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Monitoring and Evaluation Report

Fiscal Year 1998

**Mt. Hood National Forest
Land and Resource Management Plan**

Monitoring Report

Fiscal Year 1998

Mt. Hood National Forest

Land and Resource Management Plan

July 1999

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Summary

The matrix found in Table 1 offers a comparison of key resource monitoring items and program accomplishments for fiscal years 91 through 98. This comparison chart is the start to identifying long term trends in resource conditions and program outputs. A few conclusions can be drawn at this time. There are indications that Forest Plan adjustments are needed in some cases. Adjustments in management practices are taking place (in response to information learned through our monitoring efforts). These include a reliance on concessionaires for campground management, development of a prescribed natural fire policy for Wilderness areas and a focus on using designated skid trails to protect soil resources.

Projections of accomplishment that are not consistent with the original Forest Plan include Allowable Sale Quantity and Total Sale Program Quantity, Road Construction and Reconstruction and Trail Construction and Reconstruction. This is due to lower budgets and significantly lower timber outputs as well as additional requirements outlined in the Northwest Forest Plan. We are meeting the timber outputs as projected in the Northwest Forest Plan.

Continued monitoring is necessary to assess management activities and draw meaningful conclusions. A more detailed examination of Key Resource Areas can be found in Chapter 2 of this document.

Based on overall forest condition, review of monitoring information and ongoing management activities, I certify that the Mt. Hood Forest Plan as amended by the Northwest Forest Plan is sufficient to guide management of the Forest over the next year. Minor nonsignificant amendments will be made as the need arises.

Summary of Key Resource Conditions

➤ *Air Quality*

The management activities that affect air quality by the Mt. Hood National Forest remained in compliance throughout the monitoring period (10/97 to 9/98). No deviations from the State's Smoke Management Plan occurred and compliance with all Forest Service and State Air Quality Guidelines were maintained. A total of 1,643 acres were treated during the course of the period with a total of 13,130 tons consumed. No intrusions into smoke sensitive areas occurred as a result of Forest management activities. Visibility in the Mt. Hood Wilderness Class I Area was not significantly impaired as a result of management activities. All burning operations were properly recorded and submitted to Salem Smoke Management for approval and recording purposes.

In addition to monitoring prescribed fire emissions, air quality monitoring on the Mt. Hood National Forest occurs within a cooperative framework among the National Forests of western Oregon. The focus of the work is on assessment of air pollution effects to forests through biomonitoring, specifically by monitoring of lichen abundance (especially of those species known to be sensitive to air toxins) and tissue analysis. Monitoring occurs in cooperation with the Continuous Vegetation Survey (CVS) program; lichen plots are collocated with CVS plots such that in addition to lichen data, a wide range of forest composition and structure attributes are monitored as well. Lichen plots are expected to be revisited on a four-year cycle. Methodologies are adapted from and fully interfaceable with the EPA/FS National Forest Health Monitoring Program.

At the present time, 146 plots (100% of the total target number) have been installed. It appears that the western portions of the forest have lower amounts of toxin-sensitive lichens than normally would be expected. Also, lead levels in lichen tissues collected from the Mt. Hood Wilderness appear higher than would be expected in a completely natural environment. These results are only preliminary and have not been subjected to rigorous statistical testing or peer review. It has also not been established that the effects observed to lichens are the result of air pollution. Further investigation is underway to strengthen the analysis and findings.

➤ *Fisheries*

The continued decline in numbers, listing and proposed listing of stocks of fish which inhabit the Mt. Hood National Forest are indicators of the overall weak condition of anadromous wild fish in the Pacific Northwest. Limited survey results of resident wild cutthroat show a stable population. As habitat managers, Forest personnel continue to protect and restore valuable riparian areas. Assessments of effects of the 1996 floods continue, and headway was made in restoring stream channel habitat. Anadromous fish have a complex life history which includes freshwater, migration and saltwater phases. The available habitat on the Forest continues to be underutilized.

With the implementation of the Northwest Forest Plan's (NFP) Aquatic Conservation Strategy, and an associated reduction in timber harvest, the long term recovery of watershed health has begun. Continued watershed restoration as part of the NFP will further improve instream and riparian conditions while reducing the risk from upslope erosion.

➤ *Threatened, Endangered and Sensitive (TES) Plants*

Sensitive plant species found in forested habitats appear to be stable. Species which occur in nonforested habitat, such as meadows, grasslands, balds and cliffs, continue to be the most vulnerable to impacts from noxious weed encroachment, offroad vehicles and recreational rock climbing. Habitat restoration and monitoring efforts in FY 98 focused on three species which had been affected by these impacts. These efforts will continue in FY 99.

Beginning in FY 99, implementation of the Northwest Forest Plan required that surveys be conducted for Survey and Manage species. A total of 18 planning areas were surveyed resulting in the 134 new sites located for 11 plant, lichen, moss and fungi species.

➤ *Timber, Silviculture Resource*

Prescriptions to treat forest health concerns were implemented in FY98. Selection cuts, salvage harvest, and commercial thinnings make up the majority of the Forest program. However, there are several areas of concern regarding current and potential future forest health issues. These include a backlog of overly dense, young stands in need of precommercial thinning, large acreage of natural fuel accumulation on the eastside of the forest, and large acreage of overly dense stands in need of commercial thinning. Recommendations are for more commercial and precommercial thinning to improve forest health; however, lack of funding is a barrier.

The amount of timber offered for sale in FY98 slightly exceeded the adjusted probable sale quantity of 64.0 MMBF. Yet the amount actually sold was 42.1 MMBF due to several no-bid sales. Small diameter, low value timber is more difficult to sell, especially with present market conditions.

➤ *Wildlife*

Survey efforts to determine species presence and population trend have expanded to include Northwest Forest Plan Survey and Manage species as well as Endangered, Threatened and Sensitive species. Survey and Manage surveys were conducted within 30 project areas. A total of 184 Survey and Manage mollusk populations, representing 6 species, were located in 9 project areas.

Endangered and Threatened species surveys for peregrine falcon, bald eagle and spotted owl show populations to be stable.

Not all Sensitive species were surveyed for due to a lack of funding and personnel. Harlequin duck, common loon, and sandhill crane numbers are comparable with previous years while population trends for red-legged frog, Cope's giant salamander, Townsends big-eared bat and California wolverine are unknown.

➤ *Fire Management*

Estimates of the magnitude of the fire-dependent ecosystems on the Mt. Hood National Forest that are ecologically outside the range of natural conditions are varied. An effort to consolidate and update the forest's vegetation data will greatly enhance our ability to quantify any deteriorating conditions in these ecosystems. 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.

The risk of large stand-replacing fires escaping the Badger Creek Wilderness continues to be a threat due to current fuel conditions. A combination of management ignited fire inside the Badger Creek Wilderness and mechanical treatment outside the wilderness area will be needed to reduce the existing and future fuel hazard so that prescribed natural fire can be successful inside the Wilderness boundary. Completion of a fire management plan to address this strategy is anticipated in FY 2000.

The application of prescribed fire to natural fuels will continue to contribute to the maintenance of a healthy fire-dependent ecosystem on the forest's eastside zone. Outyear funding for prescribed fire projects with natural fuels will potentially increase our ability to treat up to 5,000 acres per year. However, if implemented, this increase could affect ambient air quality standards in small communities adjacent to the forest, the Mt. Hood Wilderness and potentially the Portland metro area.

Where feasible, mechanical treatment of activity-generated fuels will continue to maintain a high priority of choice for treatment methods. Mechanical treatment of natural fuels and timbered stands will also be necessary throughout portions of our eastside zone prior to the reintroduction of management-ignited fire.

➤ *Water Resources*

With continued implementation of Best Management Practices (BMPs), watershed restoration, and the Northwest and Mt. Hood N.F. Plans, water quality and watershed conditions are expected to be maintained and in some areas show an improving trend. The results of the intensive monitoring being conducted in the Bull Run watershed continue show that water quality conditions have not diminished below the high standards established in the watershed.

Work is underway to install automated water monitoring stations in the following key watersheds or their tributaries: Clackamas River (Carter Bridge), Eagle Creek (Fish Hatchery), and Alder Creek (Forest Boundary). The water monitoring stations will continuously monitor turbidity and flow depth, and provide for easy data access via telephone.

➤ *Soil Resources*

Soil compaction damage related to timber harvest remains a concern on the Forest. On a Forest-wide basis, the extent of damage has decreased as timber harvest levels have declined since the beginning of the decade. 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 in a manner consistent with Forest Plan standards. Activities in stands where multiple harvest entries have been made, the cumulative impacts from these prior activities plus planned treatments have a much higher likelihood of exceeding the standard for protecting soil productivity.

The trend toward commercial thinning and Forest Health treatments combined with use of ground based logging systems will result in an increase in the occurrence of cumulative soil impacts in future years on the Forest. Where cumulative effects are an issue, in addition to designated skid trails, other mitigating measures including logging system design and season of operation, need to be implemented to effectively manage soil resource damage.

Identifying the extent of existing soil condition in the planning phase is critical to prescribing mitigation measures, including logging system type, fuel treatment type, skid trail designation and season of operation.

➤ *Recreation Resources*

Recreation opportunities and condition of recreation facilities such as trails and camping facilities have declined over time due to reduced budgets. They will likely decline further if recreation budgets continue to decline. In an effort to continue to respond to recreational needs, changes in how we provide recreation opportunities will occur. The use of a concession operation of our campgrounds is one example. Moving toward additional privatization, use of reservations and increased fees are other future possibilities.

➤ *Travel and Access Management*

We are continuing to move toward the open road densities as identified in the Forest Plan. During the planning process, opportunities to reduce road densities are being identified. However, there is not enough funding available to implement the total reduction planned. Many of these roads identified for decommissioning will close naturally. If funding becomes available for decommissioning, the implementation rate would increase. In FY 98 approximately 18 miles of road were closed and 27 miles of road were decommissioned. We have completed the final draft of the Access and Travel Management (ATM) Plan and expect a signed plan to be completed in 1999.

Table 1. Summary Comparison Chart (by Fiscal Year)

Element	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	Recommendation/Comments
Fire Management									
• Human caused fires	61	49	42	55	29	43	27	32	Continue monitoring, management direction achieved.
• Natural occurring	29	30	3	11	19	2	9	38	
Total Fires Suppressed	90	79	45	66	48	45	36	70	
Air Quality									
• Acres treated by prescribed fire	1,516	3,559	2,727	2,809	1,962	2,448	1,082	1,647	Continue monitoring, management direction achieved.
• Intrusions into Class I areas	0	0	0	0	0	0	0	0	
Soil Resources									
• Activity areas monitored	21	15	8	0	8	2	10	8	Restrict subsoiling to areas that exceed 15% damage standard.
• % areas not meeting soil productivity S&Gs	25	33	36	-	0	0	70	25	
• Soil improvement acres	198	244	301	42	70	55	11		
Range Management									
• Permitted AUMs	7,288	3,927	3,607	3,954	1,848	1,548	1,548	1,548	Revise AMPs as scheduled. Continue monitoring.
• % of allotments receiving reviews	100	100	-	-	-	100	100	100	
• % sites meeting utilization S&Gs	33	42	62	51	70	88	91	94	
Heritage Resources									
• Evaluations/eligible			0	1	5/0	1/0	0	0	

Element	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	Recommendation/ Comments
• # of condition reviews of existing sites	52	56	0	29	7	32	73	50+	Complete process for those that are started.
• Nominations to National Register	1	0	0	0	0	0	0	0	
• # of CCC maintenance projects	44	41	8	72	15	31	47	70	
Geologic Resources									
• Created openings on mapped earthflows	2	13	19	0	7	19	7	0	Continue monitoring.
• Created openings on mapped landslides	0	3	16	0	3	2	0	0	
• Openings not meeting S&Gs size limits	1	0	0	0	0	0	0	0	
Mineral Resources									
• Mineral material used by other agencies (cu.yd.)	86,000	187,500	23,000	5,000	82,000	191,850	25,500	216,700	Complete development plans for common variety sources.
• Mineral material used by MTH (cu.yd.)	110,000	78,400	4,800	9,000	12,550	13,300	151,800	52,900	
• % projects inspected for compliance	100	100	100	100	100	100	100	100	
• Mineral material sold to public (cu.yd.)	915	900	910	900	1,400	1,600	865	1,160	

Summary

Element	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	Recommendation/Comments
<ul style="list-style-type: none"> % major projects with operating plans 	39	100	100	100	100	100	100	100	
Fish Resources									
<ul style="list-style-type: none"> Acres of lakes inventoried/improved 	30/0	1,342/302	3,635/3	1,935/5	707/9	90/0	0/0	0/0	Continue surveys.
<ul style="list-style-type: none"> Miles of streams inventoried/improved 	217	214/35	373/26	365/26	367/15	125/29.5	99/39.1	45/19	Continue surveys.
<ul style="list-style-type: none"> Chinook salmon redd counts 	25	0	-	-	0	19	40	19	Continue monitoring.
<ul style="list-style-type: none"> Lakes surveyed 	30	31	17	16	4	4	0	0	Continue surveys.
<ul style="list-style-type: none"> Riparian surveys 									
<ul style="list-style-type: none"> -% meeting pool S&Gs 	0	0.7	7	.1	1	3.8	11.3	13.6	Continue monitoring.
<ul style="list-style-type: none"> -% meeting LWD S&Gs 	29	22	23	16	.4	0	3.2	2.1	Continue monitoring.
<ul style="list-style-type: none"> % habitat structures meeting S&Gs 	-	99	90	-	64	79	91	--	Continue monitoring.
Water Resources									
<ul style="list-style-type: none"> Best Management Practices implemented ? 	yes	yes	yes	In-concl.	yes	yes	yes	yes	Continue implementation of Best Management Practices Evaluation Process. Continue monitoring and develop a consistent cumulative effects analysis.
<ul style="list-style-type: none"> Projects meeting % ARP S&Gs 	-	86	87	-	-	100	100	100	
Transportation/Roads									

Element	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	Recommendation/Comments
• Miles constructed/ Forest Plan projection	10/ 16.6	6.4/ 16.6	3.3/ 16.6	7.7/ 16.6	2.4/ 16.6	.6/ 16.6	2.3/ 16.6	5/ 16.6	Adjust Forest Plan.
• Miles reconstructed / Forest Plan projection	24.2/ 91.5	19.3/ 91.5	3.2/ 91.5	15.5/ 91.5	15.4/ 91.5	31.9/ 91.5	111.4/ 91.5	35.7/ 91.5	Adjust Forest Plan.
• Road miles obliterated		41.0	47.5	47.4	29.4	38.9	84.2	27	
• Road maintenance meeting S&Gs?	yes	yes	yes	yes	yes	yes	yes	yes	
Wildlife Resources									
• Peregrine Falcon nest sites		0	2	0	1	1	0	2	Complete implementation Plan including site specific Habitat Mgmt. Areas and Mgmt. Direction.
• % projects meeting Bald Eagle S&Gs		100	100	100	100	100	100	100	Continue surveying, complete Mgmt. Plan.
• % projects meeting primary cavity nester S&Gs	Inconcl	Inconcl	39	In-concl.	90+	50	71	65	Continue monitoring and surveying.
• % summer range S&Gs met	100		100	--	100	NA	100	100	Continue monitoring.
• Pine-oak habitat S&Gs met?	yes	yes	yes	yes	yes	yes	yes	yes	Continue monitoring.
Timber Resources									
• % timber offered of Forest Plan Total Sale Program Quantity	28	15	20	13	19	30	34.4	31	Initiate Forest Plan adjustment to match NFP.

Summary

Element	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	Recommendation/ Comments
<ul style="list-style-type: none"> • % timber offered of Forest Plan Allowable Sale Quantity 	32	17	23	14	22	34	39	35	Initiate Forest Plan adjustment.
<ul style="list-style-type: none"> • % of PSQ target offered for sale. 				39 27.3 mmbf	106 41.4 mmbf	122 63.6 mmbf	114 74.0 mmbf	104 66.6 mmbf	
<ul style="list-style-type: none"> • Silviculture acres treated (harvest methods) 	8,046	5,190	3,722	1,637	2,030	1,685	1,948	3,344	Continue monitoring.
<ul style="list-style-type: none"> • Silviculture activities (Ac.) (planting, fertilizer, etc.) 	11,104	10,191	8,954	7,193	12,361	9,852	6,172	6,589	Continue monitoring.
<ul style="list-style-type: none"> • Regeneration meets S&Gs? 	yes	yes	yes	yes	yes	yes	yes	97% meets S&Gs	Continue monitoring.
Scenic Resources									
<ul style="list-style-type: none"> • Projects monitored 		23	2	3	1	1	3	5	Continue monitoring of selected projects.
Recreation Resources									
<ul style="list-style-type: none"> • Miles trail constructed/projections 	1.6/6.6	0/6.6	0/6.6	5/6.6	0/6.6	0/6.6	0/6.6	0/6.6	Continue monitoring.
<ul style="list-style-type: none"> • Miles trail reconstructed /projections 	14.9/30.5	7.9/30.5	14.9/30.5	12/30.5	14/30.5	21/30.5	14.8/30.5	14.8	Continue monitoring.
<ul style="list-style-type: none"> • Wilderness issues of concern - overuse, nonconforming uses 			-				Prepare Wilderness Mgnt. Plan		Continue monitoring.
<ul style="list-style-type: none"> • W&SR Plans completed/remaining 	0/5	2/3	4/1	All completed	All completed	All completed	All	All	Completed.
<ul style="list-style-type: none"> • W&SR suitability studies completed 	0	0	0	0	0	0	0	0	Defer due to budget constraints.
Financial Review									

Element	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	Recommendation/Comments
• Full plan implement budget/ actual expense	65.3MM\$/ 44.4MM\$	65.3MM\$ / 39.5MM\$	65.3M M\$/ 40.9M M\$	65.3M M\$/ 32.7M M\$	65.3M M\$/ 31.7 MM\$	65.3MM \$/ 30.4MM \$	65.3MM \$/ \$38.2M M\$	65.3MM/ 33.7	

Chapter 1

Introduction

The Land and Resource Management Plan (Forest Plan for the Mt. Hood National Forest) as amended in 1994 by the Record of Decision for the 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 eighth year of management under the Forest Plan direction.

The Forest Plan established integrated multiple use goals and objectives, established standards and guidelines for resource activities, identified management areas and set their direction, established the maximum decadal sale quantity, and determined monitoring and evaluation requirements.

A part of implementing the Plan involves a commitment to monitor and evaluate how well we are doing. Monitoring provides the decision makers and the public information on the progress and results of implementing the Forest Plan. This document highlights what the Forest is doing in key resource areas.

Monitoring is the gathering of information and observing management activities to provide a basis for periodic evaluation. The overall objective of monitoring is to ensure that the commitments we made in the Forest Plan are being correctly applied and are producing the desired results.

Monitoring is fundamental for us to fulfill our responsibilities as stewards of the land. The years activities are not complete unless we monitor the effects of those activities, evaluate the results (i.e. what do the results mean?) and recommend actions or modifications to be made (i.e. what should be done now?). This process allows the Forest Plan to remain an active, usable document.

This report is composed of five chapters:

Chapter 1 - Introduction

Chapter 2 - Accomplishments/Results/Recommendations

Summarized individual resource program accomplishments, activities monitored, evaluations, and recommendations.

Chapter 3 - Financial Review

Contains information which describes the Mt. Hood National Forest in financial terms.

Chapter 4 - Forest Plan Amendments

Reviews amendments made to date.

Chapter 5 - Ongoing Planning Actions

Highlights a variety of additional planning and analysis activities, and implementation of the Northwest Forest Plan.

Although some information with respect to Forest Plan implementation may be reported now, continued monitoring allows meaningful evaluation and conclusions to be made. As monitoring continues, trends are being established that will provide valuable information for shaping the future management of the Forest.

A review of the plan was made two years ago in an effort to determine if major changes had taken place to cause a significant amendment or revision to our plan. It was determined that because the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl had significantly modified our plan in 1994, no further significant revision was needed at this time.

Chapter 2

Accomplishments/Results/ Recommendations

Monitoring Element: Fire Management

➤ 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 wildfire. Fire programs are to be implemented consistent with Forest Plan Standards and Guidelines, Management Prescriptions, and the Pacific Northwest Plan.

➤ *The 1998 Fire Season*

The 1998 fire season was represented by average to below average rainfall conditions throughout the Pacific Northwest area. There were periods when drying conditions raised the fire danger levels to high in the month of September. A total of 70 fires were reported in 1998: 38 lightning and 32 human-caused fires. Reported acreage burned totaled 18 acres. No industrial operations fires occurred in 1998. Cooperative relations with other agencies continued to be well coordinated. Other fire management program activities (e.g. Prevention and Detection) were accomplished within expectations.

➤ *Monitoring Activities and Evaluation*

The Forest Plan identified three fire protection and two 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. Information for objectives one through three are to be analyzed and results reported every five years. Objectives four and five are to be reported annually. The five fire management objectives and their current status are:

① Are the number of human-caused wildfires within levels considered in the plan?

Unit of measure, number of wildfires by cause and by type of people.

Table 2. Fire Causes and Type of People, 1990-1998

Causes	No.	%	Type of People		
			No.	%	
Equipment Use	12	3.2	Owner	2	.5
Smoking	94	25.5	Permittees	5	1.4
Campfire	186	50.4	Contractor	7	1.9
Debris Burning	9	2.4	Public Employee	8	2.1
Railroad	0	0.0	Local Permanent	0	0
Arson	17	4.6	Seasonal	4	1
Children	2	.5	Transient	13	3.6
Unknown	49	13.4	Other	30	8.2
			Recreation Visitor	300	81.3
Totals	369	100		369	100

② Are the number of, size of, and intensity of wildfires within levels considered in the plan?

Unit of measure, number of wildfires by size and intensity.

Table 3. Summary of Wildfires - Acres Burned by Size Class 1990-1998

Size Class (Acres)	Number Fires	Acres Burned by Fire Intensity Level						Total Acres
		1	2	3	4	5	6	
D (100-299)	7	0	250.0	837.0	176.0	0	0	1,263.0
C (10-99)	6	26.0	39.4	88.0	0	20.0	0	173.4
B (.26 - 9)	92	37.2	44.3	12.3	6.8	5.7	3.0	109.3
A (<.25)	480	55.9	4.3	1.4	.1	0	0	61.7
Total*	585	119.1	338	938.7	182.9	25.7	3.0	1,607.4

**Includes both lightning and human-caused wildfires.*

③ Is the Fire Management Effectiveness Index (FMEI) within levels expected in the Plan?

Unit of measure, Fire Management Effectiveness Index. The equation for determining the FMEI is to total presuppression (FFFP), suppression (FFFF), and net value change (NVC) cost and divide the total by the number of acres protected.

Table 4. Fire Management Effectiveness Index

Year	FFFP \$	FFFF \$	NVC \$	Total	Acres	FMEI
1990	1,312,000	134,000	86,000	1,532,000	1,068,000	1.43
1991	1,359,000	4,963,000	692,000	7,014,000	1,068,000	6.57
1992	1,620,000	1,078,000	164,000	2,862,000	*1,034,000	2.77
1993	1,814,000	872,000	3,000	2,689,000	1,034,000	2.60
1994	1,839,000	1,038,000	313,000	3,190,000	1,034,000	3.09
1995	1,911,000	66,000	52,000	2,029,000	1,034,000	1.96
1996	2,162,000	24,000	28,000	2,214,000	1,034,000	2.14
1997	2,583,000	135,000	23,000	2,741,000	1,034,000	2.65
1998	2,072,000	105,100	40,000	2,217,000	1,034,000	2.14
Average	1,825,000	923,000	140,100	2,940,000	1,041,500	2.81

**Reduction in total acres due to the creation of the Columbia River Gorge National Scenic Area and lands being transferred to the Scenic Area for management.*

➤ *Results*

The threshold of concern for items #1 and #2 above is, “no more than 20% departure from the expected number per decade.” It was anticipated that the human-caused occurrence would average 559 fires/decade and 56/year. Presently, the forest is averaging 46/year. Additionally, the Forest Plan estimated an average annual acreage burned by wildfire to be 408 acres/year. For the eight years of this decade the forest is averaging 202 acres/year. These numbers are well below the threshold of concern.

The Fire Management Effectiveness Index (#3) represents a measure of the combination of mitigation efforts which encompass fuel treatments, fire prevention programs, and cost effective suppression programs. It is being measured against a historical level of forest activities and fire suppression efforts. The Plan's estimate for the FMEI for the first decade is 2.873. Item #3 has a threshold of concern of "no more than 40% departure from expected number per decade." For the first eight years of decade one, the forest annual average of 2.81 is slightly lower than estimated in the Plan, but well below the unacceptable threshold level of 4.02.

④ *Are desired residue (fuel) profiles being met?*

As part of the total fire and fuels management program, the forest also 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. See Air Quality Monitoring Element for acres treated and tons of fuel consumed.

⑤ *Treat natural fuels on estimated 800 acres annually (a projected average for first decade of the Plan).*

For the current reporting period, 1,174 acres were treated. Overaccomplishment is due to two reasons:

- Decision to extend the original natural fuels burning boundary to more logical holding/mopup boundary.
- Spring conditions allowed the burning of extra acres, providing a window of opportunity that met prescription windows.

➤ *Recommendations*

Fire and fuels management direction is being achieved and current program effort should continue.

