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Forest Service

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Northwest  
Region

**TWELFTH ANNUAL**

**MONITORING AND EVALUATION REPORT**

**Gifford Pinchot National Forest**

**Fiscal Year 2002**



July 01, 2003

Dear Forest User,

This is our twelfth consecutive annual Forest Monitoring Report. The primary purpose of this report is to share our success in implementing the goals and objectives of our 1990 Forest Plan as amended by the 1994 Northwest Forest Plan. Because of vacant positions and other priorities we were unable to complete the report for botanical special interest areas and four reports related to fish and aquatic habitat.

*Results-at-a-Glance*, beginning on page 2 of this report, provides a brief summary of the items monitored and reported on in FY 2002. The full reports follow, beginning on page 4.

Beginning on page 68 is a report of the seventh year of an interagency effort to involve the public through our Province Advisory Committee in monitoring our implementation of the standards and guidelines of the Northwest Forest Plan.

If you are reading the printed version of this report, it might interest you to know that reports dating back to 1995 are posted on our Internet site at <http://www.fs.fed.us/gpnf/>.

If you have ideas on activities or conditions you believe we should be monitoring, or you would like to participate in monitoring activities, please contact John Roland, Forest Monitoring Coordinator, at (360) 891-5107 or [jroland@fs.fed.us](mailto:jroland@fs.fed.us).

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# 2002 Monitoring and Evaluation Report

## Table of Contents

A. Introduction.....	1
B. Monitoring Results - At A Glance .....	2
C. Monitoring Item Results.....	4
Wild and Scenic Rivers <sup>1</sup> .....	4
Semi-Primitive Recreation <sup>2</sup> .....	5
Scenic Quality <sup>3</sup> .....	5
Wilderness Use and Condition <sup>4</sup> .....	6
Trail Inventory and Condition <sup>6</sup> .....	8
Developed and Dispersed Recreation Use and Facility Condition <sup>7</sup> .....	10
Heritage <sup>11</sup> .....	11
Habitat for Osprey, Swainson's Hawk, Goshawk, Ferruginous Hawk and Great Blue Heron	13
Legacy Features .....	13
Survey and Manage <sup>44</sup> .....	17
Grazing <sup>45</sup> .....	18
Invasive Species (Noxious Weeds) <sup>45</sup> .....	19
Research Natural Areas (RNA) <sup>5</sup> .....	20
Botanical Special Interest Areas <sup>35d</sup> .....	21
Adequate Reforestation <sup>50</sup> .....	22
Timber Harvest Methods .....	22
Regeneration Harvest Units Size <sup>52</sup> .....	23
Timber Volume Awarded <sup>54</sup> .....	24
Silvicultural Prescriptions <sup>56</sup> .....	25
Soil Productivity <sup>60</sup> .....	27
Best Management Practices (BMPs) <sup>61</sup> .....	29
Stream Temperature Monitoring .....	31
Road Management <sup>70</sup> .....	56
Community Effects – Payments to Counties .....	60
Mining Operating Plans <sup>91</sup> .....	62
C. Accomplishments .....	64
E. Expenditures .....	66
F. Forest Plan Amendments .....	67
G. Northwest Forest Plan Implementation Monitoring.....	68
H. Other Forest Monitoring Activities .....	70
Glossary .....	72

## List of Tables

Table 1. - Monitoring in Potential Wild and Scenic River Corridors.....	4
Table 2. - Monitoring in Scenic Viewshed Corridors.....	5
Table 3. - Wilderness Use.....	7
Table 4. - Trail Construction and Maintenance .....	8
Table 5. - Trail Setting.....	9
Table 6. - Heritage Resource Sites Monitored.....	12
Table 7. - Projects Monitored for Retention Legacy Features.....	16
Table 8. - Survey Categories.....	17
Table 9. - FY 2001 Survey and Manage Results for Fauna.....	18
Table 10. - Research Natural Area Monitoring .....	20
Table 11. - Timber Harvest Methods.....	22
Table 12. – Volume sold in FY 2002.....	24
Table 13. - Ten listed water bodies for temperature on Gifford Pinchot National Forest. ....	32
Table 14. - Upper Cispus River Watershed Stream Temperatures.....	33
Table 15. - Lower Cispus River Watershed Stream Temperatures. ....	35
Table 16. - Upper Cowlitz River Watershed Stream Temperatures.....	37
Table 17. - Middle Cowlitz River Watershed Stream Temperatures.....	39
Table 18. - Upper Lewis River Stream Temperatures.....	41
Table 19. - Muddy River and Swift Reservoir Watershed Stream Temperatures.....	43
Table 20. - Yale Reservoir and Merwin Reservoir Watersheds Stream Temperatures.....	47
Table 21. - Wind River Watershed Stream Temperatures.....	49
Table 23. - Little White Salmon River Watershed Stream Temperatures.....	51
Table 24. - White Salmon River Watershed Stream Temperatures.....	51
Table 25. - Upper Nisqually River Watershed Stream Temperatures.....	54
Table 26. - Recommended Road Management Strategies.....	56
Table 27. - Recommended Maintenance Level .....	57
Table 28. - Roads in Key Watersheds.....	58
Table 29. - Road Projects completed from January – December 2002. ....	59
Table 30. - Payments to Counties – Titles I - III .....	60
Table 31. - Rural Community Assistance Grants .....	61
Table 32. - Program Accomplishments .....	64
Table 33. - List of Forest Plan Amendments .....	67

## List of Figures

Figure 1. - Wilderness Use 2000 - 2002 .....	6
Figure 2. - Civilian Conservation Corps (CCC) camp at Ollalie Lake, 1935 .....	12
Figure 3. - Down wood in Gage Unit 22 .....	14
Figure 4. - Pond/wetland complex in Steamboat Mtn. RNA .....	21
Figure 5. - Gravel Pit adjacent to Steamboat Mtn. RNA is a source of invasive weeds. ....	21
Figure 6. - Historical Harvest by Method .....	23
Figure 7. - Target Accomplishment .....	24
Figure 8. - Soil Scientist and Hydrologists monitoring compaction and erosion in the Gage Timber Sale. ....	30
Figure 9. - Temperature Monitoring Locations in the Upper Cispus River Watershed. ....	34
Figure 10. - Temperature Monitoring Locations in the Lower Cispus River Watershed .....	36
Figure 11. - Temperature Monitoring Locations in the Upper Cowlitz River Watershed.....	38
Figure 12. - Temperature Monitoring Locations in the Middle Cowlitz River Watershed. ....	40
Figure 13. - Temperature Monitoring Locations in the Upper Lewis River Watershed.....	42
Figure 14. - Temperature Monitoring Locations in the Muddy River and Swift Reservoir Watersheds. ....	44
Figure 15. - East Fork Lewis River Watershed Stream Temperatures .....	45
Figure 16. - Temperature Monitoring Locations within the East Fork Lewis River Watershed. ....	46
Figure 17. - Temperature Monitoring Stations in the Yale and Merwin Reservoir Watersheds. ....	48
Figure 17. - Temperature Monitoring Locations within the Wind River Watershed. ....	50
Figure 19. - Temperature Monitoring Locations within the Little White Salmon River Watershed....	52
Figure 19. - Temperature Monitoring Locations in the Upper Nisqually River Watershed.....	53
Figure 21. - Maintenance Needs vs. Budgets .....	57
Figure 21. - Payments to counties with land inside the Forest boundary. ....	61
Figure 22. - Total Expenditures 1993-2002 .....	66
Figure 23. - Expenditures by Program - 2002.....	66

# Monitoring and Evaluation Report

## Gifford Pinchot National Forest Fiscal Year 2002

### **A. Introduction**

Monitoring and evaluation are important elements in the implementation of the Forest Plan. They are key to making the Plan a dynamic and responsive tool for managing a complex set of natural resources and values in a climate of social and economic change. This document reflects the twelfth year of implementing the Gifford Pinchot National Forest Plan, which was approved on June 1, 1990. It reports Forest activities and accomplishments of fiscal year and compares them to the amended Forest Plan.

The Plan was amended by the Northwest Forest Plan Record of Decision to incorporate new standards and guidelines to ensure protection of late-successional and aquatic ecosystems in April 1994.

### **Monitoring and Evaluation**

There are three types of monitoring: *Implementation Monitoring* determines if goals, objectives, standards and guidelines are implemented as described in the Plan. The question being asked is, "Did we do what we said we would?"

*Effectiveness Monitoring* determines if management practices as designed and implemented are effective in meeting the Plan goals and desired future conditions. The concern here is, "Did the management practice accomplish what we intended?"

*Validation Monitoring* determines if data, assumptions, and coefficients are accurate. Here, the important question is, "Is there a better way to meet the Plan goals and objectives?"

Our monitoring effort emphasizes implementation monitoring, although several items contain elements of both

implementation and effectiveness monitoring.

*Evaluation* is the analysis and interpretation of monitoring results. Essentially, the question being asked in evaluation is, "Are changes needed?" These changes may involve amending or revising the Plan or changing the way activities are implemented.

The following outline briefly describes each section of this report:

**Introduction** - This brief overview of what monitoring is about.

**Monitoring Results - At a Glance** - summarizes monitoring results described in detail in Section C.

**Monitoring Item Results** displays the individual results, evaluations and recommended follow-up actions for all items monitored in .

**Accomplishments** show trends in program accomplishments over FYs 1998-2002 and compares accomplishments to our assigned targets (page 64).

**Expenditures** - Compares expenditures over the last 10 years and the composition of FY 2002 expenditures (page 66).

**Forest Plan Amendments** - Lists all Forest Plan amendments, and briefly describes the content of each, and when it was approved (page 67).

**Northwest Forest Plan Monitoring** - Included is the report from our sixth year of implementation monitoring conducted on the Gifford Pinchot as part of an owl region-wide monitoring program (page 68).

**Glossary of Terms** - Definitions of the technical terms used in this document (page 72).

## B. Monitoring Results - At A Glance

The following table briefly summarizes monitoring results by resource area. Detailed information for each monitoring item can be found on the page referenced in Section C, beginning on page 4.

Monitoring items preceded with an asterisk in the table below are all or part effectiveness monitoring, others are primarily implementation monitoring. Refer to the Glossary for meanings of technical terms used in this report.

Monitoring Results - At A Glance	
RECREATION	☺ * <b>Wild/Scenic Rivers</b> (page 4) - Activities in compliance, character of potential Wild and Scenic River corridors was preserved.
	☺ * <b>Semi-Primitive Recreation</b> (page 4) – The single project implemented in the semi-primitive ROS class met standards.
	☺ * <b>Scenic Quality</b> (page 5) – The four projects implemented in a scenic viewsheds met standards and guidelines. General viewshed condition monitoring was not conducted 2002.
	☹ * <b>Wilderness Use and Condition</b> (page 5) – Wilderness use is down slightly from 2001 levels. In heavily used areas resource conditions continue to be degraded.
	☺ * <b>Trail Condition</b> , (page 8) – The seven trails monitored met management level standards.
	☹ * <b>Recreation Use and Facility Condition</b> (page 10) – While toilet facilities were upgraded, developed recreation facilities continue to show the need for reconstruction or heavy maintenance.
HERITAGE RESOURCES	☺ * <b>Heritage Resource Protection</b> (page 11) – There were six heritage resource sites associated with projects implemented in Fiscal Year 2002. Protective measures were successful in the five sites found to be historically significant.
WILDLIFE	☺ <b>Raptor Habitat</b> (page 13). No proposed projects had the potential to affect these species or were implemented near known nest sites in 2002.
	☺ <b>Legacy Features</b> (page 13) Retention tree and snag requirements were met on all projects. Plan intent for down wood requirements was met where applicable.
	ⓘ <b>Survey and Manage</b> (page 17) Strategic surveys were completed in 2002. 2,170 acres were surveyed for amphibians that resulted in one new site. 1,504 acres were surveyed for mollusks and 179 new sites were located.
GRAZING	☺ * <b>Grazing Practices</b> (page 17) Cattle and sheep grazing practices conform to standards and guidelines.
*All or part effectiveness monitoring.	

- ☺ Standard and guideline met, or no activities to monitor.
- ☹ Mixed results or mitigating circumstances.
- ☹ Need for improvement.
- ⓘ Information item, not a standard and guideline.

**Monitoring Results - At A Glance (Continued)**

<b>BOTANICAL</b>	ⓘ	<b>Noxious Weeds</b> (page 19) Noxious weeds were treated on 447 acres and 1,750 acres were monitored.
	☺	<b>*Research Natural Areas</b> (page 20) – RNA standards and guidelines were met in Steamboat Mountain and TT Munger RNAs.
	☹	<b>*Botanical Special Interest Areas</b> – (page 20) Because of vacancies in the botany program, botanical special interest area monitoring was not completed in 2002.
<b>TIMBER</b>	☺	<b>Adequate Reforestation</b> (page 22) – Three years after planting, 98 percent of the 820 acres monitored were adequately stocked. 334 acres were planted in FY 2002.
	ⓘ	<b>Timber Harvest Methods</b> (page 22) – Only 8 acres were harvested in 2002
	☺	<b>Regeneration Harvest Units Size</b> (page 23) – No decisions were signed that contained regeneration units in 2002; there was nothing to monitor for this item.
	ⓘ	<b>Volume Awarded</b> (page 24) - In 2001 the Forest awarded 1.4 million board feet. The goal was 32 million board feet.
	☺	<b>Silvicultural Prescriptions</b> (page 25) – Thinning objectives were met in young stand and commercial thinnings.
<b>SOIL AND WATER</b>	☺	<b>Soil Productivity</b> (page 27) – The six harvest units monitored met the standard for protection of soil productivity.
	☹	<b>Best Management Practices</b> (page 29) – Seven minor departures and one serious departure were found on the Louie/Rosey Timber Sale.
	ⓘ	<b>Stream Temperature</b> (page 31) – Streams in 14 watersheds on the Forest exceed the state standard for temperature.
	ⓘ	<b>Water Quality Restoration Plans</b> (page 55) The Forest completed a water quality restoration plan for the East Fork Lewis Watershed in 2002
<b>FISHERIES</b>	☹	Because of competing workload priorities, reporting on four fisheries and riparian monitoring items was deferred to 2003.
<b>ROADS</b>	☺	<b>Road Management</b> (page 56) - The Forest is at 69 percent of the projected goal for road closures. 340 miles of road have been decommissioned since 1994.
<b>COMMUNITIES</b>	ⓘ	<b>Community Effects - Payments to Counties</b> (page 60) - The U.S. Treasury returned over \$14 million dollars to the six counties with lands within the Forest administrative boundary. The Forest administered nearly \$700 thousand in community assistance grants.
<b>MINING</b>	ⓘ	<b>Mining Operating Plans</b> (page 62) – The Forest administered 23 Notices of Intent and 2 Plans of Operation in 2002. No cases of noncompliance were identified or reported
*All or part effectiveness monitoring.		



## C. Monitoring Item Results

### Wild and Scenic Rivers

On the Gifford Pinchot, there are no congressionally designated Wild and Scenic Rivers.

**Introduction:** On the Gifford Pinchot National Forest there are no Congressionally designated Wild, Scenic or Recreational Rivers; however, the Forest Plan recommends the Lewis River, Cispus River, and the Muddy Fork and Clear Fork of the Cowlitz River be designated as Wild and Scenic Rivers. As a result of the 1997 Final Legislative EIS, the Upper White Salmon River is also recommended for Wild and Scenic River designation. In addition, twelve other rivers are recommended for further study.

The values for which these corridors were either recommended or deemed eligible for recommendation are being protected until Congress takes action on the Forest's recommendation or further studies are completed. The Forest monitors activities in each of these corridors to ensure that the outstandingly remarkable river values are being protected consistent with the Wild and Scenic Rivers Act.

**Results:** All projects within potential Wild and Scenic River corridors were monitored. The results are displayed in Table 1.

**Table 1. - Monitoring in Potential Wild and Scenic River Corridors**

Corridor	Project	Standards Met
Lewis River	Toilet Replacement -Twin Falls CG	Yes
Covel Creek	Culvert Replacement	Yes
Upper White Salmon	Trail Maintenance (Buck Cr. Tr. #54, Salt Cr Tr. #75, PCT #2000)	Yes

The character of the wild and scenic river corridors was preserved.

**Evaluation:** All projects completed in recommended Wild and Scenic River corridors comply with the Plan standards and guidelines. The character of the wild and scenic corridors was preserved. No activities have occurred that would adversely affect the outstandingly remarkable values, the free-flowing nature, or classification of any eligible or study river.

**Recommended Action to be Taken:** No corrective action required -- monitoring to continue.

## Semi-Primitive Recreation <sup>2</sup>

**Introduction:** The Forest Plan provides a framework for managing different classes of outdoor recreation settings, activities and opportunities. This framework is a continuum comprised of seven classes: Primitive, Semi-primitive Non-motorized, Semi-primitive Motorized, Roaded Modified, Roaded Natural, Rural and Urban. This monitoring item focuses on maintaining the character of the two semi-primitive classes. The emphasis in these areas is to maintain a predominantly natural or naturally appearing environment. Motorized recreation use is not permitted in the semi-primitive non-motorized category.

**Results:** In addition to ongoing routine trail maintenance, there was one project planned in an area identified as a semi-primitive recreation area in the Forest Plan. The Independence Pass Trail Reconstruction project in the Mount Margaret Backcountry of Mount St. Helens National Volcanic Monument reopened a portion of the trail covered by a landslide.

**Evaluation:** The Independence Pass Trail Reconstruction was consistent with the ROS class and in compliance with the Plan standards and guidelines. The semi-primitive character of the area will be maintained.

**Recommended Action to be Taken:** No corrective action required -- monitoring to continue.

## Scenic Quality <sup>3</sup>

**Introduction:** The Forest Plan delineated 37 viewshed corridors across the Forest. Lands within view of 21 of these viewshed corridors have management objectives requiring maintaining or improving scenic values. In these viewsheds, management activities are to be compatible with scenic quality objectives.

**Results:** In addition to road maintenance, there were four projects within scenic viewshed corridors:

**Table 2. - Monitoring in Scenic Viewshed Corridors**

Corridor	Project	Standards Met
Varies	Toilet Replacement	Yes
82 Road	Snowking SnoPark	Yes
80, 82 Roads	Gotchen Fuels Reduction and Roadside thinning	Yes

Activities such as thinning and dispersal of material were designed to mitigate effects to scenic values. The standards and guidelines for scenic quality were met with these projects. Landscape-scale viewshed condition monitoring was conducted in 2001. However, none of the viewsheds was monitored in 2002. Monitoring of viewshed condition will resume for 2003.

**Recommended Action to be Taken:** No corrective action required -- monitoring to continue. Resume viewshed monitoring in 2003

The project implemented in the semi-primitive ROS class complies with standards and guidelines.

Projects monitored in viewshed corridors met S&Gs for scenic objectives.

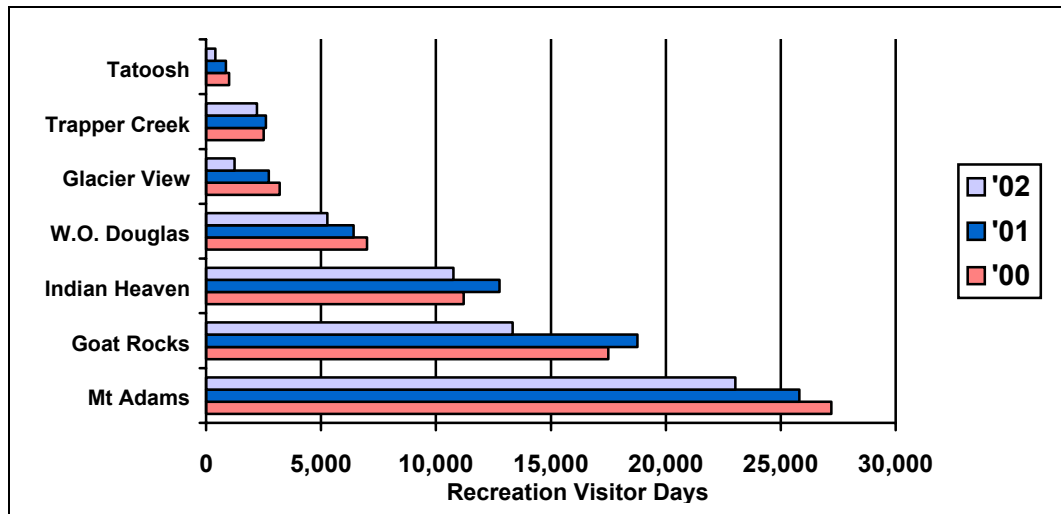
None of the viewsheds was monitored in 2002.

## Wilderness Use and Condition

The Forest currently includes about 180,000 acres in seven wildernesses.

**Introduction:** The Forest currently has about 180,000 acres in seven wilderness areas. Each wilderness is zoned according to the nature of recreation opportunity. The range of these opportunities is called the Wilderness Recreation Opportunity Spectrum. Each category has a set of standards describing the desired recreation experience. This monitoring determines if standards for the experience in each category have been met. It measures wilderness use and impacts of recreation use on wilderness character.

**Figure 1. - Wilderness Use 2000 - 2002**



### **Results:**

**Wilderness Use** - Figure 1 and Table 3 compares wilderness use in recent years. The late season access from heavier than usual snowfall contributed to lower wilderness use in 2002 compared with 2001. Visitor use has decreased by a total of 17 percent across all seven wildernesses from 2001 to 2002. Use in each wilderness declined, varying from a reduction of 11 percent in the Mt. Adams Wilderness to 54 percent in the Glacier View Wilderness.

Wilderness visitor use declined in 2002.

**Table 3. - Wilderness Use**

Wilderness	Recreation Visitor Days					2001-2002 % Change
	1998	1999	2000	2001	2002	
Mt. Adams	22,400	19,620	27,200	25,810	23,030	-11%
Goat Rocks *	21,250	12,730	17,500	18,760	13,340	-29%
Indian Heaven	12,000	8,968	11,200	12,770	10,760	-16%
William O. Douglas*	8,920	6,370	7,000	6,420	5,270	-18%
Glacier View	4,300	2,100	3,200	2,730	1,240	-54%
Trapper Creek	2,200	2,188	2,500	2,600	2,220	-15%
Tatoosh	1,100	910	1,000	860	410	-52%
<b>TOTAL</b>	72,170	54,885	69,600	69,950	58,272	-17%
* Gifford Pinchot National Forest portion only.						

In 1999, the Forest, with the input by wilderness users and other interested parties, developed a Wilderness Resource Protection Plan that includes measures such as, designated sites in overused areas, use limits, and increased education and enforcement. The primary purpose of these measures is to reduce impacts from human use, primarily overnight use. In 2002, campsites were designated in several heavily use areas of the Mt. Adams and Indian Heaven Wildernesses.

**Limits of Acceptable Change (LAC).** Limits of acceptable change is a measure of impacts associated with wilderness recreation use such as trampled area, vegetation loss at campsites, and mineral soil exposed. It is usually done on a three to five years frequency, the amount of time necessary to see measurable change occur. Monitoring done in previous years provides a baseline for determining if management measures are working to reduce impacts. Resource conditions that are degrading rather than improving are a clear indication of the needs for additional corrective actions.

