Job Corps site in the Clackamas River drainage. Knotweed populations are also located in the summer home tracts in the vicinity of Zigzag and Rhododendron.

- ***Are new infestations occurring?***

Yes. A previously unknown population of false brome (*Brachypodium sylvaticum*) was detected in FY 2006 in the Collowash drainage on Clackamas River Ranger District. The estimated infestation size is ¼ of an acre. The site was hand-pulled in 2007 and will be monitored. 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?***

Some widespread weed species that have established biological control agents, such as Scot's (or Scotch) broom (*Cytisus scoparius*), tansy ragwort at lower elevations, and St. John's-wort (*Hypericum perforatum*), are likely being controlled to some degree. Biological controls for the knapweeds, however, have had modest impact thus far. No biological controls have been approved for houndstongue, hawkweed, knotweed, or toadflax.

Biological controls do not eradicate weeds but decrease plant vigor and generally reduce population densities. Part of the reason noxious weeds out-compete natives is because the insects and diseases that affected them in their native habitat did not come here with them. The biological controls for the above weeds are all insects that do not significantly affect native plants and are approved for release through a federal agency known as the Animal and Plant Health Inspection Services (APHIS).

- ***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. 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)?***

Yes.

Results

Chemical control methods were used to treat high priority houndstongue and tansy ragwort sites east of the crest of the Cascade Range; knapweed sites on Barlow, Clackamas River, and Zigzag Ranger Districts; and hawkweed on Zigzag Ranger District. These treatments have been effective in reducing the number of plants; however, plants germinating from seed already deposited in the soil will necessitate treatment in future years until the seed bank is depleted. The weeds are so widely established east of the crest of the Cascade Range that eradication may not be possible. Treatment has been effective in treating satellite populations preventing the establishment of new large entrenched 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 manually controlled; however, there is a possibility that some small infestations may be overlooked and grow to a size where eradication using manual control is no longer possible.

Rock sources and storage sites on Barlow Ranger District were targeted as a high priority for chemical treatment due to the possibility that contaminated material could be moved to other sites resulting in establishing a new weed infestation.

Knotweed sites associated with summer homes on Zigzag Ranger District were hand pulled. The experience of others and the literature suggest that this method will not result in controlling or eradicating knotweed; however, at this time it is the only control method available to the Forest. Implementation of the Invasive species Environmental Impact Statement (EIS) for Mt. Hood NF and Columbia Gorge National Scenic Area is expected to occur in 2008, which will authorize a broader spectrum of herbicides for noxious weed control. Knotweed could then be controlled by stem-injection of glyphosate, a method used by The Nature Conservancy to treat knotweed populations along river corridors in northwest Oregon.

The population of knapweeds on treated roadsides is considerably reduced. The chemicals used have little effect on grasses, which are replacing knapweed along most of the treated areas.

Recommendations

- Encourage Bonneville Power Administration to fund treatment of the primary hawkweed infestation within the Big Eddy-Ostrander power transmission corridor.
- Watch for new infestations of Garlic Mustard and satellite populations of Knotweed. Treat with “Early detection rapid response” strategy as soon as the Mt. Hood sub-regional invasive species EIS is finished.
- Continue Agreements with Wasco County, TNC, Clackamas River Basin, and ODA to treat weeds, conduct inventories, monitor, and educate the public. Identify potential sources of funding, since it is unlikely that the Title II Payments to Counties Act will be funded in 2009, which has been a primary source of treatment funding since 2002.
- Knotweeds are riparian weed species with the potential to alter habitat for fish and other species that depend on riparian habitats. Manual control has not been effective. Provide information to summer homeowners on how to limit the spread of knotweed and explore methods which may be used to control infestations.
- 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 a project to determine their 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.
- Continue hawkweed environmental education efforts along Lolo Pass by establishing additional interpretive signs at all trailheads that are accessible from the Lolo Pass Road and intersecting roads.
- Obtain funding for a systematic invasive species inventory across the National Forest.

Geology

There were no timber harvest units in FY 2007 on land mapped as high-risk earthflow. There were two timber harvest units in FY 2007 on land mapped as moderate risk earthflow. Those units totaled 31 acres. Both 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. In all cases, the planned harvest units were reviewed by slope stability specialists and determined to have no measurable effect on earthflow stability. No roads were constructed on B8 (earthflow) land. There were no timber harvest units on mapped landslides other than B8 land in FY 2007. No roads were constructed on mapped landslides other than earthflows.

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 FY 1991.