- Continue to reduce activity fuel residues through a variety of treatment methods.
- Continue to plan for and treat natural fuels to better mitigate identified forest health issues.
- 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.
- Continue to work towards the completion of the Badger Creek Wilderness Fire Plan.
- Continue to emphasize prevention of industrial operation caused fires.
- Continue to focus prevention and presuppression efforts on reducing campfire and smoking caused fires.
- Implement the Federal Wildland Fire Policy.

Since the vast majority of our campfire incidences occur near water-oriented campsites, our prevention and presuppression forces will continue to focus their efforts there.

Monitoring Element: Air Quality

➤ Prescribed Fire Emissions

Goal

The overall goal is to manage prescribed fire emissions to meet the requirements of the State Implementation Plan (SIP) for the Clean Air Act. Management activities will also be managed to ensure that no deviations to the State Smoke Management Plan occur.

Accomplishment

The management activities that affect air quality by the Mt. Hood National Forest remained in compliance throughout the monitoring period (10/97 to 9/98). No deviations from the State's Smoke Management Plan occurred and compliance with all Forest Service and State Air Quality Guidelines were maintained. A total of 1,643 acres were treated during the course of the period with a total of 13,130 tons consumed. No intrusions into smoke sensitive areas occurred as a result of Forest management activities. Visibility in the Mt. Hood Wilderness Class I Area was not significantly impaired as a result of management activities. All burning operations were properly recorded and submitted to Salem Smoke Management for approval and recording purposes.

Table 5. Prescribed Burning - FY 98

Burn Type	Acres Treated by Area				Total
	Hood River	Barlow	Clackamas River	Zigzag	
Broadcast	0	0	0	0	0
Piles	0	310	33	33	376
Underburn	0	1,267	0	0	1,267
Total Acres	0	1,577	33	33	1,643
Tons Consumed	0	12,023	1,006	101	13,130

Summary

The Forest 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.

➤ *Lichen Biomonitoring*

Over the past five years, the Willamette and Mt. Hood National Forests have participated in a semi-regional air quality monitoring effort using lichens. Monitoring follows the national Forest Health Monitoring Program methods for lichen community surveys, and standard methods for analysis of pollutants concentrated in lichen tissues. Lichen communities data and lichen element data for sulfur, nitrogen and metals are now available for the Willamette and Mt. Hood National Forests for all 3.4 mile pilots on the Current Vegetation Survey grid.

The most significant advance in 1998 was the conversion of the element data from units of concentration in lichens to units of deposition, i.e. Kg/ha/yr. The conversion dramatically increases the usefulness of the lichen data in regulatory settings and made it possible to map estimated deposition of sulfates and nitrogen-containing pollutants forest-wide. Because the program is a multi-forest effort, including the Columbia River Gorge National Scenic Area and the Deschutes, Gifford-Pinchot, Mt. Hood, Siuslaw, Willamette, Umpqua, Wallowa-Whitman, and Winema National Forests, deposition estimates can be compared across Forest boundaries, providing a regional perspective.

Conversion of lichen data was made by comparing accumulation of sulfur and nitrogen in lichens at nine instrumented sites operated by the National Acid Deposition Program to the recorded average annual deposition at those sites. Estimates of sulfur deposition from lichen data are accurate to within 1/3 kg/ha/yr, estimates of nitrogen deposition are accurate to within 2 kg/ha/yr.

Sulfur deposition on the Mt. Hood National Forest is a complex story. Average deposition ranges from <0.7 to 4.0 kg/ha/yr. Values under 0.7 were observed only in the driest, most remote part of the Forest, i.e. the extreme southeast. Deposition in most of the southeast half of the Forest was between 0.7 and 2.0 kg/ha/yr. Highest deposition (between 3.4 and 4.0) was seen along the entire northern border of the Forest closest to the Portland metropolitan area and the Columbia River Gorge. Most of the northwest half of the Forest experiences between 2.0 and 3.4 kg/ha/yr sulfur deposition but upper elevations of the Mt. Hood Wilderness, with very high precipitation, average between 2.7 and 3.4 kg/ha/yr. Nitrogen deposition follows a similar pattern, ranging from 0.5 to 1.0 in the extreme southeast to 2.5 to 3.0 kg/ha along the northern boundary. In contrast, no areas of the Willamette National Forest exceeded an average of 2.7 kg/ha/yr sulfur or 1.5 kg/ha/yr nitrogen. Most sulfur and nitrogen deposition on both Forests is anthropogenic - a function of their proximity to urban-industrialized areas, large traffic volumes, and intensive agriculture.

In a national context, sulfur and nitrogen deposition in the most polluted areas of the Pacific Northwest is approximately equivalent to the cleanest areas in the eastern half of the United States. Average sulfur and nitrogen deposition is between 3 - 11 kg/ha/yr and 4 - 8 kg/ha/yr, respectively, in nearly **all** locations east of the Mississippi River. These and other air pollutants have reduced biodiversity and caused important declines in productivity of forests and crops. Analyzing lichen community data to identify national forest areas currently experiencing air pollution impacts to terrestrial vegetation in western Oregon and Washington is a next objective of the air quality biomonitoring program. Sulfur and nitrogen deposition is high enough in the Columbia River Gorge and northwest Mt. Hood National Forest to anticipate negative effects on forest health in some areas.

➤ *Recommendations*

- A strategy should be developed for airing concerns about air quality impacts to forest health.
- Continue lichen monitoring and coordination with EPA.
- Continue on-site monitoring of suspended particulate emissions created as a result of prescribed fire activities.

Monitoring Element: Soil Resources

➤ *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 as 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 is presented in the wildlife section.

➤ *Accomplishments*

Two needs guided the direction for soil monitoring in 1998. First, the need to continue to monitor those areas that have been harvested previously so that cumulative effects can be documented. Second, the need to document monitoring done on planning areas and specific stands proposed for some level of timber harvest activity so that effects can be better predicted. Results from monitoring reflect this direction - cumulative effects and existing condition.

Eight harvest units were monitored for detrimental soil impacts from ground based logging systems and fuel treatments. Two of the monitored units had soil damage exceeding the 15% standard. The remaining six units were well within the standard. All eight monitored units had previous harvest activity as summarized in Table 6.

Table 6. Measured Detrimental Impacts by Silvicultural Treatment and Logging System

Silvicultural Treatment	Logging System	Fuel Treatment	Previous Entries	Percent Soil Impacts
Salvage	tractor	none	1	2
Shelterwood	loader/tractor	grapple	1	1
Shelterwood	loader/tractor	grapple	1	1
Shelterwood	loader/tractor	grapple	1	5
Shelterwood	tractor	landing pile	2	7
Thinning	tractor	landing pile	1	4
Understory Thinning	tractor	grapple	1	28
Understory Thinning	tractor	grapple	1	21

Five planning areas were evaluated to determine existing soil damage within stands proposed for silvicultural treatment to determine cumulative impacts to soil quality. Aerial photos and field observations were used to make estimations of existing soil conditions. Table 7 summarizes the results.

Table 7. Summary of Percent Soil Damage by Planning Area

Planning Area	Previous Entries	Estimated % Damage
Polallie/Cooper	0	0-1
Osprey	1	0-3
Talc	1	2-3
Evans	1	10-15
Hilynx	1	0-8

With the exception of Evans, planning areas examined show little existing damage. The relatively small amount of existing impact was usually the result of a temporary road or a few old skid trails in some of the stands proposed for entry within a planning area. Stands within the Evans planning area had been entered previously and more intensively than any of the stands in any other planning area. The Forest continues to apply restoration treatments, typically subsoiling, to activity areas where management standards have been exceeded. However, the concern for damage to root systems of residual trees in thinned stands limits subsoiling as a management tool to alleviate compaction. The earliest opportunity for rehabilitation treatment in these stands would occur with a regeneration or shelterwood silvicultural prescription.

The Forest also continues to work with Oregon State University and the Pacific NW Research Station on a subsoiling effectiveness study located on the Silver Timber Sale. Preliminary results are beginning to show that soil biology (mushrooms and truffles, specifically) is rebounding on skid trails and roads where subsoiling was used to alleviate compaction damage. At least two more years of data will be collected by OSU before conclusions are drawn.

➤ *Recommendations*

Monitoring results in 1998 as compared to previous years would suggest that progress is being made with regard to the number of harvest units where soil damage exceeds the standard. Monitoring to determine cumulative effects should continue in order to find out whether 1998 was an isolated, positive year, or truly a positive long term trend. Existing conditions monitoring and documentation needs to continue also in order to provide a sound basis for cumulative effects estimation in NEPA documents. Units monitored for existing conditions should also continue to be tracked and monitored as harvest, fuel treatment, and rehabilitation (if needed) occur in order to verify estimates made in NEPA documents.

Monitoring Element: Range Management

➤ Goal

Within the constraints imposed by basic plant and soil needs, provide forage for utilization by wildlife and permitted domestic livestock.

➤ Existing Program

There were three range allotments grazed (out of a total of 6) on the Mt. Hood NF in 1998. Two grazing permits were canceled in 1993 resulting in one vacant allotment. Three permits on three separate allotments were granted nonuse for permittee convenience. This resulted in two allotments receiving total rest for the entire grazing season and half the permitted livestock running on another allotment. Permitted livestock use for the season totaled 1,548 AM's for the Forest. New fences were constructed or maintained in various key areas to gain better livestock control and ensure attainment of Forest Plan Standards and Guidelines.

➤ *Evaluation/Monitoring - Long Term and Short Term*

Long Term - Vegetation/Trend

Studies to monitor existing condition and long-term trend in vegetation are in place on all allotments. Plots are visited once every 5 years to record plant species diversity, percent bare soil, plant vigor and other factors which allow us to determine the range condition (excellent, good, fair, poor, very poor) and the vegetative trend (upward, static, downward) as compared to the “Potential Natural Community/Desired Future Condition.” These measurements, along with other observed vegetative changes occurring across the landscape, (such as wildfire, flood, noxious weed infestation) are considered in determining whether or not we are achieving Forest Plan Objectives. Results show that of the 172,087 acres having range vegetation management objectives, 51% (87,764 ac) are meeting Forest Plan objectives, 34% (58,509 ac) are moving toward Forest Plan objectives, and 15% (25,813 ac) are of undetermined status, with 1% (1,721 ac) not meeting or moving toward Forest Plan objectives. For riparian areas (19,300 ac), 47% (9,071 ac) are meeting Forest Plan objectives, 25% (4,825 ac) are moving toward Forest Plan objectives, 20% (3,860 ac) are of undetermined status, and 8% (1,544 ac) are not meeting or moving toward Forest Plan objectives. (See table for summary.) The three long term monitoring plots that were scheduled for reading this fiscal year did not occur. They will be rescheduled for reading in FY 99.

Short Term - Utilization Studies

Utilization monitoring studies were conducted on all allotments. These studies are used to monitor the consumption of the current years forage by both permitted livestock and wildlife. Out of the thirty-four established monitoring sites which are visited annually, twenty-five are located within riparian areas. Of those sites, 92% (23) met Forest Plan Standards and Guidelines. The remaining nine sites are located within the uplands, and 100% (9 sites) were in compliance with the Forest Plan.

**Table 8. Total Acres with Range Vegetation Management Objectives
(includes Riparian Acres)**

Range Allotment Monitoring			
	Verified	Estimated	Total
Acres with Range Vegetative Management Objectives			172,087
Acres Monitored in Current FY			132,554
Acres Meeting Forest Plan Objectives	18,530	60,163	78,693
Acres Moving Toward Forest Plan Objectives	19,500	34,184	53,684
Acres Not Meeting/Moving to Forest Plan Objectives	0	177	177
Acres of Undetermined Status			39,533
Riparian Area Within Allotments			
	Verified	Estimated	Total
Riparian Acres			19,300
Riparian Acres Monitored in Current FY			15,440
Riparian Acres Meeting Forest Plan Objectives	3,500	5,571	9,071
Riparian Acres Moving Toward Forest Plan Objectives	2,700	2,125	4,825
Riparian Acres Not Meeting/Moving Toward Forest Plan Objectives	300	1,244	1,544
Riparian Acres of Undetermined Status			3,860

➤ *Recommendations*

Continue revisions to allotment management plans as scheduled. Maintain coordination with Fish/Watershed and Soils specialists. Use the Proper Functioning Condition Protocol (PFC) within riparian areas on range allotments.

Monitoring Element: Noxious Weeds

➤ Goal

Control noxious weed infestations and prevent their spread in accordance with the Mt. Hood National Forest Noxious Weed Plan, the Final Environmental Impact Statement (FEIS) for Managing Competing and Unwanted Vegetation, The Mt. Hood National Forest Land and Resource Management Plan and applicable State and Federal laws and regulations.

➤ Existing Program

The Mt. Hood National Forest cooperates with the Oregon Department of Agriculture, Wasco and Hood River County Weed Departments, Bonneville Power Administration and the Confederated Tribes of Warm Springs to conduct surveys and control noxious weeds.

In 1998, efforts focused on the control of knapweed (*Centaurea* spp.) species west of the Cascade Crest, tansy ragwort (*Senecio jacobaea*) east of the Crest, and the control of new invader species including rush skeleton weed (*Chondrilla juncea*), Scotch thistle (*Onopordum acanthium*), Japanese knotweed (*Polygonum cuspidatum*) and Russian knapweed (*Acroptilon repens*). Chemical (herbicides), manual (hand pulling), mechanical and biological (insect agents) methods were used.

Table 9. Acres of Noxious Weed Treatment and Surveys

Acres Treated by Method					
Chemical	Manual	Mechanical	Biological	Fire	Total
37	1,248	1	305	0	1,591
Acres Surveyed by Method					
Informal Surveys*			Formal Surveys**		
1,800			4,367		

* Surveys conducted incidental to other field work

** Surveys specifically to detect noxious weeds

Monitoring Questions

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

Yes, particularly spotted and diffuse knapweed east of the Cascade Crest, and houndstongue.

- *Are new infestations of noxious weeds occurring?*

Yes, two new populations of Russian knapweed and orange hawkweed were detected.

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

Somewhat. Biocontrols for Scot's broom, St. John's wort (*Hypericum perforatum*) and tansy ragwort are widely distributed and are likely having an effect on these species. The distribution of spotted and diffuse knapweed bioagents is uneven and appears to have had only a local effect.

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

Most, but not all. Larger, more well funded projects have implemented mitigations. Some smaller projects have not.

- *Do chemical treatments for noxious weeds follow standards set in the Region 6 Managing Competing and Unwanted Vegetation EIS?*

Yes

Results

Untreated noxious weed populations continued to spread during 1998. The greatest spread was with spotted knapweed, diffuse knapweed and houndstongue. These species primarily colonize areas of disturbed soil, particularly along roads and trails, where they are dispersed by vehicles, people, livestock and animals.

Chemical treatments were used at 7 weed sites. The 1998 application was either the fourth or fifth year that herbicides had been applied at these sites. After an initial reduction in the number of weed plants of 90 to 95 percent the first 2 years of application, weeds have persisted in small numbers the past 2 years. These plants are the result of the seed that had built up in the soil prior to chemical treatment. One site treated with herbicides the past 3 years was manually treated in 1998 because only a few weed plants were found to exist at the site.

Manual and mechanical treatments appear to control noxious weed sites, although eradication has been possible only on very small populations which consists of a few plants.

New infestations of Russian knapweed were reported on the Hood River Ranger District and a site of orange hawkweed (*Hieracium aurantiacum*) was detected on the Zigzag Ranger District. The occurrence of the hawkweed is the first for the Mt. Hood National Forest.

During 1998, 21 biocontrol releases were made. These include the release of ragwort flea beetle (*Longitarsus jacobaeae*) to control tansy ragwort at 3 sites and the release of lesser knapweed flower weevil (*Larinus minutus*) and blunt knapweed flower beetle (*Larinus obtusus*) at 18 sites to control spotted and diffuse knapweed. Monitoring for *Apion fuscirostre*, a seed weevil bioagent of Scot's broom, was conducted across the Forest to determine its distribution. The weevil was found in every Scot's broom infestation sampled, suggesting that new releases for this insect are no longer necessary.

Past sites of rush skeleton weed (*Chondrilla juncea*) and Scotch thistle (*Onopordum acanthium*) were surveyed on the Forest. No plants were found at these sites.

➤ *Recommendations*

- Continue to analyze options which will allow for a greater number of noxious weed sites to be treated with chemicals.
- Work with the Oregon Department of Agriculture to establish new bioagents on the Forest as they become available.
- All projects which result in ground disturbance should be reviewed to assure mitigations which reduce the risk of noxious weed establishment are in place.

Monitoring Element: 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, six monitoring elements were identified in the Forest Plan.

- *Are American Indian rights being protected on National Forest lands and are projects with activities or areas of concern to Indians being coordinated with appropriate Tribal representatives?*

The Confederated Tribes of the Warm Springs Reservations are included in all scoping efforts. The Forest Supervisor and/or other Headquarters staff also meet every quarter 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. The implementation of a memorandum of understanding between the Forest and the CTWS, signed in July, 1997, regarding the management of huckleberry habitat on the Forest, continues to be very successful.

Zigzag

In April 1998, the Forest became involved with the Warm Springs Sustainability Project. This project is in partnership with Oregon State University and the CTWS who received a joint 2-year renewable grant from the Ford Foundation. The purpose of the grant is to explore ways to support and promote cultural community sustainability. The Forest's involvement is to work with the CTWS and develop projects that enhance culturally important areas such as those that contain huckleberries and camas. In a somewhat related

project, a Ph.D. candidate is preparing a dissertation which involves mapping camas field locations in GIS. This information will be useful for both the Forest and CTWS.

Hood River/Barlow

The Confederated Tribes of the Warm Springs are contacted at least once for every project. Follow-up consultation is ongoing, primarily in regard to fisheries. Total project related consultations in FY 98 exceeded 30. Additional non-project contacts include management of the Bear Springs Compound, ANPO, as well as fisheries planning.

Clackamas River

The District consulted with the CTWS regarding the transfer of management of the Breitenbush Lake Campground to the CTWS and the closure of the portion of Forest Road 4220 between Horseshoe Lake and Breitenbush Lake (within the McQuinn Strip). After consultation over the phone in FY 98, an onsite meeting was held in October 1998. Consultation is also routine for other projects including eight timber sales. Huckleberry enhancement and lynx habitat are part of the discussions.

- *Are significant (National Register eligible) historic buildings and structures being maintained, stabilized, and repaired according to historic preservation standards?*

The Timberline Lodge Historic Building Preservation Plan (HBPP) was completed in FY98. This plan will “provide managers credible alternatives for routine maintenance, rehabilitation, restoration, and replacement of historic fabric throughout the building.” Implementation will occur once the Programmatic Agreement for the HBPP is signed in FY99. The HBPP will be incorporated in an Environmental Assessment prepared for the Timberline Lodge Master Development Plan Amendment and Forest Plan Amendment #12. The Master Development Plan will allow future upgrading of Timberline Lodge while the Forest Plan Amendment designates Timberline Lodge and its immediate environs as a Special Interest Area (A-4 Land Allocation) within the existing Winter Recreation Area (A-11) Land Allocation. The Decision Notice was signed in FY 99.

The majority of the Forest's historic administrative structures were built during the Depression-era (1933-1942) and are under the Depression-Era Management Plan. Maintenance and repair work on these buildings is reported in the Summary Report below. There is a discrepancy between the "Number" of projects and "Project Effect" because not all projects were reviewed for their effect on the historic buildings. While all the work appears to have had "No Effect," they must be reviewed by the District Archaeologist to determine what level of consultation with the State Historic Preservation Office is required.

Because of reduced facility maintenance budgets, many historic administrative buildings are not receiving adequate maintenance and have not for a number of years. Lead paint, in particular, which was used on most buildings up into the 1970's is now a hazardous material concern and expensive to remove or contain. A Facility Master Plan (finalized in 1999) was prepared to address the impacts of the decreasing budget and identify which administrative buildings were no longer needed. Until the final disposition of these buildings is determined, very little maintenance will be performed. Allowing historic buildings to deteriorate may be an "Adverse Effect." Therefore, decisions need to be made soon, in consultation with the State Historic Preservation Office, so that appropriate repairs, maintenance and stabilization is performed on the buildings that will be retained.

While a few other historic buildings such as Timberline Lodge and Cloud Cap Inn are being maintained, many others are not receiving any maintenance or stabilization measures. Options such as placing a building under a special use permit or offering as a cabin rental are being explored.

- *Are significant (National Register eligible) sites being nominated to the National Register of Historic Places?*

There were no National Register nominations submitted in FY 1998. The last nomination completed was the Barlow Road in 1992. The Cooper Spur Warming Hut and Bagby Guard Station nomination documentation work was completed in 1994, including SHPO consultation. These nominations should be sent to the Washington Office [Bagby has been sent in FY 99]. The Timberline Trail had a Draft Nomination prepared in 1989. The work on this nomination should be completed.

Table 10. CCC Historic Structure - Summary Report

	Type of Project	Number	No Effect	No Adverse Effect	Adverse Effect
1	Minor repairs/routine maintenance.	45	10		
2	Replace wall or roof materials, in-kind.	5	1		
3	Replace wall or roof materials, not-in-kind.	0			
4	Repair or replace windows or doors, in-kind.	4			
5	Replace windows or doors with new features different in size, design or operation.	0			
6	Repair or replace secondary structural features; e.g. porches, gutters and downspouts, chimneys, in-kind.	4			
7	Install insulation materials, storm windows or doors.	0			
8	Repaint or refinish interior surfaces.	4			
9	Repaint exterior surfaces.	0			
10	Refurbish areas previously altered; e.g. kitchens or bathrooms; replace nonhistoric flooring or floor covering.	3			
11	Repair/replace mechanical, electrical, plumbing systems.	5	3		
12	Alteration to building (describe).	0			
13	Addition to building.	0			
14	Removal of building.	0			
15	Other (describe)	0			

****Note:** Only some of these projects were assessed for their potential effect to historic properties. The remainder apparently fall under categories of projects that do not require SHPO consultation per the Amended Programmatic Agreement for Management of Depression-Era Administrative Structures on National Forest Lands in Oregon and Washington, Stipulation VI. However, all projects must be reviewed by the appropriate Heritage Resource staff to determine whether SHPO consultation is necessary. This review did not occur on at least one of the districts.*

- *Are cultural resource sites being interpreted for the public?*

A variety of interpretation/education activities occurred on and off the Forest in FY 98. In partnership with the CRGNSA and Gifford Pinchot National Forest, the Mt. Hood hosted the Windows on the Past Show on September 29 - October 3, 1998, at the World Forestry Center in Portland, Oregon. After a year and a half of planning, the show opened with 28 different exhibits, demonstrations, or living history presentations. The students at the Timberlake Job Corp built the homestead exhibit for the show. Over 5,000 visitors attended including 4,000 school children. Other interpretation activities on the Forest include an archaeological excavation project at Clear Lake. Fifteen volunteers worked at the project, and information and interpretation was provided to 558 visitors. On Memorial weekend, volunteers from the Oregon Archaeological Society assisted on another archaeological project. An artifact analysis training was provided to those OAS members. An interpretive display at the Fish Creek Campground was installed to interpret the prehistoric use of the area. District Heritage staff gave four presentations at local schools and other forums. Frequent tours were conducted at Timberline Lodge along with the interpretive displays that the Friends of Timberline oversee. Summer volunteers at Clackamas Lake Guard Station provided interpretive services to the public.

- *Are cultural resource sites being “condition” checked and maintained on a regular basis?*

Several historic buildings and sites such as Timberline Lodge, Silcox Hut, Zigzag Ranger Station, Clackamas Lake Guard Station, and the Barlow Road Historic District receive periodic monitoring. Over 50 archaeological sites were monitored, which is less than 10% of the Forest's known sites. Most of these are located in high use areas or near proposed projects and are visited year after year. The majority of the sites on the Forest, however, have not been monitored since they were originally recorded, many as early as the 1970s. To monitor some of the most vulnerable sites, the Forest developed a Memorandum of Understanding with the Oregon Archaeological Society (along with the Gifford Pinchot National Forest and Columbia Gorge National Scenic Area), to establish a site stewardship program. After receiving training, the OAS volunteers were assigned one or more sites to visit periodically and record site conditions.

- *Are cumulative effects of forest project activities on cultural resources being tracked and studied?*

Currently, there is no systematic tracking or studies of cumulative effects of forest project activities on cultural resources. Avoidance of impacts to cultural resources has been a goal of the vast majority of projects. Therefore, effects of any kind from projects are rare. The Heritage staff do, however, routinely monitor the condition of cultural resources during and after project activities to ensure that the avoidance procedures are followed. No cultural resources were impacted in FY98.

➤ *Recommendations*

- Evaluate remaining Depression Era and other historic buildings on the Forest for eligibility to the National Register of Historic Places.
- Develop a Forest-wide historic building plan which will include a historic context statement, a summary of National Register evaluations, and direction for disposition of surplus historic facilities.
- Ensure that maintenance and repair work on historic structures is done only after review by the District Archaeologist, and, if necessary, consultation with the State Historic Preservation Office. Develop a facilities plan identifying priorities for maintenance and repair.
- Complete the National Register nomination process for the properties that have already been started.
- Develop a site determination of eligibility schedule to reduce the backlog of unevaluated sites.
- Develop a site monitoring schedule to increase the number of sites monitored each year, with emphasis on sites that have not been visited in over ten years.
- Recognize that program accomplishment will be reduced due to reduction of Forest Archaeologist position to half-time.

Monitoring Element: Geologic Resources

➤ *Goal*

The goal for the geology program is to prevent reactivation of landslides.