**Evaluation:** Overall wilderness use appears to be declining. In 2002, the late-season access from near-record snowfall, may have contributed to the decline in wilderness use. However, popular camping destinations in Mt. Adams, Indian Heaven and Goat Rocks Wildernesses continue to receive heavy peak weekend use. Based on monitoring in 2001, standards for limits of acceptable change are not met. Exceedance of limits of acceptable change is in part the result of use the occurred prior to the implementation of the Forest Plan. Measures, such as rehabilitation, education, attempts to confine damages to previously impacted areas and designating campsites, have worked to some degree to reduce soil and vegetation impacts.

Snowmobile incursions into the Mt. Adams Wilderness were less frequent than in previous years. Corrective actions implemented in 2002 included increased winter recreation education and enforcement, and boundary signing.

**Recommended Actions to be Taken:** Information about users has been important in determining how to manage use while maintaining the quality of the wilderness experience. The 2001 National Recreation Use Survey has provided general information about users and use patterns. A Wilderness Visitor Survey scheduled for summer of 2003 will provide more specific user information about Mt. Adams and

Popular wilderness destinations continue to receive heavy peak weekend use.

Indian Heaven Wilderness users, their expectations and how well they were met. The Forest should continue to participate in such studies for monitoring purposes.

The winter recreation plan to be completed in 2003, for the south side of Mt. Adams, will address the issue of Wilderness snowmobile incursion.

LAC monitoring should continue. The need to implement additional measures to reduce resource impacts should be evaluated annually.

## Trail Inventory and Condition

On the Forest there are 1,475 miles of trails, including 305 miles within Wilderness.

**Introduction:** On the Forest there are 1,475 miles of trails, including 305 miles within wilderness. These trails are managed to maintain a diverse array of travel opportunities. Difficulty, mode of travel, and distance are factors affecting the mix of travel opportunities. Each Forest trail is assigned a trail management level, with associated standards and guidelines for management of adjacent lands. These management levels offer a range of protection from roading and timber harvest impacts. We also monitor the amount of trail construction, maintenance, use, and management.

### Results:

**Trail Construction and Maintenance** -- Table 4 compares the amount of trails constructed or reconstructed in 2002 with the amount projected in the Forest Plan. Construction or reconstruction work was accomplished on the following trails: Lemei #34, East Crater #48, Morrison Cr. #39, Fossil Trail #242, Klickitat #7A, Independence Pass Trail # 227 and Toutle Trail #238.

**Table 4. - Trail Construction and Maintenance**

Trail Activity	Miles from Forest Plan	2002 - Miles Accomplished	Percent of Plan Level
Construction or Reconstruction	34 <sup>1/</sup>	12.5	37
Maintenance	1490	927	62
<sup>1/</sup> Trail mileage average based on projects listed in Appendix A of the Forest Plan.			

927 miles of trails were maintained to standard.

Approximately 927 miles (62 percent) of the 1,490 miles of the existing summer and winter use trails in the Forest Trail System were maintained to full Meaningful Measures Standards (see Glossary).

**Trail Setting** - The following table shows trails that were reviewed either in the planning phase (through the review of planning documents) or on the ground.

**Table 5. - Trail Setting**

Trail Reviewed Name and No.	Planned Mgt. Level	Meets Management Level in Plan
Ape Cave #239	I	Y
East Crater #48	I	Y
East Crater #48	I	Y
High Rock	I	Y
Hummocks #229	I	Y
Lemei #34	I	Y
Pipeline #74	I	Y

All trails monitored met standards.

All trails reviewed meet management level standards.

**Trail Use** – The Forest responded to public comments concerning use conflicts on several trails across the Forest. Motorized use conflicts were reported on East Crater Trail #48, Goat Marsh #237 and Craggy Peak #3. Complaints were from non-motorized users about motorized use on non-motorized trails. Actions taken include gating and additional signing on the Goat Marsh Trail. East Crater trail motorized use was related to a Forest Service trail bridge reconstruction project. Monitoring will continue.

Complaints were received on High Rock trail #266, related to inappropriate and unsafe conditions for horse use on a trail designated for such use. The trail uses allowed on this trail have been changed to not allow horse use.

Complaints were received about excessive horse impact in the vicinity of Killen Cr. Meadow along the Pacific Crest Trail #2000. Monitoring will continue.

**Evaluation:** Thirty seven percent of the planned target for trail construction/reconstruction was accomplished, up from 20 percent last year. The budget for this work is considerably less than is needed to reconstruct a deteriorating trail system and create new opportunities. In addition, survey and manage protocols require additional funding and time for conducting surveys. Trail mileage maintained increased slightly from last year (Table 4). User conflicts were reported on fewer than 10 percent of the system trails and thus do not trigger planning action.

**Recommended Action to be Taken:** In 2003, revenues from NW Forest Pass user-fees will continue to provide additional funding to maintain trailheads and the trails they serve. The expected result is an improved ability to meet trail operation and maintenance standards. Leveraging funds, such as supporting volunteer trail maintenance efforts, will continue to be a major emphasis of the Forest trail system maintenance strategy.

Motorized/non-motorized trail use issues will be addressed in the scheduled Forest Plan revision.

Only 37% of the planned trail construction was accomplished due to budget limitations.

## Developed and Dispersed Recreation Use and Facility Condition 7 ☺

The Forest has about 120 developed recreation sites.

**Introduction:** The Forest has about 120 developed recreation sites, not including visitor centers, with a combined capacity of 16,650 persons-at-one-time (PAOT). We have experienced increasing demand for recreation opportunities from the fast growing populations of the Portland metropolitan area and the international notoriety of Mount St. Helens and the Columbia River Gorge. Accompanying the growth in demand has been relatively stable recreation budgets. The Forest has pursued some innovative measures to close the gap between demand for services and the recreation budget through partnerships, volunteers, user fees and use of campground concessionaires. In 2000, the Northwest Forest Pass was introduced and provided a means to collect additional revenue from trail, interpretive site and rustic campground users at selected sites. The revenue from this user fee has helped to meet operation and maintenance standards for these sites.

All but two of the fee campgrounds are operated by concessionaires. Concessionaires also operated some day-use sites in 2002. These sites are managed to standard since sites are operated and maintained according to the concessionaires' operating plans approved by the Forest Service. In non-concessionaire operated fee campgrounds and some rustic campgrounds that are under the Northwest Forest Pass, revenues generated from camping fees go toward operation and maintenance of these sites. However, camping outside of campgrounds (dispersed camping) continues to be popular and use is increasing. There are currently few restrictions on where visitors may camp. Since the preference is to be near water, this is where the majority of use of this type occurs.

The Forest replaced 33 substandard toilets with 25 new vault toilets in 2002.

**Results:** The Forest is continuing to pursue upgrading of developed recreation facilities. In 2002, 25 new vault toilets were constructed to replace 33 older toilets that did not meet standards. However, in spite of these projects, many developed sites are still in need of repair or upgrading to meet new standards. Water system surveys were conducted in 2002, providing important information on fixes needed. Several water systems were closed because they could not be improved to meet today's standards.

Visitor centers at Mount St. Helens are starting to show their age and are in need of maintenance.

Visitor centers at Mount St. Helens are starting to show their age and are in need of maintenance. A survey of maintenance needs was conducted, priorities set, and funding options identified. For the long-term, the Forest is exploring partnership options for their operation and maintenance.

Numerous dispersed camping sites show evidence of over use.

Monitoring of recreation use outside of campgrounds indicates numerous dispersed camping sites, accessible by vehicle, are continuing to show evidence of overuse. In addition, we believe the number of such sites may be increasing due to increased demand resulting from the closure of adjacent private timberlands to recreation use and higher fees for Forest campgrounds. Concerns include inadequate sanitation, resource damage, litter, tree removal, illegal trash dumping; user conflicts, and user-defined sites located too close to streams, lakes, and scenic highways.

Corrective measures are being taken. A number of actions were initiated, including blocking vehicle access to sensitive riparian areas, restoring impacted sites, designating approved dispersed campsites, increasing enforcement of camping regulations.

Condition surveys of developed recreation sites indicate that the majority do not meet accessibility or sanitation standards.

**Evaluation:** While strides were made in upgrading toilet facilities, developed recreation facilities continue to show the need for reconstruction or heavy maintenance. Deferring routine maintenance of these facilities has resulted in a devaluation of the capital investment and increased maintenance costs. Condition surveys of developed recreation sites indicate that the majority do not meet accessibility or sanitation standards. Monitoring of dispersed recreation camping sites indicates that many of these sites do not meet standards and are impacting riparian areas.

**Recommended Actions to be Taken:** The Forest will continue to evaluate the ability to meet existing and future developed recreation needs, while providing facilities that meet operation, maintenance, and accessibility standards. Some revenues from the Northwest Forest Pass program will be focused on capital improvements. Other funding sources will be pursued.

To address dispersed impacts, closure of areas adjacent to some roads to overnight use should be considered. Dispersed recreation management should be addressed in conjunction with other planning efforts such as transportation planning and watershed and habitat restoration.

## Heritage <sup>11</sup>

Heritage Resources identified in project surveys are evaluated to determine their significance.

**Introduction:** Heritage Resources identified in the project survey and inventory process are evaluated to determine their significance. The level of significance is measured by the criteria of the National Register of Historic Places. Projects are usually designed to protect significant sites through avoidance. In rare cases, effects are mitigated through archaeological data recovery methods, including scientific excavation and analysis. In the case of historic structures, mitigation may take the form of detailed architectural documentation.

Typical heritage site protection strategies involve the maintenance of non-activity buffer zones. Monitoring ensures that prescribed protective measures were properly implemented in the field. Monitoring also provides an opportunity to evaluate the effectiveness of various protective strategies.

**Results:** Six heritage resource sites were associated with projects implemented during Fiscal Year 2002. The projects included are shown in Table 6.



**Table 6. - Heritage Resource Sites Monitored**

Project	Location
Oklahoma Campground Hazard Tree Removal	Mt. Adams District
Contaminated Soil Cleanup, Wind River W.C.	Mt. Adams District
Falls Creek Horse Camp Toilet	Mt. Adams District
Lewis River Trail, Bridge Replacement	Mount St. Helens District
LaWisWis Campground Toilet	Cowlitz Valley District
Ollalie Lake Campground Toilet	Cowlitz Valley District

Protective measures were successful in the five sites found to be historically significant.

Five of the heritage resource sites identified in these projects were found to be significant. These include two prehistoric archaeological sites, a historic homestead and guard station site, the site of a historic Civilian Conservation Corps side camp (see photo, below), and the site of a historic Forest Service ranger station. Avoidance measures were prescribed for all of the significant sites. In the case of most sites, protective buffers range from 50 to 100 meters.



**Figure 2. - Civilian Conservation Corps (CCC) camp at Ollalie Lake, 1935**

**Evaluation:** Protective measures were successful in the five sites found to be historically significant.

**Recommended Actions:** - Continue monitoring.

**Habitat for Osprey, Swainson's Hawk, Goshawk, Ferruginous Hawk and Great Blue Heron <sup>35b</sup>** 

**Introduction:** The Forest Plan (page 2-75) provides standards and guidelines aimed at minimizing the disruption of habitat during critical nesting periods. Direction is also provided to minimize disturbance of key winter habitat. Species protected include: Bald Eagle, Peregrine Falcon, Golden Eagle, Osprey, Swainson's Hawk, Goshawk, and Great-Blue Heron.

**Results:** No proposed projects had the potential to affect these species or were implemented near known nest sites in 2002. A great blue heron rookery is located in the Gotchen Planning Area. The Gotchen EIS will address protection measures for this rookery.

**Recommended Action to be Taken:** No action required; continue monitoring projects for disruption of habitat during critical nesting period.

No projects were found to have the potential to affect these species.

**Legacy Features <sup>40</sup>** 

**Introduction:**

Residual green trees and dead wood in harvested areas function as a bridge between past and future forests. Green trees serve several important functions: they are available for snag recruitment, contribute to multistoried canopies, and provide shade

Dead and partially dead trees or snags are important to certain wildlife species. To provide suitable habitat, a snag needs to be at least 17 inches in diameter and 40 feet high. They serve as breeding areas, shelter, and a host to insects, which provide food for birds. Species dependent on snags include the pileated woodpecker and several other woodpecker species, red-breasted sapsucker, red-breasted nuthatch, and northern flicker.

Ecological studies are expanding our understanding of the role of down woody material in forest ecosystems. Down logs are important because of their role in mineral cycling, nutrient mobilization, and moisture retention. In addition, down logs provide structure and habitat suitable to many wildlife species.

**Results:** Four harvest units from three different timber sale projects were monitored for legacy features. The Cowlitz Valley District monitored Unit 1 of the Cispus Hazard Timber Sale; the Mount St Helens Monument monitored Units 21 and 22 of the Gage Timber Sale (87 acres total); and the Mount Adams R.D. monitored Unit 15 of the Whip Timber Sale (26 acres).

**Retention Trees** - The Forest Plan prescribes that 15 percent of each regeneration harvest unit be retained in standing trees, with 70 percent in patches and 30 percent scattered through the unit.

On The Cowlitz Valley District, the Cispus Hazard Unit 1 is within a Late Sucessional Reserve (LSR). Because the primary objective of the sale was

Four units from three different timber sales were monitored for legacy features.

removal hazard trees for safety considerations, many standards and guidelines did not apply.

On the Mt. St. Helens District, the Gage timber sale was a commercial thin. There are no specific standards and guidelines for maintaining standing and down wood in thinning units, except that the remaining material should be modified to reflect the stand development cycles. The residual cover was determined to be 49 percent in unit 21, which is consistent with the assumptions outlined in the Gage Environmental Analysis.

Gage Unit 22 was a regeneration harvest with moderate retention. In addition to the 15 percent retention, 21 additional large trees per acre were retained and are evenly dispersed throughout the unit. A significant portion of the green reserve trees contain defect such as broken or dead tops. The residual canopy cover was measured at 36 percent, which meets the level of retention prescribed for moderate retention.

On the Mt. Adams Ranger District Unit 15 of the Whip Timber Sale was reviewed. The objective of 3.9 acres of dispersed leave trees and 2.7 acres of aggregate patches was met on the unit.

**Down Wood** - The Northwest Forest Plan directs that on Matrix lands, woody debris be protected during logging and that 240 linear feet per acre of decay class



Mitch Wainwright photo

**Figure 3. - Down wood in Gage Unit 22**

I and II logs be left after regeneration harvest on the westside and 120 feet per acre on the eastside.

Because the Cispus Learning Center is an administrative site, the Matrix and LSR standards for down wood and do not strictly apply. The decision was made to leave 120 feet of down wood to provide some level of ecological function while minimizing obstruction to use of the grounds of the Learning Center.

28 of the 29 prescribed down logs were provided by the Cispus Hazard Tree Sale.

For this Cispus Hazard Tree unit the contract prescribed leaving 28 logs 40 feet in length and at least 22 inches in diameter on the ground, and 15 of the 28 logs be piled in groups of three to produce 5 large log structures scattered randomly in the 2.5 acre area. The total number of logs left in the unit was one less than prescribed, and the clustered piles of logs were higher than recommended but were all located in a line paralleling the southwest edge of the unit. No corrective actions will be taken to scatter the piles; the unit has been planted and damage to the seedlings is not recommended.

On the Mt. St. Helens District, in Unit 21 of the Gage Timber Sale, a commercial thin, the down wood appears sufficient and probably exceeds the levels expected for a natural stand of that age. There is no specific standard and guideline for down wood in thinning units except that the amount of down wood should reflect the timing of the stand development cycles.

The additional amount of large hard class III logs and smaller class I and II logs will provide the needed down wood habitat on Gage Unit 22.

In Unit 22, the regeneration unit, each log meeting the minimum size requirements and decay class was measured individually. The unit contains a lot of down woody material; however, much of it does not meet the definition of class I or II logs (bark is lacking), was not at least 20 inches in diameter, or was not at least 20 feet long. A significant number of the residual standing green trees in the unit contain decay and it is likely that many of these will fall and become part of the large down wood component over the next ten years. Although the down wood level in the unit does not meet the requirements for class I and II logs, additional green tree felling is not recommended. The additional amount of large hard class III logs and smaller class I and II logs will provide the needed down wood habitat until the standing green trees begin to fall. In the professional opinion of the wildlife biologists who reviewed this unit, there is adequate down wood to provide the intended ecological function.

On the Mt. Adams District, Whip Timber Sale was reviewed for down wood. The inventory was conducted on approximately 4 acres. Approximately one acre was equal to or less than 120 ft per acre objective, the remainder of the unit exceeded the requirements. The overall, visual estimate of down wood across the unit was heavy (cull material left behind).

**Snags** - There are no specific standards and guidelines for maintaining snags in thinning units. Because they present a safety hazard to users of the Cispus Learning Center, dead and dying trees were intentionally removed in the Cispus Hazard Tree Removal timber sale.

In Unit 22, the regeneration unit of the Gage Timber Sale, a significant portion of the remaining green trees contain defect such as dead or broken tops. This condition is similar to what would exist in a unit where snags have recently been created, thus the standard for snags was met.

Snags will be created from surplus retention trees on the Whip Sale.

The Whip sale snag densities were 2 per acre which, while high for post harvest in a light retention prescription, fell short of objective of providing 3.6 per acre. KV funds were collected to create additional snags in the 2003 field season to bring the snag levels to the 3.6 per acre desired level.

**Table 7. - Projects Monitored for Retention Legacy Features**

Timber Sale Projects	Standards Met? (Yes or No)		
	Retention Trees	Snag	Down Woods Debris
Cispus Hazard	N/A	N/A	N/A*
Gage unit 21	N/A	N/A	Y
Gage unit 22	Y	Y	Y*
Whip unit 15	Y	Y	Y
* See text.			

The intent of the standards and guidelines were met in all units monitored.

**Evaluation:** LSR standards for down wood and snags were relaxed on all units within the administrative site. Leaving snags and meeting LSR level of down wood would have presented a safety hazard to users.

The district biologist believes the hard class III logs on Gage Unit 22 are providing the ecological function intended of the Class 1 and 2 logs and that the intent of the standard was met. There are a significant number of residual standing green trees in the unit with decay, it is likely that many of these will fall and further add to the down woody component over the next ten years.

Additional snags created in the 2003 field season in the Whip sale area will bring the levels up to the desired 3.6 per acre.

**Introduction:** The Northwest Forest Plan (1994) provides for surveys for over 300 rare and /or isolated plant and animal species. These species are grouped in six categories based on relative rarity, ability to reasonably locate occupied sites and level of information know about the species (see Table 8).

**Table 8. - Survey Categories**

<b>Relative Rarity</b>	<b>Pre-Disturbance Surveys: Practical</b>	<b>Pre-Disturbance Surveys: Not Practical</b>	<b>Status Undetermined</b>
<b>Rare</b>	<b>Category A:</b> Manage All Known Sites Pre-Disturbance Surveys Strategic Surveys	<b>Category B:</b> Manage All Known Sites  Strategic Surveys	<b>Category E:</b> Manage All Known Sites  Strategic Surveys
<b>Uncommon</b>	<b>Category C:</b> Manage High-Priority Sites Pre-Disturbance Surveys Strategic Surveys	<b>Category D:</b> Manage High-Priority Sites  Strategic Surveys	<b>Category F:</b>  Strategic Surveys

**Flora** - Currently surveys before ground-disturbing activities are required for the following botanical and fungi species: *Bridgeoporus nobilissimus* (fungi) *Schistostega pennata* and *Tetraphis genciulata* (bryophytes); *Hypogymnia duplicata*, *Loabaria linita*, and *Pseudocyphellaria rainierensis* (lichens); *Botrychium montanum*, *Coptis asplenifolia*, *C. trifolia*, *Corydalis aquae-gelidae*, *Cypripedium fasciculatum*, *C. montanum*, *Eucephalus vialis*, *Galium kamtschaticum*, *Platantera orbiculata* var. *orbiculata* (vascular plants). Starting in fiscal year 2003 pre-disturbance surveys for the following lichen species are required: *Leptogium burnetiae* var. *hirsutum*, *L. rivale*, *Niebla cephalota*, *Platismatia lacunosa*, *Ramalina thrausta*, and *Teolschistes flavicans*.

**Fauna** - Surveys for great gray owls, Larch Mountain salamander (*Plethodon larselli*) and Van Dyke’s salamander (*Plethodon vandykei*), and for several mollusk species were conducted on the Forest in FY 2002.

Table 9 displays the number of acres of completed surveys for each group, and the number of new sites by species for both complete and incomplete surveys.

1 amphibian site and 173 mollusk sites were located.

**Table 9. - FY 2001 Survey and Manage Results for Fauna**

	CV acres surveyed	CV new sites	MSH acres surveyed	MSH new sites	MTA acres surveyed	MTA new sites	Total Acres and Sites
Great Gray Owl	0	0	0	0	0	0	0
Amphibians	610		666		894		2170
<i>Plethodon larselli</i>		0		1		0	1
<i>Plethodon vandykei</i>		0		0		0	0
Mollusks	830		157		517		1504
<i>Cryptomastix devia</i>		10		2		0	12
<i>Hemphillia glandulosa</i>		0		8		30	38
<i>Hemphillia malonei</i>		0		129		0	129

Remaining strategic survey botanical plots were completed in 2002.

**Strategic Surveys:** A Regionally coordinated effort was initiated in FY 2000 to sample federal habitat in a statistically valid manner across the range of the Northwest Forest Plan for Survey and Manage species. The Umpqua and Gifford Pinchot National Forests were selected as pilot Forests and data were collected on Continuous Vegetation Survey (CVS) plots. These plots included reserved as well as non-reserved land allocations. The goal of the strategic surveys is to better document and understand the species rarity and determine their distribution and habitat. The botanical plots were completed in FY2002 and this data is currently being analyzed.

**Recommended Action To Be Taken:** Continued specialized training for individuals conducting these surveys.

**Grazing** <sup>45</sup> 

**Introduction:** The grazing of cattle, horses, and sheep are among the historical uses on national forest system lands. Records from 1890 indicate over 100,000 sheep and 1500 cattle grazed on the Forest. On an average year 716 cattle and 1150 sheep are grazed on approximately 200,000 acres of the Gifford Pinchot National Forest.

The allotment management plans for these allotments are current and periodic evaluations of the allotment sites are performed. Cattle allotment management plans are reviewed and reissued every ten years. The sheep allotment management plan is reviewed and reissued every five years. Every year, for each allotment, an annual operating plan is developed by the permittees and the Forest Service. Through our evaluations, we ensure that the Forest Plan standards are met. Forest Plan consistency is ensured through inspections of the sites prior to dispersal of livestock, and monitoring of the livestock to ensure proper utilization

In 1890, over 100,000 sheep were grazed on the Forest.

of resources, distribution of livestock, and maintenance of ecosystem health. Range improvements such as maintenance of fences, cattle guards, and water lines are performed cooperatively by the Forest Service and the permittees. Grazing is not permitted in Research Natural Areas and Biological Special Interest Areas.

Our monitoring utilizes photo plots of vegetation that aid in determining the condition and trends within certain sites over time. When grazing in or near riparian zones we ensure that the objectives for the Aquatic Conservation Strategy are fulfilled, including but not limited to water quality, stability of streams and ponds, riparian vegetation and fish and wildlife habitat. In the past, approved post-grazing levels of vegetation were established by Regional and Forest personnel; our current post-grazing vegetation levels fall within their guidelines.