Continued measurements during FY 2007 at established earthflow monitoring stations will provide valuable information to guide future management activities on earthflows. These measurements are primarily for 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 FY 2008 should be focused on continuing the on-the-ground monitoring of the earthflows to enlarge our baseline data to enable the evaluation of future changes due to management activities, continuing the review of the risk classification system for earthflows, and continuing the field verification of the earthflow and landslide boundaries.

On November 7, 2006, storm induced debris flows swept down five channels draining Mt. Hood, destroying two Forest Service bridges, damaging State Highway 35, and reminding all observers of one of the geologic hazards associated with large active volcanoes. The debris flows removed public access to the Old Maid Flat area for about six months and closed State Highway 35 for about one month. Debris flow frequency has increased on Mt. Hood since a regional climate change that occurred in 1995. Large debris flows in the stream channels that drain Mt. Hood are likely to continue, threatening public safety and transportation routes. Interagency efforts are underway to redesign stream crossings or relocate roads to minimize the damage from these natural events.

Air

Goal

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

Monitoring Activities and Evaluation

Monitoring activities include monitoring prescribed fire emissions and criteria pollutants, including their deposition and effects on visibility, precipitation chemistry, 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 dioxide, ozone, carbon monoxide, lead, and particulate matter < 10 μm and < 2.5 μm). 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). NADP data is accessible from <http://nadp.sws.uiuc.edu> and IMPROVE data can be accessed at <http://vista.cira.colostate.edu/improve>. In addition, the Forest Service Pacific Northwest Region, in collaboration with the Forest Inventory Analysis-Forest Health Monitoring (FIA-FHM) Program, has created a biomonitoring network. This network consists 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 are the primary indicator in the biomonitoring network. Air quality is assessed at each site using lichen community composition and pollutants loads of nitrogen, sulfur, lead and other toxic metals. Monitoring data is accessible at the Northwest Region Air Resource Management website <http://gis.nacse.org/lichenair>.

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 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 is being achieved to date.

Accomplishment

The management activities that affect air quality by the Mt. Hood National Forest remained in compliance throughout the monitoring period (10/06 - 9/07). 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 1,024 acres were treated during the course of the period with a total of 1385 tons being consumed. 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 FASTRACS system.

Air Pollutants

Air pollutants of most ecological concern to the Forest are nitrogen oxides (NO_x), sulfur dioxide (SO₂), and ammonia (NH₃) and their secondary reaction products, which are ozone, nitrates, nitrites, ammonium ions, sulfates, nitric acid and sulfuric acid. Large additions of nitrogen from vehicle exhaust, industry, and agriculture cause eutrophication of aquatic and terrestrial system with adverse effects to water quality, fish, aquatic communities, altered soil chemistry and reduced tree growth rates.

Four pollutants with high potential to cause adverse ecological effects are monitored:

- nitrogen,
- sulfur,
- lead, and
- mercury.

Initial surveys and chemical analyses were made in 1994-1997, and re-measurements of previously surveyed sites were made in 2004 and 2005. Lichen identifications and laboratory analyses from 2005 field work are still in process.

Nitrogen-containing Air Pollutants

Between 1994 and 2004, the Columbia River Gorge and the northern boundary of the Forest have experience substantial increases (25-40%) in nitrogen deposition as detected by lichen nitrogen content and collaborated by NADP wet deposition at the Bull Run. The increase is related to increasing population or agricultural influences. No change in lichen nitrogen was detected at sites in the Mt. Hood Wilderness, which has been far enough away from sources and high enough in elevation to be unaffected by regional increases in nitrogen. Analysis of lichen community data from 10-year re-measurements will indicate whether or not increasing nitrogen deposition at the boundaries of the Forest is having detectable ecological effects on the presence or abundance of sensitive species.

Sulfur-containing Air Pollutants

There were no significant changes in sulfur concentrations in lichens or in sulfates in wet deposition. Lichen monitoring indicates that the eastern part of the Forest, Columbia River Gorge corridor, and the western boundaries continue to experience the elevated levels of sulfur deposition, which is primarily resulting from agriculture (in the east) and traffic and pollution funneling through the Columbia River Gorge and the Portland metropolitan area (in the west). On the Mt. Hood Wilderness, sulfur levels in lichens were within expected ranges for background sites.

Lead Pollution

Regionally and nationally, lead deposition has decreased significantly over the past ten years, primarily due to the removal of leaded gasoline from the nation's fuel supply. Lead levels in the Mt. Hood Wilderness and nearly all sites on the Forest continued to be within background ranges.