➤ *Surveys and Inventories*

There were thirteen timber harvest units in FY98 on land mapped as medium or high risk earthflows. Total acreage for these units was 231 acres. Most of the acreage occurred in two of the units. The first involved 177 acres that was part of a hazard tree removal project along Forest Service Road 70, where scattered individual trees were removed. The second unit was a 40 acre commercial thin where about 1/3 of the smaller trees were removed to promote more vigorous growth in the remaining trees. The remaining eleven timber harvest units were part of a project to remove insect-killed trees or blowdown related to the insect infestation to limit its spread and protect the health of the surrounding forest. The tree-removal on those units occurred in small isolated pockets. Total acreage for these units was 54 acres. None of these treatments reduced the crown closure below 70% and therefore did not create an 'opening' on earthflow land. None of the units were field reviewed. No roads were constructed or reconstructed on lands mapped as earthflows during FY98. These management activities met the standards and guidelines for B8 land.

There were no timber harvest units on mapped landslides other than earthflows in FY98. No roads were constructed or reconstructed on mapped landslides other than earthflows. These management activities met the Forestwide standards and guidelines for Geology.

Continued measurements during FY98 at established earthflow monitoring stations will provide valuable information to guide future management activities on earthflows. These measurements are primarily for slope movement rates. Much additional effort is still needed in verifying the scientific validity of the standards and guidelines for earthflows, particularly those covering hydrologic recovery.

For several days in early September a series of debris-flow surges initiated near the snout of the White River Glacier on Mt. Hood, heightening the awareness of all observers of one the geologic hazards associated with large active volcanoes. These debris-flow surges caused extensive erosion in the upper White River Valley and extensive deposition where the valley floor widens just north of the Highway 35 bridge. The surges threatened public safety and a major transportation route. The valley floor above the bridge was closed to public access. Geologists monitored this situation for several weeks until cooler weather reduced the dangers.

➤ *Recommendations*

- Additional efforts in 1999 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.
- Continuing the field verification of the earthflow and landslide boundaries.

Monitoring Element: Mineral Resources

➤ *Goal*

The goal is to facilitate the exploration and development of energy and mineral resources while maintaining compatibility with other resource values.

There were no commercial leasable or locatable mineral development activities on the Mt. Hood National Forest in FY98. Locatable mineral activities were limited to minor sampling and exploration on the Forest. Six Notice-of-Intent were submitted to the Forest. In all cases the planned activity was limited to mineral exploration. One unpatented mining claim was filed during the last year; activities on this claim were limited to mineral exploration. There were 23 inquiries from the public regarding laws and guidelines covering locatable minerals on National Forest managed 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 9 major projects where a total of 216,700 cubic yards of mineral materials were used by another government agency. This included 215,100 cubic yards used by ODOT, 1000 cubic yards used by the Willamette National Forest, and 600 cubic yards used by BLM. Most of the material used by ODOT was for highway sanding operations on State Highways 26 and 35. There were 34 major projects where a total of 52,900 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 of the requirements of the operating plan had been met. During FY98 there were 6 operating plans completed for current and future projects. One small quarry was closed and restored.

There were 23 smaller projects (less than 500 cubic yards each) where salable mineral materials were used by the Mt. Hood National Forest. No operating plan was required for these projects. These projects removed a total of 6600 cubic yards.

There were 393 smaller projects where salable mineral materials were used by the public. These projects removed a total of 1160 cubic yards. These projects produced an insignificant level of surface disturbance and therefore did not require an operating plan.

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 existing common variety mineral material sources were completed during FY98. No new development plans were completed, although several remain nearly completed.

In addition, many of our sources are being depleted of the easily accessible loose material by the continuing demand for "landscape rock" by the public.

➤ *Recommendation*

- For next year, additional efforts should be focused on completing more development plans for our primary common variety mineral material sources.
- Inexpensively create additional loosened material at those sources to meet the public demand for small quantities of salable mineral materials.

Monitoring Element: Fish Resources

➤ Goal

The goal of the fishery program is to maintain or increase fish habitat capability and assure long-term aquatic ecosystem health.

Our GIS stream layer indicates that there are 6,400 miles of streams on the National Forest. Approximately 1,600 miles are inhabited by fish. There are also over 100 lakes with fish. Mt. Hood National Forest waters support 24 fish species, including salmon, steelhead, and trout. Fish resources on the Forest are an important contributor to local and regional recreational, commercial and tribal fisheries.

The waters of the Mt. Hood National Forest provide important habitat for native populations of fish. There are five salmon and trout species presently listed under the federal Endangered Species Act. Species and status are listed below:

<u>Evolutionarily Significant Unit</u>	<u>Status</u>
Lower Columbia River steelhead (<u><i>Oncorhynchus mykiss</i></u>)	Threatened
Lower Columbia River chinook salmon (<u><i>O. tshawytscha</i></u>)	Threatened
Columbia River bull trout (<u><i>Salvelinus confluentus</i></u>)	Threatened
Columbia River chum salmon (<u><i>O. keta</i></u>)	Threatened
Mid-Columbia River steelhead (<u><i>O. mykiss</i></u>)	Threatened
Upper Willamette River spring chinook salmon (<u><i>O. tshawytscha</i></u>)	Threatened

➤ *Spawning and Redd Counts*

Spawning and redd surveys for steelhead and salmon were completed in 23 streams totaling over 44.9 miles. Surveys are usually completed along predetermined index reaches that are surveyed yearly to show spawning trends and fish distribution. Some surveys were done with partners, including the Oregon Department of Fish and Wildlife and the Confederated Tribes of Warm Springs Reservation.

Key findings include:

Lower Columbia River Steelhead

Spawning surveys for late winter steelhead were conducted along index reaches on seven streams above the North Fork Dam in the Clackamas River watershed. A total of 16.5 miles of streams were surveyed and 28 redds were identified. The most heavily utilized areas were Roaring River, lower Fish Creek and North Fork of the Clackamas River.

In addition to the index reach spawning surveys, two extensive spawning surveys were conducted with volunteers along 3.8 miles of the Oak Grove Fork and 5.5 miles of the Collawash River. Four redds were counted in these surveys for an average of 0.4 redds/mile.

A comparison of redd counts between 1997 and 1998 shows an increase in the number of redds sighted within the index stream reaches and extensive surveys. In 1997, 18 redds were identified which accounted for 5% of the total escapement over North Fork Dam. In 1998 a total of 32 redds were identified accounting for 15% of the total escapement. The average number of redds per mile increased from one per mile in 1997 to 1.7 per mile in 1998.

The difference between these two years might be explained by two factors. The Roaring River was not surveyed in 1997 and the Upper Clackamas River basin was subjected to higher flows in the spring of 1997 than in 1998. Surveyors frequently note that identifying steelhead redds is difficult when higher flows obscure visibility and scour substrate of its background layer of periphyton.

The 1998 late-run winter steelhead surveys indicated the lower portion of the basin above the North Fork Dam was preferred for spawning. It also identified the upper index reach of the Roaring River as being a “hot spot”.

Mid-Columbia River Steelhead

Winter steelhead surveys were completed in index reaches of Fifteenmile Creek and Ramsey Creek. A total of four redds were found in 4.0 miles of Ramsey Creek (1.0 redds/mile) and four redds were found in 6.5 miles of Fifteenmile Creek (0.6 redds/mile). These numbers indicate a continued low escapement of wild winter steelhead into the headwaters of the Fifteenmile Creek basin.

Lower Columbia River Chinook

Based upon past marking and radiotelemetry studies, the majority of spring chinook in the Hood River watershed spawn in the West Fork and its tributary, Lake Branch. In the West Fork of the Hood River index reach the redd count was down from 14 in 1997 to 2 in 1998. The lower reach redd count in the West Fork of Hood River remained steady at 19 in 1997 and 17 in 1998. No redds were observed in Lake Branch in 1998 while seven were observed in 1997. The numbers of adult Chinook salmon returning to Hood River in 1998 was lower than in 1997. Thus, there was a proportionally fewer number of redds in 1998 as compared to 1997.

Spawning surveys have been conducted in Still Creek, a tributary to the Zigzag River in the Sandy watershed, since 1989. Two index reaches totaling 2.6 miles are surveyed. A total of 74 spring chinook spawners were observed in 1998. This was the second lowest count since 1989 (range 63 - 140, mean 110). It represented 2.8 percent of the spawning escapement over Marmot Dam on the main-stem Sandy River. This is the second lowest percentage in that time period (range 2.75 - 8.6).

The number of spawners in Still Creek are fairly stable although fish counts over Marmot Dam have varied. Variations in the percentage of spawners in Still Creek of the total escapement over Marmot Dam may have several explanations. There may be natural variations in escapements to different spawning tributaries within the upper Sandy River. Also, conditions within Still Creek during the time of the surveys may vary each spawning season. Peak flows and turbid water affect the ability to view fish.

Spawning and redd surveys for spring chinook were also conducted in the Salmon River, a tributary to the Sandy River. Three reaches totaling 15 miles have been surveyed beginning in 1996. Salmon observed in Salmon River, as a percentage of the counts over Marmot Dam, were 46% in 1996, 27% in 1997 and 38% in 1998. The Salmon River is clearly an important spawning tributary for spring chinook in the Sandy basin.

Since 1996, spring chinook spawning surveys have also taken place on the Sandy River and additional smaller tributaries: Camp Creek, Clear Creek, Clear Fork, Lady Creek, Henry Creek, Devils Creek and Lost Creek. Approximately 32% of the habitat available for chinook above Marmot Dam was included in the survey reaches. Approximately 52% of the adults counted over Marmot Dam were detected in the 1996 surveys, 35 % in 1997 and 43% in the 1998 surveys. These tributaries all originate and/or have significant spawning habitat on the National Forest.

Columbia River Bull Trout

Index reaches for annual adult bull trout surveys include upper Clear Branch, lower Clear Branch, and Pinnacle Creek, within the Hood River Basin. In 1998, eight additional tributaries were surveyed for bull trout presence, including Bear Creek, Eliot Branch, Coe Branch, McGee Creek, Lake Branch, upper West Fork of the Hood River, Tony Creek, and Compass Creek. Methodology for surveys include day snorkeling for adult census, night snorkeling for juvenile census as well as radio-tracking of tagged adults moving up from the Columbia River.

Index reach monitoring (data represent single highest single count for the year) for bull trout found:

	Upper Clear Branch	Lower Clear Branch	Pinnacle Creek
1991	10 (partial survey)	2	not surveyed
1992	19	2	not surveyed
1993	37	2	not surveyed
1994	6	2	not surveyed
1995	5	1	1
1996	18	0	0
1997	20	3	1
1998	30	0	1

The population above Laurance Lake dam appears to be maintaining itself at low numbers. Low counts in 1994 and 1995 were likely due to the low, draw-down reservoir level which created a thermal block and shallow water in the stream where it enters Laurance Lake. Juvenile bull trout were noted in lower Coe and Eliot Branches during night surveys. This is the first documentation of rearing juveniles outside of the known populations in Clear Branch and Pinnacle Creek (both are populations above the dam). No bull trout were found in other non-index streams. Low counts (three juveniles and 1 adult in 1.1 miles) in Pinnacle Creek may be due to the culvert at the mouth of Pinnacle Creek acting as a complete upstream passage barrier (physical or behavioral barrier) for bull trout. Pinnacle Creek contains excellent habitat for bull trout. There are plans to remove this culvert in the year 2000.

Cutthroat Trout

Cutthroat trout redd counts have been done since 1993 in tributaries of Bull Run Lake. Beak Consultants was contracted by the Portland Water Bureau to do the counts in 1998. Beak used a different methodology than the MHNH had in previous years, but developed a correction factor so that results could be compared. Excluding 1996, when only three surveys were done, the USFS method has generated counts ranging from 94 - 188. From an initial count of 94 redds in 1993, there was an increasing trend of counts through 1997 (188). Redd counts may be stabilizing (146 in 1998).

There are many environmental factors that may affect cutthroat populations as indicated by spawner and redd counts in Bull Run Lake. One of these factors appears to be lake elevation. The amount of large organic debris available as cover, as rearing habitat and as a host to cutthroat food sources decreases dramatically as the lake elevation is lowered. As lake elevations have increased during the spawning season since 1993, passage to tributaries has also improved. The lake was drawn down by the Portland Water Bureau in 1992 during a drought.

➤ *Stream Surveys*

The Forest-wide riparian (stream) inventory program completed 71.1 miles. Large wood and pool frequencies were compared against Land and Resource Management Plan (LRMP) standards. Of the 71.1 miles, only 1.5 miles met the large wood standard and 9.7 miles met the pool standard. None of the miles met both standards. Since this survey methodology began in 1989, only a small fraction of streams meet the LRMP standards. This is the case even for wilderness streams. The standards do not appear to reflect the range of natural conditions for streams of the Mt. Hood National Forest.

A stream survey and population estimate was conducted on the Oak Grove Fork of the Clackamas River (RM 0.0-3.5). The surveys were used to identify habitats in conjunction with a fish population estimate. The habitat survey quantifies habitat composition. Habitat data collected during this survey is in the process of being analyzed. When data analysis is complete we expect to be able to identify preferred rearing areas, and habitat utilization by different species and years classes.

Surveys to determine flow classification (ephemeral/intermittent/perennial) and upper limit of fish use was completed on 22 tributaries on the Hood River Ranger District and on 31 tributaries on the Barlow Ranger District. Survey data was used to determine appropriate buffer widths for proposed management activities such as timber sales and ski area management.

➤ *Highland Ditch Impact Monitoring*

A long-term monitoring effort was initiated in 1998 on Badger Creek, within the Badger Creek Wilderness. A headgate structure diverts water into the Highland Ditch. In the recent past, several ditch failures/breaches have occurred, depositing large pulses of sediment and organic matter into the stream. Badger Creek has indigenous inland/redband rainbow trout (*O. mykiss gairdneri*), a FS Region 6 and Oregon State sensitive species, as well as other aquatic life. Before 1998, no formal monitoring effort assessed existing conditions, trends and possible effects to aquatic habitat. The objectives of the Badger Creek Monitoring effort are as follows:

- To quantify trends in fluvial and geomorphic conditions of Badger Creek over time, above and below the Highland Ditch diversion structure.
- To quantify flow and discharge modifications to Badger Creek, as a result of Highland Ditch operations.
- To monitor number, size and trend of existing and new debris chutes and flows originating from the Highland Ditch.
- To assess if current and past management of the Highland Ditch is consistent with the Northwest Forest Plan and more specifically, the goals and objectives of the Aquatic Conservation Strategy.

In meeting these objectives, permanent sites were established for channel cross-sections, pebble counts, and photo points. These sites are located in the reference area (above the diversion structure) and the study reach (below the diversion structure).

Pebble count statistics indicate that the surface of the streambed in the reference reach is characterized by larger-size particles than the study reach. This suggests that finer material has entered the channel (possibly from upslope) in the study reach. Visual observations of study reach streambed particles noted a high proportion of angular rocks. Angular rocks indicate recent introduction into a stream channel, compared to rounded rocks.

In 1998, there were 22 ditch failures and chutes, as well as numerous cracks and smaller faults documented, originating from the Highland Ditch. Measurement of these chutes found approximately 9300 cubic yards of rock and soil had mobilized downhill, of which approximately 7000 cubic yards had reached Badger Creek (Johnson, 1998).

➤ *Gate Creek Riparian Monitoring*

The Gate Creek Area is a recently acquired 10 acre parcel of logged-over land on the south end of the Barlow District. Camping, off highway vehicle (OHV) use, and cattle-grazing have affected the stream channel and riparian area. In 1997, a riparian exclosure fence was built in a partnership with Catlin Gable School. Permanent photo points and shade surveys were established. In 1998, photo points and shade surveys were repeated. The Gate Creek Area did not show any noticeable increase in shade, one year after exclosure.

➤ *Grasshopper Grazing Allotment Riparian Monitoring*

When the Grasshopper Grazing Allotment Environmental Assessment, 1996 was signed, it included goals and objectives for desired conditions in riparian areas. Attainment of these goals and objectives must be met prior to allowing livestock grazing to return to the Rocky Burn Pasture of the allotment area. Streams in the area include Rock Creek, Threemile Creek and Gate Creek. This area experienced a fire in 1973, with subsequent salvage logging and cattle grazing. Grazing has not taken place for five years.

Monitoring of canopy cover in 1998 indicates that five of six stream reaches meet the goals. Goals are met for the same five of six reaches for percent of the streambank in eroded condition. The water temperature standard for not exceeding 24 degrees Celsius at any time was met. However, the Mt. Hood LRMP standard for not exceeding 14.4 degrees Celsius was not met for any of the three streams. The state DEQ standard for not exceeding 17.8 degrees Celsius for no more than 35 days per year was not met in two of three streams.

➤ *Lake Surveys*

Portland State University was contracted to conduct surveys at Laurance Lake, located on the Hood River Ranger District. The final report has not been received.

➤ *Stream Habitat Restoration Effectiveness Monitoring*

East Fork Hood River and Lake Branch Flood Restoration

Approximately 400 logs were placed to reintroduce large wood debris to the stream channel. Objectives were to increase channel roughness, provide high flow refugia, rewater portions of the flood plain and possibly capture spawning sized gravel. Both projects had photopoints set up for short-term (1-3 years) monitoring of structure stability and channel/floodplain changes. Preliminary findings during the winter of 1999, shows that treated portions of Lake Branch have already accomplished some of the project objectives, aggrading 1 to 3 feet and rewatering portions of its flood plain. Field visits during a high water event during the winter, 1998 found the added LWD was meeting project objectives.

Clackamas River Tributaries Flood Restoration

Pre-project photo points were established at large wood placement habitat restoration projects on Fish Creek, Oak Grove Fork of the Clackamas River, Cub Creek, and also at the upper Clackamas side channel project. Following project implementation, post-project photos were taken at all sites. Photo points will be re-taken at intervals detect changes in structure locations, channel morphology, and riparian vegetation.

Ramsey Creek Flood Restoration

Permanent photo points were established in 1998 to complement physical measurement monitoring sites established in 1997. Data collected will be stratified and compared with analog reach data to be used for project design specifications and to monitor channel adjustments over time.

Clear Branch Gravel Retention

Post-project monitoring of the 1997 lower Clear Branch of the Middle Fork of Hood River gravel addition project continued during the summer of 1998. The project added spawning-sized gravels downstream from the Laurance Lake dam. The dam prevents gravel and other bedload recruitment from upstream. The Wolman pebble count method was used. Spawning sized gravel (8-32 mm) has markedly increased, while sediment (4mm and smaller particles) has decreased in this reach since monitoring began in 1996. Monitoring has also shown that gravels are being retained in this reach rather than being mobilized downstream and out of the project reach. The district will continue to monitor this reach so a recommendation can be made for future gravel augmentation.

Oak Grove Fork of the Clackamas River

Population estimates using a modified Hankin and Reeves (1985) methodology were conducted at a restoration project site from RM 0.0 to 3.8 on the Oak Grove Fork of the Clackamas River. The objectives of the survey were to provide data for the construction of a life table for the sub-basin, obtain a population estimate for coho salmon using smolt trap data from the subsequent spring to generate an overwinter residence estimate, and to measure temperatures along the length of the river to correlate fish distribution with water temperature. The survey extended to the upper limit of anadromy. Data recorded during this survey is being analyzed and results are pending.

Preliminary results reveal that fish counts were higher for 1+ steelhead and the confidence intervals were tighter in the 1998 surveys than in 1997. No coho were observed in the 1997 survey. In 1998 an estimate of 3208 coho was obtained. This difference can be attributed to spring flows being much higher in 1997 with releases from Lake Harriet dam. Only minor spilling occurred in 1998. Smolt trap data showed many 0+ coho leaving the Oak Grove Fork in the spring of 1997. Almost no movement of fry was observed in 1998.

Side-Channel vs Natural Pond Population Estimates in the Upper Clackamas River

Population estimates were conducted at a pond within a side-channel restoration project site and a natural pond area along the upper Clackamas River in FY 1998. The two ponds were surveyed to estimate populations of juvenile coho salmon and compare fish densities and size between a natural area and a man-made area. The densities of juvenile coho salmon were higher in the natural pond while the average size of the fish was larger in the restored habitat.

The higher densities within the natural pond area may be because of better access into the pond from the main channel. Access to the man-made pond is through a side channel and culvert underneath Road 46. Size difference of fish between the two ponds may be due to warmer water temperatures within the man-made channel. Additional observations comparing the natural ponds with man-made habitat along with temperature monitoring of the sites will be needed to compare production rates within natural and man-made habitats.

Rock Creek

Long-term monitoring of the Rocky Burn (1973) continued by re-shooting 18 permanent photo points on lower Rock Creek. These photo points were established in 1984/1985, documenting an in-stream restoration effort using boulders and small diameter wood. Analyzing the photo series for several of the points over time show vast improvements in bank stability, width to depth ratio, pool area and pool volume, riparian vegetation and stream shade.

Juvenile Salmonid Population Estimates On Still Creek

An experimental survey utilizing a new population estimation model was done within a three mile section of Still Creek, a tributary to the Zigzag River in the upper Sandy watershed. Snorkel surveys were done to count steelhead, coho salmon, and chinook salmon juveniles. The species were tallied by age classes. A random selection of pools, runs, riffles, deep pools and side channels were sampled, after a physical habitat survey was done. The data is currently being analyzed by the U. S. Forest Service Pacific Northwest Research Lab in Corvallis for further analysis and to test the new methodology in estimating the fish population within the three mile section of stream surveyed.

A total of 4,522 fish were counted during the survey. Of the total number of fish observed, 35% were steelhead, 38% were coho, and 27% were chinook. An analysis of physical habitat quantity and fish densities by species and age class is currently being done to determine if there are habitat preferences.

Structure Durability and Function

No habitat structure durability and function surveys were conducted during FY 1998 on the Forest.

➤ *Aquatic Invertebrate Surveys*

Survey and Manage Aquatic Mollusk Surveys

Two aquatic snail species, Columbia dusky snail (*Lyogyrus spp.*) and basalt juga (*Juga oereobasis*), are listed as mandatory survey/manage species in the Northwest Forest Plan.

Twenty-two sites on the Hood River Ranger District were surveyed. Of the twenty-two sites, eight had snails with similar physical morphology to *Lyogyrus* and one appeared to be a *Juga*. Species verification is not possible without specific training and dissecting equipment, so all samples were preserved and sent in at the end of field season in November 1998 for positive identification. As of February 1999, no results have been received.

Barlow Ranger District fisheries personnel completed similar aquatic mollusk surveys, taking 23 samples in perennial spring/stream channel habitat types. Collected samples were sent off to qualified personnel for identification. Results have not been received as of February, 1999.

On the Clackamas River Ranger District 25 sites were surveyed. Presence of *Lyogyrus* was confirmed at nine sites. No *Juga* species were found during the surveys.

➤ *Aquatic Insects*

Follow-up surveys were done for two sites within the Mt. Hood Meadows permit area for R6-listed sensitive aquatic macroinvertebrates. In 1997, 2 out of the four listed caddisfly species were tentatively identified in both sites. Unfortunately, the adult winged stage needed for final verification was not located this year, though the survey was repeated once per week for several months.

➤ *Conclusions*

- There appears to be a continued low escapement of winter steelhead into the headwaters of the Fifteenmile Creek basin. While redd counts were up in the index reaches of the Clackamas River, counts of 1.7 redds/mile also indicate low escapement.
- Since monitoring began in 1991, bull trout spawning surveys have not censused more than 40 adults in all known tributaries in the Clear Branch of the Middle Fork of Hood River watershed. The population seems to be extremely small. This raises population viability concerns as small populations are vulnerable to genetic problems and natural or human caused events. It is promising that bull trout have been found rearing in tributaries downstream from Laurance Lake dam. The entire adult (20cm and larger) population within the Hood River is suspected to be less than 200 individuals. Available habitat is not fully utilized in the basin.
- Hood River spring chinook (hatchery stock): Escapement to West Fork Hood River seems to be extremely variable from year to year. Numbers in our index reach correlate roughly with numbers of fish that return to the Hood River each year. Habitat is not fully utilized in the basin.
- Streams originating in the Mt. Hood National Forest, particularly Still Creek and the Salmon River, are significant spawning areas for spring chinook salmon in the upper Sandy River.
- Cutthroat trout redd counts in Bull Run Lake appear to be leveling off after an upward trend. This may have a relationship with higher lake water levels as the lake has filled after drawdown during the 1992 drought.
- Riparian surveys continue to demonstrate that few streams meet the LRMP pool or large wood debris standards. The standards do not appear to reflect the range of natural conditions for streams of the Mt. Hood National Forest. This is the case even for Wilderness streams.
- Highland Ditch and Badger Creek monitoring suggest that there have been impacts to the stream channel from ditch failures.

- Gate Creek riparian monitoring is inconclusive one year after construction of an enclosure.
- Land within the Grasshopper Grazing Allotment is generally in an upward trend for riparian conditions and water quality.
- The Lake Branch instream habitat restoration project is meeting project objectives.
- The Clear Branch gravel retention project has been effective in providing spawning sized gravel.
- The Rocky Burn area monitoring indicates recovery has occurred in Rock Creek. Bank stability, width-to-depth ratio, pool area and pool volume, riparian vegetation reestablishment and shade canopy have all improved.
- No conclusions can be drawn yet from aquatic mollusk surveys, as samples have not all been analyzed.