**Results:** There are three active allotments on the Gifford Pinchot National Forest. These allotments are all on transitional rangeland. They are located on portions of the Mt. Adams District and Mt. Saint Helens District in the areas of Twin Buttes, Mt. Adams and Ice Caves. Livestock use for the 2002 season totaled 1,216 head months for the Forest, which is approximately 48 percent below the allowed and permitted head months.

**Evaluation:** During 2002 all grazing allotments were in compliance with the amended Gifford Pinchot Forest Plan standards and guidelines.

**Recommended Action To Be Taken:** No corrective action required - monitoring and current management practices are to be continued. Continue to emphasize prevention and coordinate monitoring activities with the permittees, US Fish and Wildlife Service, and botany, wildlife, fish, and hydrology specialists to maintain current resource conditions.

All grazing allotments were in compliance with standards and guidelines.

## Invasive Species (Noxious Weeds) <sup>45</sup>

**Introduction** Invasive Species are a problem because they can be toxic to wildlife, domestic livestock, and humans and they displace desirable plant communities. They are rarely ingested by humans. Ecosystem changes produced by invasive species can be dramatic and have highly adverse impacts to plant and animal environments.

**Results:** Houndstongue (*Cynoglossum officiale*) was found for the first time on the Mt. Adams Ranger District. The houndstogoe currently is within a 300 acre cattle enclosure. Approximately, 1,750 acres were field reviewed across the Mt. Adams and Mt. St. Helens districts. Four hundred and forty seven acres of Tansy Ragwort, Scotch Broom, five Knapweeds, and Houndstongue species were treated manually and with biological controls.

In addition, over \$165 thousand in invasive species inventory and eradication projects were funded by two Resource Advisory Councils. These projects will be implemented in 2003.

**Recommended Action To Be Taken:** Continue with the prevention measures, inventory of infestations, and aggressive treatment.

Invasive species were treated on 447 acres.



## Research Natural Areas (RNA)

The Forest Plan forbids any activity within an RNA that would adversely affect the natural values for which it was established.

**Introduction:** The Forest Plan forbids any activity within an RNA that would adversely affect the natural values for which the RNA was established. Prohibited activities include livestock grazing; timber and miscellaneous forest products harvest; recreation development and use; road construction; temporary facility installation; unlawful mining or mining of common variety materials; establishment of exotic plant, animal, or insect species; and establishment of non-endemic levels of insects, pathogens, or disease.

The seven areas designated as RNAs through the planning process are listed in the Table 10. These areas provide representative examples of biologically important ecosystems and are managed to conserve their biological diversity. They serve as undisturbed controls for comparison with managed areas and are valuable for studying natural processes. Research Natural Areas are permanently protected federally designated reserves where long-term studies that contribute to our knowledge of the ecosystem is encouraged. The standards and guidelines for Research Natural Areas focus on maintaining their natural state for research and education. RNA standards and guidelines also apply to three proposed RNAs until they are evaluated for RNA designation. Monitoring serves to evaluate whether the natural conditions of the Research Natural Area have been modified, and prescribes corrective actions if necessary.

**Table 10. - Research Natural Area Monitoring**

Research Natural Area	Last Monitored	Standards & Guidelines Met?
Butter Creek	1991	yes
Goat Marsh	2000	yes
Sisters Rock	1999	yes
<b>Steamboat Mountain</b>	<b>2002</b>	<b>yes</b>
Cedar Flats	2000	yes
<b>Thornton T. Munger</b>	<b>2002</b>	<b>yes</b>
Monte Cristo	2000	yes
Proposed Smith Butte	2001	yes

Steamboat Mountain and TT Munger RNAs were monitored. Standards and guidelines were met.

**Results:** In FY 2002 Steamboat Mountain and TT Munger RNAs were monitored. RNA standards and guidelines were met. Moderate recreational use was observed along the Steamboat Mountain trail No. 14 and dispersed, unauthorized camping occurred along a short temporary road, just west of Mosquito Creek in Steamboat Mountain RNA.

Two draft establishment reports for the proposed Smith Butte and Weigle Hill RNAs are in the review process.



John Scott Photo

**Figure 4. - Pond/wetland complex in Steamboat Mtn. RNA**



**Figure 5. - Gravel pit adjacent to Steamboat Mtn. RNA is a source of invasive weeds.**

**Recommended Action To Be Taken:** Noxious weed should be pulled to prevent their spread throughout the RNAs. The short temporary road in Steamboat Mountain RNA was closed to vehicles using berms and rocks. Posting of “RNA” and “No Camping” signs is recommended. Complete the review process for the two establishment reports.

### **Botanical Special Interest Areas <sup>35d</sup>**

**Introduction:** Thirty botanical special interest areas (botanical areas) have been designated on the Gifford Pinchot National Forest. These areas often contain plant species or communities that are significant because of the occurrence of threatened, endangered, or sensitive plant species; are floristically unique; or have noteworthy specimens, such as record-sized tree specimens. They range in size from one to over 2,000 acres, though most are 20 acres or less. Some of these areas are popular destinations and warrant monitoring to ensure that recreational impacts do not compromise the integrity of the sites. Other botanical areas serve as baselines for monitoring trends of sensitive species. Botanical areas are selected for monitoring each year, based on level of risk to resources and vulnerability to change.

**Results:** Because of vacancies in the botanist positions on the Forest, botanical special interest area monitoring was not completed in 2002, for the second consecutive year.

**Recommended Action To Be Taken:**

Resume monitoring in 2003.

Thirty botanical areas have been designated on the Gifford Pinchot.

Because of a vacant position, BSIA monitoring was not completed in 2002.

**Adequate Reforestation** <sup>50</sup> 

Reforestation was completed on 334 acres in 2002. First year survival for these acres was 86 percent. The main cause of mortality, where it occurred, was generally due to the dry spring and summer that occurred in 2002. However, overall stocking objectives were met. Monitoring on these stands will continue until trees become established on these sites.

A diversity of species was planted on the forest. The major species planted on the west side of the forest were Douglas fir and Western white pine. White Pine was planted not only to increase species diversity but also to minimize the impacts of Phellinus root disease on site productivity. Other species planted included Noble fir, western red cedar and a minor amount of mountain hemlock

On the drier portion of the Forest within the Gotchen area, a small number of acres were planted to ponderosa pine and western larch. These species were planted to increase the component of early seral species that are not susceptible to defoliation from insects such as the western spruce budworm. Ponderosa pine was also planted as a future source for large diameter ponderosa pine that has died due to insects such as the western pine beetle or been removed through past harvest. Survival was low due to the generally dry summer and competition from adjacent vegetation. Stocking levels were determined to be minimally satisfactory following surveys. Stocking levels in these units will continue to be monitored until establishment certification at 3-5 years.

Third year exams were completed on 820 acres of young plantations. These are plantations that were initially planted 3 years ago or were replanted. All but 2 percent of these plantations are considered to be adequately stocked.

98% of 820 acres of 3 year old plantations were adequately stocked.

**Timber Harvest Methods** <sup>51</sup> 

Table 11 identifies harvesting methods conducted on the Forest in 2002. Only eight acres of regeneration harvest were completed on the Forest, removing approximately 400 thousand board feet of timber. An additional 1 million board feet was harvested as firewood. Acres of firewood harvest were not estimated.

Only 8 acres were harvested in 2002.

**Table 11. - Timber Harvest Methods**

Silvicultural Practice	2001 Acres	NW Forest Plan Projection	Percent of Projection
Clearcut Harvest	0	0	-
Regeneration Harvest	8	1,454	< 1
Commercial Thinning	0	1,264	0
Salvage	0	N/A	-
Firewood	N/A	N/A	-
<b>Totals</b>	<b>8</b>	<b>2,718 acres</b>	<b>&lt; 1</b>

Figure 6 which displays the harvest methods used on the Forest from 1990 to 2002. This clearly shows the dramatic reduction in clearcut harvest early in the 1990s.

Figure 6 shows that the last clearcuts on the Forest were harvested in 1995. Since 1995, the first year Northwest Forest Plan was in effect, less than half the Plan projection of 2,700 acres has been harvested.

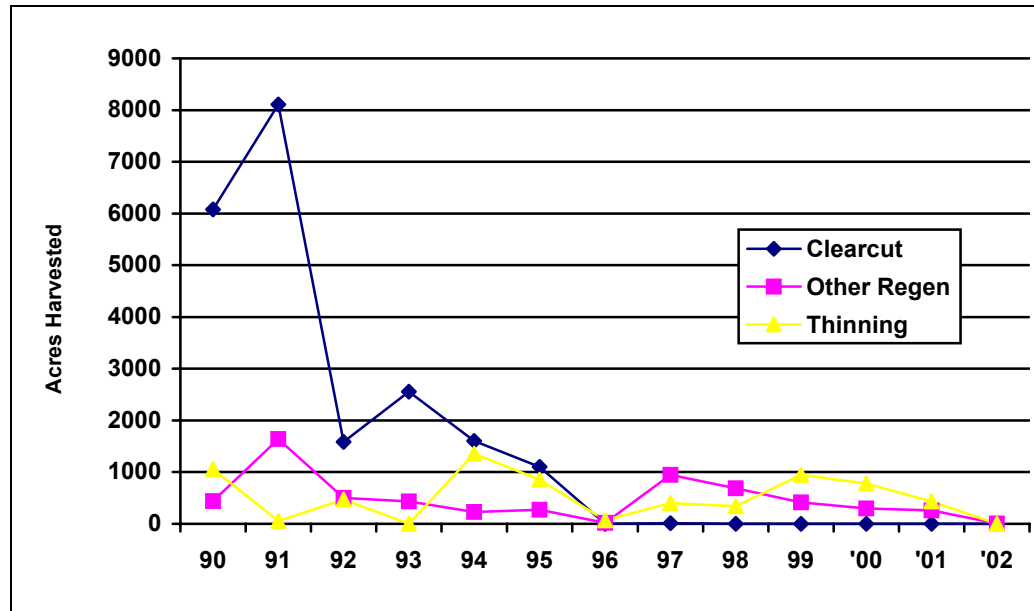


Figure 6. - Historical Harvest by Method

**Regeneration Harvest Units Size** <sup>52</sup> 😊

No NEPA decisions were signed in 2002 for sales that included regeneration harvest units.

Monitoring regeneration harvest units size determines whether timber sales that had NEPA decisions signed during the fiscal year containing regeneration harvest units meets the objectives of size, separation, and natural appearance defined in the Regional guidelines for timber sale preparation.

During 2002 this item was not applicable because no decisions were signed that contained regeneration units.

**Recommended Action To Be Taken:**

No corrective action needed, continue monitoring.

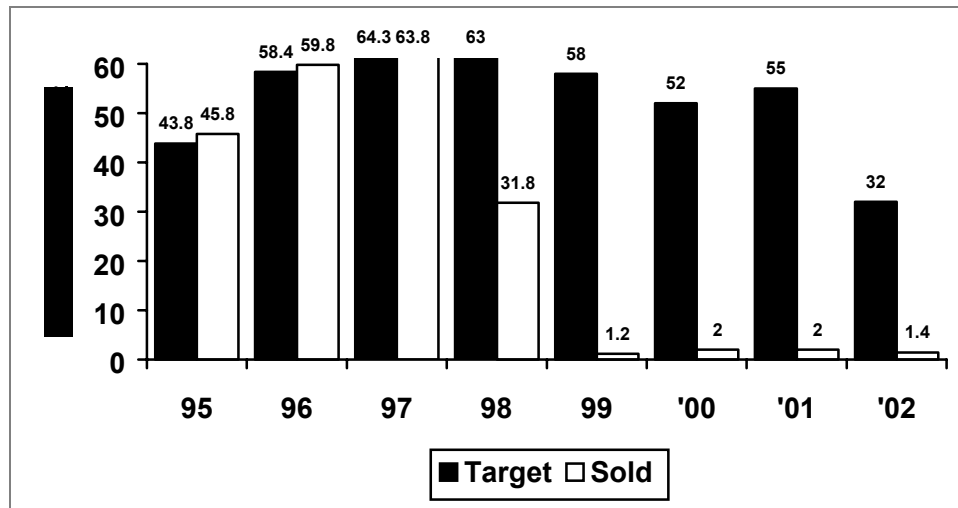
**Timber Volume Awarded** <sup>54</sup> 

The 2002 sale goal was 32,000 MBF (62,000 CCF) of new sales. The Forest did not accomplish the primarily because of litigation related to the Aquatic Conservation Strategy.

Actual volume awarded from sales in 2002 was 1.43 MMBF or 2,774 CCF of new sales.

**Table 12. – Volume sold in FY 2002.**

Volume Sold MMBF	Volume sold MCCF	Projected Volume MMBF	Projected Volume MMCF	% of Projection	Remaining MMBF Under Contract
1.43	2,774	32	62	4%	11



**Figure 7. - Target Accomplishment**

**Introduction:**

Vegetation management on the Gifford Pinchot is dynamic. It varies based on the current condition of the vegetation and is blended with the goals and objectives identified in the northwest forest plan. The Forest monitors overall condition with a number of tools including permanent inventory plots and field level inventories that are maintained within a Forest geographic information system. For example, recent analysis of this information has shown that the Forest has an increasing backlog of thinning needs within all allocations. It is estimated that the Forest has approximately 33,000 acres of stands in need of thinning within the 41-80 year old age class and another 70,000 acres in the 81-120 year old age class. Additionally, the area in and surrounding the Gotchen LSR continues to be an area of significant concern with regard to the effects of continued budworm defoliation and mortality caused by a variety of insects and diseases. The outyear planning program for the Gifford Pinchot will emphasize commercial thinning opportunities as well as reducing the impacts from insect and disease.

This years monitoring program for vegetation management of forested stands looked at two specific areas:

- 1) the thinning of young stands (less than 30 years old), and
- 2) treatments in those older stands (greater than 40 years old) that are in need of thinning or regeneration prescriptions.

Silvicultural prescriptions are the mechanism that takes Forest Plan direction, and the specific requirements identified in NEPA, and implements this direction on the ground. They describe an event or sequence of events that are needed to modify the establishment, composition or growth of forest vegetation including trees, shrubs, grasses, and forbs. Whenever the desired future condition of the forest depends on the manipulation of forest vegetation a silviculture prescription is prepared that describes the means for achieving the desired conditions. The purpose of this section is to monitor prescriptions to see if they meet objectives.

**Results:** Projects were monitored in Matrix, Late Successional Reserves and Adaptive Management areas.

**Young Stand Thinning** - Four young stand thinning projects were monitored in 2002. Two were at the Mount Saint Helens District and two were at Mount Adams. Objectives for these thinnings was to reduce overall stocking to increase growth, maintain species and structural diversity, and reduce the incidence of insect and disease. All three of these components are important to maintaining future options within young stands.

**Mount Adams** - Two young stand thinnings were monitored. Residual density objectives were met. Contract allowed for 25 percent variability in spacing which increased structural diversity by creating small openings and allowing for the release of recently established natural regeneration within the stand. Both stands had a component of Noble fir, Douglas fir, Pacific silver fir, western hemlock and western white pine prior to thinning and maintained this composition following

thinning. Residual western white pine was hand pruned during the thinning process to minimize the impacts of white pine blister rust and assure that it continues to be a component of these stands into the future.

Overall, thinning objectives were met in young stand and commercial thinnings.

**Mount Saint Helens** - Two young stand thinning projects were monitored. Residual stand density objectives were met. Thinning was wide (about 14 feet) which allowed for increased structural diversity. The contract also allowed for 25 percent variability in spacing which also increased structural diversity. Both stands had a component of Noble fir, Douglas fir, Pacific silver fir, western hemlock and western white pine prior to thinning and maintained this composition following thinning with Noble fir being the dominant residual species both before and after.

**Commercial thinning** - Three commercial thinnings were monitored. The first thinning was located within and directly adjacent to the Cispus Environmental Learning Center. It is within a late successional reserve. The stand contains scattered pockets of laminated root rot throughout. The objective of this thinning was to reduce potential risks from dead and dying trees expected to be a hazard within the next 10 years. Secondary objectives were to improve overall tree growth and maintain species diversity. No specific spacing was prescribed due to this objective. The overall objectives were met. Only one dead tree was found during the monitoring field visit.

Secondary objectives were also met. Harvest activity was designed to protect existing hardwood clumps as well as to maintain a component of all species prior to harvest. Monitoring showed little damage to existing hardwood components such as big leaf maple and cottonwood. While snag creation for wildlife is normally a part of commercial thinning on the forest, no snag creation was prescribed due to the close proximity to the Learning Center. Down wood averaged 311 lineal feet per acre following harvest.

At the Mount Adams Ranger District one commercial thinning in Matrix was monitored. The objective of the thinning was to reduce stocking within the stand while maintaining a minimum of 50 percent canopy cover. Secondary objectives were to maintain and enhance overall species and structural diversity. Small gaps and residual small diameter trees (<6 inches) were left to provide increased structural diversity. Harvest reduced the overall component of western hemlock which was high preharvest, reduced the density of Douglas-fir, and maintained a component of western white pine, ponderosa pine, western larch and western redcedar, all of which were consider minor components of the stand.

The opportunity to create snags at this time is limited due to the size of material within the residual stand. Overall all objectives were met in this thinning.

At the Mount Saint Helens District one commercial thinning in Matrix was monitored. The objectives for this thinning were to reduce overall stocking, improve growth on residual stand and increase overall structural diversity and species composition. The prescription called for maintaining 40 percent canopy cover and thinning to a relative density of 40. This objective was met. Structural diversity within the stand was increased. The prehavest stand was uniformly dense. An increase in structural diversity was created by leaving unthinned

clumps scattered throughout the unit to break up site distances. Creation of small gaps by variable spacing, and yarding corridors left additional small openings (1/2 acre and less). Small diameter individual and clumps of trees were left. Species diversity was maintained following harvest.

**Recommended Action To Be Taken:** No corrective action needed, continue monitoring. Forest Silviculturist to revise this monitoring protocol in 2003.

## **Soil Productivity** <sup>60</sup>

The Gifford Pinchot National Forest Plan requires a minimum of 80 percent of an activity area to have unimpaired soil productivity

**Introduction:** Maintenance of soil productivity is essential to sustaining ecosystems and is mandated by every act of Congress directing national forest management. Region 6 Forest Service Manual (2550.3-1, R6 Supplemental # 50) and the Gifford Pinchot National Forest Plan require a minimum of 80 percent of an activity area to have unimpaired soil productivity. Since roads average 5 percent of any timber sale unit area, no greater than 15 percent of the timber sale unit can have impaired soil productivity.

Units sampled are evaluated for the degree and extent of conditions impairing soil productivity, including compaction, displacement, erosion, and severe burning. Gage Timber Sale - Units 21 and 22, Cispus Hazard Tree Removal - Units 1 and 2, and Whip Timber Sale - Units 12 and 15 were assessed for compliance with the standard.

The units were evaluated for detrimental soil damage by visually estimating the extent of heavily impacted skid trails, landings, and severely burned areas. Damage was randomly sampled by inserting a tile spade in numerous places to test resistance and observe soil hardness and platiness. Compaction was assessed by observing coarse platy structure, measuring difficulty in digging compared to adjacent, undisturbed soil, and observing horizontal roots. Displacement was assessed by testing where 100 square feet of subsoil was found at the surface. Puddling was assessed by testing for ruts greater than six inches in depth.

The six units monitored met the standard for protection of soil productivity.

**Results:** All the units met the standards and guidelines for long-term soil productivity. Some units were not implemented in compliance with all specifications in the contract and mitigation measures in the environmental analysis.

### **Gage Timber Sale - Units 21, 22**

Both units had roads that were subsoiled. Neither fully implemented the mitigation measure for subsoiling (scarification of all temporary roads down to 18 inches). The main temporary road in Unit 21 was not subsoiled to the end of the road, and skid roads in Unit 22 were not subsoiled thoroughly enough to fulfill the contract requirements or EA specifications. Inconsistent interpretation and specification of the treatments “subsoiling,” “ripping” and “scarification” resulted in ground conditions that fell short of soils specialist’s expectations. However, the goals of allowing water infiltration and preventing sediment transport were achieved.



### **Cispus Hazard Tree Removal – Units 1, 2**

Both units had temporary roads that were subsoiled. Subsoiling was successful; they accomplished the measures prescribed in the EA.

The EA specified scarification, cross ditching, and erosion seeding on landings and skid trails. Locations were to be determined on a case-by-case basis.

Inconsistent interpretation and specification of the treatments “subsoiling,” “ripping” and “scarification” resulted in ground conditions that may fall short of soils specialist’s expectations. Scarification results in soil loosening at shallower depths than is needed to mitigate moderate to heavy compaction.

### **Whip Timber Sale – Units 12, 15**

Both units had temporary roads that were subsoiled. The EA specified soil compaction on landings and skid roads would be corrected by deep ripping or subsoiling. Approximately 0.2 miles of temporary road in Unit 15 was not subsoiled. Interpretation of contract specifications differed with EA specifications. Newer contract language has addressed this, and the conflict should not recur.

In Unit 12, a single-toothed winged subsoiler was used on a heavily compacted, native surface road. The winged subsoiler was effective when the passes were less than 18 inches apart, but not effective when furrows were 30 inches apart.

**Recommendations:** Subsoiling 100 percent of the roads would most effectively accelerate the long-term recovery of compacted soils in the area. The recovery of as much area as possible is a main factor in maintaining and improving soil productivity. When stands are likely to be managed again in a relatively short time, the soils will not likely recover from compaction before the next harvest.

Restricting machine operation to a limited number of designated skid trails is widely considered an effective method of reducing impacts of ground-based harvesting on forest soils.

Following are recommendations for the soil resource:

- Deviations from mitigation measures should involve consultation with the appropriate resource specialist and documentation in daily diaries.
- When stands are likely to be managed again in a relatively short time, resource specialists should consider subsoiling areas to allow water infiltration and prevent sediment transport, while leaving a limited number of designated skid trails for future use.
- Subsoiling, ripping and scarification terms should be specifically defined in all future environmental analysis and associated contract specifications formulated to achieve the treatments.
- Where necessary, modify existing environmental analysis language pertaining to subsoiling and scarification treatments and/or associated contract specifications to achieve desired ground conditions.

## Best Management Practices (BMPs) <sup>61</sup> 😊

**Introduction:** Best Management Practices are the primary mechanism to ensure water quality standards are met during project implementation. Best Management Practices (BMPs) are selected and tailored for site-specific conditions to provide project level protection of water quality. The Clean Water Act and the National Forest Management Act directs us to protect streams, streambanks, shorelines, lakes, wetlands and other bodies of water from detrimental changes in water temperature, blockages of water courses, and deposits of excessive sediment, where activities have the potential to seriously and adversely affect water conditions or fish habitat.

Five minor departures were found on the Gage Timber Sale.

Five harvest units within three timber sales were monitored for compliance with Best Management Practices (BMPs): Cispus Hazard Tree Removal Sale Unit 1, Whip Timber Sale Units 12 and 15 and Gage Timber Sale Units 21 and 22. The Cispus Hazard Tree Removal Sale Unit 1 and Whip Timber Sale Units 12 and 15 complied with all the BMPs. The Gage Timber Sale Unit Units 21 and 22 did not comply with five of the 23 BMPs that apply to timber management and road management. The lack of compliance with the BMPs were considered minor departures.