Mercury Pollution

In the Pacific Northwest and elsewhere, mercury is primarily emitted during coal combustion. In 2006, lichen samples from the Forest, the Columbia River Gorge and six other National Forests were submitted. Results from the samples are not yet available.

Recommendations

New direction from the National Fire Plan is to:

- 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 product.

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. 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 A

List of Preparers

Arredondo, Christine – Community Engagement

Cartwright, Linda – Noxious Weeds

DeRoo, Tom – Geology and Minerals

Dodd, John – Soils

Dyck, Alan – Wildlife/Plants

Fissell, Dan – Range

Geiser, Linda – Air Quality

Godek, Chris – Financial

Hakanson, Shelley – Partnerships/Volunteers

Hamilton, Malcolm – Recreation

Hickman, Tracii – Fisheries

Lankford, Nancy – Silviculture

Lombardo, Michelle – Planning

McClure, Rick – Heritage Resources

O'Connor, Jennie – Planning

Rice, Jeanne – Ecology

Rice, Jim – Timber

Steinblums, Ivars – Water Resources

Tierney, Jim – Transportation/Roads

Wrightson, Jim – Fire

York, Shelly – Desktop Publishing

Appendix B

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.

Principal 1 - Social Well- Being

1.1 - Collaborative Stewardship

1.1.1 - Citizen Involvement

- 1.1.2 - Local area empowerment
- 1.1.3 - Collaborative decision making
- 1.1.4 - Civic science

1.2 - Community Resilience

- 1.2.1 - Social capital – Built relationships
- 1.2.2 - Civic competence at the community level
- 1.2.3 - Civic enterprise

1.3 - Institutional Adequacy

1.3.1 - Rules of the game

- 1.3.2 - Tenure
- 1.3.3 - Legal framework
- 1.3.4 - Authority structure

1.4 - Social and Cultural Values

- 1.4.1 - Sense of place
- 1.4.2 - Aesthetic values
- 1.4.3 - Recreational values
- 1.4.4 - Access
- 1.4.5 - Civil rights
- 1.4.6 - Environmental justice organization
- 1.4.7 - Worker safety
- 1.4.8 - Cultural heritage

1.5 - Community Livability

- 1.5.1 - Community health
- 1.5.2 - Settlement pattern

Principal 2 – Ecological Integrity

The ecological criteria and indicators were based on maintaining integrity of ecological systems to provide sustainable forests.

2.1 - Landscape Function

- 2.1.1 - Disturbance processes
- 2.1.2 - Hydrologic function
- 2.1.3 - Long-term Community Dynamics

2.2 - Landscape Structure/Composition

- 2.2.1 - Landscape diversity
- 2.2.2 - Landscape patterns

2.3 - Ecosystem Function

- 2.3.1 - Productive capacity
- 2.3.2 - Functional diversity
- 2.3.3 - Invasive species
- 2.3.4 - Nutrient cycling
- 2.3.5 - Carbon sequestration
- 2.3.6 - Stream function

2.4 - Ecosystem Structure

- 2.4.1 - Air, soil & water quality**
- 2.4.2 - Ecological legacies
- 2.4.3 - Special habitats
- 2.4.4 - Species richness

2.5 - Population Function

- 2.5.1 – Population Viability – species of concern

2.6 - Population Structure

2.6.1 - Population of indigenous species

2.7 - Genetic Function

- 2.7.1 - Artificial selection
- 2.7.2 - Migration
- 2.7.3 - Drift

Principal 3 – Economic Well-Being

3.1 - Sustain minimum stocks of natural, human and built capital

- 3.1.1 - Natural capital
- 3.1.2 - Human capital
- 3.1.3 - Built capital

3.2 - Produce and consume sustainable (annual) flows of market goods and services

- 3.2.1 - Commercial products from the forests and lands
- 3.2.2 - Energy flows
- 3.2.3 - Developed recreation

3.3 - Produce and consume sustainable flows of non-market goods and services

- 3.3.1 - Undeveloped active recreation
- 3.3.2 - Passive tourism and scenic amenities
- 3.3.3 - Water flows and quality
- 3.3.4 - Air quality effects

3.4 - Ensure an equitable distribution of benefits and costs

- 3.4.1 - Marketed forest goods and services
- 3.4.2 - Non-marketed goods and services
- 3.4.3 - Demographics of workforce
- 3.4.4 - Local revenue sharing
- 3.4.5 - Rent distribution by recipient

3.5 - Maintain an appropriate regional economic trade balance

- 3.5.1 - Exports of goods and services
- 3.5.2 - Imports of goods and services
- 3.5.3 - Ability for local community to meet labor requirements

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