➤ *Recommendations*

- The Badger Creek Monitoring effort should continue for 2 or 3 years in succession to provide accurate, quantifiable data to assist in making sound resource decisions for the area.
- Spawning and redd surveys should continue for anadromous species. This information allows us to understand fish distribution and the contribution of National Forest habitat. It is also useful for developing restoration and protection strategies, and to determine the effectiveness of instream habitat restoration projects.
- Bull trout surveys should continue to annually monitor the index reaches due to the low numbers of bull trout found during the last eight years of monitoring. This information provides a baseline to determine if habitat restoration projects are effective. Night surveys should continue in attempts to detect potential new populations within the Hood River. This information will be vital for determining the vulnerability of the Hood River population and providing adequate identification of preferred habitats. This would lead to an understanding of critical habitat areas. Continue to work with the Hood River bull trout working group to prioritize restoration projects to benefit existing bull trout populations as well as to improve dispersion opportunities to adjacent tributaries.
- Continued rest of the Rocky Burn Pasture of the allotment area is recommended to provide riparian vegetation the avenue for further growth and to improve water temperatures.
- Prepare a non-significant amendment to the LRMP so large wood and pool frequency standards better reflected conditions within the range of natural variability for Mt. Hood National Forest streams.

Monitoring Element: Water Resources

➤ *Goal*

A key goal of the Mt. Hood 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.

The purpose of various water resource monitoring activities is to assess Forest Service compliance with the Clean Water Act, as outlined in a Memorandum of Agreement with the State of Oregon. Water quality Best Management Practices (BMPs) and related Forest Plan Standards have been developed to achieve compliance with the Clean Water Act and state water quality regulations. The objective is to meet Federal Designated Management Agency obligations and responsibilities (under the Clean Water Act) with respect to nonpoint source pollution control.

➤ *Forestwide Monitoring Activities*

Forestwide, water-related monitoring activities are summarized in this document, including a summary of the water quality monitoring in the drainage portion of the Bull Run Watershed Management Unit.

➤ *Bull Run Monitoring Activities*

The Bull Run Water Quality Monitoring program included:

- Bull Run water quality standards monitoring,
- Flow based monitoring, and
- Project monitoring.

Bull Run Watershed monitoring has been developed over the years to provide an effectiveness assessment of water quality protection. Federal standards which have been developed to comply with PL 95-200, known as the Bull Run Management Act, were designed to characterize the very high quality of waters from the Bull Run watershed and are considerably higher standards than stream standards applied elsewhere, i.e. Oregon Administrative Rules for streams.

➤ *Forestwide Monitoring*

Forestwide, two broad categories of water resource monitoring were carried out during the past year:

Implementation Monitoring is directed at assessing whether the Forest Service is “*doing what we said we would do*”, i.e. assessing whether specific water quality BMPs and related Forest Plan standards and guidelines were identified, applied correctly (location, design, etc.), and applied in a timely manner.

Implementation monitoring includes office and field reviews of projects for:

- Selection of site-specific BMPs;
- Translation of BMP intent and content into project contract provisions or administrative control language; and
- Implementation of BMPs in the field as specified in the NEPA document and other administrative direction.

Implementation monitoring for timber harvest and road construction activities also includes regular inspections made by timber sale administrators and/or engineering representatives.

Effectiveness Monitoring is undertaken to assess whether applied BMPs and Forest Plan Standards are effective in maintaining water quality. Monitoring techniques, sampling design, and monitoring frequency are varied. Examples of effectiveness monitoring include:

- Observing the effectiveness of BMPs designed to prevent/minimize the off-site movement of sediment and debris from an activity area into a stream channel; and
- Observing the effectiveness of waterbar spacing and construction for preventing erosion off a skid trail.

➤ *Implementation Monitoring*

Best Management Practices (BMPs)

BMPs are those practices used to achieve compliance with State water quality standards and protect the beneficial uses of water. Post-project monitoring was done using the Best Management Practices Evaluation Process (BMPEP) for a limited number of projects.

Visual observation was the predominant method used by watershed specialists to monitor the implementation and effectiveness of BMPs during 1998. In several instances, monitoring was accomplished during site visits intended for purposes other than monitoring. Additional BMP implementation monitoring is routinely carried out by timber sale administrators and/or engineering representatives.

Barlow Ranger District

BMPEP Process

The Test Plot Timber Sale, which consisted of one unit, was monitored for timber administration, landings, temporary roads, and skid trails. A ground based system was used to harvest the sale. All four activities fully met the timber sale contract and/or project requirements. The BMP's that were in place during the sale were effective for protecting water quality.

Timber Sale Activity Monitoring

Several site visits were made to the Owl Quarry and Con 1 Timber Sales to observe the logging operations. On the Owl Quarry timber sale, two changes were made to the skid trail locations to better meet the NW Forest Plan Aquatic Conservation Strategy objectives based, in part, on the recommendations of the hydrologist. The first change involved rerouting a skid trail to avoid crossing an ephemeral stream that was flowing during harvest operations. For the second change, line pulling in the riparian reserve was creating multiple skid trails perpendicular to the channel as well as damaging a large amount of residual vegetation. The change allowed a skid trail in the riparian reserve which reduced the overall amount of exposed soil and protected the riparian vegetation. Mitigations for both of these new skid trail locations included waterbarring and re-vegetating them. These visits and changes are documented in the daily diaries of the sale packages.

Clackamas River Ranger District

BMP Implementation and Effectiveness Monitoring

Of the 30 BMPs monitored, 25 (83 %) were implemented as planned (protection achieved), 3 (10%) were implemented with a minor deviation to the original plan (partial protection achieved), and 2 (7 %) were not noted in the Environmental document or the information was not available.

Five different BMPs were monitored, with up to 4 being monitored in any one unit, and in some instances only one BMP was monitored. All the BMPs monitored were associated with riparian reserves, yarding methods, landings, and roads. The most common BMP monitored was the width of riparian reserves. Of the 13 units, riparian reserve widths were monitored on 11 units, landings were monitored on 6, roads were monitored on 6, yarding suspension requirements were monitored on 5, and skidtrails were monitored on 2 units. A total of 30 BMPs were monitored on the 13 units. Overall, most of the timber sale and road-related BMPs monitored were prescribed and implemented as planned. The result is adequate protection of soil and water resources in most instances.

Timber Sales

Thirteen units (10 salvage, 3 thinning) representing 6 timber sales and 4 Environmental Assessments were monitored using the Best Management Practices Evaluation Process (BMPEP) process in 1998. Seven of the 10 salvage units were helicopter logged, 2 were cable logged, and the remaining unit was logged with a combination of helicopter and tractor. The thinning units were tractor logged. Of the 13 units monitored, no striking or serious adverse impacts to soil and water resources were observed.

Road Maintenance/Closure

One situation where BMPs were not implemented as planned (R-18 Maintenance of Roads and R-20 Traffic Control during Wet Period) resulted in a relatively minor degree of resource damage. Road 4612-141 passing through Yoda unit 7 is located on gentle ridgetop slopes with no stream crossings. The eastern segment is a short term specified road planned for obliteration after timber sale closure. It is an outsloped, bladed road without constructed drainage features (e.g. ditch lines, culverts, etc.) and without compacted tread aggregate. Currently, the road surface is in poor condition from rutting and surface erosion, with no observable sediment delivery to a water source.

After logging was completed in August 1997, the purchaser maintained the road to Forest Service standards and closed it with a berm. Soon afterward, the berm was breached and waterbars were destroyed by public users of the road. In August 1998, the unit was opened for firewood cutting (only during the late summer period), as the road was already open and being used. The road was also used for administrative use (pile burning) and by the general public through mid-November during inclement weather, resulting in the degraded road condition. The outslope and waterbars had not been maintained and drainage was impeded. Overall, the impact to soil resources is judged to be minor in extent and effect and is perceived to be short-lived because the road is soon scheduled to be closed and obliterated.

Road maintenance and reconstruction measures were also not implemented to an optimum level on Yoda units 8 and 9 (roads 4612 and 4612-140) and South Bugs unit 608 (road 6340-280). Both environmental assessments and decision notices covering these timber sale units stated that standard BMPs would be implemented, allowing for protection of tread, drainage structures, and cut/fill slopes during harvest related activities. Some minor tread damage remains and surface drainage (crown/inslope/outslope) is partially dysfunctional on small sections of the 4612 and 6340-280 roads. Some sections exhibit minor sheet and rill erosion. A clogged ditchline and several partially plugged cross-drain culverts remain on the 6340-280 road. Only partial protection was achieved with BMP R-18: Maintenance of Roads.

The South Bugs timber sale has closed, and road maintenance on road 6340-280 is Forest Service responsibility. The Yoda timber sale is still operating, and road maintenance on roads 4612 and 4612-140 is the purchaser's responsibility only while timber sale is still active. The overall impact is relatively low, even though these road sections are near (within 50 to 300 feet) several stream crossings and Boyer and Farm Creek. A minor degree of sediment production and delivery will likely occur as long as road-intercepted precipitation on these sections is routed down the tread, instead of being dispersed via prism drainage features.

Road Obliteration

Road obliteration is undertaken to close roads that are no longer need for administrative purposes, to reduce the risk of soil erosion/sedimentation, and to return the site back to a productive forest. Monitoring was done to determine how to achieve even better resource protection following road obliteration work in the future.

Six road obliteration projects were monitored in 1998, evaluated by 36 different road obliteration design features. Up to seven design features were evaluated at each location. The monitoring results indicate that most of the road obliteration design features were implemented as planned, and resource protection has been achieved. Recovery of these sites to a more natural forested condition has been greatly facilitated.

Of the 36 design features evaluated, 28 (78%) were implemented as planned and were effective at providing resource protection. There were eight (22%) instances where a design feature was not implemented as planned. Of those, five (14%) were only partially protecting targeted resources, and some level of resource impact remains despite obliteration of the road. There were three instances where a design feature was not fully implemented as planned, however, resource protection was still achieved for the most part. All three instances pertain to the removal of road surface before obliteration procedures, or there was a thick subgrade with a high rock content. In both conditions, remaining road prism aggregate did not get adequately mixed with finer soil material, resulting in a seemingly hardened surface because of a high rock content. This condition was observed on several sections of the 4500-340 and 4691-012 road sites, as well as on the 6370 road obliteration at the Ogre Creek crossing. The effect of a hardened surface is deemed to be relatively low and is not perceived to be a hindrance to natural recovery of the site in the long run. Nor is the condition perceived to impart a severe adverse impact to soil, water, aquatic, and riparian resources.

There were five instances where resource protection was compromised because certain design features were not implemented as planned. Particular design features were incorporated as planned on the majority of the project site, but not entirely. On those areas of the site where a design feature was not installed as planned, some level of impact to soil, water, aquatic, or riparian resources is likely to remain. These conditions occurred on portions of the 5420-200 road site and the obliteration of the 6370 road at Ogre Creek.

Cumulative Watershed Effects Analyses

Forest-wide, existing watershed conditions/cumulative effects were assessed as part of project-level and programmatic Environmental Assessments (EA's) and Biological Evaluations (BE's). The results of this work are documented in each project report (EA or BE) and supporting analysis files available for review at Ranger District offices. The Aggregate Recovery Percentage (ARP) assessment of existing watershed conditions/cumulative effects was also revised for the Collawash Watershed Analysis. This watershed analysis is available for review at the Clackamas River Ranger District office. The findings are briefly summarized below.

The ARP Methodology in Use on the Forest

One tool often used is the Aggregate Recovery Percentage methodology. The Aggregate Recovery Percentage (ARP) methodology is a tool used to evaluate potential cumulative hydrologic effects related to management activities or natural disturbance factors within a watershed. ARP values provide an index of a watershed's susceptibility to potentially damaging increased peak streamflows resulting from typical rain-on-snow precipitation events. Increased peak flows can have adverse effects on stream channel processes, including accelerated channel erosion and sediment deposition. The methodology is based on the premise that created openings in the forest cover increases snowpack accumulation and the risk of rapid snowmelt, leading to increased runoff during a rain-on-snow event.

Higher ARP values are indicative of a watershed which is hydrologically recovered and at relatively low risk to the adverse effects of increased peak flows. Conversely, lower ARP values are indicative of a watershed which is at relatively higher risk. The Mt. Hood National Forest Plan has established varying ARP threshold of concern (TOC) values for each major watershed on the Forest, ranging from 65% to 82%. These vary according to a watershed's inherent sensitivity to the adverse effects of peak flows and significant water resource values (anadromous fish, domestic water supply, etc.) identified for the watershed during forest planning.

For the west side of the Cascades, an area is considered to be hydrologically recovered when the forest cover is equivalent to a coniferous forest having more than 70% crown closure and an average tree diameter (DBH) of 8 inches or greater.

The ARP methodology has also been refined for the Eastside of the Mt. Hood National Forest, to better adapt the methodology to eastside forest conditions. East side crown closure requirements vary by vegetation type, based upon expected natural crown closures for a healthy forest ecosystem, where lower densities and natural openings are expected.

The ARP methodology has been refined so that the cumulative effect of various partial cut (thinning, etc.) prescriptions can be evaluated. Various forms of partial cutting constitute a major component of current and proposed timber management.

In recent years, many watershed specialists, researchers and practitioners have cautioned against the adoption of specific watershed thresholds of concern", since an absolute threshold cannot be identified considering the incredible physical and vegetative variability in wildland watersheds. While they serve as useful indicators of relative risk, calculated ARP values do not always reflect all of the relevant factors which should be considered in a cumulative effects analysis.

Comprehensive watershed analysis documents prepared to date for lands administered by the Mt. Hood National Forest often use, as appropriate, additional tools to assess watershed condition and response to management. These include, but are not limited to, assessments of stream channel network expansion due to roads (related to increases in the magnitude and frequency of potentially damaging peakflows), assessment of sediment source areas and contribution to streams, and geologic stability assessments, etc. Similar methodologies have also been used to varying degrees in watershed assessments associated with project planning, providing additional insight into the hydrologic function and condition of watersheds.

Barlow Ranger District

FY 98 was the first year that ARP analysis was calculated using the eastside recovery standards developed by the Barlow district which are based on the stand potential, low annual precipitation, and Fire Group. The Hilynx Planning Area and the Juncrock Planning Area had ARP calculated for both the fifth and sixth field drainages. Values ranged from 76 to 81 which were within the Forest Plan standard. Field reconnaissance of both planning areas, particularly the within riparian reserves, validated the ARP calculation which indicated that the watersheds were in good condition.

Cumulative effects analysis was completed, as part of a formal Biological Evaluations/Assessment process for 9 projects located on the district, which include: Ramsey/Fifteenmile Creeks flood restoration, noxious weed eradication, Flag Point Lookout fuel break, Wolfrun Ditch fish screen, Ramsey Creek / East of 27 underburn, Jobs in the Woods projects, Hilynx Timber Sale, Timber Stand Improvement and the Gopher EA.

Zigzag Ranger District

As summarized in the July 1998 Forest Plan Monitoring Report, cumulative watershed effects analyses were completed as part of the formal BE and NEPA process for three projects: the Salmonberry, Abbott-Salmon, and North Clackamas Timber sales. ARP values in the project areas for implementable decisions and watershed analysis areas were determined to be in compliance with Forest Plan standards. The watershed analysis and project related files are available for review at the Zigzag Ranger District office.

Clackamas Ranger District

ARP values which were generated during Watershed Analysis were updated for every planned timber sale project. In FY 1998, 14 different NEPA documents were signed for various timber sales and also for the Fish Creek Restoration environmental assessment. For the projects in the Oak Grove Fork for which no ARP modeling was ever done, ARP figures were generated for 5 subwatersheds. Hydrologic standards were met for all planned projects.

A revision of the Collawash/Hot Springs Fork Watershed Analysis was completed in FY 1998, and ARP values for the entire area were updated. Some subwatersheds continue to be below the ARP levels set in the Forest Plan and timber harvest continues to be deferred in these areas.

Hood River Ranger District

A cumulative effects analysis was completed, as part of a formal Biological Evaluation/Assessment process, for 8 projects, including the Polallie/Cooper timber sale, Osprey timber sale, Evans timber sale, BPA powerline Integrated Vegetation Management, Special Forest Products, Wilderness Plan Amendment, and road use permits. The ARP calculations completed for all sixth-field watersheds in the 1996 watershed analysis effort were used in the cumulative watershed analysis for each Biological Assessment. Assemble work groups to continue process of providing interpretations and guidelines for implementing Forest Plan standards, reflecting the findings and recommendations of ongoing research efforts.

Comprehensive watershed analysis documents prepared to date (for lands administered by the Mt. Hood National Forest) often use, as appropriate, additional tools to assess watershed condition and response to management. These include, but are not limited to, assessments of stream channel network expansion due to roads (related to increases in the magnitude and frequency of potentially damaging peakflows), assessment of sediment source areas and contribution to streams, and geologic stability assessments, etc. Similar methodologies have also been used to varying degrees in watershed assessments associated with project planning, providing additional insight into the hydrologic function and condition of watersheds.

More work is needed to further refine the methodology for assessing the effects of partial cutting in the ARP model. 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.

➤ *Effectiveness Monitoring*

Water Temperature Monitoring

Barlow Ranger District

Stream temperature was monitored at 31 sites using recording thermographs (Hobo-Temp). Temperatures for most sites were higher than in the past 2 years, which was due, in part, to a warmer, drier summer. The site at Camas Prairie dried up for the first time in over 20 years.

Fivemile, Eightmile, and Fifteenmile Creeks at the Forest boundary did not exceed the State 7 day average maximum water temperature standard of 17.8 degrees C during 1998, with maximum annual temperatures of 17.1 degrees C, 15.0 degrees C, and 17.1 degrees C, respectively. Water temperature was also measured at five stream sites further up in the Fifteenmile Creek watershed, and three stream sites in the Eightmile Creek watershed, with all water temperatures below the State day average maximum standard of 17.8 degrees C..

Water temperature at Ramsey Creek (old Forest boundary) was also consistent with past trends. This is likely due, in part, to its relatively constant annual streamflow, which is spring-fed. Ramsey Creek at the new Forest boundary, about 3.5 miles downstream of the old Forest boundary, had a 7 day average maximum of 21.8 degrees C, with a maximum daily temperature of 22.6 degrees C recorded. The elevated water temperatures are probably due to past shade removal along Ramsey Creek on the newly acquired lands.

Though much of the Badger Creek watershed is within the Badger Creek Wilderness, an upstream irrigation diversion is likely responsible for some of the high water temperatures recorded on Badger Creek. During the 1998 field season, water temperature was monitored in the wilderness at Pine and Gumjuwac creeks, above and below the Highland Ditch diversion, and at Bonnie Crossing. A sixth site was located at Badger Creek at the Forest boundary. Water temperature at all sites except the site at the Forest boundary met the State 7 day average maximum standard. Badger Creek at the Forest boundary had a 7 day average maximum of 23.2 degrees C.

Jordan and Tygh Creeks (both sites at Forest boundary) met the State 7 day average maximum standard during the 1998 field season. Gate Creek had a 7 day average maximum of 20.6 degrees C. Gate Creek has several reaches with minimal riparian cover, has grazing pressure, and is subjected to a stream diversion of about 50 percent of its low flow above the monitoring site. Water temperature monitored at four sites in Threemile Creek, including a site at the Forest boundary met the State standard. Water temperature at Rock Creek (Forest boundary), had a 7 day average maximum of 21.3 degrees, while another site at the head of Rock Creek met the State standard.

Water temperature was measured near the mouth of Clear Creek at Keeps Mill and at the confluence with Camas Creek. Water temperature at those sites stayed below the State 7 day average maximum standard of 17.8 degrees C. Temperatures at the Camas Prairie site were the highest recorded in the 1998 season: the 7 day average maximum was 31.3 degrees C. This high temperature regime is a natural condition. Camas Creek flows through a low gradient, slow-moving meadow ecosystem.

Clackamas Ranger District

Summer stream temperatures were monitored at 11 locations along Fish Creek and it's tributaries. This was done in accordance with the Fish Creek watershed restoration project monitoring objectives. Preliminary results indicate similar trends to 1997. Summer stream temperatures exceed the State Standard (17.8 degrees C) for the 7 day rolling average of the daily maximum temperatures (7 day average maximum) in the lower 3 miles of the main stem Fish Creek.

The Lower Clackamas River and several tributaries were also monitored in cooperation with Estacada High School and the Clackamas River Basin Council. Of these monitoring locations, only the sites in the Eagle Creek watershed are located on the Mt. Hood National Forest. This program, which will continue in 1999 with the support of USFS challenge cost share funding, recorded summer temperatures at 13 locations below River Mill Dam. The areas monitored include Clear Creek, Eagle Creek, Deep Creek, Rock Creek and the Mainstem Clackamas River. The sites located in the South Fork Eagle Creek watershed on the Mt. Hood National Forest were the only locations where temperature thresholds were less than the State standard of 17.8 degrees C for the 7 day average maximum.

Zigzag Ranger District

Baseline water temperature data was collected at the following sites by Zigzag Ranger District Staff:

- Bull Run and Little Sandy watersheds (8 sites),
- Alder Creek (2 sites),
- Mud Creek (1 site),
- Salmon River (2 sites),
- Upper Chance Creek (1 site), and
- Upper Eagle Creek (1 site).

These sites were selected based on historical points for data collection and sites identified during the watershed analysis process.

On-Forest

The lower Little Sandy at the confluence with the Bull Run River did not meet the State water quality standard of 17.8 degrees C for the 7 day average maximum in the Sandy Basin. Summer water temperature at the Middle Little Sandy site just at National Forest boundary upstream was 16.6 degrees C for the 7 day average maximum, meeting the state water temperature standard. The Lower Little Sandy River flows through about 2.5 miles of privately managed land before entering the National Forest again downstream.

Off-Forest

The lower Little Sandy River at the USGS gaging station and Salmon River at Wildwood did not meet the State water quality standard of 17.8 degrees C for the 7 day average maximum in the Sandy Basin.

Water temperature data were also collected at 3 sites using recording temperature sensors by the Bureau of Land Management (BLM) on the Salmon River as part of a baseline characterization study for the Salmon Wild & Scenic River.

Table 11. Summary of Stream Temperature Monitoring Results -Zigzag RD

Note: Bold face type indicates station located on Mt . Hood National Forest.

Site	Monitoring Period	Daily Maximum Temperature ⁰ C	7-Day Moving Average of Maximum Daily Temperature ⁰ C
Bull Run River (above reservoirs)	June 1 - October 1	17.5 (July 29)	16.6 (July 28)
Bull Run River (below reservoirs)	July 1 - October 1	23.2 (Aug 5)	22.2 (July 25)
Fir Creek	July 8 - October 5	15.1 (July 28)	14.2 (July 28)
North Fork	June 1 - October 1	15.1 (July 28)	14.2 (July 26)
South Fork	June 1 - October 1	16.9 (July 27)	16.5 (July 27)
Upper Little Sandy	July 2 - Sept 29	17.8 (July 28)	16.7 (July 27)
Middle Little Sandy	July 2 - Sept 29	17.8 (July 28)	16.6 (July 25)
Lower Little Sandy (USGS gaging station)	July 2 - Sept 29	21.1 (July 28)	19.7 (July 25)
Lower Little Sandy Confluence with Bull Run River	July 10 - Oct 5	20.2 (July 28)	19.3 (July 28)
Alder Creek Above Roads	July 9 - Oct 5	9.2 (July 28)	8.9 (Sept 3)
Alder Creek at Forest Boundary	July 1 - Oct 6	15.3 (July 28)	14.2 (July 27)
Mud Creek	July 10 - Oct 4	15.4 (Aug 4)	14.3 (July 23)
Salmon River at Wildwood	July 8 - Oct 7	20.0 (July 26)	19.1 (July 25)
Salmon River Side Channel at Wildwood	July 8 - Oct 7	20.0 (July 26)	19.2 (July 25)
Upper Chance Creek	July 14 - Oct 1	14.2 (Aug 4)	13.0 (July 27)
Upper Eagle Creek	July 24 - Oct 9	17.1 (July 28)	16.3 (July 27)

Hood River Ranger District

Twenty sites on 17 streams were monitored for water temperatures with continuously-recording thermographs (Onset's Hobo-temp) during spring-fall. Sites were chosen with the following criteria: potential for (or documented use) by bull trout, anadromous fish, sensitive species, and/or site was suspected to have unnaturally elevated temperatures due to management. Sites include: West Fork Hood River, East Fork Hood River, Lake Branch (2), Ladd Creek, McGee Creek, Robinhood Creek (2), Meadows Creek, Tilly Jane Creek (2), Doe Creek, Dog River, Clear Branch (2), Coe Branch, Eliot Branch, Bear Creek, Tony Creek and WF Neal Creek. General findings are summarized below.

The Lower Clear Branch flow source is directly from Laurance reservoir (heat sink), thus affecting its temperature regime, particularly during summer months. Water temperatures cannot likely be lowered until a variable height pipe can be installed in the reservoir to regulate level of water withdrawn (from different stratification levels within reservoir).

Lake Branch temperatures are likely close to natural conditions as warm surface waters from Lost Lake are spilled over into Lake Branch during summer months. The water cools considerably by the time it gets to the National Forest boundary 9 miles downstream (near Lost Lake the 7 day average maximum is 20.8 degrees C, while at the National Forest boundary it is 16.0 degrees C).

Robinhood Creek is unnaturally warmed by 10 to 30 yr-old timber harvests that left little buffer between river mile 0.1 to 1.5. The area is dominated by frost pockets thus little regeneration has occurred in this area. Stream temperatures increased 6.0 degrees C in the 2 miles it flows through this area. A thermograph at river mile 2.3 (above harvest areas) had a maximum 7 day average maximum of 8.8 degrees C, while the thermograph at the mouth (below the harvest area) has a 7 day average maximum of 14.8 degrees C. in 1998.