### **Gage Timber Sale Units 21 and 22**

Erosion control including seeding and mulch did not occur as per contract specifications. This was considered a minor departure of two BMPs, *T-5 Limiting the Operating Period of Timber Sale Activities*, *T-13 Erosion Prevention and Control Measures During Timber Sale Operations* and *T-16 Erosion Control on Skid Trails*. The temporary road in Unit 22 was not seeded and mulched. Seed was applied on the temporary road in Unit 21 but did not survive, possibly due to the late date of application and/or the light rate of mulch. Erosion control specifications for the skid trails were not necessarily needed as in most places, the flat topography, a thick layer of native organic material and effectively utilized wood slash provided erosion control and minimized soil disturbance.

**Recommendations:** Erosion control specifications should be implemented in a timely manner in the locations specified in the contract. Contract specifications should include keeping seed and mulch requirements up-to-date after September 15. Grass seeding and mulch should be specified in the contract only where deemed necessary. Natural revegetation should be prescribed where appropriate.

Minor departures occurred from the BMPs *T-15 Log Landing Erosion Prevention and Control* and *R-23 Obliteration of Temporary Roads and Landings* due to the incomplete treatment of landings and temporary roads and the partial effectiveness of the landings and temporary road subsoiling. One section of the temporary road and some landings were not treated as specified in the environmental analysis “All temporary roads will be subsoiled/ripped to an 18-inch depth, have water bars installed, and be seeded and fertilized after timber sale activities are complete. All landings... will be outsloped, subsoiled/ripped to an 18-inch depth, seeded and fertilized.” The contract specification did not

capture the entire intent of the environmental analysis objective to treat temporary roads and landings in a manner that not only results in a seedbed, but also results in appropriate drainage off the temporary road or landing. Water infiltration and erosion prevention was achieved on the ground despite the incomplete or ineffective treatments.

The objective of restoring soil productivity on the temporary road is not specifically stated in the environmental analysis, although the term subsoiling implies the objective of restoring soil productivity to some resource specialists. The contract clause used the term scarified and thus subsoiling with the implied objective of restoring soil productivity was not incorporated into the contract. The National Forest Management Act requires that all temporary roads be returned to resource production within ten years. Therefore, the environmental analysis should address this requirement either by specifying the needed treatments to the temporary road that will result in resource production within 10 years i.e. subsoiling, explaining why treatments would not be necessary for resource production to occur on the temporary road or by identifying a near term use of the temporary road necessitating a delay in treatments while still assuring the attainment of the requirement in the 10 year timeframe.

**Recommendation:** Subsoiling, ripping and scarification terms and objectives should be specifically defined in future environmental analysis, and associated contract specifications formulated to achieve the treatment and desired ground conditions. Subsoiling for soil productivity and scarification for erosion prevention (improving water infiltration) are related but differing objectives, and can be addressed separately where appropriate.



Karen Thompson photo

**Figure 8. - Soil Scientist and Hydrologists monitoring compaction and erosion in the Gage Timber Sale.**

## Stream Temperature Monitoring

**Introduction** The Clean Water Act and the Northwest Forest Plan directs the forest to maintain the physical, chemical and biological integrity of our aquatic resources. The Forest Plan mandates the Forest manages its streams to fully support all designated beneficial uses of water. Cool water temperatures are important in providing quality fish habitat and therefore maintaining beneficial uses.

The state temperature standard is stated as follows:

Temperatures shall not exceed 16.0° C (61° F) due to human activities. When natural conditions exceed 16.0° C, no temperature increases will be allowed which raise the receiving water temperature by more than 0.3° C.

The specific stream temperature monitoring objectives are to track trends in water temperature at the watershed scale and identify reaches adversely affecting temperatures. All stream sites that consistently exceed 16°C are monitored annually.

We report more detailed information for this item to meet the needs of Washington Department of Ecology, the state agency charged with implementing the Clean Water Act.

**Results:** During the summer of 2002, extra sites were monitored to investigate location of thermal sources to streams within the Upper Nisqually River Watershed. Information from these sites will help develop a Water Quality Restoration Plan for temperature.

Currently, there are ten water bodies listed by the state for exceeding the temperature standard on lands managed by the Gifford Pinchot National Forest (Table 13). Monitoring data for other watersheds is also displayed. Temperature exceedances in East Fork Lewis, Upper Lewis Muddy River and Wind River watersheds exist, though they are not currently on the state's list of streams exceeding the water temperature standards.

The state temperature standard requires that stream temperatures not exceed 16° F. as a result of human activities.

**Table 13. - Ten listed water bodies for temperature on Gifford Pinchot National Forest.**

Table 13 lists 10 water bodies on the Forest identified by the state as exceeding the temperature standard.

Watershed	Stream	
Upper Cispus River	Cispus River	Headwaters to above confluence with North Fork Cispus
	North Fork Cispus River	Headwaters to confluence with Cispus River
	East Canyon Creek	Outlet of Takhlakh Lake to confluence with Cispus River
Lower Cispus River	Cispus River	Below confluence with North Fork Cispus River to confluence with Cowlitz River
	Iron Creek	Headwaters to confluence with Cispus River
Middle Cowlitz River	Willame Creek	Headwaters to confluence with Cowlitz River
	Silver Creek	Headwaters to confluence with Cowlitz River
Upper Nisqually River	Catt Creek	Headwaters to confluence with Big Creek
Wind River (Total Maximum Daily Load has been developed – 2002)	Bear Creek	Headwaters to confluence with Wind River
	Eightmile Creek	Headwaters to confluence with Panther Creek

## Upper Cispus River Watershed

- Water temperatures of Walupt Creek are high due to solar radiation heating the surface waters of Walupt Lake (Table 14).
- East Canyon Creek exceeded the state standard and contributes to the elevated stream temperatures of the mainstem Cispus River.

**Table 14. - Upper Cispus River Watershed Stream Temperatures.**

Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Walupt Creek	At inlet to Walupt Lake	10.4	0	10.0	2002	0	10.4 (2002)
Walupt Creek	At outlet to Walupt Lake	<b>20.2</b>	<b>44</b>	<b>19.3</b>	2001-2002	2	21.7 (2001)
Walupt Creek	At confluence w/ Cispus R	<b>20.4</b>	<b>47</b>	<b>19.5</b>	2001-2002	2	20.8 (2001)
Cispus River	Above Walupt Creek confluence	14.1	0	13.3	2002	0	14.1 (2002)
Cispus River	About 4.5 miles above Muddy Fork confluence	14.8	0	13.9	1994,2000, 2002	0	14.8 (2002)
East Canyon Creek	About 5 miles above confluence w/ Cispus R	*	*	*	1994	1	16.6 (1994)
East Canyon Creek	About 1 mile from Cispus R. confluence	<b>16.7</b>	<b>3</b>	<b>15.9</b>	1994-97 1999-2002	7	18.2 (1994)
North Fork Cispus River	Near confluence w/ Cispus R	15.8	0	15.0	1991-95 1997-2002	3	16.3 (1992)
Cispus River	Above North Fork Cispus confluence	*	*	*	1994,2000	1	16.6 (2000)

\* Data not collected in 2002.

**Bold denotes site exceeded temperature standard during 2002.**

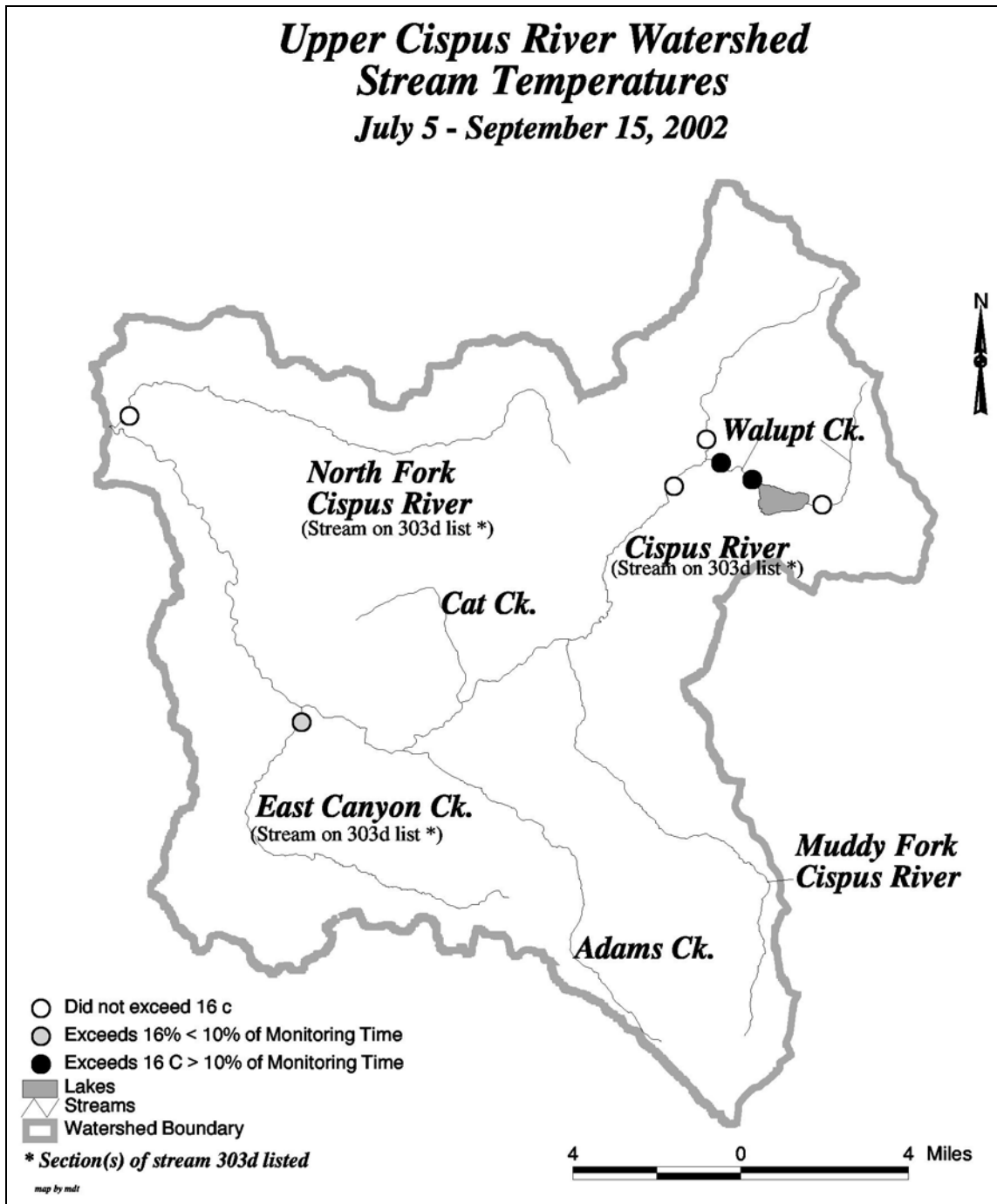


Figure 9. - Temperature Monitoring Locations in the Upper Cispus River Watershed.

## Lower Cispus River Watershed

- The highest maximum stream temperature within the Lower Cispus River Watershed was 1918 Creek (20.5°C).
- Three of the major tributaries, Yellowjacket Creek, Greenhorn Creek and Iron Creek, contribute waters that exceed the state standard to the mainstem Cispus River for prolonged periods.

**Table 15. - Lower Cispus River Watershed Stream Temperatures.**

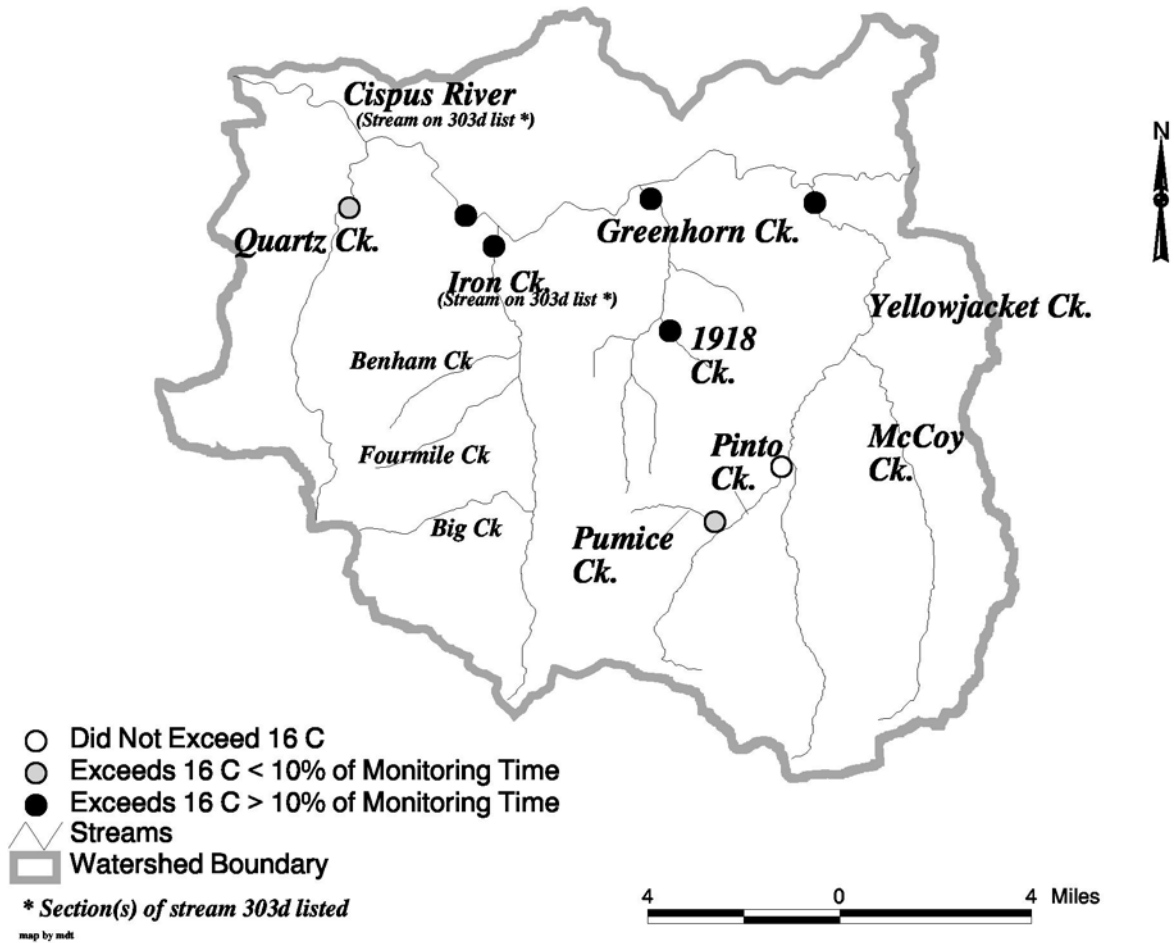
Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Yellowjacket Creek	About 2.5 miles above confluence w/ Pinto Creek	*	*	*	1992,1994 1995,1997	0	14.4 (1992)
Pumice Creek	At confluence w/ Yellowjacket Creek	<b>16.5</b>	<b>2</b>	<b>15.5</b>	2001-02	2	16.5 (2002)
Pinto Creek	At confluence w/ Yellowjacket Creek	14.4	0	13.6	2001-02	1	16.2 (2001)
Yellowjacket Creek	At confluence w/ Cispus R	<b>17.7</b>	<b>28</b>	<b>17.2</b>	1996, 1999-2002	4	19.3 (2001)
1918 Creek	At Greenhorn Creek confluence	<b>20.5</b>	<b>35</b>	<b>18.7</b>	2001-02	2	20.5 (2002)
Greenhorn Creek	At confluence w/ Cispus R	<b>19.9</b>	<b>34</b>	<b>18.4</b>	2000-02	3	20.2 (2000)
Iron Creek	Above Big Creek	*	*	*	1999,2001	0	13.5 (2001)
Big Creek	At Iron Creek confluence	*	*	*	1999,2001	0	13.8 (2001)
Benham Creek	At Iron Creek confluence	*	*	*	1999,2001	0	13.3 (1999)
Iron Creek	At confluence w/ Cispus R	<b>17.3</b>	<b>19</b>	<b>16.8</b>	1996, 1999-2002	4	18.1 (1996,2000)
Cispus River	About 4.5 miles above Quartz Creek confluence	<b>17.5</b>	<b>17</b>	<b>16.5</b>	1991-1992 1996-2002	7	21.9 (1996)
Quartz Creek	About 1 mile from Cispus R. confluence	<b>16.0</b>	<b>2</b>	<b>15.3</b>	2000-02	3	16.3 (2001)

\* Data not collected in 2002.

**Bold denotes site exceeded temperature standard during 2002.**



**Lower Cispus River Watershed  
Stream Temperatures  
July 5 - September 15, 2002**



**Figure 10. - Temperature Monitoring Locations in the Lower Cispus River Watershed**

### Upper Cowlitz River Watershed

- Streams monitored in the Upper Cowlitz River Watershed did not exceed state standards during 2002 (Table 16).
- Stream temperatures of all the major tributaries to the mainstem Cowlitz River within the Upper Cowlitz River Watershed have been monitored at various times during the past nine years and were below the state standard. Coal Creek has the warmest stream temperature recorded (15.4°C ) of any of these major tributaries.

**Table 16. - Upper Cowlitz River Watershed Stream Temperatures.**

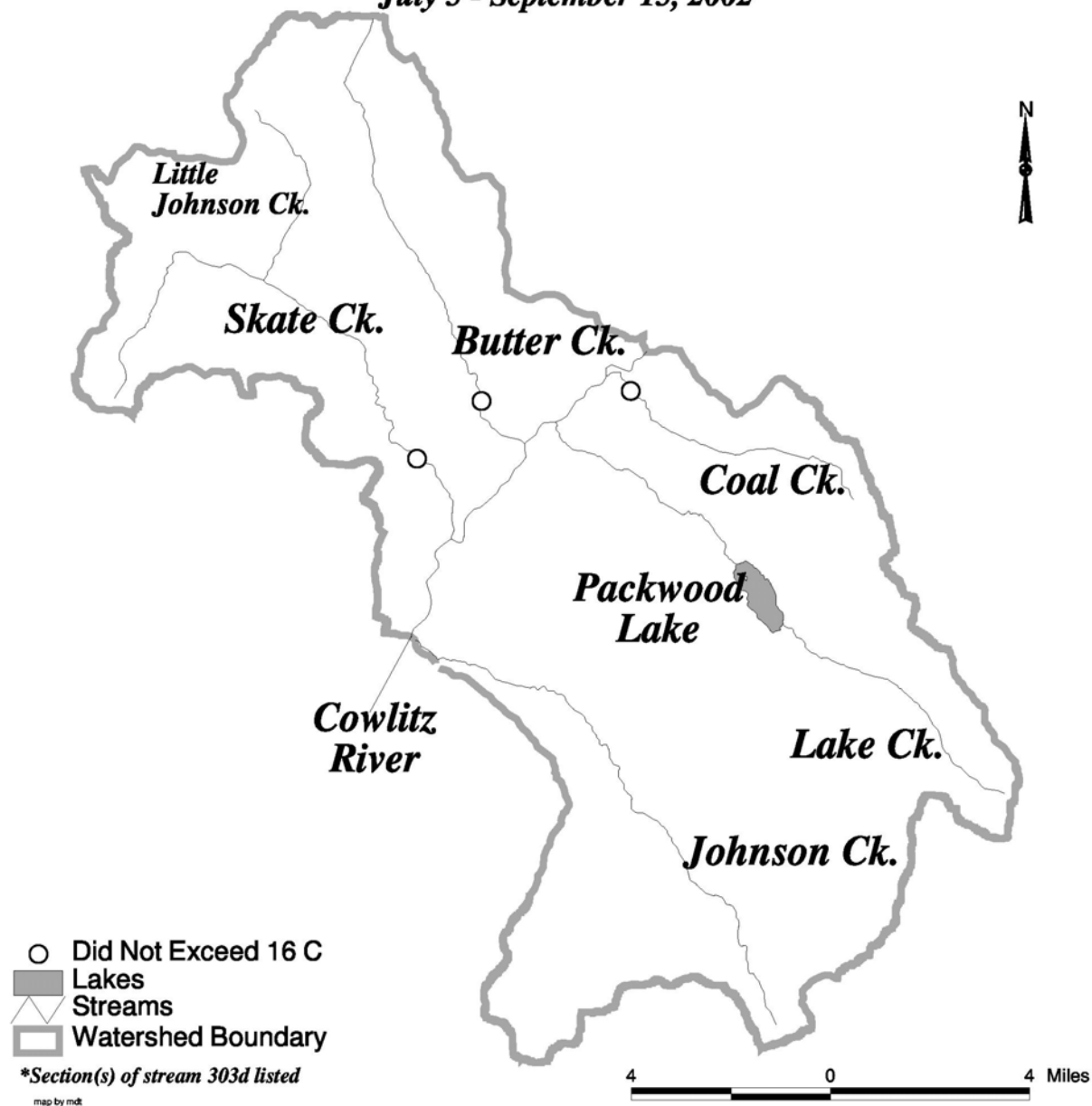
Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Coal Creek	About ¼ mile from Cowlitz R. confluence	15.4	0	14.3	2002	0	15.4 (2002)
Butter Creek	About 1 mile from Cowlitz R. confluence	13.5	0	12.6	1995,2002	0	13.5 (2002)
Skate Creek	0.5 miles below Little Johnson Crk confluence	*	*	*	1994-98	0	14.6 (1994)
Skate Creek	About 2 miles from Cowlitz R. confluence	15.0	0	14.3	2002	0	15.0 (2002)
Johnson Creek	About 1 mile above confluence w/ Cowlitz R	*	*	*	1975-78 1981-88 1994-99	0	14.3 (1998)

\* Data not collected in 2002.

**Bold denotes site exceeded temperature standard during 2002.**

**Upper Cowlitz River Watershed  
Stream Temperatures**

**July 5 - September 15, 2002**



**Figure 11. - Temperature Monitoring Locations in the Upper Cowlitz River Watershed.**

### Middle Cowlitz River Watershed

- Silver Creek has the highest stream temperature (17.0°C) of the tributaries to the mainstem Cowlitz River in the Middle Cowlitz River Watershed (Table 17). Silver Creek has exceeded the state standard every year monitored (8 years).
- Lillian Creek, at tributary to Willame Creek, exceeded the state standard during 2002, the first year since 1998 which was a hot summer.

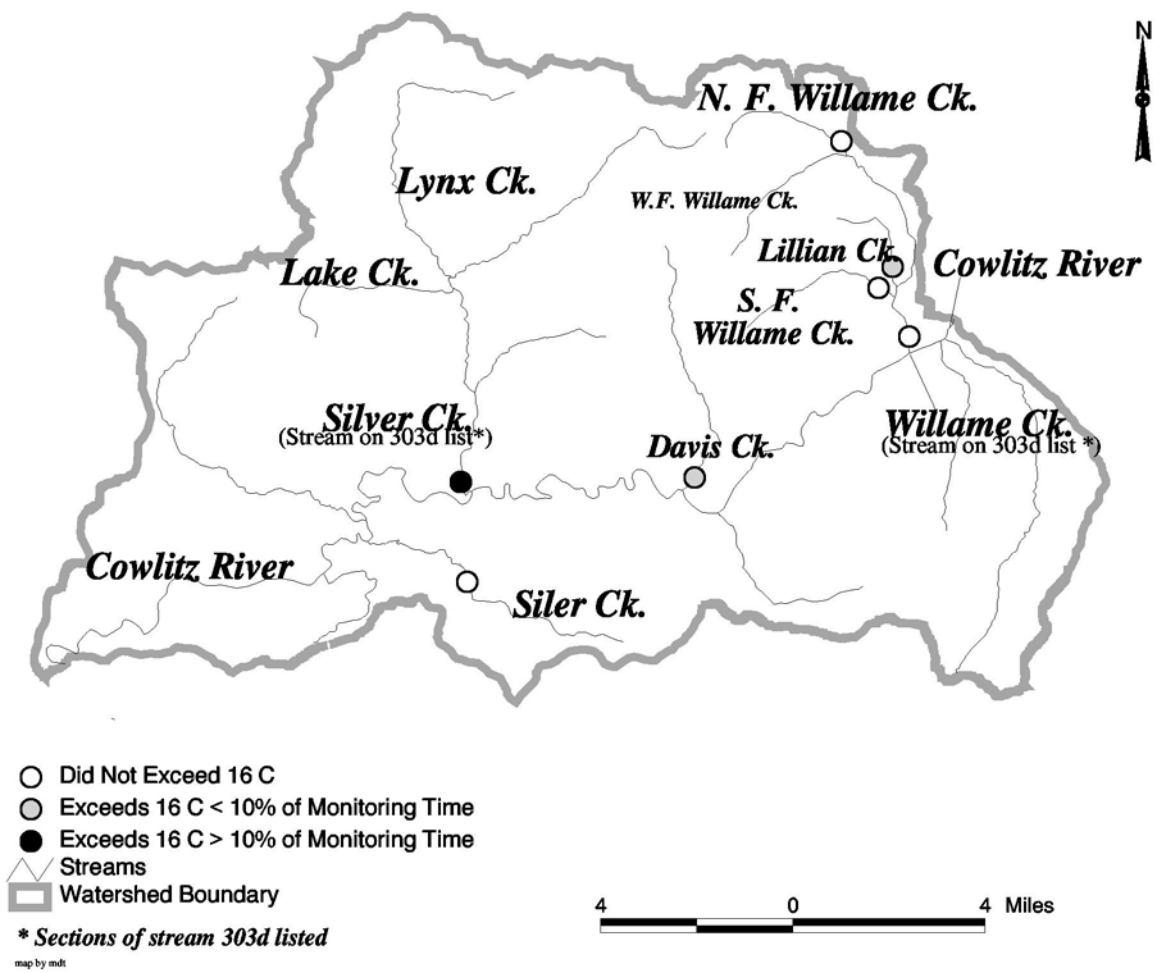
**Table 17. - Middle Cowlitz River Watershed Stream Temperatures.**

Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
North Fork Willame Creek	At confluence w/ Willame Creek	14.5	0	13.5	1978, 1983-1987, 1987,1996, 1998-2002	1	16.3 (1996)
West Fork Willame Creek	At confluence w/ Willame Creek	*	*	*	1996,1998	0	14.2 (1998)
Lillian Creek	At confluence w/ Willame Creek	<b>16.2</b>	<b>1</b>	<b>15.2</b>	1998-2002	2	17.0 (1998)
South Fork Willame Creek	About 1 mile above Willame Cr	*	*	*	1975-78 1980-88 1994	0	14.4 (1994)
South Fork Willame Creek	At confluence w/ Willame Creek	14.4	0	13.6	1998, 2000-2002	1	16.4 (1998)
Willame Creek	1/2 mile above confluence w/ Cowlitz R	15.4	0	14.6	1999-2002	2	16.2 (2001)
Davis Creek	About 2 mile from Cowlitz R. confluence	<b>16.3</b>	<b>1</b>	<b>15.3</b>	2001,2002	1	16.3 (2002)
Silver Creek	About 2.5 miles above Lynx Ck	*	*	*	1995-1997	0	11.9 (1995,1996)
Silver Creek	Below Lake Creek confluence	*	*	*	1999,2001	1	16.3 (2001)
Silver Creek	About 1 mile from Cowlitz R. confluence	<b>17.0</b>	<b>11</b>	<b>16.1</b>	1992, 1995, 1997-2002	8	19.3 (1996)
Siler Creek	About 2.5 miles from Cowlitz R.	15.4	0	14.6	1996,2002	0	15.8 (1996)

\* Data not collected in 2002.

**Bold denotes site exceeded temperature standard during 2002.**

**Middle Cowlitz Watershed  
Stream Temperatures  
July 5 - September 15, 2002**



**Figure 12. - Temperature Monitoring Locations in the Middle Cowlitz River Watershed.**

## Upper Lewis River Watershed

- Quartz Creek and the lower reaches of the mainstem Lewis River exceeded the temperature standard (Table 18).
- Quartz Creek had cooler temperatures during 2002 than in the previous two years.
- The Lewis River temperatures during most of August were not sampled due to data recorder being out of the water.

**Table 18. - Upper Lewis River Stream Temperatures.**

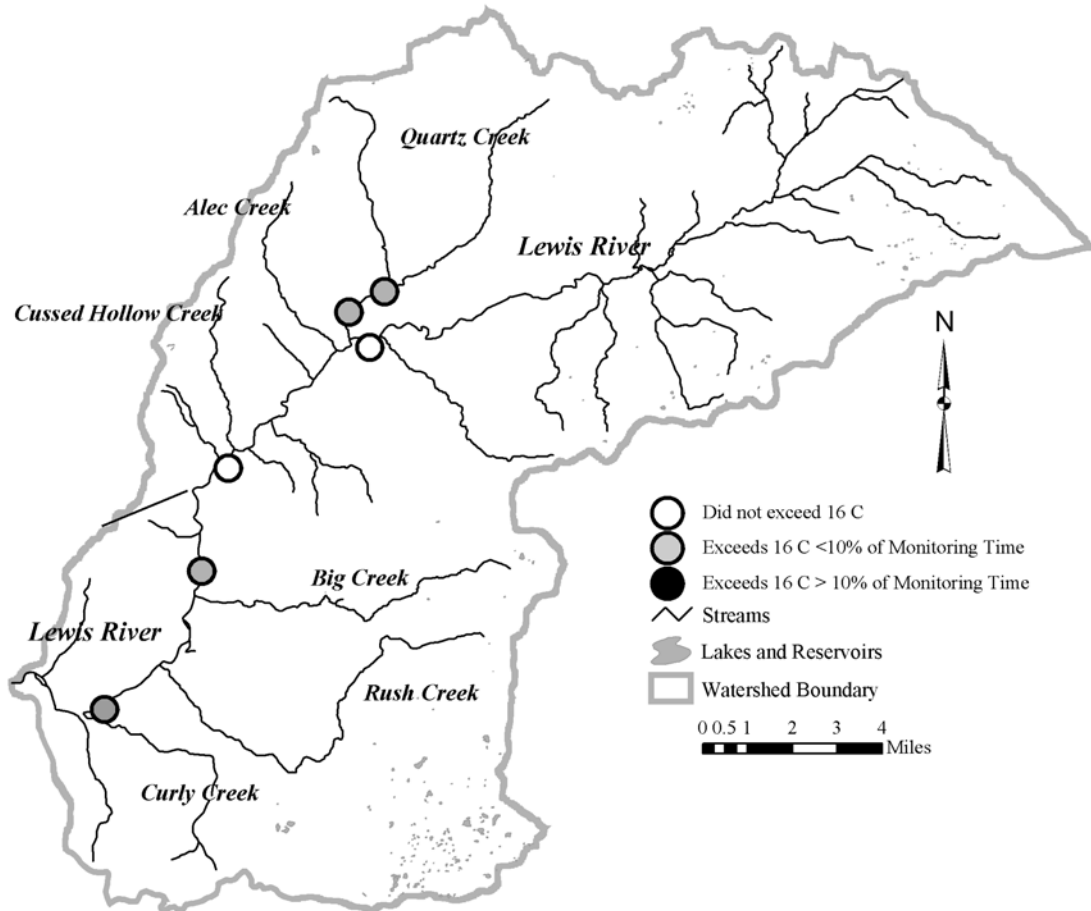
Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Lewis River**	Above Quartz Creek	13.7	0	13.3	1999-2002	0	15.7 (2001)
<b>Quartz Creek</b>	<b>Above Platinum Creek</b>	<b>17.3</b>	<b>8</b>	<b>16.1</b>	<b>2000-2002</b>	<b>3</b>	<b>17.6 (2000,2001)</b>
<b>Quartz Creek</b>	<b>Below Platinum Creek</b>	<b>16.7</b>	<b>2</b>	<b>15.6</b>	<b>1977-1979 1982-1984 1988, 1991 1997-2002</b>	<b>9</b>	<b>19.0 (1997)</b>
Lewis River	Above Cussed Hollow Creek	*	*	*	1996-1997	2	17.7(1996)
Lewis River**	Below Cussed Hollow Creek	15.5	0	12.9	1998-1999,2002	1	17.9 (1998)
<b>Lewis River**</b>	<b>Above Big Creek</b>	<b>16.2</b>	<b>4</b>	<b>16.2</b>	<b>2001-2002</b>	<b>2</b>	<b>18.5 (2001)</b>
Rush Creek	Above Meadows Creek	*	*	*	1996,1999-2000	0	11.8(2000)
Lewis River	Below Rush Creek	*	*	*	1996-1997	0	15.8(1997)
<b>Lewis River**</b>	<b>Above Curly Creek</b>	<b>16.5</b>	<b>1</b>	<b>15.4</b>	<b>1975-1988 1991, 1997-2000 2002</b>	<b>11</b>	<b>22.7 (1997)</b>

\* Data not collected in 2002.

\*\* Data gaps exist during a significant part of the summer (2<sup>nd</sup>- 4<sup>th</sup> weeks in August) at the Lewis River Stations.

**Bold denotes site exceeded temperature standard during 2002.**

*Upper Lewis River Watershed Stream Temperatures  
June 15 - September 15, 2002*



**Figure 13. - Temperature Monitoring Locations in the Upper Lewis River Watershed.**

### The Muddy River and Swift Reservoir Watersheds

- Clear Creek and the mainstem Muddy River exceeded the temperature standard (Table 19).
- Clearwater Creek water temperatures never exceeded 16°C during 2002, while it exceeded 16°C on 39 days in 2001. Clear Creek also had fewer temperature exceedances during 2002 than in 2001.
- Pine Creek of the Swift Reservoir Watershed maximum stream temperature was 15.0°C. This creek has known Bull Trout populations

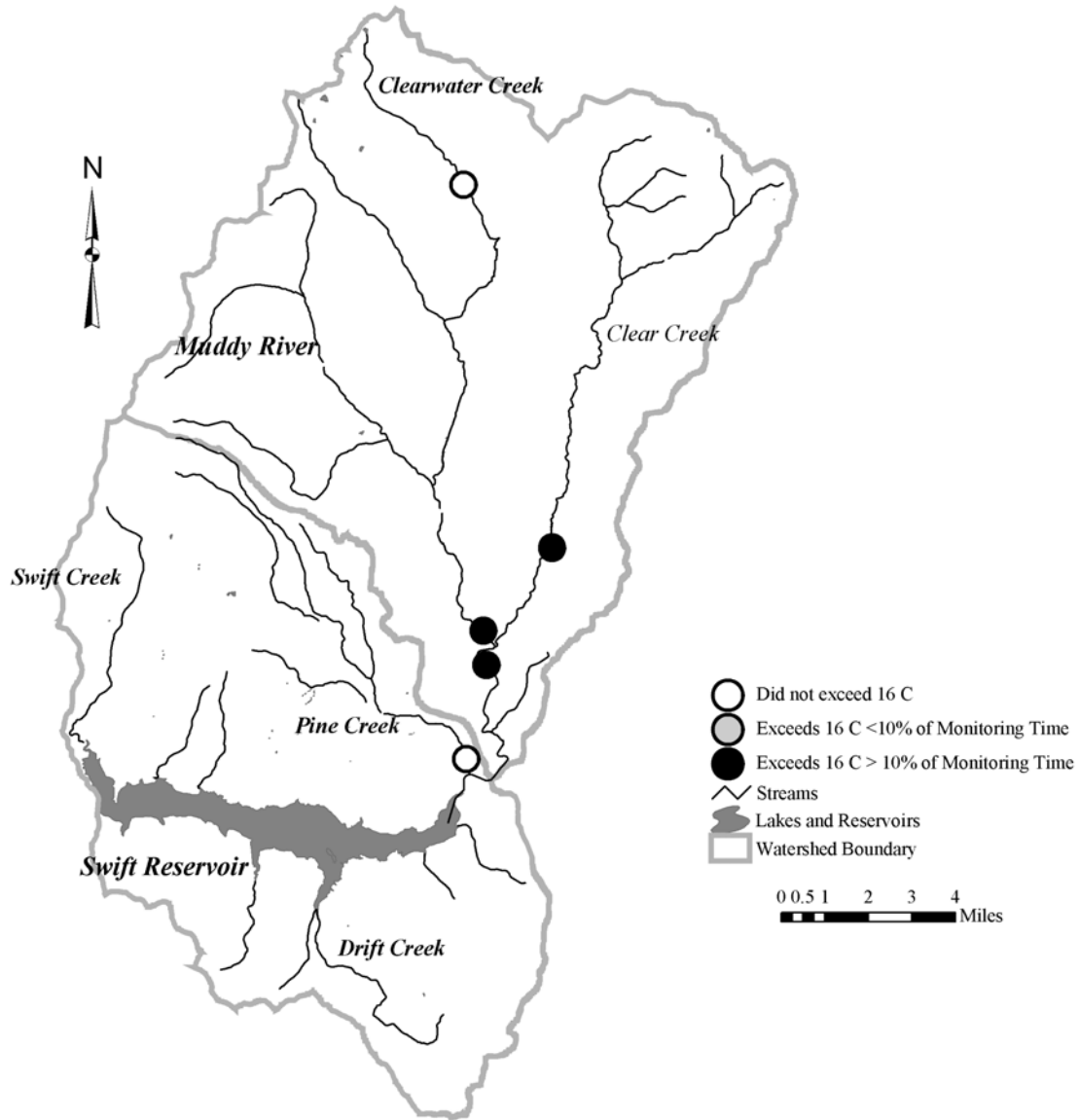
**Table 19. - Muddy River and Swift Reservoir Watershed Stream Temperatures.**

Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0° C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Clearwater Creek	8 miles above Muddy River	15.0	0	13.9	1996-1999 2001-2002	5	18.8 (1998)
Muddy River	Above Clear Creek confluence	<b>20.7</b>	64	<b>19.0</b>	1991, 1996-2002	8	24.4 (1991)
Clear Creek	Near confluence w/ Muddy River	<b>17.2</b>	10	<b>16.4</b>	1991, 1997-2002	6	22.9 (1991)
Muddy River	Below Clear Creek confluence	<b>21.2</b>	60	<b>19.7</b>	2001-2002	2	21.2(2002)
Pine Creek	0.5 Mi. above Lewis River confluence	15.0	0	14.2	2002	0	15.0 (2002)

**Bold denotes site exceeded temperature standard during 2002.**



***Muddy River and Swift Reservoir-Lewis River  
Watershed Stream Temperatures  
June 15 - September 15, 2002***



**Figure 14. - Temperature Monitoring Locations in the Muddy River and Swift Reservoir Watersheds.**

## East Fork Lewis River Watershed

- The mainstem of the East Fork Lewis River, Copper Creek and Slide Creek exceeded 16°C during 2002 (Figure 15).
- Temperature patterns and the number of excursions beyond 16°C in the East Fork Lewis River during 2002 were similar to measurements taken in 2001. Most temperature exceedances occurred downstream of Slide Creek in the mainstem of the East Fork Lewis River.
- Copper Creek water temperatures exceeded 16°C during 2000 and 2002 for 6 and seven days respectively while the stream remained cool in 2001 with a maximum temperature of 15.8°C.

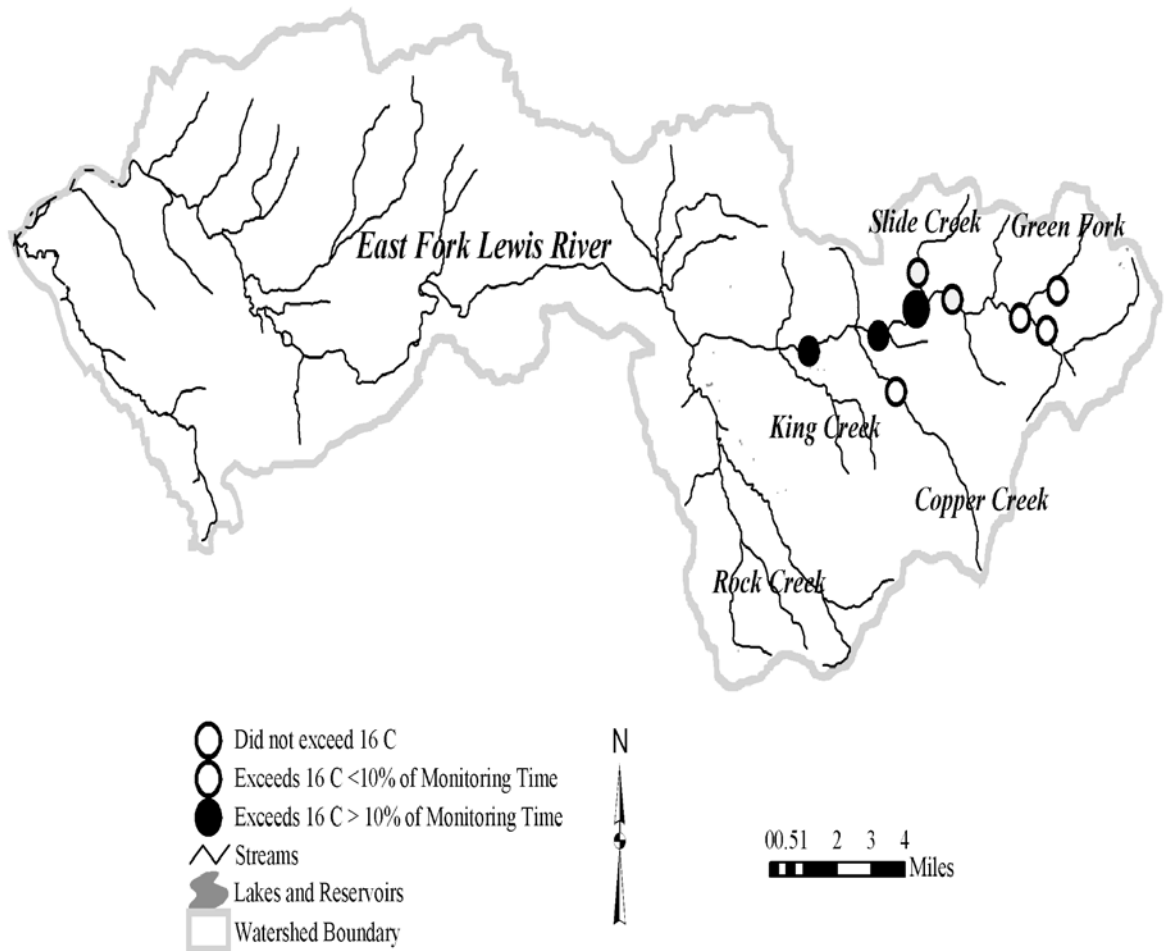
Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
East Fork Lewis River	Above Green Fork	<b>17.1</b>	<b>6</b>	<b>16.1</b>	<b>1999-2002</b>	<b>3</b>	<b>17.5 (2000)</b>
Green Fork**	1 mile above East Fork	14.2	0	13.8	1996-2002	2	22.0 (1997)
East Fork Lewis River	Just Below Green Fork	<b>16.4</b>	<b>2</b>	<b>15.5</b>	<b>2001-2002</b>	<b>2</b>	<b>16.4 (2002)</b>
East Fork Lewis River	1 mile below Green Fork	*	*	*	1999-2001	1	17.9 (2000)
East Fork Lewis River	About 1 mile above Slide Creek	*	*	*	1996-1998	3	19.4(1996)
East Fork Lewis River	Just Above Slide Creek	<b>16.7</b>	<b>7</b>	<b>16.0</b>	<b>2001-2002</b>	<b>2</b>	<b>17.1 (2001)</b>
Slide Creek	¼ Miles above East Fork	<b>16.1</b>	<b>1</b>	<b>15.1</b>	<b>2001-2002</b>	<b>2</b>	<b>16.2 (2001)</b>
East Fork Lewis River*	Below Slide Creek	<b>17.4</b>	<b>18</b>	<b>16.5</b>	<b>2001-2002</b>	<b>2</b>	<b>18.1 (2001)</b>
East Fork Lewis River	Below Sunset Falls Campground	<b>18.8</b>	<b>28</b>	<b>17.8</b>	<b>2001-2002</b>	<b>2</b>	<b>18.8 (2002)</b>
Copper Creek	Above Bolin Creek	<b>21.8</b>	<b>7</b>	<b>17.2</b>	<b>1977-1981</b> <b>1996-2002</b>	<b>8</b>	<b>21.8 (2002)</b>
East Fork Lewis River	Above Niccolls Creek	<b>19.6</b>	<b>39</b>	<b>18.5</b>	<b>1997,</b> <b>1999-2002</b>	<b>5</b>	<b>20.1 (2000)</b>

\* Data not collected in 2002.

\*\*Data collection ended August 1, 2002 due to hardware failure.