Oregon State Department of Environmental Quality standards has recently (7/96) changed their standards to a 7 day average maximum of 17.8 C. Waters containing bull trout should now have a 10 degrees C maximum year-round, while waters in which "*support salmon spawning, egg incubation and fry emergence from the egg and from the gravels*" shall be a 7 day average maximum of 12.8 degrees C for the currently defined period of October 1 through May 31. The Oregon DEQ and ODFW are currently working to better define the period of time the 12.8 degree C standard applies for specific rivers and streams.

None of the twenty sites exceeded the 17.8 degree C standard for the 7 day average maximum. All but six sites exceed the 10 degree C standard for the 7 day average maximum. The six sites that met this criteria are: Pinnacle Creek, Eliot Branch upstream of diversion, Upper Clear Branch, Bear Creek, Tilly Jane Creek and Robinhood Creek. Meeting 10 degree C standard year-round for Bull Trout Habitat is not realistic in most streams of the Hood River because water temperatures under natural conditions probably naturally exceed the standard for most streams.

Overall, the temperature regimes within the FS lands are adequate to sustain salmonid species.

Recommendation

Continue both baseline and project-related water temperature monitoring Forest-wide.

Turbidity Monitoring

Clackamas Ranger District

Eagle Creek

Turbidity monitoring was conducted at four sites within the South Fork Eagle Creek watershed. The sites are located within the Eagle Timber Sale planning area. Two sites are on the mainstem South Fork Eagle Creek and two sites are located on tributaries flowing into the South Fork. Samples were collected in May, October, and November. The samples in November were taken during a significant rainfall period. All samples were measured with a portable turbidimeter. Results of the monitoring showed a range of turbidity from 0.63 NTU taken during low flow conditions to 2.4 NTU taken during a bankful flow event, representing good water clarity.

An automated turbidity monitoring station is currently scheduled to be installed just upstream of the U.S. Fish and Wildlife Service fish hatchery.

Carter Bridge

The Carter Bridge site on the Clackamas River was identified as a site for a turbidity, pH, conductivity, and stage monitoring station. The objective for this monitoring is to develop water quality trends for the identified parameters and also enable early warning for downstream Municipal water suppliers if elevated turbidity occurs during storm periods. Automated monitoring equipment will be installed at the Carter Bridge site during the summer of 1999.

Zigzag Ranger District

Alder Creek

In a cooperative effort between the Forest Service, Bureau of Land Management, and the City of Sandy, stream gaging stations have been installed on Alder Creek and the East Fork of Alder Creek at the Forest Service and Bureau of Land Management boundaries respectively.

These stream gaging stations will measure streamflow and turbidity with the data telemetered out to the Zigzag Ranger Station. As of February 1999, the instrumentation was in place and the program to record the data on the on-site datalogger was being tested. The equipment to telemeter the data has been purchased and is planned to be installed in the summer of 1999.

Bull Run Watershed

The following monitoring discussion describes trends of measured water quality constituents whose values are within limits for state water quality standards and within the Bull Run standards as well. This means that water quality conditions have not diminished below the high standards established for the Bull Run Watershed.

Bull Run Water Quality Standards

Key Station monitoring provided water quality and quantity information at the four principal streams which flow into the reservoirs and at Headworks. Bi-weekly reports compare the present water quality and quantity at the Key Stations to the standards. Any deviations are designated as specified in the Water Quality Standards for the Bull Run Watershed Management Unit (Updated, 1987).

The 1998 Water Year (October 1, 1997 to September 30, 1998)

The following summary of the water quality data for Water Year 1998 (time series, collected on a consistent time period, 7, 14, or 28 days) is based on preliminary data. Subsequent tests of some of the data would likely reduce the number of deviations that are being presented in this summary. These tests are an agreed part of the standard compliance analysis process with the City of Portland (Water Quality Standards for Bull Run Watershed Management Unit (1987 update) and will be done before the final summary and report is completed.

The only major activities in the watershed were road decommissioning projects and dike reconstruction at Bull Run Lake (implemented by the City of Portland Water Bureau). About 14 miles of road were decommissioned from August 15, 1997 to October 15, 1997. The activities occurred in the Mainstem, North Fork, and Headworks subbasins. None of the deviations described in the following narrative can be related to these human activities.

There were a number of preliminary deviations for pH at Station 2 and the stream key stations that were not addressed in this report. Since 1988 there have been persistent annual and seasonal shifts in pH throughout the watershed. Previous analyses investigated the possible relations between pH, algae, and nutrient data but did not find any relationships. Conclusions drawn by the Forest Service, U.S. Geological Survey, and Portland Water Bureau hydrologists in 1988 were that the small persistent pH shifts could be the result of either comparing data to a database which includes outliers or is reported to unrealistic accuracy. It was speculated that the small persistent pH shifts were not the result of any natural phenomena happening in the watershed. Annual trends for water year 1998 at Station 2 (Headworks) indicate a small (0.1) decreasing trend in pH. This trend is small and may not have any environmental significance so the preliminary deviations were not summarized.

Summary of Standards Compliance at Station 2 (Headworks)

Station 2 is located at the point where the water leaves the watershed and enters the distribution network for the City of Portland. Excluding pH there was a total of 20 preliminary deviations for water year 1998. About 60 percent (12 deviations) were for temperature above the period standards. These deviations were in the period from February 3 through May 19. The deviations are attributed to a mild El Niño February where there was never an arctic air intrusion into the state, a mini heat wave at the end of April, and very wet May.

About 10 percent (2 occurrences) of the deviations were for suspended sediment. Both deviations were in the reservoir drawdown period during July and August. The deviation in late July was small with the deviation in mid August much higher at 316% of the standard for that period. During the period in August when the deviation occurred there were no deviations for suspended sediment at any of the stream key stations so the deviation is attributed to reservoir operations. This was during the 47 day period without measurable precipitation in the Portland area.

About 15 percent (3 occurrences) of the deviations were for orthophosphate. These deviations were very small (0.0021 to 0.0001 mg/l) and near the detection limit (0.001 mg/l) for this variable.

About 10 percent (2 occurrences) of the deviations were for algae. These deviations occurred in late February and late April during periods of warmer than normal water temperatures in the lower reservoir. There were no deviations of the algae standard at the stream key stations during the same period so these deviations are attributed to reservoir dynamics.

About 5 percent (1 occurrence) of the deviations were for turbidity. This deviation was very small (0.02 NTUS) and at the detection limits for this variable.

Table 12. Annual Trend at Station (Headworks)

Variable	Period Length	Mean	P-Level
Turbidity	7 days	-0.23	0.0001
Color	7 days	-0.84	0.0041
Total coliform	7 days	-1.85	0.0001
Heterotrophic plate count	7 days	-103	0.0001
Temperature	7 days	1.83	0.0001
Fecal Coliform	14 days	-0.57	0.0001
Nitrate-nitrogen	28 days	-0.0098	0.0035
Orthophosphate	28 days	0.0008	0.0730

All annual trends with the exception of temperature and orthophosphate indicate improvements in water quality for municipal supply. The annual trend in temperature is attributed to the El Niño event. The trend for orthophosphate is very small and below the detection limit of 0.001 mg/l for measurement of that variable.

Summary of Standards Deviations: Stream Key Stations

The stream key stations are long term monitoring stations that have been established where major streams enter the reservoirs.

Fir Creek has had no significant management activity (logging or roading) and is used as the control drainage for the entire Bull Run Watershed. As with any wildland basin selected to represent a "control"-- there are limitations to comparisons when differences are slight. The slope, runoff, geological characteristics, and watershed area of Fir Creek differ in important ways from the other key stations (Eilers et al , 1994).

For water year 1998 there were 62 occurrences of scattered deviations for a number of variables including turbidity, color, heterotrophic plate count, total coliform, fecal coliform, orthophosphate, streamflow, temperature, and conductivity. About 37 percent (23 occurrences) were for stream temperature and are for the most part grouped in April and May and are assumed to be associated with the high air temperatures at the end of April and the wetter than normal May. Other deviations related to turbidity, color, coliform bacteria, streamflow, orthophosphate, and conductivity are infrequent and no direct cause-effect relationship can be determined. In summary, these deviations are considered minor and of natural origin and did not affect overall quality of Bull Run drinking water.

Patterns associated with the other variables where there were deviations of standards will be assessed with the trends analysis.

Trends - Bull Run Stream Key Stations

Table 13. Annual Trends

Annual Trends at North Fork Bull Run River (station 15)

Variable	Mean	P-Level
Turbidity	-0.11	0.0016
Suspended Solids	-0.23	0.0780
Total Coliform	-3.61	0.0071
Heterotrophic Plate Count	-44	0.0843

Annual Trends at Bull Run River (station 18)

Variable	Mean	P-Level
Turbidity	-0.08	0.0055
Heterotrophic Plate Count	-51	0.0985

Annual Trends at South Fork Bull Run River (station 35)

Variable	Mean	P-Level
Total Coliform	-6.92	0.0001
Heterotrophic Plate Count	-59	0.0972
Streamflow	21.1	0.0765

Annual Trends at Fir Creek (station 44)

Variable	Mean	P-Level
Total Coliform	-5.29	0.0001
Heterotrophic Plate Count	-82	0.0001

For all the stream key stations there are trends indicating reduced levels of bacteria (nonpathogens, pathogens, and opportunistic pathogens) as evidenced by the declining trends for total coliform and heterotrophic plate count.

At the North Fork and Bull Run key stations there are small declining trends for suspended sediment and turbidity.

The trends for total coliform, heterotrophic plate count, suspended sediment and turbidity indicate improving water quality for municipal water supply at the stream key stations. At this point the reason for the increasing trend in stream-flow at the South Fork key station cannot be explained.

Project Monitoring

Due to recent changes in the management direction for the Bull Run Watershed Management Unit by the Oregon Resources Conservation Act, PL 104-208 and by the Northwest Forest Plan, no new projects related to timber management activities will occur within the water supply portion of the Bull Run watershed. Instead Forest Service activities are being directed to the decommissioning of unneeded roads in the Bull Run Watershed. Close to 20 miles of road were inventoried and placed in a self-maintaining condition in the late summer of 1997. The Forest Service is assisting the City of Portland Water Bureau in a study assessing the effects of culvert removal associated with road decommissioning on suspended solids and turbidity levels. Water samples are being collected with automated pumping samplers every six hours and stream stage is being measured continuously. Results of this study should be available in next years monitoring report.

Water Quality Monitoring of Salt Application to Palmer Snowfield at Timber Line Ski Area - 1998 Season

Timberline Ski Area applies salt to the Palmer snowfield during the summer to condition the snow surface and maximize its use for skiing. RLK and Company, the holder of the Timberline Ski Area permit, has retained Golder Associates since 1990 to complete the annual water quality monitoring report. Several revisions to the original plan have occurred over the years, which has generally added to the monitoring requirements. Most recent have been the additions added since Timberline sought and received 401 certification from ODEQ in 1997.

Water samples were collected each week during the summer season and monthly for the remainder of the year, by Timberline employees from twelve locations on streams within the Palmer drainage, and at three locations outside the Palmer drainage area. Samples are analyzed for chloride, specific conductance, and total dissolved solids.

Two permanently installed dataloggers are installed, one at the Salmon River 3445 site (USGS Gauging Station) adjacent to Hwy 26, and one at Still Creek, which was recently (5/99) relocated upstream of Mineral Creek and adjacent to the Still Creek Campground Host Site. Relocation was necessary to minimize any influence of Mineral Creek which eliminates from a geothermal spring. Both data loggers record temperature, chloride and conductance at 15 minute (summer ski season) to one hour (remainder of the year) intervals.

Streams sampled within the Palmer drainage include the Mile Canyon, Salmon River, West fork Salmon River, and Still Creek. Streams sampled outside the Palmer Drainage include Camp Creek, White River, and Little Zigzag River.

The most recent report by Golder Associates covers the period from mid-September 1997 to mid-September 1998 and includes a sampling database since 1988. The following information is taken from Golder's letter dated 4/29/99 to RLK and Company.

Results

Chloride and specific conductance have remained relatively stable in all streams from 1988 to 1998, despite an overall trend of increased salt application. Short-term seasonal changes in chloride and specific conductance are observed in the upper elevation stations in Salmon River and Still Creek in response to salt application on the Palmer Snowfield. Chloride and specific conductance typically increases in the Salmon River and Still Creek above the 3,000' elevation near the end of the summer salt application periods, and decreases to normal values within a few days after salt application ends for the year. Chloride and specific conductance are typically reduced to levels similar to lower elevation (2,000') or background streams over the winter months.

There were several individual sample events when laboratory results for Total Dissolved Solids (TDS) were higher than the ODEQ guidance values of 117 mg/L. However, there were only two sample events when the consecutive values within a one-week period exceeded 117/mg/L. This occurred from September 3, 1998 (130 mg/L) to September 10, 1998 (130 mg/L) and from September 10 to September 14, 1998 (160 mg/L). The interval between the September 10 to September 14 sample events is less than one week, thus the ODEQ guidance value may have been exceeded for that period.

Specific conductance as measured by the dataloggers exceeded ODEQ guidance values 11 out of 45 weeks at Still Creek. As dataloggers recordings are higher than the hand samples, Golder is suspicious of the dataloggers. As mentioned earlier, the datalogger at Still Creek was recently (5/99) relocated upstream of Mineral Creek and adjacent to the Still Creek Campground Host Site to eliminate influence of Mineral Creek's geothermal influences.

Besides the influences of Mineral Creek causing higher TDS and conductance, Golder also contributes the TDS exceedance to the unseasonably warm weather experienced last September that resulted in large debris flows in streams (White River) draining snowfields (from 4/29/98 letter). Golder also states that the actual influence the high snowmelt runoff had on the water quality of Still Creek is unknown. However, specific conductance values have never exceeded 175 umhos/cm in the ten years of record for all Still Creek monitoring stations.

Environmental Fate Assessment

This year's data suggest that between 54% to 76% of the chloride applied to the Palmer Snowfield passes through the Salmon River Gauging Station and the Still Creek sampling station. Due to uncertainties still remaining in this analysis, Golder will be collecting the following information during the 1998/99 monitoring year to further refine the fate analysis:

- Collect a full year of data, including stream flow at all gauging stations. Timberline Lodge Ski Area to perform regular maintenance and regular downloading of dataloggers.
- Verify stream flow data at the new Still Creek 3600' gauging site.
- Collect and analyze snow and soil samples from the Palmer Snowfield to determine what percentage is retained by these media.

Other Monitoring

Grasshopper Fire Sediment Monitoring

The Grasshopper Fire burned approximately 180 acres within the Barlow Ranger District during July, 1994. The burned area is within the upper Threemile Creek drainage, a tributary to White River. Threemile Creek is home to inland/redband rainbow trout (*Oncorhynchus mykiss gairdneri*), a FS Region 6 and Oregon State sensitive species. The soils in the basin are very erosive after disturbance according to the District Soils Scientist (SRI = 353). The objective of this monitoring effort is to quantify any possible effects or changes in surface sediments in tributaries to and in Threemile Creek, as a result of the fire. In 1994, four study sites were established, each having 4 permanent channel cross sections. Two study sites are within the burned area and two are outside (to be used as a control). Wolman pebble counts were completed along each of the four cross sections of each site in 1994, 1995, 1997 and 1998. Permanent photo points were also established along each channel cross section and were re-shot during each of the monitoring efforts. A full summary of the data and report are stored at the Barlow Ranger District, fisheries office. Following is the summarized 1998 Wolman Pebble count data, as well as other important trends:

Significant findings show that the percent of surface fines, directly after the fire, are all above the Forest Standard of 20 percent less than 6 mm (used as an indicator of pre-fire conditions). This may indicate the inherent properties of the parent geology to constantly produce fine sediment to surrounding aquatic systems. Furthermore, this may also show the low transport or flushing capacity of the streams in the analysis area.

Over time, sites 1 and 3 show an interesting trend. The headwaters of site 1 is located within the burn area. Elevated sediment levels at this site should be resultant of upstream, fire induced conditions. Cross sectional data from this site show a 94% increase in surface fines less than 6 mm from 1994 to 1997, followed by a marketed decrease in 1998. Site 3 showed similar trends by increasing 53% from 1994 to 1997, followed by a leveling off of amounts of fine sediment. D50 data from sites 1 and 3 show a similar trend, decreasing approximately 74.2 % and 58.1%, respectively. Data from sites 2 and 4 do not show as noticeable of a change over the same time period. Possible interpretations of the data may include a brief mobilization of fine sediment into the stream channels following the fire, only to be flushed out of the system within 3 to 5 years. Although this may also be partially attributable to constant channel shifting and sorting of bedload material, increases of this magnitude is believed to be above unburned, seasonal stream conditions.

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 six 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)

The Forest funded a telemetered USGS stream gage on Fish Creek (Clackamas River Ranger District), and has reestablished a discharge measurement gage at a previously decommissioned USGS gaging station on the Upper Clackamas River at Big Bottom. Streamflow information from the Fish Creek gage is useful for characterizing the hydrology of the watershed and also providing real-time flow information to provide an alert for implementing flood emergency road maintenance (FERM) surveys and patrols. The Forest has also reestablished a previously abandoned USGS gaging station on the Zigzag River. This site will also be used to characterize the hydrology of the watershed, and also as an “early warning” indicator for FERM plan activation on the Zigzag Ranger District.

➤ *Recommendations*

Best Management Practices

- Continue implementation of the Best Management Practices Evaluation Process (BMPEP), using the updated tracking forms provided by Forest watershed staff.
- Forest Headquarters hydrology staff will assist Districts in accomplishment of BMP monitoring.
- Consideration should be given to contracting for some of the BMP monitoring, given limited personnel and the large program of work associated with flood restoration and other project planning efforts.

Watershed Effects Analyses

Continue the process of providing interpretations and guidelines for implementing Forest Plan standards and reflecting the findings and recommendations of ongoing research efforts. More work is needed to further refine the methodology for assessing the effects of partial cutting in the ARP model. 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.

Effectiveness Monitoring

Continue both baseline and project-related water temperature monitoring Forest-wide. Continue implementing the program to monitor turbidity at key locations on the Forest, focusing on streams/watersheds which are source areas" for domestic/municipal water supplies. For those streams identified as exceeding state water quality temperature standards, do additional monitoring in 1999/2000 to determine if the water temperatures are naturally elevated. If the elevated water temperatures are a result of management activities or wildfire, work will begin on Water Quality Restoration Plans.

Timberline Ski Area Water Quality Monitoring

The monitoring program should continue over the coming year to observe any temporal changes in water quality that may be attributable to salt application on the Palmer Snowfield, and to refine the salt loading model for the Palmer Snowfield and streams draining from the area. Forest Service oversight should continue to ensure that monitoring is in full compliance with the requirements of the permit issued by the Oregon Department of Environmental Quality.

Monitoring Element: Transportation/Roads

➤ *Goals*

The construction and maintenance of roads will minimize environmental damage and meet resource and Forest visitor needs. Provide safe and efficient access for those who use the transportation system and manage the forest.

➤ *Monitoring Activities*

Road Construction and Reconstruction

Five miles of local road was constructed for timber support on the Forest in 1998. There were 35.7 mile of road reconstructed. Most of this reconstruction is repair of damage resulting from the 1996 flood events. The annual Forest Plan outputs for the first decade were 16.6 miles of new construction, 17.5 miles per year of collector reconstruction and 74.0 miles per year of local road reconstruction. During past years, these outputs have been reduced. The reduction in miles of road constructed or reconstructed can be attributed to one of the following:

- A major reduction in budgets for Capital Investment Road Program which effects reconstruction of arterial and collector reconstruction.
- A reduction of timber harvest from Forest Plan outputs which has a direct effect on local construction and reconstruction.
- More use of helicopter logging eliminates need for new road construction.
- Construction of temporary roads to harvest timber and then obliterating them after project completion.

These trends, which will continue, aid in keeping long term erosion of sediment at a minimum and will not increase the road system. The flood repairs completed this year will also reduce long term sediment erosion.

Evaluation

Using district MARS reporting, this item was monitored adequately. However, the change in the projected Forest Plan outputs for miles of miles of road construction and reconstruction should be reviewed and changed to reflect the change in timber harvest, reduced budgets, and policy decisions which will likely result in additional road closures.

Road Closures/Road Decommissioning

Closed

Roads identified for closure are closed to traffic, but will remain on the road system. These roads have an identified need (generally within seven years). Roads needed for future timber harvest activities or fire protection efforts would fall into this category.

Decommissioned

Roads identified for decommissioning have no identified future need (generally within ten years) or are at a high risk for resource damage.

Currently, 502 miles of system roads are in the maintenance level 1 (closed road) category, of which 17.7 miles were closed in FY 1998. These roads are closed to vehicular traffic but drainage facilities are maintained. Since the implementation of the Forest Plan, approximately 268 miles have been closed. Approximately 302 miles have been decommissioned and removed from the transportation system. In FY 1998, approximately 27 miles of road were decommissioned.

The decisions for these actions were made through the district planning process to meet specific resource needs and to meet the Forest Plan standards and guidelines.

Road closures and road decommissionings have a direct effect on open road density. Forest Plan standards and guidelines identify maximum levels of open road densities for each management area. Most districts do planning on a few areas annually, while other districts have analyzed the entire district as a whole to determine which roads should be closed or decommissioned. These analyzes are updated as new planning efforts occur. Currently, the amount of roads identified for closure or decommissioning has exceeded the Forest's funding available for implementation.

Evaluation

Using MARS and road accomplishment reporting data, this item was monitored adequately. During the planning process opportunities to reduce road densities are being identified, but there is not enough funding available to implement this reduction. This may result in not meeting the goals set forth in the Forest Plan standards and guides. During the next year we will continue to develop the In-fra/Travel Routes application, which will help determine current Forest road densities. This would identify areas to emphasize in closing and decommissioning roads.

Road Management

The Forest expects to complete the Mt Hood Access and Travel Management Plan in FY 99. This Access and Travel Management (ATM) plan will have an effect on road management and maintenance plans. Due to reduced road budgets, resource protection, management needs and policy direction, it is necessary to downsize the forest transportation system. The ATM Plan reduces road maintenance levels to a minimum system that will still meet the anticipated public needs while trying to stay within the road maintenance budget. Following is a table showing road maintenance levels and vehicle access type before and after the Draft ATM Plan by district.

Table 14. Road Maintenance Levels

District	Maintenance Levels/Access Type					
	1 - Closed		2 - High Clearance		3-5 - Passenger Car	
	Before	After	Before	After	Before	After
Clackamas	646	886	451	427	513	243
Barlow/Hood River	595	450	692	548	397	254
Zigzag	39	97	68	122	100**	113
Bull Run*	30	116	174	190	139	0
Forest Total***	1310	1549	1385	1287	1149	610

* *The road system in the Bull Run watershed is closed to all public traffic.*

** *District boundaries changed while the ATM was being developed. Bear Springs Ranger District miles were divided up between the districts listed above.*

*** *These numbers will change as the ATM Plan is finalized.*

The road system within the Bull Run watershed is maintained to accommodate the City of Portland to maintain the City's water supply and for Forest Service Administration. The road system before and after the ATM does not change public access to the Bull Run watershed. The following discussion of effects on public access will not include the Bull Run road system.

The table shows a considerable decrease in the number of miles available for passenger car traffic (40% decrease) as well as a decrease in the number of miles available for high clearance vehicles. However, most of the road mileage listed under Maintenance Level 1 will not be physically blocked but will be allowed to close naturally, i.e. brush in, not log out. If funding becomes available to close these roads, the implementation rate would increase.

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. However, maintenance efforts will be more focused on the mainline access roads.
- We should expect fewer landslides to occur.
- There will be less sediment reaching waterways.
- There will be less harassment to wildlife.

Road Maintenance

In 1998 there were 1,135 miles of road classified in maintenance levels 3-5 (maintained for passenger car use). However, due to the 1996 flood events, many roads were not maintained to their designated levels and some road systems were blocked off to traffic. Approximately 483 miles were maintained to standard. There were 1933 miles of road classified as maintenance level 2 (maintained for high clearance vehicles). Approximately 577 miles were maintained to standard. Roads maintained to standard are defined as roads that meet the intended maintenance standard (these may be roads that meet the intended standard with little or no work) or roads that are planned to be moved into a lower maintenance category. The Forest Plan projected 1,222 miles of maintenance on levels 3-5 (passenger car use) and 1,678 miles of maintenance on level 2 (high clearance vehicles). These projections were not met this year. The reasons are:

- The Forest is in the process of phasing in the ATM plan which will reduce level 3-5 miles.
- The 1996 flood events resulted in blocking off an entire watershed (Fish Creek) and level 3-5 standards could not be met on many flood damaged roads.

➤ *Recommendations*

- Revise Forest Plan outputs for road construction and reconstruction to reflect reduced budgets and reduced timber ASQ.
- Continue implementation of the Forest Access and Travel Management (ATM) Plan. The effects of the ATM Plan should be addressed in the next round of Forest planning.
- Develop a GIS/INFRA/Travel Routes analysis to determine current forest-wide road densities for management areas over the entire forest.

Monitoring Element: Wildlife/Plants

➤ *Goal*

The emphasis continues to be on maintaining 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.

In addition, the implementation of the Northwest Forest Plan has meant that consideration is not only given to threatened, endangered and sensitive species during the planning of management activities but to species classified as Survey and Manage species. This group includes lichens, bryophytes (mosses, liverworts), fungi, mammals and mollusks.