**Bold denotes site exceeded temperature standard during 2002.**

*East Fork Lewis River Watershed Stream Temperatures  
June 15 - September 15, 2002*



**Figure 16. - Temperature Monitoring Locations within the East Fork Lewis River Watershed.**

### Yale Reservoir and Merwin Reservoir Watersheds

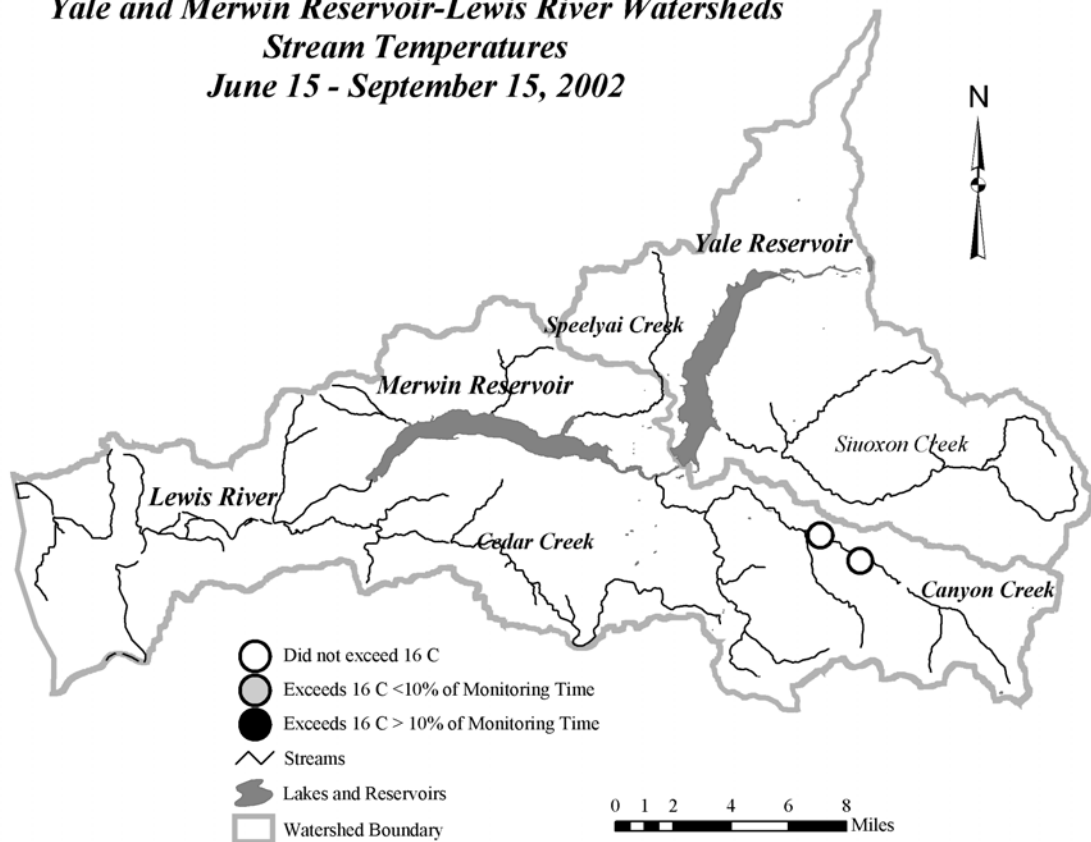
- Canyon Creek had zero temperature exceedances during 2002 (Table 20).

**Table 20. - Yale Reservoir and Merwin Reservoir Watersheds Stream Temperatures.**

Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Siouxon Creek	Below West Creek	*	*	*	1996-2000	5	22.0 (1997)
Canyon Creek	Above Jake's Creek	12.5	0	12.0	2001-2002	0	12.6 (2001)
Canyon Creek	Above Big Rock Creek	15.2	0	14.3	1997-1998 2001-2002	2	16.9 (1998)

\* Data not collected in 2002.

*Yale and Merwin Reservoir-Lewis River Watersheds  
Stream Temperatures  
June 15 - September 15, 2002*



**Figure 17 - Temperature Monitoring Stations in the Yale and Merwin Reservoir Watersheds.**

**Wind River Watershed**

- Water temperatures exceeded 16°C at thirteen of twenty monitoring stations in the watershed.
- Trout Creek below Hemlock Lake had the highest recorded temperatures of the year at 22.9°C.
- Trout Creek above Hemlock Lake had the greatest duration of temperature standard exceedances, with 45 days exceeding 16°C.
- Water temperature maximums were *lowest* in Panther Creek, reaching just 11.7°C.
- Cooler water and sustained flow levels in Falls Creek contribute to a lowering of water temperatures in the Wind River.

**Table 21. - Wind River Watershed Stream Temperatures.**

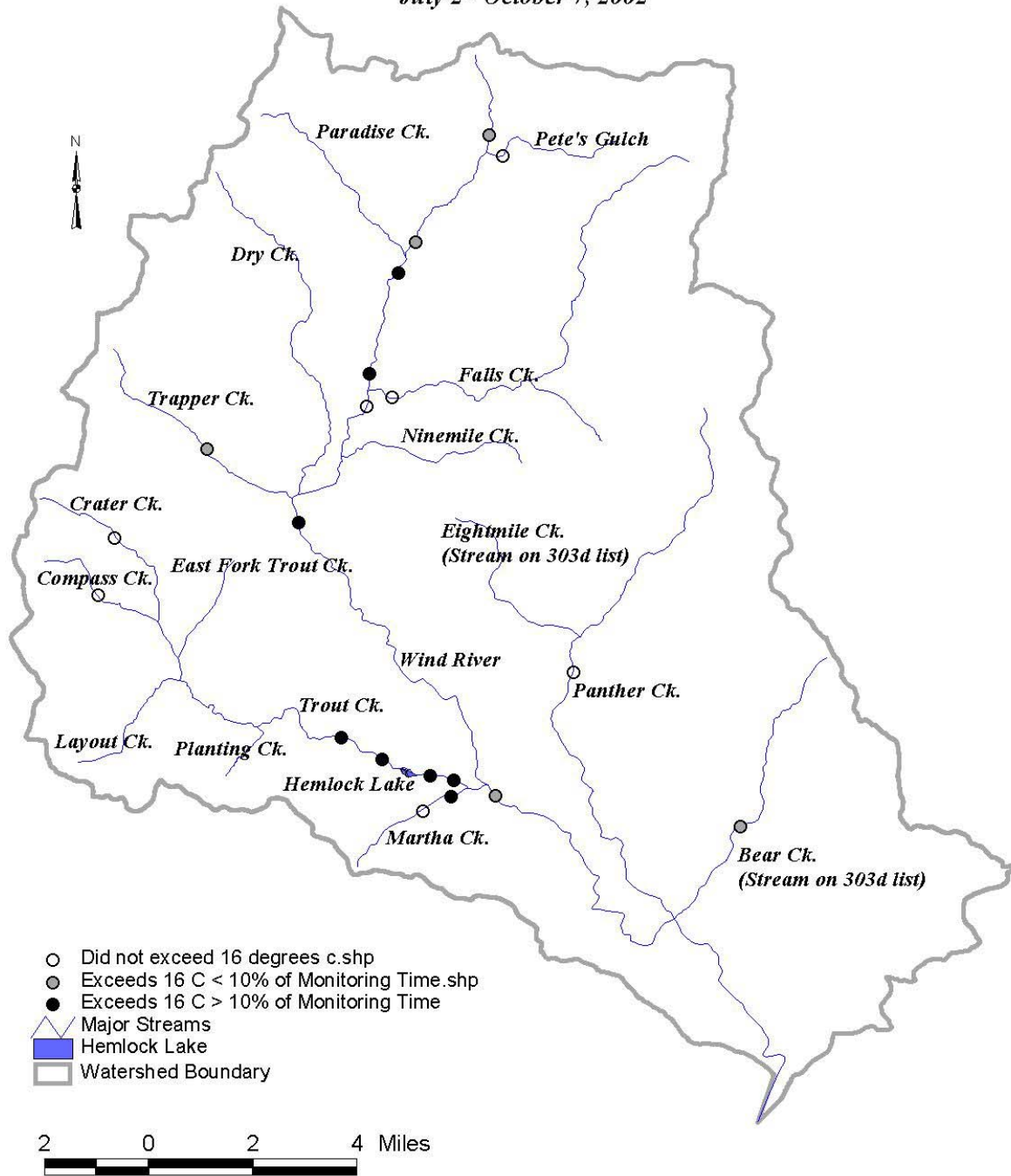
Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
<b>Wind River Headwaters</b>	<b>Above Pete's Gulch</b>	<b>17.2</b>	<b>7</b>	<b>16.0</b>	<b>1998-2002</b>	<b>2</b>	<b>17.2 (2002)</b>
Pete's Gulch	Above confluence w/ Wind River	15.6	0	14.6	1999-2002	0	15.9 (2001)
<b>Wind River</b>	<b>Above Paradise Creek</b>	<b>17.7</b>	<b>8</b>	<b>16.8</b>	<b>1993 1995-1997 1999-2002</b>	<b>7</b>	<b>17.7 (2002)</b>
<b>Wind River</b>	<b>Below Paradise Creek</b>	<b>17.7</b>	<b>14</b>	<b>16.8</b>	<b>1999-2002</b>	<b>3</b>	<b>17.7 (2002)</b>
<b>Wind River</b>	<b>Above Falls Creek</b>	<b>17.3</b>	<b>24</b>	<b>16.7</b>	<b>1993 1999-2002</b>	<b>4</b>	<b>17.3 (2001,2002)</b>
Falls Creek	Above confluence w/ Wind River	15.1	0	14.0	1998-2002	2	17.1 (2001)
Wind River	Below Falls Creek	15.6	0	14.0	2002	0	15.6 (2002)
<b>Trapper Creek</b>	<b>River mile 1.8</b>	<b>18.6</b>	<b>9</b>	<b>17.9</b>	<b>1977-1984 1986-1997 1999-2002</b>	<b>5</b>	<b>18.6 (2002)</b>
<b>Wind River Baseline</b>	<b>Below Trapper Creek</b>	<b>17.4</b>	<b>7**</b>	<b>16.4</b>	<b>1978-2000 2002</b>	<b>18</b>	<b>23.0 (1980)</b>
Crater Creek	River mile 2.0	12.1	0	11.4	2002	0	12.1 (2002)
Compass Creek	River mile 2.1	13.9	0	13.3	2002	0	13.9 (2002)
<b>Trout Creek</b>	<b>Below Planting Creek</b>	<b>17.8</b>	<b>22</b>	<b>16.9</b>	<b>2002</b>	<b>1</b>	<b>17.8 (2002)</b>
<b>Trout Creek Baseline</b>	<b>Above Hemlock Lake</b>	<b>21.0</b>	<b>56</b>	<b>20.0</b>	<b>1977-1993 1995-2000 2002</b>	<b>23</b>	<b>25.0 (1990, 1992)</b>
<b>Trout Creek</b>	<b>Below Hemlock Lake</b>	<b>22.9</b>	<b>50</b>	<b>21.3</b>	<b>2002</b>	<b>1</b>	<b>22.9 (2002)</b>
<b>Trout Creek</b>	<b>Above Martha Creek</b>	<b>20.1</b>	<b>44</b>	<b>19.1</b>	<b>2002</b>	<b>1</b>	<b>20.1 (2002)</b>
Martha Creek	River mile 0.9	15.6	0	15.1	2002	0	15.6 (2002)
<b>Martha Creek</b>	<b>River mile 0.5</b>	<b>20.1</b>	<b>35</b>	<b>18.9</b>	<b>1998,2002</b>	<b>2</b>	<b>24.8 (1998)</b>
<b>Wind River</b>	<b>Below Trout Creek</b>	<b>17.1</b>	<b>3</b>	<b>15.9</b>	<b>2002</b>	<b>1</b>	<b>17.1 (2002)</b>
Panther Creek Baseline	River mile 6.5	11.7	0	11.4	1996-2002	0	12.6 (2001)
<b>Bear Creek Baseline</b>	<b>River mile 2.8</b>	<b>16.2</b>	<b>3</b>	<b>15.3</b>	<b>1977-2002</b>	<b>17</b>	<b>18.0 (1983, 1986, 1987)</b>

\*\*Data collected for a limited period due to equipment error. Based on comparisons with data from other sites, it is likely that the peak was captured, but not every day that exceeded the standard.

**Bold denotes site exceeded temperature standard during 2002**

## Wind River Watershed Stream Temperatures

July 2 - October 7, 2002



**Figure 18. - Temperature Monitoring Locations within the Wind River Watershed.**

### Little White Salmon and White Salmon River Watersheds

- Lost Creek just above the Big Lava Bed had the highest water temperatures recorded in the two watersheds at 17.8°C (Table x and x).
- Trout Lake Creek below Skull Creek also exceeded the state standard, reaching a maximum of 17.3°C.
- Glacially-fed Cascade Creek reached a maximum of just 14.4°C.

**Table 22. - Little White Salmon River Watershed Stream Temperatures.**

Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Little White Salmon River	Above Beetle Creek	14.8	0	14.2	1998-2002	1	16.5 (1998)
Little White Salmon River	Above Lusk Creek	15.3	0	14.2	2002	0	15.3 (2002)
Lost Creek	Above Dry Creek	12.8	0	12.1	2001-2002	0	14.2 (2001)
Lost Creek	Below Dry Creek	<b>17.8</b>	17	<b>17.1</b>	2002	1	17.8 (2002)

**Table 23. - White Salmon River Watershed Stream Temperatures.**

Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Cascade Creek	Near mouth	14.4	0	13.9	1999-2002	1	20.8 (2001)
Trout Lake Creek	Below Skull Creek	<b>17.3</b>	5	<b>16.2</b>	2002	1	17.3 (2002)

**Bold denotes site exceeded temperature standard during 2002.**



# White Salmon and Little White Salmon Watersheds Stream Temperatures

July 3 - October 3, 2002

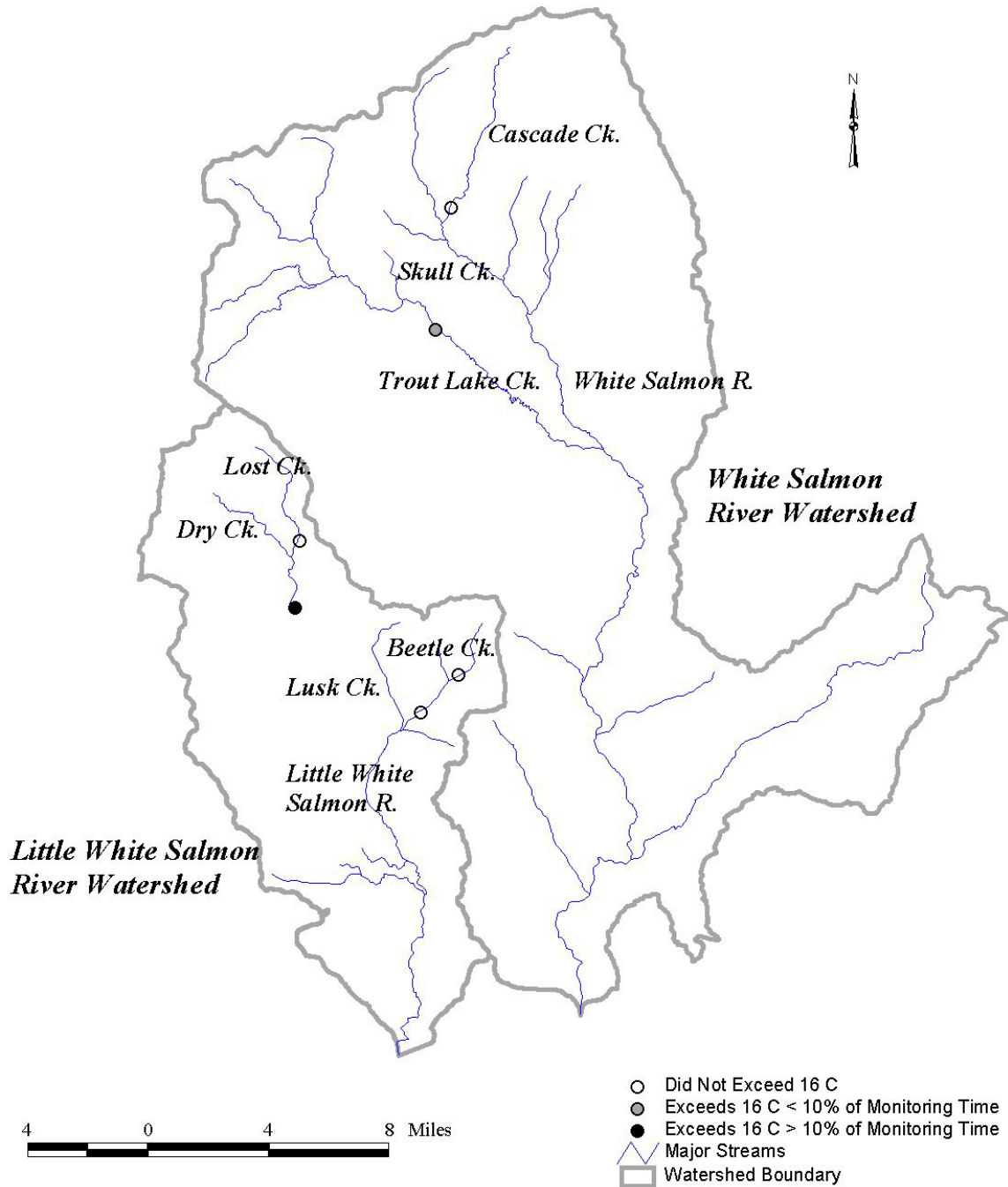


Figure 19. - Temperature Monitoring Locations within the Little White Salmon River Watershed.

## Upper Nisqually River Watershed

- West Fork Little Nisqually River had the highest maximum temperature (18.9°C) and longest prolonged period of elevated temperatures in the watershed (Table x).
- Little Nisqually River enters the Alder Creek Reservoir with temperatures over the standard for over two weeks during the summer of 2002.
- Catt Creek exceeded the standard only 2 days during 2002.

### *Upper Nisqually River Watershed Stream Temperatures July 5 - September 15, 2002*

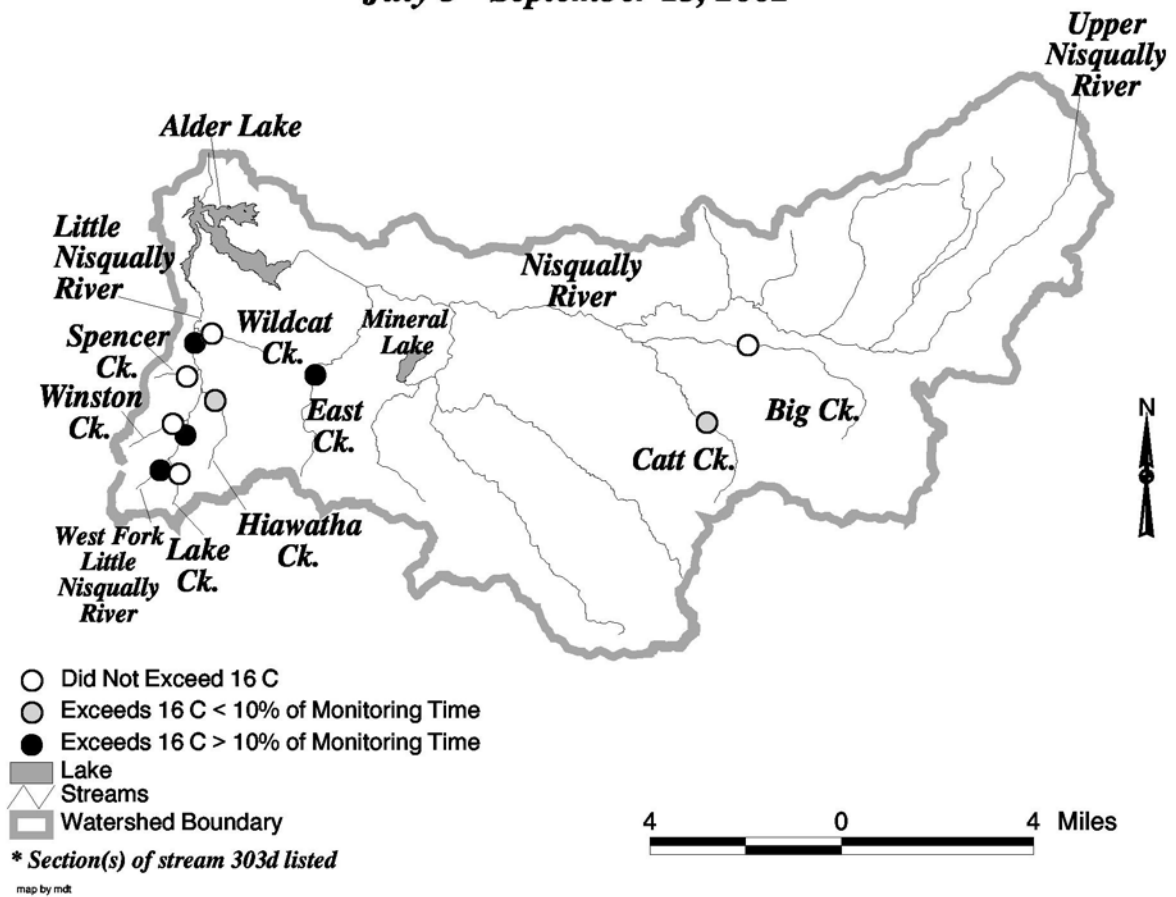


Figure 20. - Temperature Monitoring Locations in the Upper Nisqually River Watershed.

**Table 24. - Upper Nisqually River Watershed Stream Temperatures.**

Stream Name	Monitoring location	Maximum temp. in 2002 (°C)	Days above 16.0°C in 2002 (#)	Maximum 7-day average temp. in 2002 (°C)	Years monitored	Years temp. exceeded 16.0°C (#)	Maximum temp. (°C) during monitoring period (Year)
Big Creek (Nisqually R trib)	About 3.5 miles above Catt Crk confluence	15.5	0	14.6	1997,2002	0	15.5 (2002)
Catt Creek (Big Ck trib)	About 3 miles above Big Crk confluence	<b>16.2</b>	<b>2</b>	<b>15.0</b>	1996,1999, 2001-02	2	16.2 (2002)
East Creek (Nisqually R trib)	About 4.5 miles above Nisqually R. confluence	<b>17.5</b>	<b>17</b>	<b>16.5</b>	2002	1	17.5 (2002)
Lake Creek (West Fork Little Nisqually R trib)	At confluence w/ Little Nisqually R	14.4	0	13.9	2002	0	14.4 (2002)
West Fork Little Nisqually River	At confluence w/ Lake Ck	<b>18.4</b>	<b>26</b>	<b>17.7</b>	2002	1	18.4 (2002)
Winston Creek (West Fork Little Nisqually R trib)	At confluence w/ Little Nisqually R	14.1	0	13.5	2002	0	14.1 (2002)
West Fork Little Nisqually River	At confluence w/ Winston Ck	<b>18.9</b>	<b>26</b>	<b>18.1</b>	2002	1	18.9 (2002)
Hiawatha Creek (Little Nisqually R trib)	At confluence w/ Little Nisqually R	<b>16.4</b>	<b>3</b>	<b>15.8</b>	2001-02	1	16.4 (2002)
Spencer Creek (Little Nisqually R trib)	At confluence w/ Little Nisqually R	14.2	0	13.5	2002	0	14.2 (2002)
Little Nisqually River	At confluence w/ Wildcat Ck	<b>17.9</b>	<b>17</b>	<b>17.0</b>	2002	1	17.9 (2002)
Wildcat Creek	At confluence w/ Little Nisqually R	15.4	0	14.7	2002	0	15.4 (2002)

**Bold denotes site exceeded temperature standard during 2002.**

## Water Quality Restoration Plans

The Forest completed a Water Quality Restoration Plan for the East Fork Lewis Watershed in 2002

The development and implementation of Water Quality Restoration Plans provides the specific actions by which the Forest Service meets Total Maximum Daily Load requirements for 303(d) listed water bodies on lands under Forest Service jurisdiction. Total Maximum Daily Load includes the maximum amount of solar radiation received by a stream per day. Management can affect solar radiation by reducing stream shade.

The Gifford Pinchot National Forest will follow the protocols specified in Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters (USDA, 1999) when developing Water Quality Restoration Plans. The Gifford Pinchot National Forest completed a Water Quality Restoration Plan for the East Fork Lewis Watershed in 2002.

The East Fork River Water Quality Restoration Plan focuses on two potential human caused sources that alter natural processes and contribute to increased stream temperatures on national forest system lands.

- Reduced riparian shade resulting from landscape scale fires (Yacolt Burn and subsequent fires) and salvage logging and associated road building that followed.
- Removal of large wood resulting from past management philosophy that wood was both a threat to the roads and bridges and a barrier to fish.