➤ *Threatened, Endangered and Sensitive Species*

Peregrine Falcon

The peregrine falcon is listed as endangered by the US Fish and Wildlife Service. Potential nesting habitat for the peregrine occurs on all Ranger Districts.

The Mt. Hood National Forest coordinated a volunteers group for the fourth consecutive year to survey sites for habitat suitability and peregrine presence.

Results

Surveys were conducted across the Forest with a total of 7 individuals sighted. The surveys visited two active nest sites, one of which is confirmed to have produced chicks. All peregrine sightings were on the Clackamas Rivers Ranger District.

Bald Eagle

The bald eagle is listed as threatened in Oregon by the US Fish and Wildlife Service. The eagle is a winter migrant on the Mt. Hood National Forest. Management Areas are designated in the Forest Plan (LRMP) for nesting and established winter communal roost areas.

Results

One potential nest site was surveyed in 1998. The site was found to be unoccupied. To date, no communal roost sites have been located on the Forest. All sightings have been individual birds during the winter months.

Northern Spotted Owl

The northern spotted owl is listed as threatened by the US Fish and Wildlife Service. Management of this species is outlined in the Standards and Guidelines (4/94) for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan).

Results

As we continue to operate outside of critical periods and assume occupancy for suitable spotted owl habitat, our need to intensify survey for spotted owls continue to decrease. The primary focus of spotted owl survey work on the Forest is habitat assessment at the project level. Spotted owl surveys were conducted on Barlow District. The surveys covered 47,650 acres, or 27 percent of the District. A total of 23 individuals were located.

Sensitive Wildlife Species

Red-legged Frog

No surveys for the red-legged frog were conducted in 1998. The population trend for this species across the Forest is unknown.

Harlequin Duck

Surveys were conducted on two districts (Hood River, Clackamas). The results were 14 individuals observed, an increase of one from the previous year's survey. The population trend for this species is stable across the Forest.

Sandhill Crane

Surveys were conducted on three districts (Barlow, Clackamas, Zigzag) in cooperation with Wetland Wildlife Watch, the Portland Audubon Society and Confederated Tribes of Warm Springs. Volunteers and Forest Service personnel surveyed approximately 700 acres of the Mt. Hood National Forest and 300 acres of Confederated Tribes of Warm Springs Land. A total of 17 adults and 3 colts (juveniles) were observed on the Forest and 2 adults on Warm Springs. Based on these results, the population trend across the Forest appears to be stable.

Cope's Giant Salamander

A survey for Cope's giant salamander was conducted on the Forest by volunteers. The result of this effort was not available at the time this report was completed. Incidental sightings of 4 individuals were also reported by a Forest Service stream survey crew. The population trend of this species across the Forest is unknown.

Townsend's Big-eared Bat

A limited survey covering 10 acres was conducted on Clackamas District. The population trend across the Forest is unknown.

California Wolverine

No surveys were conducted for the wolverine in 1998 and no individuals were observed.

Common Loon

Surveys were conducted for the loon on Zigzag District. A total of 6 individuals were observed. The population trend across the Forest is stable.

Primary Cavity Nesters

Under the Mt. Hood Land and Resource Management Plan, all recent timber harvest units should retain sufficient snag numbers to maintain populations of primary cavity nesters (e.g. woodpeckers) at or above 60 percent of biological potential. Findings displayed in the tables below indicate that pretreatment conditions are below the 60% biological potential level 65 percent of the time on the westside and 42% of the time on the eastside. Our down woody conditions are far below our Standards and Guidelines. These tables highlight the need for treatment to help correct past effects.

Table 15. Wildlife Tree Retention, Mt. Hood National Forest

	Eastside	Westside
Total Project Area	19,859	4,661
% Area Survey	80% (15,938 acres)	82% (3,865 acres)
% of Area Meeting Standards and Guidelines Before Entry	58% (11,418 acres)	35% (1,642 acres)

Table 16. Down Woody Material Retention, Mt. Hood National Forest

	Eastside	Westside
Total Project Area	19,859	4,661
% Area Survey	100%	87% (4,031 acres)
% of Area Meeting Standards and Guidelines Before Entry	29% (5,920 acres)	17% (817 acres)

➤ *Summer and Winter Range*

Deer/Elk Winter Range

Winter range allocations are intended to provide high quality deer and elk winter habitat in order to sustain stable populations of mule deer, black-tailed deer and Roosevelt elk (LRMP 4-273).

Results

Barlow Ranger District

Winter range forage conditions are stable. An 800 acre underburn project has improved suitability for deer and elk habitat in summer range. This was done with cost share dollars from the Rocky Mountain Elk Foundation (RMEF).

Clackamas Ranger District

Winter range forage conditions are good. The availability of created foraging areas are declining due to decreases in timber harvesting activities.

Hood River Ranger District

Overall, winter range conditions are better changed from last year. Thermal cover is showing an increasing trend. Forage stable to decreasing while permanent foraging areas are showing a declining trend.

Zigzag Ranger District

Winter range conditions have not changed from last year.

Deer/Elk Summer Range

The goal of the summer range land allocation is to provide high quality summer rearing habitat for deer and elk. The only summer range allocation is on the Clackamas River and Barlow Ranger Districts.

Results

Barlow Ranger District

Summer range conditions are stable, having recovered from previous declines.

Clackamas Ranger District

Summer range conditions are stable but with a gradual decline in forage availability due to decreases in timber harvest.

Pine-Oak Habitat

All of the Pine-Oak management allocation is located on Barlow District. Of the total 22,423 acre allocation, the amount maintained in adequate condition for turkey and grey squirrel was 22,423 and 13,500 acres respectively. This represents no change from 1997 figures. Open road densities within the allocation have decreased and it is estimated that the Forest Plan objective of reducing densities to 2.0 miles of open road per square mile will be met on 80 percent of the allocation within 4 years. Overall, Pine-Oak habitat on the Forest is considered to be stable.

Pine Marten and Pileated Woodpecker

Habitat Management Areas

All habitat management areas were dissolved as per the Northwest Forest Plan except those identified as connectivity between watersheds. The monitoring of these corridors has not been established.

Snag Density

Using the data from Clackamas River Ranger District, post harvest sampling showed improvement from preharvest activities but still showed 35% of unit did not meet Standards and Guidelines.

Table 17. Wildlife Resources

Elements	FY 98
New Peregrine Falcon Nest Sites	0
% Projects Meeting Bald Eagle S&Gs	100%
New Spotted Owl Pairs Located	0
% Projects Meeting Primary Cavity Nester S&Gs	*65%
% Projects Within Marten and Pileated Woodpecker Areas Meeting S&G	NA
% Summer Range S&Gs Met	100%
Pine-Oak Habitat S&Gs Met	Yes

** For 1998, a post-project survey of snag density within timber harvest units on the Clackamas Rivers Ranger District is being used as an indicator of Forest-wide conditions. The survey found that 65% of individual units meet or exceed the Forest-wide standards and guidelines to provide for primary cavity nesters at 60% biological potential.*

Recommendations

- Continue to monitor green tree replacement marking and assess whether Mt. Hood Land and Resource Management Plan standards and guidelines are being met.
- Continue to survey for bald eagle nest sites and work to complete management plans for the remaining recovery sites identifies in the Mt. Hood Land and Resource Management Plan as funding allows.
- Continue forage enhancement on the eastside of the Forest through the use of underburning in conjunction with the Forest fuels program.

- Expand the volunteer monitoring effort for Cope's giant salamander to include the red-legged frog.

➤ *Sensitive Plant Species*

A total of 30 Sensitive plant species are documented to occur on the Mt. Hood National Forest. Those species which occupy forested habitat are considered to be stable at this time, largely due to the implementation of the Northwest Forest Plan. Species which require non-forested habitat including meadows, dry grasslands, balds and cliffs continue to be more vulnerable than species of forested habitats. Threats to these non-forested habitats include noxious weed encroachment, off-road vehicle use, and recreational rock climbing. Three species, Watson's lomatium (*Lomatium watsonii*), sickle-pod rockcress (*Arabis sparsiflora*) and violet Suksdorfia (*Suksdorfia violacea*) were highlighted in the FY 1997 Monitoring Report because habitat had been lost or modified. Monitoring efforts in 1998 focused on these three species with the following results.

Results

Noxious weeds were manually pulled at the one known site of Watson's lomatium on the Forest. Sickle-pod rockcress also occupies this site and was benefited by the habitat enhancement.

Boulders were placed adjacent to the Watson's lomatium site to limit access by off-road vehicles. This project was done in cooperation with the Bonneville Power Administration.

Meetings were held between the Mt. Hood National Forest and Pete's Pile Climbing Association to discuss ways of eliminating impacts to violet Suksdorfia at a cliff site used by the group. Designated climbing routes were informally designated which will minimize the potential to impact existing plants.

A site of Tygh Valley milkvetch (*Astragalus tyghensis*) was located on the Mt. Hood National Forest for the first time in 1998. This population consists of a single plant and is therefore highly susceptible to extirpation from the Forest.

Monitoring questions identified in the Mt. Hood Land and Resource Plan include:

- *Have Sensitive plant inventories been conducted for all ground disturbing activities?* **Yes**
- *Have implemented mitigation measures been effective in maintaining the integrity of Sensitive plant sites?* **Yes**
- *Are Threatened, Endangered and Sensitive plant standards and guidelines being implemented?* **Yes**

Recommendations

- Continue to manually remove noxious weeds for the Watson's lomatium and other Sensitive plant sites with the potential to be adversely impacted from noxious weed encroachment.
- Monitor the Watson's lomatium site to determine whether the boulder placement is effective in reducing encroachment by off-road vehicles.
- Continue to work in partnership with the Pete's Pile Climbing Association with the goal of eliminating adverse impacts to violet *Suksdorfia* while allowing continued recreational rock climbing. This partnership should be formalized through a memorandum of understanding.
- A thorough survey should be conducted for Tygh Valley milkvetch in the area where it was found to determine whether there are any additional plants and an assessment made as to what, if any, actions can be taken to enhance the population.
- In addition to the species mentioned above, monitor those Sensitive plant sites which occupy habitats at greatest risk of being adversely impacted, such as meadows, e.g. adder's tongue (*Ophioglossum pusillum*) and tall agoseris (*Agoseris elata*).

➤ *Northwest Forest Plan - Survey and Manage Species*

Surveys were conducted by Forest botanists and biologists within 34 project areas to detect the presence of Survey and Manage (C-3) Species in compliance with the Northwest Forest Plan. Target species included mammals, birds, lichens, fungi, mosses, liverworts and vascular plants. Reports have been completed which disclose the full result of the surveys.

Results

Lichen Species

Survey and Manage lichens were located on all four districts in 1998. The 51 new sites represent 7 species, with a large majority (39) of sites belonging to one species, *Hypogymnia oceanica*.

Moss and Liverwort (Bryophyte) Species

Two Survey and Manage moss species, bug-on-a-stick (*Buxbaumia viridis*) and giant-spored tree moss (*Ulota megalospora*) were located in 1998. The bug-on-a-stick, not known to occur on the Forest prior to the 1998 field season, was located at 70 sites on Barlow, Clackamas and Hood River Districts. The tree moss was found to be relatively abundant across the Forest.

Vascular Plant Species

One species of Survey and Manage vascular plant, the candystick (*Allotropia virgata*), was located during Fiscal Year 1998. Total known occurrences on the Forest for this species number 65. As a result of this survey information, management specific to candystick is no longer recommended on the Mt. Hood National Forest (Candystick Management Recommendations, 1998).

Known tall bugbane (*Cimicifuga elata*) and cold-water corydalis (*Corydalis aquae-gelidae*) populations were monitored on the Forest. Populations appear to be stable at this time.

Fungi Species

In Fiscal Year 1998, sites for 13 Survey and Manage fungi species were located, all on Clackamas Rivers Ranger District. These sites represent three species, *Ramaria celerivirescens*, *Ramaria maculatipes* and *Ramaria amyloidea*, all in the coral fungi group.

Mollusk Species

Surveys were conducted within 30 project area. A total of 184 Survey and Manage mollusk populations, representing 6 species, were located in 9 project areas.

Recommendations

- Complete the Survey and Manage species database and map layer in the Geographic Information System.
- Continue to augment the Mt. Hood National Forest herbarium with Survey and Manage lichen, bryophyte and fungi specimens to aid Forest personnel conducting surveys for these species.
- Continue to monitor tall bugbane and cold-water corydalis.

Monitoring Element: Timber Resources

➤ *Goal*

The goal of timber management is to help attain desired Forest ecosystem conditions, to produce a continuing supply of forest products, and to provide a positive economic return.

There are 1,063,450 acres in the Mt. Hood National Forest. If we look at the Northwest Forest Plan, and the FEMAT report of July, 1993, it shows the Mt. Hood Forest having 186,200 acres of Congressionally withdrawn areas; 304,950 acres in Late-Successional Reserves, 16,500 acres in unmapped Late-Successional Reserves, 71,450 acres of administratively withdrawn areas, and 484,350 acres in Matrix lands. The matrix is the federal land outside the four categories of designated areas set forth above. It is also the area in which most timber harvest and other silvicultural activities will be conducted. However, the matrix does contain non-forested areas as well as forested areas that may be technically or administratively unavailable for timber production.

After considerations for Riparian Reserves as well as other suitability restrictions, approximately 204,000 acres remain available for scheduled timber harvest.

➤ *Harvest Activities*

Timber Sold and Harvested

Our 1990 Forest Plan identified a total timber sale program quantity (TSPQ) of 215 million board feet (MMBF) that could be sold on average per year over the decade. An allowable sale quantity (ASQ) of 189 million board feet per year was also identified in the plan. The Northwest Forest Plan identifies a Probable Sale Quantity (PSQ) for the Mt. Hood NF of around 67 million board feet per year, with the Fiscal Year 1997 targeted as the full implementation year where that goal would be met from then on. The 67 MMBF is “volume offered for sale”, not volume harvested (this amount varies from year to year depending on market conditions).

In 1995 the PSQ level of 67 MMBF was adjusted downward to 64 MMBF. This adjustment was made to reflect the need to protect 100-acre buffers around owl activity centers. 64 MMBF is the current PSQ for FY98.

66.6 million board feet was **offered** for sale in FY 98 which exceeded our goal. Of this total, 26.0 MMBF came from salvage sales, and 40.6 MMBF came from green timber sales.

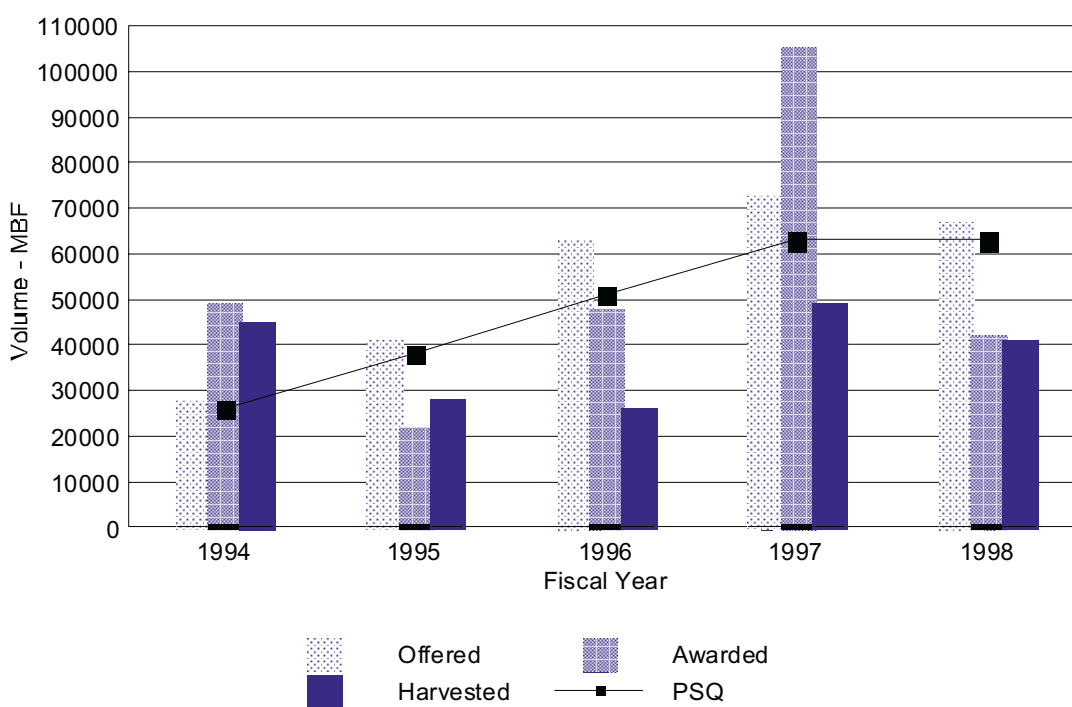
The following statistics show additional timber program details for FY 1998.

Table 18. Timber Volume Sold/Harvested - FY 98

Timber Volume Sold and Harvested	
Volume Offered	66.6 MMBF
Volume <u>Sold</u> and Awarded	42.1 MMBF
Value (Total Sold Revenue)	\$6,533,266
Volume <u>Harvested</u>	41.2 MMBF
Acres <u>Harvested</u>	3,344 Acres
Other Products Sold and Harvested	
Volume of Firewood Harvested	3,002 cords
Value	\$30,026
# of Christmas Trees Harvested	3,587

The actual volume sold over the decade will vary year to year because sales are returned due to bankruptcies, defaults, weather events, etc., harvesting will also vary year to year.. The following figure shows the actual volume of timber offered for sale and harvested since the Northwest Forest Plan was implemented.

Figure 1. Mt. Hood National Forest Volume Summary



Evaluation

In FY 98, the timber volume offered exceeded the revised Northwest Forest Plan target by 2.6 MMBF. However, the amount actually sold was less than the target by 24.5 MMBF due to several sales that received no bids. In FY 99, all but two of the no-bid sales will be offered for resell. As of 3/12/99, one of the no-bid sales, Roundup (3.2 MMBF), has been sold and awarded.

Potential reasons for the no-bid sales were analyzed to aid in future sale planning. The possible reasons for lack of bidding include:

Market Conditions

- Large amount of volume on market at one time.
- Saturation of the domestic timber market due to the Asian economic crisis.

Sale Specifications

- High deposits for brush disposal and road maintenance.
- Operating restrictions and limited operating seasons in contract.
- Use of high cost helicopter yarding and/or skyline yarding on low valued sales.
- Chip specs (grade 7) too low on small diameter, low value sales.

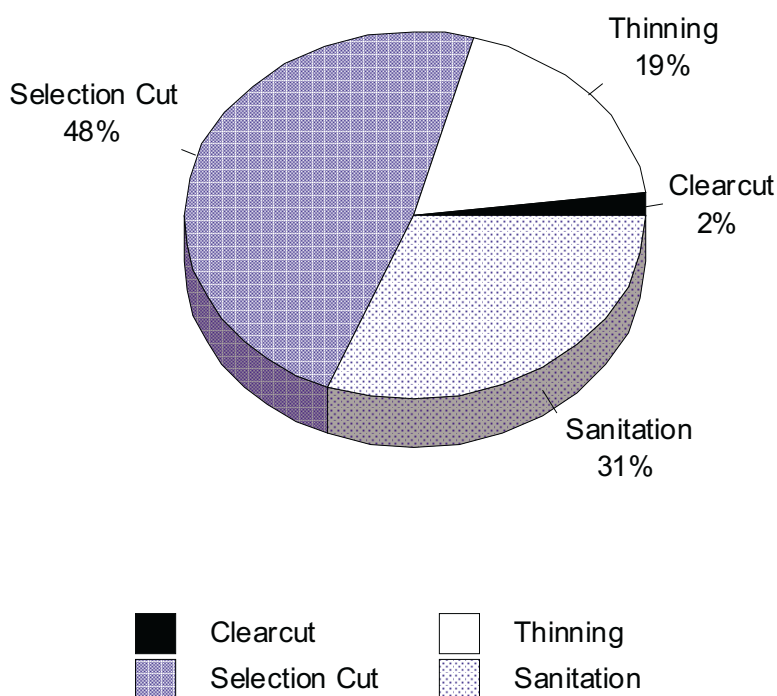
Sale Design

- Large amount of specified road work (purchaser credit) on low value sales.
- Overall sale size too large in some cases, especially for small diameter and low value sales.
- Small diameter, low value sales may have sold better as flat rate sales instead of escalated rates.

➤ *Harvest Methods*

The following figure displays the types of harvest methods that were implemented during FY 98. The majority of the acres treated, 48%, were selection cuts on the eastside of the forest. Sanitation cuts occurred on 31% of the overall acres, mainly from salvage of trees killed by bark beetles. Commercial thins accounted for 19% of the harvest and 2% in clearcuts. It should be noted that on the clearcut acres, at least 15% of the trees are left standing to meet ecosystem objectives.

Figure 2. Silvicultural Harvest Methods (Acres Treated - 3,344)



Evaluation

Acres treated with different silvicultural methods shows a good mix of practices implemented to meet management objectives. Amounts of harvest methods assumed in the 1990 Forest Plan are different than those currently reported because clearcutting or regeneration harvest was assumed almost entirely in 1990 modeling. Reported acres follow management standards and guidelines, though, and the increases in thinnings, selection cuts and sanitation cuts, are a result of Forest Health issues and the concentration of efforts on younger stands. The very small amount of clearcut harvest is a direct response to standards and guidelines calling for more reserve trees and different approaches to harvesting for other objectives. Monitoring indicates that current management direction is being achieved.

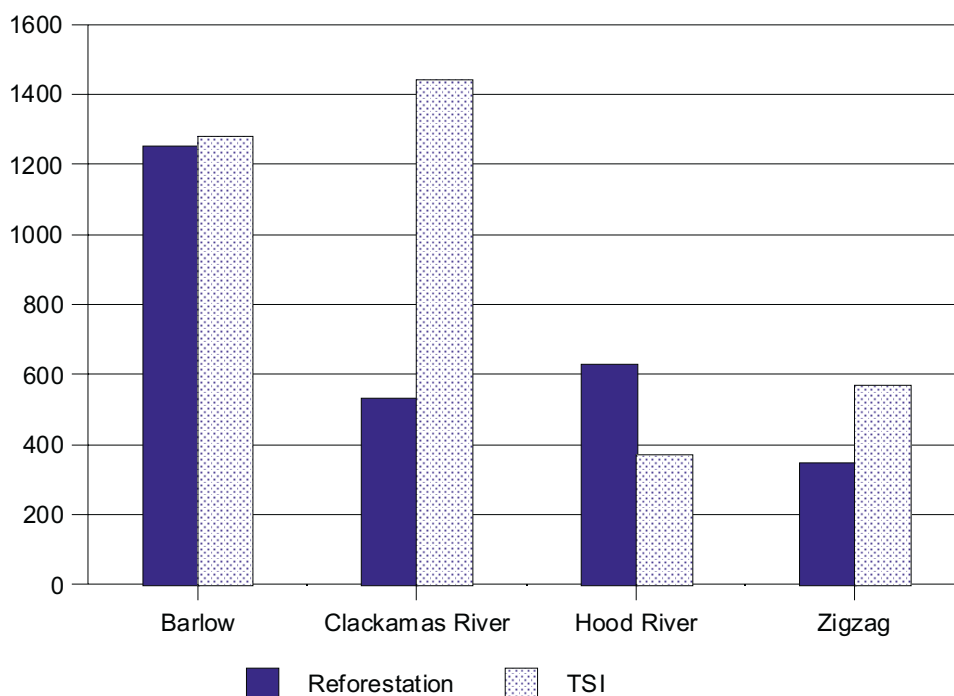
➤ *Silvicultural Activities*

Silvicultural activities in FY 98, such as planting, thinning, release, and fertilization of young stands, are at similar overall levels to FY 97, but less than previous years.

The number of acres accomplished exceeded targets assigned to the Forest, although the amount of acres being precommercially thinned is falling below Forest Plan projections for the sixth year in a row. This is due to lack of appropriated funding from Congress to accomplish our needs. The Mt. Hood National Forest planted 3,830 acres in FY 1998, down from 3,877 acres in FY 97 and 4,758 acres in FY 96. The Forest also accomplished 3,759 acres of combined thinning, release and fertilization on young stands less than 25 years old. This is up from the 2,295 acres in FY 97, but down from 5,094 acres in FY 96.

The following graph displays the accomplishment of both reforestation and timber stand improvement by ranger district in fiscal year 1998.

Figure 3. Reforestation and Timber Stand Improvement Accomplishments



Evaluation (Silvicultural Activities)

The total amount planted was approximately 1,000 acres less than 1997 levels. This is due to the overall decrease in harvest levels and less acres of regeneration harvest prescription.

Timber stand improvement (precommercial thinning) increased by approximately 1,500 acres over 1997 levels yet this amount is still substantially less than the identified need. This is due to congressional appropriations that emphasize funding of reforestation and do not fully fund thinning. Currently we are not meeting our Forest Plan projections of thinned acres, and we are continuing to add to the backlog of unthinned young stands. This has the potential to create unhealthy forest conditions for the future.

➤ *Regeneration Activities*

Reforestation survival information available for trees planted in fiscal year 1998 is from the first year survival report. This showed from inventory of staked trees that the total first year survival was 83%, which meets Regional goals for desired survival after the first year. Past experience indicates that reforestation will occur within the five year period required by law.

Acres harvested five years ago are tracked to ensure that reforestation will occur within the five year period required by law. The minimum standard to be considered adequately stocked is 125 trees per acre.

Total acreage harvested in 1993 was 2,009 acres. Ninety-seven percent of the acres are now adequately restocked. The three percent that is not adequately restocked has been planted but has less than 125 trees per acre because of rock piles, thick duff, pocket gophers, or other site factors. Fifty-two acres are being evaluated for further treatments in FY 99. In addition, natural regeneration may increase the stocking levels.

In order to maintain species diversity in our regeneration program, ten different tree species were planted in FY 98. An ongoing program of planting native conifer shrub, grass and forb species continue to be implemented on the Forest. Natural regeneration also supplements the diversity of planted species.

Evaluation

First year survival is being met on the forest. Ninety-seven percent of the 2,009 acres harvested five years ago are adequately reforested and therefore compliant with NFMA and the Chief's policy of reforestation within five years. Approximately three percent, or 52 acres, have not met the five year regeneration requirement and further treatments are planned for FY 99.

➤ *Forest Health - Insect Activity*

Insect caused defoliation and mortality on the forest are monitored annually by an aerial sketchmap survey. The survey is conducted by Forest Insect and Disease personnel and maps current effects only, often indicated by red foliage. In 1998 the aerial survey showed approximately 8,688 acres of visible defoliation on the Mt. Hood National Forest. The primary damaging agents in FY 98 were mountain pine beetle in both lodgepole and ponderosa pine, larch needle cast, larch casebearer, and fir engraver. In 1998, both larch needle cast and larch casebearer caused significant defoliation which has not been readily visible in recent years.

Table 19. Forest Health Indicators - Insect Activity

	1992	1993	1994	1995	1996	1997	1998
Acres Defoliated	269,964	71,252	39,942	37,398	4,752	7,584	8,688
No. of Trees Killed	20,532	10,673	3,115	18,212	826	11,308	4,614

Major Damaging Agents: mountain pine beetle, larch needle cast, larch casebearer, fir engraver.

Evaluation

On the Barlow and Hood River ranger districts, east of the Cascade crest, 6,286 acres were affected by larch needle cast. Larch needle cast is an endemic foliage disease which can reduce growth in western larch if repeated infections occur, but serious impacts usually do not occur on thrifty trees. Moist conditions greatly favor infection and the disease is most notable in years with wet springs and early summers, such as in 1998. Decline or increase in larch needle cast in successive years is dependent on moisture levels.

In addition, 2,374 acres of western larch on the Barlow district were affected by the larch casebearer. The larch casebearer is an introduced insect and consecutive years of defoliation can cause growth loss and contribute to mortality. However, casebearer populations commonly do not reach outbreak proportions partially because of the successful introduction of natural enemies. Therefore the defoliation from casebearer is expected to decrease as the predators increase.

Actual tree mortality occurred on 4,614 trees on 1,750 mapped acres. 3,750 trees were lodgepole pine affected by the mountain pine beetle, almost all of it on the Barlow Ranger District.

Mountain pine beetle attacks trees under stress and is highly related to stand density. Overstocked stands are very susceptible.

Selection harvest and commercial thinnings were implemented in 1998 to decrease stand susceptibility to insect attack. However, the presence of large acres of overstocked stands increases the probability for insect outbreaks in the future.

➤ *Forest Health Restoration Spreadsheet*

This was the second year the Forest implemented a new reporting requirement for ecosystem monitoring. A “Forest Health Restoration Spreadsheet” was developed to display numerous activities. These activities, when reported together in context, are generally accepted as representing those activities we need to do to maintain or restore health of each watershed. The key question being asked is: *“To what degree is the forest outside the range of natural conditions, desired conditions or standards with regard to the factors below, and what is our rate of progress toward the desired state?”*

- Resilience of Landscape to Fire
- Stand Structure
- Conditions in Riparian Zones
- Noxious Weeds
- Road Density
- Soil Productivity

Enclosed is the “Forest Health Restoration” summary spreadsheet for the Forest. The key question behind the spreadsheet is to report two basic things:

- **Total** acres of each activity outside: desired condition, range of natural conditions, or FP/NWFP Standards and Guidelines, which would indicate that these acres/miles need treatment. These acres are to be available for treatment, considering the land allocation.
- **Treated** acres in this last fiscal year, by District. In other words, what was our progress in treating those acres outside desired conditions on our districts? How far did we get in restoring forest health for that particular item?

Table 20. Forest Health Restoration Spreadsheet

Table 20. Forest Health Restoration Spreadsheet

Activity	Total Available Miles Needing Treatment (Outside Desired Conditions)	Total Available Acres Needing Treatment (Outside Desired Conditions)*	Total Acres Treated by District				Total Forest Acres Treated
			Barlow		Hood River		
			Chickamaux River	414,879	208,416	Zions	
Total Acres within Watersheds Forest Service Acres	175,997	164,632	409,993	194,592	256,533	256,533	
Prescribed Burn							
Natural Fuel		31,450	1,168	0	0	1,168	
Activity Fuel		1,101	409	368	0	777	
Fuels Treatment (mechanical & other)							
Natural Fuel		4,214	0	0	100	100	
Activity Fuel		2,793	0	43	0	43	
Precommercial Thinning (overly dense)		15,315	1,236	1,462	370	3,567	
Pruning for Disease Control		77	0	0	0	77	
Reforestation							
Planting		10,712	1,588	535	690	3,166	
Animal Damage Control		6,852	868	0	148	1,016	
Timber Sales							
Fire Salvage		0	0	0	0	0	
Salvage for Fuels Reduction		10,800	0	0	0	0	
Commercial Thinning (overly dense)		64,676	2,190	249	0	2,439	
Other Forest Health Related		24,684	0	0	675	675	
Riparian Restoration Projects Outside Stream							
Noxious Weed Control		7,298	3	2,056	8	2,067	
Herbicide		17,450	0	17	0	37	
Biological							
Mechanical/Manual							
Road Obliteration** - miles		567.50	857	1	380	2,000	
Road Closures - miles		184	1	24	0	10	
Subsiding							
		786	101	0	3	16	
TOTALS	751.50	198,208	8,421	4,832	2,404	11,822	

*Total acres needing treatment are those acres "available" for treatment, considering land allocation. LSR's and wilderness are not automatically excluded.
 **Road obliteration done for hydrological stability; "hydrologically maintenance free".

Evaluation

This is the second year for reporting forest health restoration activities. Further refinement and verification is still needed to:

- Accurately display the total available acres needing treatment, and
- Provide consistency with other reporting documents.

After completion of this year's monitoring report, the forest health spreadsheet will be critiqued to improve display and accuracy of the information.

The value of this spreadsheet is to point out broad areas where the resource is outside the desired condition and our rate of progress in treating that need. Currently there are several areas of concern on the forest regarding forest health as indicated on the spreadsheet.

- More than 15,000 acres of overly dense, young stands are in need of precommercial thinning, with less than 25% of the need treated each year.
- More than 64,000 acres of overly dense stands are in need of commercial thinning with less than 4% of the stands treated.
- More than 17,000 acres of noxious weed problem areas are identified with less than 10% of the acres being treated.
- Several hundred miles of road have been identified for decommissioning, yet only a small percentage have been treated due to funding shortages.
- There are large amounts of natural fuel accumulations, especially in the Badger Creek wilderness, with only 4% of the need being treated forestwide.

➤ *Forest Inventories*

Ecological Unit Inventory

A multi-scale ecological unit inventory is being conducted on the Forest. The objective of the inventory is to classify and map ecological units based on relationships of climate, geology, geomorphology, soil and vegetation properties that determine ecological potentials, ecosystem capabilities and predicted responses. Inventory work is being completed at the landscape scale to facilitate land management planning analysis work. Work is also being completed at the land unit scale to validate and refine landscape level concepts. This hierarchical framework for defining ecological units at different scales provided by the inventory products allows a scientific basis for implementing ecosystem management principles at different levels of land planning.

Land unit mapping was completed on 20,000 acres in 1998.

Evaluation

There is an active schedule for inventories to validate or improve current data. The Ecological Unit Inventory is coordinated out of the Mt. Hood Forest Headquarters; however, staffing for this project changed in 1998. During the transition to new staff less acres were accomplished. Additional staffing will be needed in order to accelerate the inventory. At the current rate of accomplishment, the Ecological Unit Inventory for the forest would take another 20 years.

➤ *Model Assumptions*

Timber yields in our Forest Plan were generated from lands that are considered suitable for timber harvest. They are generally described as:

- No regulated harvest lands (“A” lands);
- Regulated harvest with partial yield (“B” lands);
- Regulated harvest with full yield (“C” lands);
- Bull Run Watershed Planning Unit (“D” lands);

Within these four categories are the 45 management areas the Forest is divided into. Part of our monitoring effort is to monitor the amount of acres harvested within each of these management areas, or major categories of areas. The results are shown below in terms of percent of harvested acres that lie within management area categories.

Table 21. Percent of Acres Harvested by Management Area Category

*Fiscal Year	Mt. Hood NF Land Allocations			
	A	B	C	D
91	2	46	42	10
92	.3	40.2	52.5	7.0
93	.6	45.6	50.9	2.9
95	1.0	62.3	36.7	0
96	0.8	68.9	30.3	0
97	4.5	40.9	54.6	0
98	11.0	41.0	48.0	0

* FY 94 data is not available.

A = No regulated harvest (salvage).

B = Regulated harvest with partial yield.

C = Regulated harvest with full yield.

D = Bull Run Watershed Planning Unit.

Of the total acres harvested in FY 98, the following displays the percentage split between Northwest Forest Plan land allocations:

Administratively Withdrawn	10%
Late Successional Reserves	2%
Riparian Reserve	8%
Matrix	<u>80%</u>
Total	100%

Table 22. Acres Harvested by Forest Plan Management Area in FY 92, FY 93, FY 95, FY 96, FY 97 and FY 98 (Data not available in FY 91 and FY 94)

	Mt. Hood NF LRMP Management Area	Acres Harvested by FY					
		92	93	95	96	97	98*
A4	Special Interest Area	6			14	13	372
A5	Unroaded Recreation		14	12			
A6	Semi-primitive Roaded Recreation	3	5				
A7	Special Old Growth						95
A9	Key Site Riparian	7				75	
A10	Developed Recreation						14
A11	Winter Recreation Area			9			
A12	Outdoor Education Area		3				
B1	Designated WS&R Rivers		6	30	20	11	
B2	Scenic Viewshed	1,167	689	644	597	197	876
B3	Roaded Recreation		15	4			
B4	Pine Oak Habitat Area	179	288		98	268	366
B6	Special Emphasis Watershed	465	470	306	70	62	169
B8	Earthflow Area	57	104	125	347	119	191
B9	Wildlife/Visual Area	28	63		26	136	
B10	Winter Range	182	34	153	3		156
B11	Deer and Elk Summer Range	11	28				23
B12	Back Country Lakes					3	
C1	Timber Emphasis Area	2,723	1,896	744	510	1,064	2,104
DA1	Bull Run Physical Drainage	98	13		0	0	
DA3	BR Research Natural Area	43	45				
DB8	BR Earthflow Area	19					
DC1	BR Timber Emphasis Area	202	49				
	Total	5,190	3,722	2,027	1,685	1,948	4,366*

* Note: The number of acres indicated here are higher than the figure for acres harvested that is displayed elsewhere in this monitoring report. Many of the FY 98 timber sales were salvage operations in which small pockets of beetle killed trees or other mortality were harvested. The area of small pockets actually harvested equal 3,344 acres. However, the mapping for land allocations often included the larger, more encompassing sale area or was mapped to fit existing vegetation cells. Therefore, the number of acres by land allocation figure is substantially higher at 4,366 acres.

Evaluation

This comparison allows the manager to see where harvesting has occurred according to the Mt. Hood Forest Plan land allocations. Percent and acres of harvesting that occurred on different Management Areas appears to be somewhat evenly split between harvesting on “B” and “C” lands over the last six years, however there has been an increase of harvesting on “A” lands in FY 98. The acres harvested in A4, Special Interest Area, were along the Barlow Road Corridor. These stands were treated to restore them to their historic structure and composition. Acres harvested in A7, Special Old Growth, was roadside salvage.

➤ *Recommendations*

- Continue to pursue and request funding for those items that are needed to restore and maintain forest health. These include:
 - Timber stand improvement dollars for precommercial thinning of overly dense, young stands.
 - Sale planning and preparation funds for commercial thinning of overly dense stands.
 - Noxious weed abatement funding.
 - Road decommissioning funding.
 - Planning dollars to complete the Fire Management Plan for the Badger Creek Wilderness.
- Update Monitoring Plan to incorporate Northwest Forest Plan direction focusing on a few critical items. These focus items would include:
 - Effectiveness of silvicultural prescriptions in meeting given ecosystem objectives.
 - Acres harvested where objectives was to accelerate development of late successional habitat.

- Acres treated within Riparian Reserves by objective.
- Amount of Late Successional/Old Growth by watershed.
- Summary of forest acreage with stand density concerns that show existing Forest Health risks by land form or vegetation type.
- Consider the potential reasons for current no-bid sales as an aid in future planning of small diameter, low value timber sales.
- Continue to aerially monitor insect activity on the east side of the forest and augment with on the ground observations.
- Pursue accelerating the Ecological Unit Inventory. At the current rate of accomplishment, the forest inventory would take at least another twenty years. Consolidate and coordinate with other inventory needs where possible.
- Continue current reforestation practices, including animal damage control, to meet 5 year generation and minimum stocking laws.

Monitoring Element: Scenic Resources

This report covers scenic monitoring for five timber sale projects on the Clackamas River and Zigzag Ranger Districts. Projects included in this report are Bugs Timber, South End Salvage, Road 70 Salvage, Yober Commercial Thin and Sugarloaf Timber Sale. Monitoring included both a review of pertinent planning documents as well as a field review of post harvest units.

➤ *Monitoring Activities*

Bugs Timber Sale /Clackamas River Ranger District

Bugs Timber Sale involved the salvage of windthrown and beetle killed trees on approximately 600 acres in small clumps or intermittently scattered throughout a larger landscape. Land allocations for this project area under the Mt. Hood Forest Plan include B6 Special Emphasis watershed, C1 Timber Emphasis, B8 Earthflow, B2 Scenic Viewshed and B12 Backcountry Lake. Visual quality objectives (VQO) in the project area range from Partial Retention along roads 63 and 70 and the Hot Springs Fork to Modification along the secondary roads. The logging system was primarily helicopter with a limited number of skyline or tractor harvest units. Thorough slash disposal occurred within 100 feet of the mainline and secondary roads (63, 70, 6340, 6341, 6350, and 6380). Because this timber sale harvested only small groups of dead trees or intermittent trees and the mitigation measures included falling trees away from the roads, flush cutting stumps, and removing slash and damaged vegetation within the foreground of the roads, this project met or exceeded the VQO of partial retention.

South End Salvage/Clackamas River Ranger District

South End Salvage involved the harvest of approximately 174 acres of dead and down timber damaged by wind in 23 separate units in the Collawash River watershed. The timber sale units are distributed throughout Mt. Hood Forest Plan allocations of B6 Special Emphasis Watershed and C1 - Timber Emphasis with a VQO of modification as seen from open roads. The salvage prescription for this project included small partial cuts and leavetree mark using primarily skyline and helicopter logging systems. Because of the “light touch” quality of the prescription, the timber sale met or exceeded the VQO of modification.

Road 70 Salvage/Clackamas River Ranger District

This timber sale is located along forest road 70 which parallels the Hot Springs Fork of the Collawash River. The objective of this project was the removal of 130 hazard trees and blown over trees which impeded road maintenance. Land allocations in the project area include A7-Special Old-Growth, B2-Scenic Viewshed, and B7-General Riparian. The VQO of these land allocations range from foreground Retention in the Special Old-Growth area to Partial Retention in the foreground of the Scenic Viewshed and General Riparian areas. Because of the selective harvest of individual trees, low impact logging system, and the thorough slash disposal, this project meets the VQO of Retention.

Yoda Timber Sale /Clackamas River Ranger District

This project involved the commercial thinning of second growth forest on 617 acres in the North Fork watershed with thinning and group tree selections treatments. The land allocation for this project area is C-1 Timber Emphasis and has a VQO of Modification and this sale achieves that VQO.

*Sugarloaf Timber Sale/Zigzag Ranger District
(Planned-1995; Implemented-1998)*

All eight harvest units in this timber sale meet their respective VQOs which range from Modification to middleground Retention due to factors such as small size (clearcut/shelterwood units 2,5,9,10 and 12); and silvicultural prescription (thinning units 6,13, and 24). All units are vegetatively and/or topographically screened from critical viewpoints (Hyw 26; recreation sites).

Monitoring Element: Recreation Resources

➤ *Goal*

In order to meet the diversity of demand that exists and continues to grow, the Forest will strive to provide a broad range of year round, high quality developed and dispersed recreation opportunities.

➤ *Monitoring Items*

Trails

The Forest has approximately 1,230 miles of recreation trails. This includes about 200 miles managed for cross-country skiing and snow machine use. Of the hiking trails, 363 miles are in Wilderness.

In FY 98 we reconstructed 9.7 miles of existing trail. This is about one-eighth of the amount projected in the Forest Plan.

The FY 98 maintenance report indicated that 44% of our trail system miles were maintained to standard.

Situation

With trail maintenance budgets less than ½ of the level that is needed to maintain our trail system to the prescribed standard level and funding for construction and reconstruction at less than 1/4 of the level that is needed to reconstruct a deteriorated system or build new opportunities for our increasing public, additional miles of trail will deteriorate to a level that requires reconstruction to bring them up to a safe and acceptable level.

To help provide funds that will be used to improve our trail system, the forest will continue to collect parking fees at selected trailheads. Eighty percent of the fees collected will be returned to the forest to fund trail maintenance activities.

If current trends of reduced maintenance and reconstruction continue, we will close some trails and restrict the type of use on others. Also, fewer new facilities will be constructed because more of the limited capital investment dollars will be needed to reconstruct trails that were not properly maintained. Currently, there are a limited amount of trails available for barrier-free, bicycle and off-road vehicle users. These systems will feel the greatest impacts from lack of new facility construction.

Wilderness

There are six Wilderness areas on the Forest covering approximately 186,000 acres. Wilderness management emphasizes not only the preservation of the areas primitive characteristics, but also the restoration of areas that have lost their primitive character through overuse. The use in Wilderness areas is not evenly distributed. Many historic, traditionally visited areas receive use exceeding the local carrying capacity, while other areas receive use within estimated capacities. Due to topography and use patterns, stream and lakeside areas typically receive the heaviest use.

A mandatory, non-regulatory use permit system is being used on the Mt. Hood, Salmon-Huckleberry, and Columbia Wildernesses. The purpose is to obtain more accurate information on use levels and patterns, and to educate others on Wilderness ethics and values.

- Wilderness Use = 47,000 Visitor Days.
- Number of authorizations for non-conforming uses was 2, same as last year.
- Number of wilderness search and rescues equaled 8, up from 6 last year.
- Wilderness Implementation Schedules are completed but not implemented.

The LAC process for Mt. Hood, Salmon-Huckleberry and Hatfield Wildernesses has been completed. An EA was drafted that proposed management actions such as a limited use permit system, designated campsites and campfire restrictions to bring the wilderness into compliance with standards. The proposal also included amending Forest Plan Standards and Guidelines and revising the Wilderness Recreation Spectrum Allocations to more accurately reflect conditions at the time the Wilderness was designated. An extensive public review process is planned for fiscal year 1999.

Wild and Scenic Rivers

No suitability studies have been done for the remaining 10 identified eligible rivers. In all cases, the attributes which could lead to potential classification as a Wild and Scenic River are being protected. We have completed management plans for all designated Wild and Scenic Rivers.

Developed and Dispersed Recreation

The Mt. Hood National Forest is literally the backyard of the Portland/Vancouver metro area and the Willamette Valley. We have a wide variety of sites, totaling over 150 developed sites on the Forest. The current use of most of the sites now equals or exceeds their practical capacity; backlog rehabilitation and reconstruction are a major concern.

In 1998 there were approximately a total of 5 million visits to the forest. Approximately 600,000 of those visits were dispersed use.

All fee campgrounds are currently being operated by a concessionaire. Day use sites associated with fee campgrounds are also being operated by the concessionaire and a fee is charged.

➤ *Recommendations*

- Amend Forest Plan use expectations/quality of experience anticipated to reflect current decline in budget levels.
- Complete the trail portion of the Travel and Access Management Plan.
- Continue to emphasize trail rehabilitation and maintenance. Develop a Forest Trail Management Plan to help insure effective utilizing of our resources with respect to our users needs.
- Explore alternative ways to finance trail work, continue participation in the Recreation Fee Pilot Project which will allow the forest to retain at least 80% of parking fees collected at selected trailheads. Encourage partnership arrangements to help accomplish needed work.
- Adjust Forest Plan projections to reflect current budget limitations during Forest Plan revision process.
- Explore opportunities for adding to concessionaire operations a limited number of dispersed sites that need management action to prevent resource damage.
- Continue permit system and data collection. Start the Limits of Acceptable Change (LAC) planning process on the Bull of the Woods Wilderness to validate carrying capacities, and recommend new Wilderness resource opportunity spectrum classes, and associated Standards and Guidelines. Continue the LAC planning process for the Badger Wilderness. Amend Forest Plan to reflect changes needed.
- Complete public review for the LAC process for the Mt. Hood and Salmon Huckleberry Wilderness Areas.
- Complete the Prescribed Natural Fire (PNF) planning process for the Badger Wilderness.
- Postpone, due to budget limitations, suitability studies on the 10 identified eligible rivers.

- Complete the Meaningful Measure data base to provide a means of allocating and prioritizing recreation funds.
- Complete condition surveys on all recreation facilities over the next five years to provide a more accurate estimate of annual maintenance, deferred maintenance and capital investments.

Chapter 3

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 fiscal year 1998 (October 1, 1997 to September 30, 1998). All figures are rounded to the nearest thousand dollars.

The total budget predicted for full Forest Plan Implementation was \$65,275,000; actual funds expended in FY 98 was \$33,753,000. Approximately 15% of the expenditures in FY 98 were for flood damage repair work from the February 1996 floods. This funding was a large increase above what the forest expected for normal operations in FY 98. Table 23 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 Plan. Outputs and activities in individual years will vary due to changing conditions and Congressional budget appropriations.

Figures 5 and 6 show a significant change as related to the total forest budget and workforce (Full Time Equivalent = FTE) since 1990.

Table 23. Budget Levels Predicted/Actual (Partial List)

Activities	*Forest Plan Predicted (thousands/year) 1990	**Actual Expenditures (thousands)			
		FY 95	FY 96	FY 97	FY 98
Fire					
• Brush Disposal	3,056	995	758	632	426
• Fire Fighting Fund	2,118	1,119	2,145	2,520	2,187
Engineering					
• Timber Roads	2,709	244	292	518	586
• Recreation Roads	1,381	103	53	103	104
• General Purpose Roads	118	575	56	151	16
• Recreation Facilities	1,751	424	293	499	599
• Trail Construction	1,279	606	253	534	346
• Road Maintenance	4,079	1,874	1,030	1,139	965
• Facilities Maintenance	478	271	222	230	264
Timber					
Salvage Sale Funds		5,918	6,647	4,696	2,501
• KV Funds	9,602	4,362	4,566	4,126	2,925
Forestland Vegetation	2,792	2,610	1,969	2,331	1,855
• Genetic Tree Improvement					
• Reforestation					
• Timber Stand Improvement					
Timber Sale Management	5,270	1,222	2,279	2,465	3,798
• Sale Administration					
• Sale Preparation					
• Silvicultural Exams					
Administration					
• General Administration	3,318	2,114	489	1,276	1,479
Recreation/Lands					
• Land Acquisition	50	521	7	128	23
• Cultural Resources	459	70	55	78	90
• Land Line Location	10	0	0	0	
• Trail Maintenance/ Recreation	5,924	2,036	2,045	1,692	2,021
Fish/Wildlife/ Range/Soil/Water					
• Fish-Anadromous	986	768	644	491	557
• Fish-Inland	365	130	76	92	141
• Wildlife	809	202	224	256	

Activities	*Forest Plan Predicted (thousands/year)	**Actual Expenditures (thousands)			
	1990	FY 95	FY 96	FY 97	FY 98
• Threatened, Endangered Species	642	242	224	154	
• Range Betterment	4	3	4	1	
• Soil Inventory	112	152	60	30	
• Range Vegetation Management	73	14	11	18	23
• Soil/Water Administration	1,726	534	266	289	296
• Ecosystem Management		1,671	1,806	999	888

* Not adjusted for inflation.

** Additional costs are incurred in a variety of areas including Forest Health, Highway Administration, Quarters Maintenance, Agricultural Research, etc. Total expenditure was \$33.8 million.

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

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

➤ *Recommendations*

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

➤ *Accountability*

In 1997 the Forest Service embarked on a huge effort to increase the agency's accountability in financial management. A new financial system was started called Foundation Financial Information System (FFIS). The Mt. Hood NF currently is working towards full implementation by the end of FY 99.