**Shade** - A shade GIS analysis estimated the difference between the current condition shade and shade that would result from 160 feet tall conifer species. Decreased shade in the East Fork Lewis Headwaters Subwatershed (7 percent) and Upper East Fork Lewis Subwatershed (6 percent) were higher than the decreased shade of Copper Creek Subwatershed (2 percent). Two primary limitations of the model are the character of the near stream riparian vegetation structure was not specifically identified in the GIS data but instead generalized from larger stands delineations, and canopy closure was not modeled. Effects of road prisms were also not represented in the shade analysis.

The riparian reserve vegetation structure is 24 percent hardwood of which red alder is the dominant species within the watershed. The continuing positive contribution of red alder stands are their ability to fix nitrogen and rapidly increase soil organic matter on disturbed sites although this has limited the ability of conifers to become established, resulting in a delay of conifer stand development.

Riparian stand treatments to increase shade vary but include decreasing density of red alder, culturing around individual conifers, and thinning conifers to a density of 40 trees per acre. Stand treatments to limit direct solar radiation to streams are recommended for sixty acres of riparian stands within the East Fork Lewis Headwaters Subwatershed and the Upper East Fork Lewis River Subwatershed.

**Channel Improvements** - Although lateral channel stability is not a problem in the upper reaches of the East Fork Lewis due to the bedrock confined stream, several mainstem response reaches widened along with the lowest reach of Slide Creek after the 96 Flood. Channel restoration projects to eliminate low flow channel widening will involve instream structures using boulders and wood. Five miles of channel restoration along the mainstem East Fork Lewis River and Green Fork are recommended.

**Road Management** 

The Forest completed a Roads analysis as prescribed by the national Roads Management Policy.

**Roads Analysis** - In 2002 the Forest completed a forest level Roads Analysis as prescribed by the national Roads Management Policy. The policy required that managers assess the benefits and ecological costs of roads in a roads analysis. A product of this process was an updated Access and Travel Management Plan (ATM), which identified the future desired maintenance condition of roads after considering the public and government access needs and the potential risks to aquatic and terrestrial ecosystems. This process identified the appropriate maintenance level for forest road segments and identified roads that should be considered for closure and decommissioning because they are unneeded or cause unacceptable environmental impacts. Documentation describing the analysis is on the Forest Internet Site at <http://www.fs.fed.us/gpnf/>.

**Roads Analysis Results** - The road management recommendations fall into one of the following seven road management strategies. The Table 25 shows the miles of road recommended for each of the road management categories.

**Table 25. - Recommended Road Management Strategies**

<b>Recommended Road Management</b>	<b>Miles</b>
OP – Open to passenger cars	636
OH – Open, high-clearance vehicles	941
SO – Seasonally open	1,226
CA – Closed to public, admin. only	194
CS – Closed and stabilized	673
DE – Decommission	697
RT – Road to trails conversion	47

Road maintenance is divided into the following five categories, Level 1-5. Levels 3 through 5 are considered highways, and are subject to regulations of the National Traffic Standards Safety Act. These standards require signing, brushing to maintain sight distance, and other maintenance required for user safety.

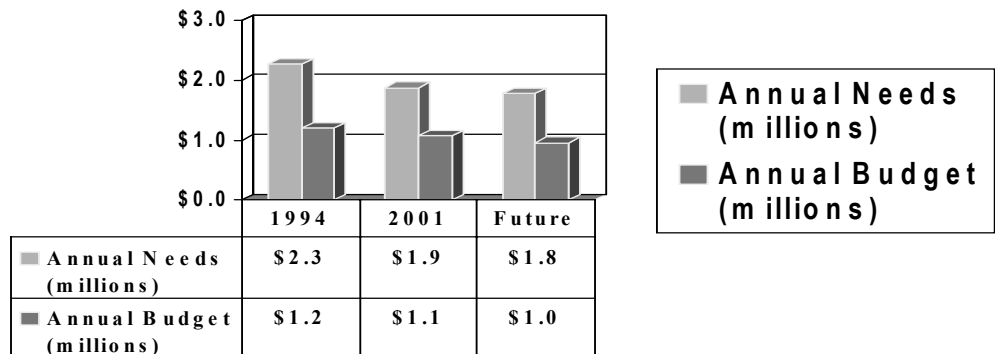
Table 26 shows the miles of road recommended for each of the road maintenance level.

**Table 26. - Recommended Maintenance Level**

Recommended Maintenance Level	Miles
Level 1 – Closed to all traffic	673
Level 2 - Open and maintained for high-clearance vehicle	2,177
Level 3 - Open and maintained for passenger cars; low level of comfort	517
Level 4 - Open and maintained for passenger cars; moderate level of comfort	188
Level 5 - Open and maintained for passenger cars; high level of comfort	113

The economics of the current road system was compared to the road system that would result from implementing all of the road management recommendations.

The current Forest road maintenance budget and the future budget based on anticipated changes in funding levels are compared to the total estimated costs for maintaining the road system. The results, illustrated in Figure 21, show that our anticipated budget is less than anticipated maintenance needs for the foreseeable future:



**Figure 21. - Maintenance Needs vs. Budgets**

**Road Closures** - Road closures include permanent and seasonal closures and decommissioning. Permanent closures are year-around closures created by berms, rock barricades, or by allowing vegetative growth to obscure the road.

Some roads are closed seasonally by gates or other barriers that allow us to open the road during non-critical periods. This seasonal closure may be to protect elk calving grounds, winter range for deer and elk, other wildlife resources, or for administrative reasons such as protection of weak subgrades, or providing visitors with non-motorized experiences.

Decommissioning involves permanent removal of the road from the system by removing drainage structures to create more natural drainage patterns, decompacting some roadbeds to restore their capacity to absorb rainfall, blocking the entrance to prevent vehicles from reopening the road, and revegetating the

roadbed to prevent runoff and to restore productivity. We account for how much overall decommissioning is done on the Forest, and also how much decommissioning and new construction have been done in each of the designated Key Watersheds on the Forest, in order to ensure there is no increase in road miles in any Key Watershed.

**Road Closure Results:**

**Biological Winter Range (BWR):** Road closures are one means of reducing wildlife disturbance in deer and elk winter range. The Forest Plan established a goal of reducing open road density to 1.7 miles of open road per square mile within the biological winter range. The Gifford Pinchot has surpassed this goal, with a current road density in BWR of only 1.67 miles of open road per square mile.

**Overall Forest:** The projected road closure target for the entire Gifford Pinchot National Forest, as stated in the Forest Plan, is 1,230 miles of road in seasonal or permanent closure, Forest-wide. There are currently an estimated 849 miles of road closed by effective year-round closures, or seasonally for BWR or other resource needs. This puts the Forest at 69 percent of the projected goal. In addition, 340 miles of road have been decommissioned since 1994.

The Forest has surpassed the Forest Plan goal for road density in Biological Deer and Elk winter range.

**Table 27. - Roads in Key Watersheds**

KEY WATERSHED	1994 Road Miles	Miles Decommissioned in FY 2002	Miles Decommissioned since 1994	Miles Constr. Since 1994	2002 Road Miles	Net Change Road Miles
Clear Fork Cowlitz	110	0	0	0	110	0
E.Fork Lewis	79	0	3	0	76	-3
Lewis River	737	4	40	0	697	-40
Little White Salmon	133	0	9	1	125	-8
N. Fork Cispus	102	0	4	0	98	-4
Packwood Lake	23	0	0	0	23	0
Siouxon Creek	69	0	0	0	69	0
Upper Cispus	70	1	8	0	62	-8
White Salmon	129	0	17	1	113	-16
Wind River	433	11	60	0	373	-60
Totals	1,885	15	140	2	1,747	-139

**Key Watersheds:** Table 27 compares current road mileage in the 10 key watersheds on the Forest with mileage at the time the Northwest Forest Plan was implemented in 1994. The Forest is required to maintain or decrease the road mileage in each Key Watershed. As can be seen from Table 27, this objective has been met; there are now 7.3 percent fewer miles of roads in key watersheds on the Forest than there were in 1994, and there has been no increase in road mileage in any key watershed.

Table 28 lists road projects completed on the Forest during calendar year 2002. These figures will differ from those in Table 31. - Program Accomplishments, Table 31 figures are compiled on a fiscal year basis.

**Table 28. - Road Projects completed from January – December 2002.**

<b>Watershed</b>	<b>Road Number</b>	<b>Miles</b>	<b>Activities</b>
Clear Fork Cowlitz	4500000	0.1	Clean culvert, construct drain dip
Clear Fork Cowlitz	4500077	0.1	Clean culvert, construct drain dip
Clear Fork Cowlitz	4600000	0.1	Repair fill at culvert inlet
East Fork Lewis	4107000	0.1	Install Trail bridge (road to trail)
East Fork Lewis	4200000	7.5	Install culvert, upgrade culvert and drainage improvement
Kalama River	8123000	0.2	Reconstruction, ditch repair,
Little White Salmon	6800580	0.1	Bridge Removal
Little White Salmon	6000200	0.7	Surfacing
Lower Cispus	2306000	0.1	Bridge Removal
Lower Cispus	2500000	0.2	Repair fill, underdrain installation
Lower Cispus	2608000	0.9	Reconstruction including 4 culvert installations
Lower Cispus	2810000	0.3	Install culvert, construct drain dip, slide cleanup
Lower Cispus	7700000	0.1	Install culvert, repair fill
Lower Cispus	7700090	0.1	Install culvert, repair fill
Middle Cowlitz	4700000	0.1	Install culvert, repair fill
Middle Cowlitz	4700223	0.1	Install culvert, repair fill
Middle Cowlitz	6300000	0.1	Repair fill
Middle Cowlitz	7500000	0.1	Construct drainage dips
Muddy River	9900000	0.4	Install culvert, repair fill, reconstruction/repair
Nisqually River	7400000	0.6	Repair fillslope, clean ditches, clean culverts, construct drain dips, construct rock ford, repair rutted road bed
Nisqually River	7400040	0.3	Repair fillslope
Nisqually River	7400186	0.1	Culvert upgrade, construct 2 grade sags
Nisqually River	7409000	0.1	Repair fillslope, clean ditch
Nisqually River	7409015	0.7	Decommission, remove 5 culverts
Nisqually River	7413000	0.1	Repair rutted road bed, construct drain dip
Nisqually River	7415000	0.1	Repair fillslope
North Fork Toutle	2612036	0.1	Reconstruction/repair
Upper Cispus	2203000	0.1	Install culvert, construct drain dip
Upper Cispus	2328000	0.7	Decommission
Upper Cowlitz	1262000	0.2	Drain dip and rock
Upper Cowlitz	1262029	0.5	Clean culvert, construct drain dip
Upper Cowlitz	2130000	0.1	Clean culvert, repair fill slope
Upper Cowlitz	5290082	0.1	Clean and reinstall culvert, construct drain dip
Upper Lewis	2300000	1.0	Culvert replacement, repair vandalized culvert
Upper Lewis	3200000	0.1	Vegetation Stabilization
Upper Lewis	9331000	0.5	Vegetation Stabilization
White Salmon	8810010	0.1	Bridge Removal
Wind River	4300417	0.2	Surfacing



**Community Effects – Payments to Counties** 

**Introduction:** By an act of Congress in 1908, 25 percent of Forest revenues were paid to counties in proportion to the amount of national forest system land in each county. The act stipulated that the money generated be spent on public schools and roads. While this formula worked well for many years, with the dramatic decline in timber harvest over the past decade, an interest arose in developing a more stable and reliable means to compensate rural communities for their federal lands.

The *Secure Rural Schools and Community Self-Determination Act of 2000* provides an alternative system by which counties can choose to receive payments from the federal government for the support of roads and schools. This legislation stabilizes payment levels to their historic high and provides that 15 – 20 percent of the funds may be used for projects on the Forest with advice from local citizens. The new formula is based on averaging a state’s three highest payments between 1986 through 1999 to arrive at a compensation allotment or “full payment amount.” Communities have the choice to fund restoration projects on federal lands or on county endeavors such as search and rescue, community service work camps or fire prevention. Forest projects must be approved by one of two 15-member Resource Advisory Committees (RAC) comprised of local citizens. The new legislation is slated to guide payment activities through fiscal 2006. The legislation includes three categories of payments. Title I is for roads and schools, Title II is for projects that will benefit resources on federal lands, and Title III is for other natural resource related programs. Details of the legislation are on the Internet at <http://www.fs.fed.us/payments/index.html>.

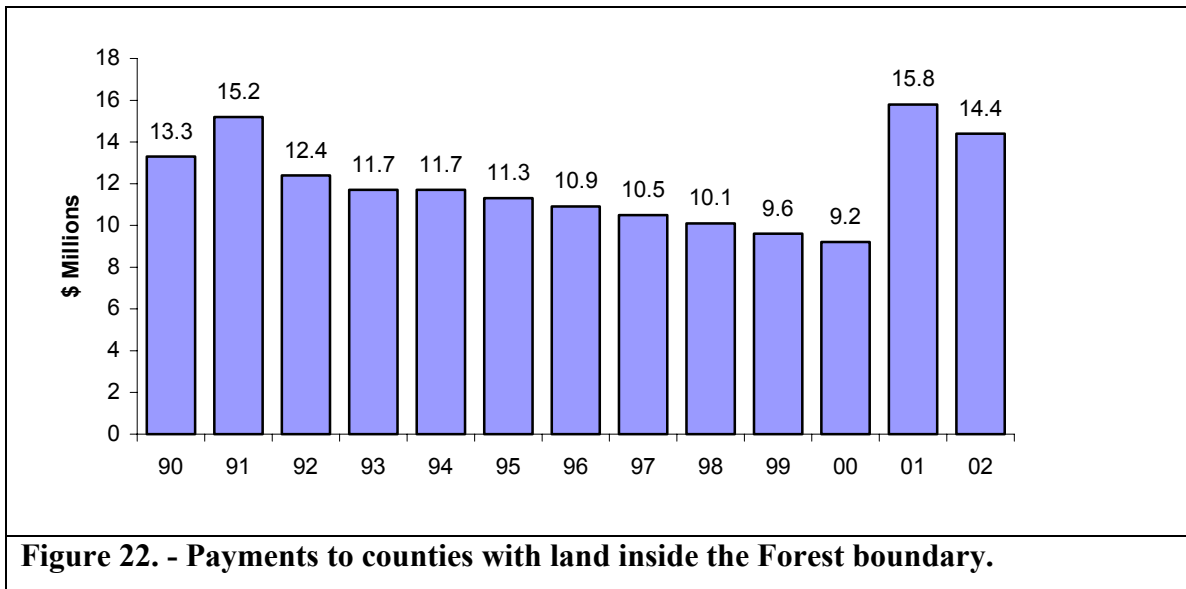
Over \$14 million was returned to the 6 counties within the Forest boundary.

**Results:** A total of over \$14 million was returned to the six counties with lands in the Forest boundary See Figure 22. Projects benefiting resources on national forest system lands (Title II) totaling nearly \$1.3 million were recommended for funding by the RACs and approved by the Forest Supervisor. Projects funded in 2002 are on the internet at <http://www.fs.fed.us/gpnf/forest-administration/county-payments/projects-fy2002.shtml>.

The current distribution of total county payments among counties within the Forest boundary is displayed in Table 29.

**Table 29. - Payments to Counties – Titles I - III**

County	Percent Total Distribution	2002 Distribution
Clark	0.1%	14,908
Cowlitz	2.9%	419,470
Klickitat	1.02%	146,532
Lewis	26.6%	3,826,206
Skamania	67.6%	9,725,040
Yakima	1.8%	255,328
<b>Total</b>	<b>100%</b>	<b>14,385,482</b>



An important Forest Service goal in recent years has focused on helping rural communities adjust to changing federal land management practices and policies. The Forest Service has developed a program, separate from the county payments program, designed to provide both financial and technical assistance to natural resource-based communities and rural development organizations striving to diversify and revitalize local economies and address wildfire hazards. In 2002, the program, called Rural Community Assistance, invested \$696 thousand in the infrastructure of communities surrounding the Forest. Grants by county in the past seven years are tabulated in Table 30.

**Table 30. - Rural Community Assistance Grants**

County	1996	1997	1998	1999	2000	2001	2002
Cowlitz	400,200	90,538	2,500	0	86,750	78,000	57,000
Klickitat	302,832	227,600	178,700	129,000	117,500	50,000	205,000
Lewis	417,754	223,691	32,000	167,75	76,600	64,800	218,000
Wahkiakum	48,200	28,000	105,000	62,785	98,000	0	0
Clark	23,426	0	0	0	0	20,000	22,000
Skamania	118,560	192,050	164,000	273,280	111,800	332,600	128,800
Yakima	0	0	0	0	0	0	65,000
Pierce	7,314	15,000	0	0	0	0	0
<b>Total</b>	<b>\$1,318,286</b>	<b>\$776,879</b>	<b>\$482,200</b>	<b>\$632,840</b>	<b>\$490,050</b>	<b>545,400</b>	<b>695,800</b>

**Introduction:** The Forest Service is charged with making minerals available to the economy, while minimizing the adverse impacts of mining activities on other resources. Mining is unlike other activities on federal lands in that the General Mining Law of 1872 grants the federal land management agencies far less authority over mining activities than over timber harvest, recreation, grazing and other activities. The Forest Service minerals regulations, 36 CFR 228, provide rules to ensure that mining operations be conducted to minimize environmental impacts. These regulations require that a Notice of Intent (NOI) be submitted to the Forest Service District Ranger on the district where the mining is proposed. The operator is required to submit a Plan of Operations (POO) if the district ranger determines that such operations will likely cause significant disturbance of surface resources. Recreational suction dredgers are required to get hydraulic permits from the state for working in streams and should submit a NOI or POO to the Forest Service prior to working on the district.

**Results:** The Forest issued about 125 minerals permits, administered 23 Notice of Intent and two Plans of Operations for mining activities. Cowlitz Valley issued 33 permits and administered 22 NOI's, Mt. Saint Helens issued 43 permits and administered one NOI and Mt. Adams issued 49 permits and had both POO's.

Most of the minerals permits involved salable (common variety) mineral resources. The permits issued were for a total of 375 cubic yards for a cost of \$2,330. Mt. Adams also had one rock permit for larger quantities. These permits were issued for either building material (flat, platy flagstone-type rock), construction material (used for fill, road rock or similar use) or landscaping material (decorative uses). The Forest has sold little to no processed rock such as crushed aggregate that is used as a surfacing for roads.

On-Forest use of rock for numerous construction projects amounted to about 12,000 tons. Federal Highways utilized most of this rock for the restoration of the 26 Road. There was some surface rock replacement to improve drivability. Some was also utilized for rock fills or riprap for stabilization of slopes.

**Suction Dredging** - The required hydraulic permits limit mining activity and its timing, based on guidelines set up in a state publication, *Gold and Fish*. This publication contains rules and regulations for mineral prospecting and placer mining in Washington State (WDFW Publication GF-1-99). This year the Forest had 14 NOIs for suction dredging on the Forest; one was on Copper Creek, which is a tributary of the East Fork Lewis, and the other 13 were located on Yellowjacket/McCoy creeks and various tributaries of this system. There is some concern that *Gold and Fish* allows suction dredging in the lower Yellowjacket and McCoy creeks that may adversely impact anadromous fish spawning. The district fish biologist is working with the state to initiate a change to *Gold and Fish* to reduce the potential of spawning salmon from being adversely affected.

Monitoring the effects of suction dredging was conducted during the open dates. Numerous campsites were noted and posting of mining claims along McCoy Creek but no dredgers were active during the times of visits. It appears most of

The Forest issued 125 permits for mining activities in 2002.

It appears the effects of suction dredging to the aquatic ecosystem are negligible.

the activity probably takes place only on weekends. Monitoring should continue in the future. Personnel need to be on-site when activity is occurring to further assess the effects of mining activity. At this time it appears that effects would be negligible to the aquatic system.

**Evaluation**: Standards and guidelines were met.

**Recommended Action**: Continue monitoring the level of activity by recreational suction dredgers. Continue having the state notify the Forest of applicants for hydraulic permits on the Forest. The dredgers should also be providing Notices of Intent to each district where they plan on working.

## A. Accomplishments

The following table compares program accomplishments for FY's 98-02:

Table 31. - Program Accomplishments							
Output	Units	Outputs					2002 Target
		1998	1999	2000	2001	2002	
Developed and Dispersed Recreation Visits**	Thousand Visits	N/A	N/A	N/A	N/A	1,787	*
Wilderness Use	(thousand)	72.2	44.7	69.6	69.9	58.3	*
Trail Const/Recon.	Miles	66	13.7	1.7	6.7	12.5	*
Trails Maintained	Miles	832	668	76.8	819	927	*
<b>Wildlife Habitat Improvement:</b>	Acres	250	1,200	849	765	650	650
<b>Wildlife Indicator</b>	<b>Indicator</b>						
<b>Species:</b>	Habitat Capability	18,150	18,000	17,850	17,750	17,650	*
Deer							
Elk	Animals	4,530	4,490	4,450	4,410	4,370	*
Mountain Goat	Animals	290	290	290	290	290	*
Net Sell Volume	MCF	9400	606	260	400	273	6,110
	MMBF	48.8	3.3	1.3	2	1.4	32
Volume Harvested	MMBF	34	30	17.8	9.4	1.7	*
Reforestation	Acres	1,342	923	891	552	334	329
Fuel Wood	MCF	141	279	178	306	273	*
Precommercial Thin	Acres	2,087	1,419	2,012	6,027	2,944	1,400
Release	Acres	438	25	14	55	45	*
Fertilization	Acres	0	0	0	0	0	*
Grazing	Head Months	1,736	1732	1732	1,732	1732	*
Watershed Improvement	Acres	53	55	77	318	108	
Instream Restoration	Miles	2.5	2.1	7.1	8.75		*
Air Quality	Particulate Tons	16.8	N/A	85.1	51.7	152.8	*
Fuel Treatment	Acres	0	629	15	518	449	400

\*There are no Regional targets for these items.

\*\*The system for reporting recreation visits rather than visitor days first became available in 2002. This system is believed to be superior to the previous method because it is statistically valid and allows comparisons among national forests.

**D. Accomplishments (continued)**

Output	Units	Output					
		1998	1999	2000	2001	2002	2002 Target
<b>Timber Purchaser Roads:</b>							
• Construction	Miles	0	0	0	0	0	*
• Reconstruction	Miles	14.3	1.1	0	0	0	*
<b>Allocated Funding (Roads):</b>							
• Construction	Miles	0	0	0	0	0	*
• Reconstruction	Miles	0	48.0	31.7	10.5	21	*
• Decommissioning	Miles	47	42	72.3	8.6	2.2	*
<b>Roads Open to:**</b>							
• Passenger Cars	Miles	822	822	833	821	819	*
• High Clearance	Miles	2,352	2,319	2,631	2,583	2627	*
<b>Roads Closed</b>	Miles	1,004	995	600	658	668	*
<b>TOTAL ROAD SYSTEM</b>	Miles	4,178	4,136	4,064	4,061	4115	*
Returns to Govt.	\$ Million	6.8	4.1	4.8	3.5	3.3	*
Payments to Counties	\$ Million	10.0	9.6	9.2	15.8	14.4	*
<b>Landlines:</b>							
• Located	Annual Mi.	3.8	6	2	5	2	2
• Maintained	Annual Mi.	7	2	5	5	5	
Congressionally Designated Boundaries	Miles	4.3	0	3	1	2	
Total Expenditures	\$ Million	36	29	24	36	20	*

\*There are no Regional targets for these items.  
\*\* 2002 figures were developed from a new data base and are not directly comparable to previous years.