Figure 4. Mt. Hood National Forest Budget Trends

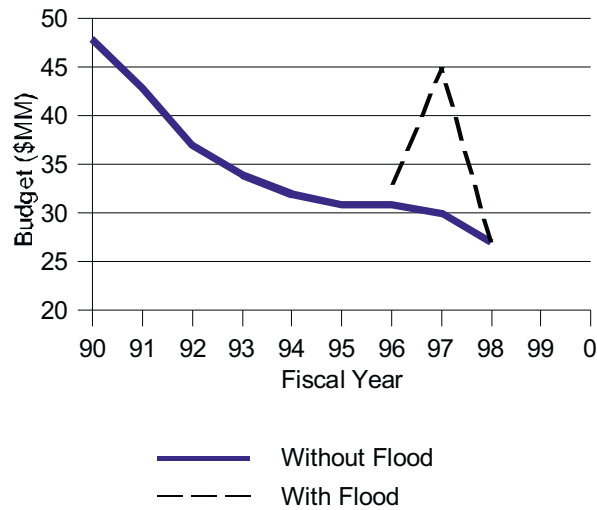
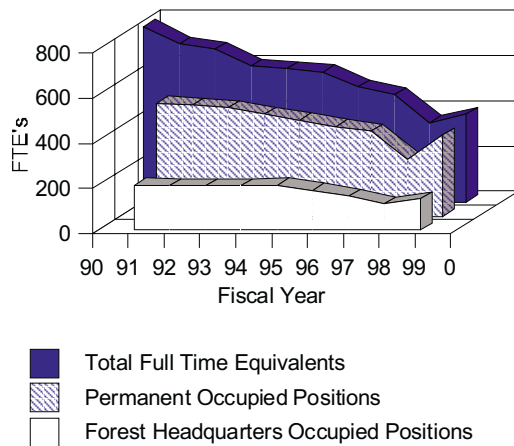


Figure 5. Mt. Hood National Forest FTE/Position Usage



Chapter 4

Forest Plan Amendments/ Interpretation Process

As we continue to implement the Plan, it is apparent that amendments and clarification of direction is continually needed if we are to meet the expectation and desires of the public.

New information identified through the monitoring program will continue to be evaluated. The need to change the Forest Plan will be reviewed in accordance with the National Forest Management Act regulations.

Amendments

An important aspect of keeping our Plan an up-to-date living document is the preparation of amendments. Based on analysis of objectives, standards, monitoring and constantly 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, 1998 eleven amendments have been made to the Forest Plan. Five reflect changes made during Wild and Scenic River planning, one concerning noxious weed management, one adjusting a Research Natural Area Boundary, one responding to Elk Habitat Enhancement needs, one dealing 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 that expanded Mt. Hood Meadows ski area permit boundary and one Congressional Act that modified activities within the Bull Run watershed.

The eleven amendments are:

- Big Bend Mountain Research Natural Area boundary change (within the Bull Run Watershed). 10/3/91
- Clackamas Wild and Scenic River EA and Management Plan - delineates final river boundary and removes all National Forest land within the river corridor from “regulated” timber harvest. 4/19/93
- Salmon Wild and Scenic River EA and Management Plan - delineates final river boundary and eliminates “regulated” timber harvest within the corridor. 3/10/93
- Lemiti Elk Habitat Enhancement Project - exchanges an existing Roded Rec. Management Area at Lemiti Creek with an adjacent Deer and Elk Summer Range Management Area. 5/17/93
- Roaring National Wild and Scenic River EA and Management Plan - delineates final river boundary and modifies management direction within the corridor relating to recreational developments, timber harvest and commercial livestock grazing. 9/13/93
- Upper Sandy National Wild and Scenic River EA and Management Plan - delineates final river boundary and eliminates “regulated” harvest within the corridor. It provides replacement management direction for the new A-1 allocation. 2/24/94

- White River National Wild and Scenic River Management Plan - 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. 11/3/94
- 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 allocations and standards and guidelines. 5/13/94
- Environmental Assessment for Management of Noxious Weeds - Mt. Hood National Forest - this amendment clarified noxious weed management objectives by adding missing statements pertaining to noxious weed management under Goals, Desired Future Condition and Resource Summary sections of the Mt. Hood Forest Plan. 12/8/93
- The Environmental Impact Statement for the new long term conceptual master plan for Mt. Hood Meadows Ski Area expanded the ski area permit boundary by 96 acres to include an area which was being used by the ski area. It changed the land allocation for this area from a Wildlife/Visual classification to Winter Recreation classification. It also changed the Northwest Forest Plan allocation from Matrix to Administratively withdrawn. 1/24/97
- The Oregon Resource Conservation Act of 1996 changed the allocation for the Bull Run Area from Administratively withdrawn to Congressionally withdrawn. It prohibited harvesting of trees for timber management within the Bull Run drainage and prohibited the authorization of salvage sales.

Monitoring has not disclosed significant disparity between our amended Forest Plan and Forest conditions that would currently warrant a revision at this time.

We will continue to make nonsignificant amendments to our Forest Plan as the need arises.

Chapter 5

Ongoing Planning Actions

The Mt. Hood Forest Plan as well as the Northwest Forest Plan implementation process is now well underway. As we move further into the implementation phase, we do our best to meet the intent of the Plans. In addition to site specific project analysis, several additional planning and monitoring actions are continually taking place.

Northwest Forest Plan

➤ Introduction

Implementation of the Northwest Forest Plan, also titled the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl, began in 1994. There are four primary components of this plan that the Mt. Hood NF is involved in:

- Watershed Analysis,
- Watershed Restoration,

- Implementation Monitoring, and
- Northwest Economic Adjustment Initiative

Extensive energy has been focused on the following areas during this past year and is summarized in the following paragraphs.

➤ *Watershed Analysis*

Watershed analysis is an intermediate analysis between land management planning and project planning. It provides analytical information about ecosystem functions, structures, and flows in the watershed, including past and current conditions and trends. The result will be a scientifically based understanding of ecological interactions occurring within a watershed as they relate to specific social issues.

Watershed analysis is purely an analysis step and does not involve NEPA (National Environmental Policy Act) decisions. Given the desired future conditions, goals and objectives, management area boundaries, and standards and guidelines, which come from the Forest Plan and the Northwest Forest Plan, watershed analysis is a tool to help identify and prioritize Forest Plan implementation actions.

Information gained during watershed analysis may show that a Forest Plan amendment is necessary. When this is the case, and the Forest Supervisor decides to proceed with a plan amendment, the watershed analysis may be used to support the NEPA analysis for the amendment.

The watershed analysis will normally provide information regarding existing conditions, issues, and management concerns useful during project NEPA analysis and may help in addressing the cumulative effects of multiple activities within a watershed. When this is the case, the watershed analysis may be incorporated by reference into the project NEPA document and will become part of the project record.

In addition to the watershed analysis efforts that were completed in FY 94, FY 95, FY 96, and FY 97, the following watershed analysis was completed in fiscal year 98. As of October 1998, approximately 95% of the Forest is covered by a watershed analysis. See Map 1, page 5-13.

Table 24. Watershed Analyses Completed in FY 98

Watershed	Within Forest Boundary	Total
Columbia Tributaries East	60,800*	66,920*
* Acres are approximate		

➤ *Watershed Restoration/Jobs-in-the-Woods*

In 1998, the Mt. Hood National Forest contracted Watershed Restoration/Jobs-in-the-Woods projects to local businesses in timber dependent communities adjacent to the Forest. These contracts provided jobs to the private job sector of the communities.

The projects included stream channel restoration, instream fish habitat improvement, wildlife enhancement, road obliterations, campground restorations, slope stabilization, and replacing fish passage barriers.

Sixty-one percent of the FY 98 program was comprised of previously approved projects in the Supplemental Flood Repair Program. These projects were primary instream fish habitat improvements, road-stream crossing repair, and road obliteration.

Jobs-in-the-Woods program dollars spent for the last several years are indicated in the following table.

Table 25. Jobs-in-the-Woods Expenditures (thousands \$)

FY	94	95	96	97	98
Money Spent	338	600	700	720	718

➤ *Implementation Monitoring*

A crucial component of the Northwest Forest Plan is monitoring implementation at a variety of scales. At the request of the Regional Ecosystem Office, an inter-agency regional review team was formed and they developed a process to review a 10% sample of all timber sales, road projects, restoration projects, and watershed analysis located within the area covered by the Northwest Forest Plan.

One timber sale, Grasshopper Salvage on the Barlow Ranger District and the Colowash Watershed Analysis were selected for review.

The core of the review for the timber sale was an extensive questionnaire which was to be filled out for each project selected. All standards and guidelines were met or exceeded. The objective was to determine if the ROD and its standards and guidelines are being implemented. The Colowash Watershed Analysis was a preliminary review process which will be fully developed for FY 99 reviews.

Monitoring teams were interagency, interdisciplinary, intergovernmental and most included members of the public from the Provincial Advisory Committees. Monitoring in a public interagency environment provides an objective, open forum for the participating members to discuss adaptive management opportunities. The discourse that took place throughout the various monitoring trips resulted in increased trust among team members and an appreciation for the skills and knowledge of Forest Service and BLM employees who design and administer a variety of projects.

Analysis of the findings indicate that overall, at the Regional scale, the Forest Service and Bureau of Land Management (BLM) have a high level of compliance with the standards and guidelines related to timber sales and no major changes in management direction are warranted at this time.

In addition, other project specific monitoring trips are carried out by individual districts. An example is the post harvest review of the Owl Quarry Timber Sale conducted by the Barlow Ranger District. The review consisted of two days in the field followed by a ½ day office wrap-up. Several aspects were reviewed including management and condition of roads, landings, skid trails, slash treatment, adequacy of riparian buffers and silvicultural prescription implementation. Some specific short term actions to improve on-the-ground conditions were identified. Overall, the review team felt the harvested stands reflected identified prescriptions and met project objectives.

In addition, continuing the Forest Leadership emphasis for monitoring, two additional projects were selected for review with the intent of moving toward an ecosystem based monitoring system. This effort focused on a forestwide compliance review of the Mt. Hood Forest Plan Standards and Guidelines and assessing whether we are moving toward our desired future conditions.

Two projects were selected for review by an interdisciplinary team selected from resource specialists across the forest. The two projects were the John II salvage sale on the Clackamas River District and the South corner underburn project on the Barlow District.

These reviews included the Forest Supervisor and Deputy Forest Supervisor, as well as the appropriate District management personnel. Specific highlights included recognizing the importance of complete documentation of actions and rationale. In addition, the close coordination between project implementation folks and project planners was emphasized as the key to successful project completion.

The projects met Forest Standards and Guidelines and the reviews provided excellent cross-district information exchange of project implementation and problem solutions. The starting point was the list of questions developed by the Provincial Implementation Monitoring Team. Operational considerations were discussed.

➤ *Northwest Economic Adjustment Initiative*

Role and Activities in Community Development

The Mt. Hood National Forest is committed to being partners with our neighbors in a vision of sustainable development and responsible management where economic, social, and environmental progress go hand-in-hand. The Mt. Hood National Forest assists communities through partnerships, agreements, and alliances. It allows an increased capacity to improve local economic health. The following is a menu of areas and programs the forest is involved in to promote community development.

The Northwest Economic Adjustment Initiative, part of President Clinton's Northwest Forest Plan, is aimed at providing economic stability to northwest communities with ties to the timber industry. The Initiative brings the Forest Service together with eight other Federal agencies, as well as with State and local governments, for funding projects that are community priorities to help build economic and social community capacity. Specific programs include:

Rural Community Assistance

The Rural Community Assistance program on the Mt. Hood National Forest is a combination of providing technical assistance and grants to communities. In 1998 the Forest Service awarded three grants to rural communities in the influence area of the Mt. Hood National Forest.

- **Odell Downtown Revitalization Plan and Stormwater Study.**

\$35,000 was granted to the Mid-Columbia Economic Development District to develop a downtown revitalization plan and stormwater drainage plan for the unincorporated community of Odell, Oregon. The community will define its vision and include the work elements required to improve the physical and economic components of Odell's downtown. The project will encourage local partnerships, strengthen community bonds, develop local capacity and identify critical resources, which will foster long-term civic pride and stewardship. The stormwater drainage facilities plan will provide engineering and funding alternatives that the community will use to seek financing for final design and construction of stormwater infrastructure.

- **Mt. Hood Towne Hall Architectural and Engineering Report.**

\$10,000 was granted to Hood River County obtain a professional engineering and feasibility report for rehabilitation and adaptive use of the historic Mt. Hood Towne Hall as a multiple use, accessible community center.

- **Bear Creek trail Engineering and Design Project.**

A \$60,000 grant was awarded to the City of Molalla to complete:

- wetland delineation and biological identifications;

- wetlands mitigation planning;
- engineering and design of trailhead parking, ADA accessible trail, and signage; and
- a fundraising strategies for construction.

This project is being accomplished in conjunction with a mill site conversion project.

Technical assistance to rural communities involves Forest Staff providing information, support and/or educational training opportunities that assist communities to build economic capacity. In 1998 the Mt. Hood National Forest provided technical assistance to rural communities by completing an environmental assessment for a sewage treatment facility on the National Forest and providing meeting facilitation services.

Jobs-in-the-Woods

Creates restoration projects for displaced timber workers (refer to page 5-3).

➤ *Cooperative Agreements*

The Forest partners with state, county and local governments to provide services that are mutually needed across common boundaries, or promote educational messages that will benefit our management goals. Specific programs are:

- Fire prevention cooperatives with rural fire departments working with urban interface programs;
- Road maintenance agreements with counties and state;
- Law enforcement agreements with counties.
- Fish habitat projects utilizing the Wyden amendment.

➤ *Special Use Permits/Memorandum of Understanding*

Special Use permits provide another avenue toward community development. These permits allow outside agencies and private businesses to operate on National Forest land in order to accomplish their mission. Examples include:

- Sewer system at Government Camp.
- Water systems...MOU with Clackamas Water Providers
- City of Sandy and BLM MOU - Alder Creek Watershed.
- American Native People Organization (ANPO) - Special Use Permit.
- Oregon State Film Office - various filming permits.
- City of Portland - Bull Run Watershed.
- Outfitter guides provides employment and recreation opportunities.
- FTV Communications Inc. - laid fiber optic cable to improve communication and service.

➤ *Partnerships*

The Forest has many partners, allowing us more opportunities to provide education about our environment and ways of managing desired outcomes. Our partners include teachers, students, nonprofit organizations, forest user groups, State agencies and programs, local government, individual volunteers and private businesses. We also participate in small and large community events which help to raise awareness.

Our partnerships also provide us with valuable volunteer time and labor. Many of our hosted and human resource programs provide labor on projects that otherwise may not be accomplished. Some of our partners provide much needed funding, or allow us to stretch our dollars further through the Challenge Cost Share Program**.

Hosted Programs

- Teachers-in-the-Woods** - Portland State University Continuing Education Program.
- Camp Cody - youth camp, partially funded by YCC.
- Hawk Watch International - a raptor migration survey done by volunteers.
- Student requisitions/summer employment.
- The Private Industry Council (TPIC) - Inner City youth projects.
- Northwest Service Academy - AmeriCorps Program worked jointly on projects.
- Student Conservation Association (SCA).
- MacLaren School - volunteer work projects for troubled youth.
- Catlin Gabel School of Portland - private school volunteer projects.
- Oregon Archaeological Society - Passports in Time projects.
- Izaak Walton League, Washington County Chapter - natural resource projects.
- Oregon Youth Conservation Corps (YCC) - natural resource projects, funding.
- SCEP Program - we hosted six coop positions this year.

Education Programs

- Cascade Streamwatch** - FS, BLM and Wolfree, Inc. (nonprofit).
- River Keepers Program** - local community habitat program.
- Oregon Arbor Week at the World Forestry Center - nonprofit, school, private.

Ongoing Planning Actions

- Smokey Bear visits to local schools - teaches about Forest Service and fire prevention.
- Oregon Museum of Science and Industry (OMSI) - education and safety program.
- Job Shadowing and Mentoring - partner with local schools.
- Salmon Watch** - partner with Oregon Trout to provide school programs.
- Environmental Education lending library for teachers, scout leaders, etc.

Human Resource Programs

- Senior Community Service Employment Program (SCSEP).
- Special Emphasis Programs.

Community Awareness Events

- Salmon Festival** - partner with Metro Parks and Recreation.
- Songbird Celebration - Migratory Bird information, partner Audubon Society.
- Junior Fishing Clinics - ODFW, Private Business, Oregon Trout.
- Wildflower Festival - local community event.
- Sandy Mountain Festival - local community event, partner Sandy/Boring Fire Departments.
- PNW Sportsmen Show - regional impact.

Customer Service Programs

- Estacada Chamber of Commerce - visitor information.
- Mt. Hood Area Chamber of Commerce - visitor information, interpretive and educational materials.
- Christmas Tree tag vendors - allows customers more convenience in purchasing.
- Sandy Chamber of Commerce - visitor information, map and trail park sales.
- Trail Park Pass vendors - local businesses, customer convenience.

Interest Groups

- Snowmobile Club - grooms cross country ski trails at no cost to us.
- Mazamas - volunteer trail work projects.

➤ *Emergency Assistance Agreements*

The Forest Service is often called upon to assist with emergency situations. Agreements allow us to use our expertise to help the lead agency accomplish their mission.

- Fire, floods, search and rescue - Sheriff, volunteers, local government, ODF, BLM, Confederated Tribes of Warm Springs.
- Volcano hazards - Multnomah County, Clackamas County, Hood River County, USGS.
- Participation of FS employees as volunteer First Responder crew members with the local Sheriff.

➤ *Urban Forestry*

The Mt. Hood National Forest is located next to a major metropolitan area. Being involved with the community helps promote visibility and awareness, as well as attracting new partners.

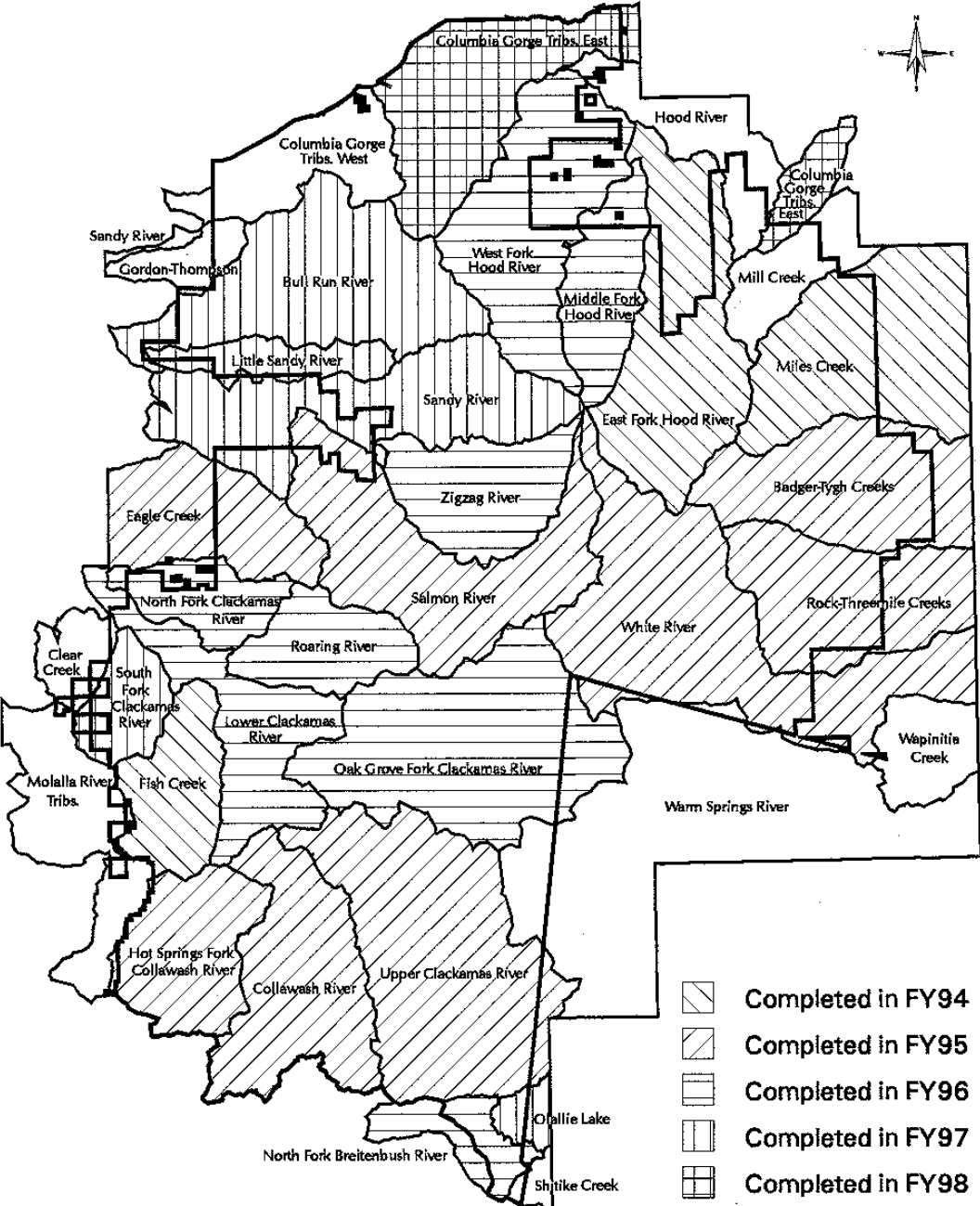
- Urban Forest Coalition.
- World Forestry Center - provide educational materials to teachers.
- Portland City Club - member to increase Forest visibility.
- Portland Chamber of Commerce - member to promote linkage with community.
- Clackamas County Tourism.

➤ *Watershed Councils*

Watershed councils are voluntary local groups designated by a local government and convened by a county governing body to address the goal of sustaining, protecting or enhancing natural resources within a watershed. Watershed councils consist of a balance of interests in the watershed and are made of local people who live in the area. We participate in four of these councils.

- Sandy River
- Clackamas River Basin Council
- Hood River
- Fifteen Mile Watershed Council

Map 1. Mt. Hood National Forest Watersheds Watershed Analyses Completed



Appendix A
Summary of Flood Repair
and
Associated Monitoring

During the Fiscal Years of FY96 and FY97 the Mt Hood National Forest was heavily impacted by four separate flood events. The Forest was allocated \$24.55 million to repair the damage done by these four events. The funding came from two primary sources. Most of the road damage repair was covered by the Emergency Repair Federally Owned (ERFO) roads program. In addition to the ERFO funding, supplemental flood funds provided for the repair of riparian areas, streambanks, campgrounds, trails and some road repair not covered under the ERFO program. The table below summarizes the entire flood repair program.

<u>Fund Source</u>	<u>\$ Allocation</u>	<u># Sites</u>	<u>% Completion</u>
FY96 ERFO	10,042,000	195	86%
FY96 Supplemental	10,658,000	100	77%
FY97 ERFO	1,666,000	22	14%
FY97 Supplemental	<u>\$ 2,184,000</u>	<u>16</u>	12%
Totals	\$24,550,000	333	

The flood repair program placed its primary emphasis on completing the FY96 ERFO program to provide access to the forest via the forest roads. The projects funded by the FY96 ERFO allocation are substantially completed with the notable exception of the Fish Creek Watershed. The extensive damage within the Fish Creek Watershed required a lengthy environmental analysis which resulted in a \$1,800,000 repair contract being awarded in FY99. It is expected that work in Fish Creek will be started in FY99 and completed in FY2000.

The FY96 Supplemental Flood program is expected to be 100% awarded in FY99 and completed in FY2000. The FY97 ERFO and Supplemental Flood projects are progressing through NEPA, contract preparation, and contract award. It is expected that the FY97 flood program will be substantially completed in FY99, with only a few projects carrying over into FY2000.

Flood repair contracts are monitored during construction and after completion of the contract. All public works contracts receive a final inspection prior to the final payment on the contract. In FY98, all of these final inspections determined that the project met project specifications. In addition, photopoints have been established on approximately 20% of the projects to assist in long term monitoring. Although some minor problems such as settlement of fill embankments have been detected by this long term monitoring, no major problems have been found in any individual project.

Monitoring of the flood repair program in FY98 has shown that the program has been very successful in improving fish passage through culverts, stabilizing roads and trails, improving instream conditions for fish habitat, and allowing for the passage of 100-year storm events through road culverts.

Appendix B

List of Preparers

Blank, Myron - *Planning*
Cartwright, Linda - *Range*
DeRoo, Tom - *Geologic/Mineral Resources*
Dewing, Cecil - *Recreation*
Diaz, Nancy - *Air Quality*
Dodd, John - *Soil*
Haide, Barb - *Financial*
Huston, Reggie - *Fire*
Lankford, Nancy - *Timber*
Loeffler, Gary/Pat Greene - *Scenic*
Martin, Cissy - *Transportation*
Moreau, Joe - *Fish*
Otani, Bill - *Wildlife*
Prior, Jan - *Heritage Resources*
Sachet, Glen - *Partnerships/Rural Community Assistance*
Stein, Marty - *Noxious Weeds*
Steinblums, Ivars - *Water/Flood*
York, Shelly - *Desktop Publishing*

Mt. Hood National Forest

Supervisors Office

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Acting Deputy Forest Supervisor <i>Meredith Webster</i>	16400 Champion Way Sandy, OR 97055	(503) 668-1700

Ranger Districts

Barlow Ranger District <i>Paul Bryant</i>	730 NE Court Street Dufur, OR 97021	(541) 467-2291
Clackamas River Ranger District <i>John Berry</i>	595 NW Industrial Way Estacada, OR 97023	(503) 630-6861
Hood River Ranger District <i>Kim Titus</i>	6780 Highway 35 Parkdale, OR 97041	(541) 666-0701
Zigzag Ranger District <i>Dick Hardman</i>	70220 E. Hwy 26 Zigzag, OR 97049	(503) 666-0704

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