## E. Expenditures

The budget for the Gifford Pinchot National Forest is an outcome of the annual congressional appropriations process. Congress allocates an annual budget for the Forest Service that is subsequently disaggregated to the nine Forest Service Regions. Forest Service Regional Offices then allocate the Regional budget among Forests in each Region. Budgets are not related to receipts from timber sales or most other other activities on the Forest. Eighty percent of the user fees collected are kept on the Forest for use in maintaining recreation facilities. Collections from the NW Forest Pass program funds are used to improve maintenance of low development level campgrounds and dispersed camping areas. Beginning in 2002, the Forest will have access to over a million dollars of Title II funds under the Secure Rural Schools Act.

The Forest spent about \$20 million in 2002, less than half the budget of 10 years ago.

Figure 23 displays expenditures on the Gifford Pinchot National Forest over the last 10 years. Expenditures were buoyed in 2001 by \$9 million dollars in land acquisitions and over \$2 million spent suppressing the Salt Creek Fire on Mt. Adams.

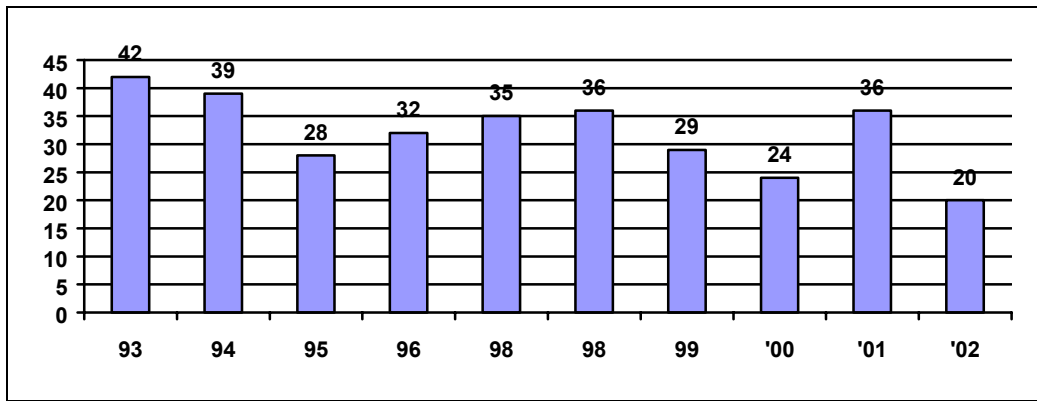


Figure 23. - Total Expenditures 1993-2002

Figure 24 shows the composition of 2002 expenditures by program area. The Other category includes costs for fleet, computers, human resource programs and land management planning.

The largest budget items in 2002 were vegetation management, recreation and transportation (roads).

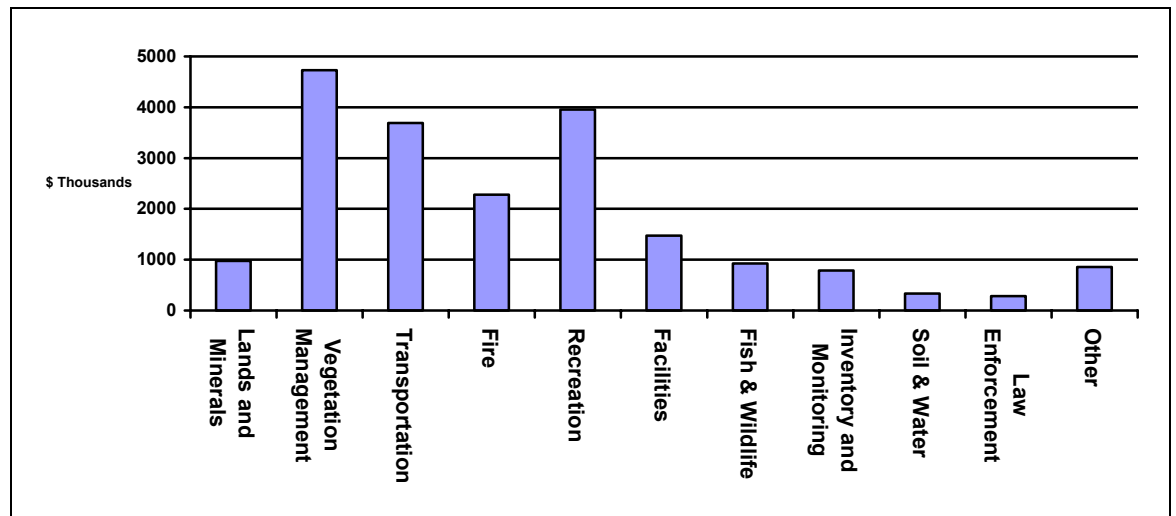


Figure 24. - Expenditures by Program - 2002

## F. Forest Plan Amendments

The following is a list of amendments to the Forest Plan that have been approved to date:

**Table 32. - List of Forest Plan Amendments**

Amendment No.	Approved	Description
1	5/1/91	Decision Memo - Adds Pacific Yew to the list of Acceptable Species in all working groups.
2	9/24/91	Decision Memo - Provides additional direction for visual resource management and mineral claims and leases in Wild River corridors.
3	9/24/91	Decision Memo - Clarified the lower terminus of the Cispus River Wild and Scenic River recommendation in the Forest Plan documents so that it coincided with the Federal Energy Regulatory Commission license boundary of the Cowlitz Falls Hydroelectric Project.
4	9/24/91	Decision Memo - Adds Bigleaf Maple as an Acceptable Species in the Western Hemlock Working Group.
5	9/24/91	Decision Memo - Includes monitoring criteria for the goldeneye and wood duck.
6	8/12/92	Decision Memo - Adds a section on Managing Noxious Weeds and Unwanted Vegetation to the Forest Plan.
7	11/24/92	Decision Notice - Opens Blue Horse Trail 237 to winter motorized use (snowmobiles).
8	3/3/93	Decision Memo - Modifies boundaries of the Forest Plan Map of Record.
9	12/13/93	Decision Notice - Allows grazing in enclosure area of the Cave Creek Wildlife Special Area.
10	7/08/94	Decision Memo - Allows grazing in the Grand Wildlife Special Area, a great blue heron rookery.
11	4/13/94	Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl. Subsequent documentation reconciles Forest-wide and Management Area Standards and Guidelines and the Forest Plan Map with the Record of Decision for the President's Plan. Replaces Forest Plan pages IV-45 through IV-150.
12	5/29/98	Decision Notice – Established the Monte Cristo RNA
13	9/30/98	Record of Decision - White Pass Ski Area Expansion Amends the GP Forest Plan and Northwest Forest Plan to authorize construction of approximately 0.25 miles of road. The ROD and this amendment were invalidated in September 2000 by a court ruling in <i>Northwest Ecosystem Alliance, Hogback Basin Preservation Ass'n., and Washington Wilderness Coalition v. U.S. Forest Service, et al.</i> A new proposal is being studied.
14	4/19/99	Decision Notice - Amends wilderness management standards and guidelines, particularly those related to determining limits of acceptable change.
15	4/30/01	Decision Notice – Amends standards and guidelines forbidding new road construction in a portion of a roaded recreation management area to allow construction of 400 feet of road to access campsites that were relocated away from a riparian reserve.



## **G. Northwest Forest Plan Implementation Monitoring**

Monitoring is a key component of the Northwest Forest Plan. A Region wide implementation monitoring program was initiated in FY 1996 to monitor our implementation of the Northwest Forest Plan standards and guidelines. Below is an excerpt from the 2002 Northwest Forest Plan monitoring report.

### **2002 Province Implementation Monitoring**

#### **Southwest Washington Province**

**September 10 and 17, 2002**

##### **Introduction**

Monitoring was conducted in two sessions. The Muddy River Watershed, an LSR precommercial thinning and a bridge and trail relocation project were monitored on September 10. The Lower Cispus Watershed and an LSR commercial thinning were monitored on September 17. This year's monitoring activities were scaled back from those of recent years in response to extraordinary demands placed on ranger district personnel by the 2002 fire season. While the monitoring activities were streamlined, the objectives were not compromised. The agenda for both watershed activities began with a session in the district office hosted by district staff who provided an overview of the watershed. Much of the information in the overview was drawn from the watershed analyses. Buddy Rose gave a particularly effective demonstration of how ArcView GIS with linked digital photography can be used to prepare a compelling presentation of watershed conditions at multiple scales.

##### **Muddy River Watershed – September 10**

The Muddy River watershed comprises the east slopes of Mount St. Helens. The landscape was heavily modified by the 1980 eruption. The watershed was also heavily impacted by the 1996 flooding. Most of the watershed is either in the legislated Monument or LSR. With its close proximity to Portland and Vancouver, the area is popular for hiking and sightseeing, with striking views of Mount St. Helens and surrounding landscape. There continues to be commercial timber management activities in the Matrix portion of the watershed.

**LSR Precommercial Thinning** - The team reviewed an 87-acre precommercial-thinning project located in the Lewis LSR. This unit was part of the 1,983-acre district-wide stewardship program of 2001. This project was prepared to comply with direction contained in the Forest-wide Late- Successional Reserve Assessment (LSRA). The density management project had the primary objective of accelerating development of late-successional habitat but also provided interim benefits of enhanced deer and elk forage production and accelerating development of structure in riparian areas. The forage production objective was acknowledged in the LSRA. The project was partially funded by Rocky Mountain Elk Foundation. There is a growing concern over availability of forage for deer and elk on Forests managed for late-successional habitat. The project removed about 400 trees per acre at a cost of about \$62/acre. It was evident that the treatment met the LSRA objectives for diversity in spacing and species composition of retained trees. The prescribed no-thin stream buffers were implemented to maintain shade and bank stability. Accelerating development of latesuccessional structure will also accelerate hydrological recovery of the plantation.

**Smith Creek Trail/Bridge Relocation** - Since the eruptions of Mount St. Helens the Smith Creek bridge had been washed out three times, most recently during the floods of 1996. Because the original site was in a widely meandering alluvial fan, the likelihood of further erosion in future flood events and the high cost of effectively mitigating the original location led to the decision to relocate the bridge to a more stable location. A suitable site was found about a mile up-stream in Smith Creek. The 90 foot modular bridge was flown by helicopter from the original site to the new site where Smith Creek flows through a narrow gorge. About one mile of new trail was built to connect the south end of the bridge to

the Smith Creek trailhead and a short section on the north end to connect to the Lava Canyon trail. No large trees were felled in either the trail construction or bridge relocation. The project was deemed to be neutral to LSR objectives.

### **Lower Cispus Watershed – September 17**

The Lower Cispus watershed lies south of the town of Randle, east of Mount St. Helens National Volcanic Monument, and north of the Muddy River watershed on the Cowlitz Valley Ranger District. The watershed is known for Tower Rock and Cispus Learning Center as well as the middle reaches of the Cispus River. Historically, fire was the most significant disturbance mechanism in the watershed, over 40 percent of the watershed burned between 1880 and 1918. Roads in the watershed were heavily impacted by the 1996 floods. Unneeded roads were decommissioned rather than repaired. Since 1996 there has been an ongoing effort to add structure and restore channel stability in the Cispus River. The watershed contains some of the more productive lands on the Forest and historically played an important role in supplying timber to the Northwest economy. The Lower Cispus watershed was analyzed in two watershed analyses, Lower Cispus East and Lower Cispus West, both completed in 1996. The Watershed Analyses are being combined in an updated watershed analysis for the entire watershed in 2003. The focus of the update is to address the effects of the 1996 flood.

**Tower Timber Sale** - Tower Timber Sale is a commercial thinning of young stands in the Woods Late-Successional Reserve. Tower was prepared concurrently with the preparation of the Forest-wide Late-Successional Reserve Assessment (LSRA) in 1987. Logging was completed in May 2000. It was designed to be consistent with the LSRA which provides slightly more flexibility with respect to stand density than the July 1986 REO exemption letter. The LSRA is, however, more prescriptive than the REO exemption letter regarding the requirement for retaining down wood. The LSRA provides for consideration of structural diversity at a landscape level and when the landscape is diverse it allows more uniformity at the stand level than is suggested by the REO exemption letter.

The team reviewed Tower Unit 9, a 25 acre, 42 year-old, primarily Douglas-fir stand. Unit 9 provided for stand-level density diversity by leaving a riparian reserve un-thinned, and thinning half the stand by cutting trees in 3 tree clumps resulting in small gaps in the stand. The other half of the stand was cut to leave a uniform tree spacing. Down wood was provided to exceed the “moderate” level prescribed by the LSRA by leaving 27 down trees per acre. Some of the down wood was left in 3-log structures to mimic the functions of a larger log. Unfortunately, creating the log structures at \$104 each would be prohibitively expensive in most situations since simply falling a tree of this size costs only \$4. There was some concern that this “pulse” in down wood was an unnatural condition and could attract insects or be a fire hazard in periods of drought. There is also a concern about the effect of meeting LSRA down wood goals on the economic viability of the sales. Leaving high levels of down wood threatens economic viability of LSR thinnings which must compete with similar products coming from non-federal ownerships.

## **H. Other Forest Monitoring Activities**

The Forest routinely conducts a wide range of monitoring activities which are not directly linked to the Forest Plan. Examples of these monitoring activities, which we conduct to evaluate the effectiveness of resource program management and trends in the resources, are briefly described in this section.

### **Recreation**

- Campsite facilities monitoring.
- Activity reviews.
- Review and inspection of special-use permittees at visitor centers.

### **Research Natural Areas (RNAs)**

- Monitoring for compliance with RNA management plans. Long-term structure monitoring every three to four years.

### **Wildlife**

- Monitoring of northern spotted owl nests not connected to timber sales.
- Effectiveness monitoring for K-V projects.
- Periodic monitoring (throughout the year) of raptor (osprey/goshawk) nests.
- Nest box monitoring (ducks, etc.).
- Annual surveys for harlequin ducks.
- Annual breeding bird surveys.
- Monitor restoration projects.
- Verification of wildlife sitings.
- Status checks on various habitats (e.g., heron rookeries).
- Monitoring for challenge cost-share projects (e.g. amphibian project).

### **Botany**

- Informal monitoring of sensitive species sites.
- Monitoring of specific species across the Forest in partnership with Partners for Plants.
- Tracking of population trends of rare plant species (such as the fringed pinesap, which has nine sites across the Forest).
- Pine broomrape monitoring study.
- Pale blue-eyed grass monitoring study on grazing impacts.

### **Fisheries**

- Annual stream surveys.
- Annual steelhead snorkel surveys.
- Bull trout monitoring in the Lewis River.

### **Hydrology/Watershed**

- Monitoring of restoration projects within the Adaptive Management Area (in collaboration with PNW Research).
- Yearly utilization monitoring for grazing allotments.
- Informal observation/monitoring of watershed/ soils condition when FH personnel out in the field.
- Monitoring of mass movement through the watershed analysis process.

### **Air Quality**

- Air quality monitoring (Packwood Lake) in collaboration with EPA and WA State Ecology Department, June through September.
- Lichen surveys, one quarter of the Forest each summer.

### **Timber**

- Surveys for down and dead woody material, and standing wildlife trees during sale administration.
- Random sale inspections documented with Inspection Reports.
- Monitoring of roads, landings, mitigation, riparian areas, wildlife trees, and down woody material.
- Forest Headquarters sale area visits.
- Contracting Officer Review of performance/ techniques of individuals administering timber sales.
- Official sale inspections.
- Genetics program monitoring.
- K-V reforestation surveys (1st and 3rd year).
- Informal slash monitoring.

### **Engineering/Roads**

- Maintaining status of roads gated and decommissioned (necessitated by p.

C-7 of ROD, which requires no net increase in roads).

- Inventory of number and mileage of temporary roads.
- Monitor road maintenance activities (ours and purchasers) for compliance with Road Management Objectives and Road Management Specifications.
- Monitor road and trail bridges for safety.
- Monitor public drinking water stations.

Monitor traffic signing program (monitoring of uniform traffic control devices).

- Quarterly groundwater monitoring at Chelatchie Prairie.
- Year-round traffic counts across the Forest.
- Weather conditions, especially rain-on-snow events for flood forecasting.

#### **Fire**

- Effectiveness monitoring in units after prescribed burning.
- Annual preparedness monitoring.
- Periodic NIFMAS monitoring.
- Pre/post-prescribed burn fuel inventories.

# Glossary

## A

**Anadromous fish** - Those species of fish that mature in the sea and migrate into streams to spawn. Salmon, steelhead, and searun cutthroat trout are examples.

## B

**Big game** - Large mammals hunted for sport. On the National Forest these include animals such as deer, elk, antelope, and bear.

**Big game winter range** - A range, usually at lower elevation, used by migratory deer and elk during the winter months; usually more clearly defined and smaller than summer ranges.

**Board Foot** = a piece of wood 12 inches wide by 12 inches long by one inch in width

MBF = 1000 Board Feet, approximately  
1.94 CCF depending on growing site

CCF= 100 Cubic Feet

MCF= 1000 Cubic feet = 10 CCF

1 MCF = 8 cords of wood

## C

**Cavity** - The hollow excavated in trees by birds or other natural phenomena; used for roosting, food storage, and reproduction by many birds and mammals.

**Ceded lands** - Lands surrendered to the federal government by treaty.

**CF (cubic foot)** - The amount of timber equivalent to a piece of wood one foot by one foot by one foot.

**Cord of firewood** a stack of wood 4 feet high by four feet wide by 8 feet long = 1.28 CCF or 128 cubic feet---- which includes the air space between pieces of wood.

**Creel** - A wicker basket used by anglers to carry fish.

**Cultural resource** - The remains of sites, structures, or objects used by humans in the past-historic or prehistoric.

**Cumulative effects** - Those effects on the environment that result from the incremental effect of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other action. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

## D

**Diameter at breast height (d.b.h.)** - The diameter of a tree measured 4 feet 6 inches above the ground.

**Dispersed recreation** - A general term referring to recreation use outside developed recreation sites; this includes activities such as scenic driving, hiking, backpacking, hunting, fishing, snowmobiling, horseback riding, cross-country skiing, and recreation in primitive environments.

## E

**Endangered species** - Any species of animal or plant that is in danger

of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

## F

**Forage** - All browse and nonwoody plants that are available to livestock or game animals and used for grazing or harvested for feeding.

**Fringed pinesap** - A sensitive plant species.

## K

**Knutson-Vandenberg (K-V)** -

Legislation authorizing the collection of money from timber sales receipts for reforestation, stand improvement or mitigation projects on timber sale areas.

## M

**Management Area** - Provides direction and practices for specific portions of the Forest. Each Management Area identifies a goal, or management emphasis, and the desired future condition of the land. Each MAC includes one or more Management Prescriptions.

**Management indicator species** - A species selected because its welfare is presumed to be an indicator of the welfare of other species using the same habitat. A species whose condition can be used to assess the impacts of management actions on a particular area.

**Mass movement** - A general term for any of the variety of processes by which large masses of earth material are moved downslope by gravitational forces - either slowly or quickly.

**Meaningful Measures** - A recreation management process to better guide recreation management activities at the project and site level intended to provide quality service to recreation visitors. It includes standards of quality, as well as prioritization for work to be accomplished based on documented expectations, needs, visitor preference and resource condition. Examples of standards for trail maintenance include: trees removed, tread maintained and brush cleared to predetermined widths.

**MMBF** - Million board feet

**MMCF** - Million cubic feet

**MRVDs (Thousand recreation**

**visitor day)** - A measure of recreation use, in which one RVD equals twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

## N

**National Environmental Policy Act of 1969 (NEPA)** - An Act to

declare a National policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality. (The Principle Laws Relating to Forest

Service Activities, Agriculture Handbook No. 453, USDA, Forest Service, 359 pp.)

**Northwest Forest Plan (NWFP)** -An amendment to westside Forest Plans intended to ensure viability of the spotted owl and other late-successional dependent species, and maintenance and restoration of healthy riparian ecosystems.

## O

**Optimal cover** - For elk, cover used to hide from predators and avoid disturbances, including humans. It consists of a forest stand with four layers and an overstory canopy that can intercept and hold a substantial amount of snow, yet has dispersed, small openings. It is generally achieved when the dominant trees average 21 inches diameter at breast height or greater and have 70 percent or greater crown closure.

**ORV** - Off Road Vehicle. A category of recreational vehicles which includes four-wheel-drive vehicles and trail bikes.

**Owl Region** - National Forests and BLM districts within the range of the northern spotted owl.

## P

**Partial Retention** - Management activities remain visually subordinate to the characteristic landscape.

**PC (Precommercial) thinning** - The practice of removing some of the trees less than marketable size from a stand so that the remaining trees will grow faster.

## R

**Raptor** - Predatory birds, such as falcons, hawks, eagles, and owls.

**Redd** - Depressions in gravel in streams where salmon, steelhead, and trout lay their eggs.

**Riparian** - Pertaining to areas of land directly influenced by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence. Streamsides, lake borders, or marshes are typical riparian areas.

## S

**Selection** - The annual or periodic removal of trees (particularly mature trees), individually or in small groups, from an uneven-aged forest, to realize the yield and establish a new crop of irregular constitution.

**Semi-primitive motorized** - A classification of the Recreation Opportunity Spectrum, characterized by a predominantly unmodified natural environment in a location that provides good to moderate isolation from sights and sounds of people, except for those facilities/travel routes sufficient to support motorized recreational travel opportunities which present at least moderate challenge, risk, and a high degree of skill testing.

**Semi-primitive non-motorized** - A classification of the Recreation Opportunity Spectrum, characterized by a predominately unmodified natural environment of a size and location that provides a good to moderate opportunity for isolation from sights and sounds of people. The area is large enough to permit overnight foot travel within the area, and presents opportunity for interaction with the natural

environment with moderate challenge, risk, and use of a high degree of outdoor skills.

**Sensitive species** - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent placement on Federal or State lists.

**Seral** - Transitory stage in an ecological succession.

**Shelterwood** - A regeneration method under an even-aged silvicultural system. A portion of the mature stand is retained as a source of seed and/or protection during the period of regeneration. The mature stand is removed in two or more cuttings.

**Silviculture** - The art and science of controlling the establishment, composition, and growth of forests.

**Snag** - A standing dead tree.

**Soil productivity** - The capacity of a soil to produce a specific crop such as fiber or forage under defined levels of management. Productivity is generally dependent on available soil moisture and nutrients, and length of growing season.

**Special Interest Areas** - Areas managed to make recreation opportunities available for the understanding of the earth and its geological, historical, archeological, botanical, and memorial features.

## T

**TE&S** - Threatened, endangered and sensitive species.

**Threshold of Concern** - Degree of departure from a standard and guideline which would trigger an analysis to determine if a change in practices or plan adjustment is needed.

**Threatened species** - Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. (See also Endangered species.)



## PREPARERS

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Aldo Aguilar	Soils
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**Gifford Pinchot National Forest  
Administrative Units**

