

United States  
Department of  
Agriculture

Forest Service

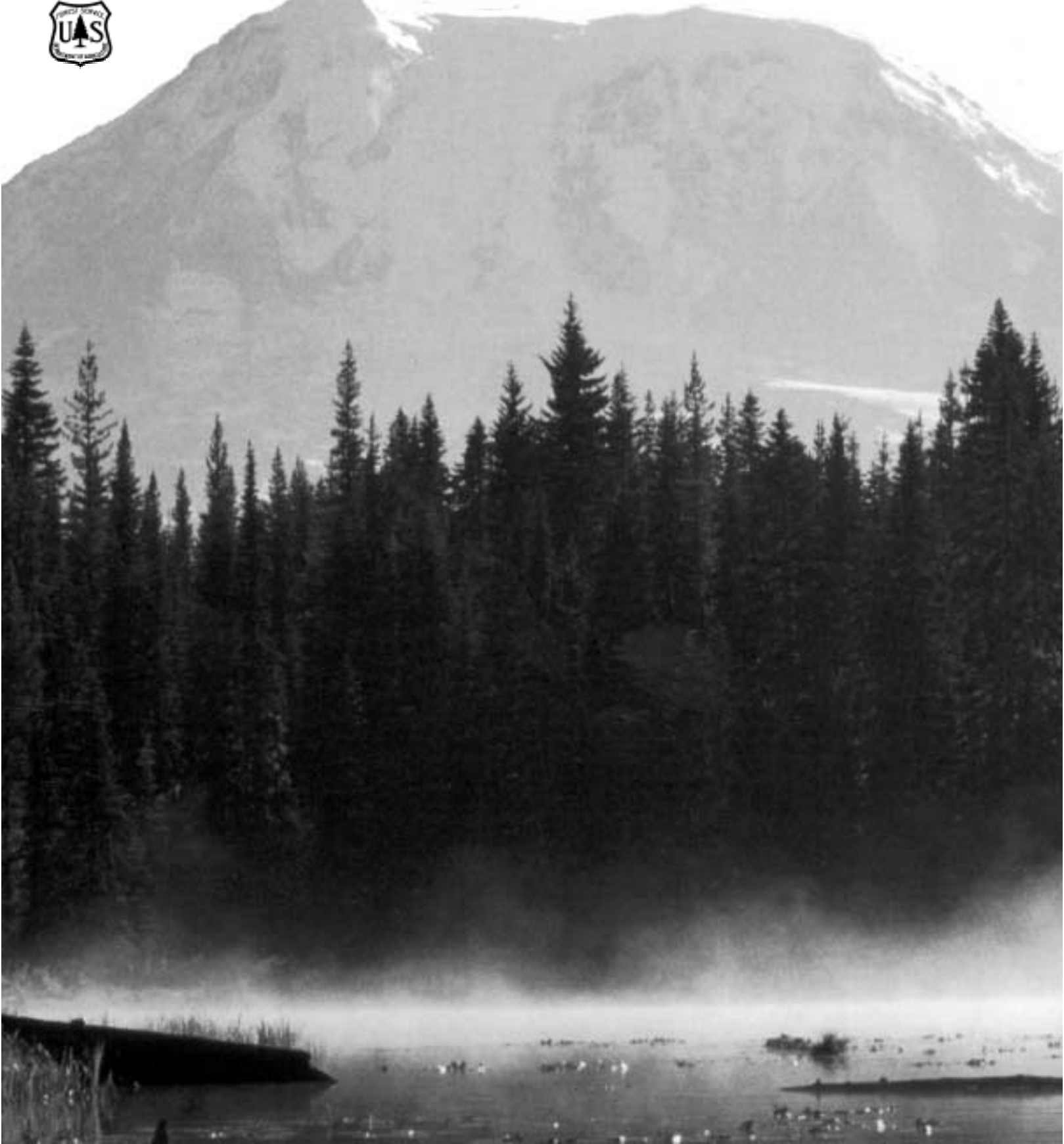
Pacific  
Northwest



**TENTH ANNUAL**

# **MONITORING AND EVALUATION REPORT**

**Gifford Pinchot National Forest**  
**Fiscal Year 2000**



Dear Forest User,  
Welcome to our tenth annual Forest Monitoring Report. The primary purpose of this report is to share our success in implementing the goals and objectives of our Forest Plan. We have expanded the report this year to include new monitoring items and analyses related to water quality. The new reports this year are



*Stream Temperature Monitoring*, page 31, *Wind River Water Quality Restoration Plan*, page 51, and *Stream and Lake Surveys*, page 53. There is also expanded information on the changes in our Survey and Manage program, beginning on page 14.

*Results-at-a-Glance*, beginning on page 2 of this report, provides a brief summary of the 31 items monitored in FY 2000. The full reports follow, beginning on page 5.

Beginning on page 89 is a report of the fourth year of an interagency effort to involve 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/mgtdir/index.html>.

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) 891-5099 or [jroland@fs.fed.us](mailto:jroland@fs.fed.us).

/s/ Claire Lavendel

CLAIRE LAVENDEL  
Forest Supervisor

# 2000 Monitoring and Evaluation Report

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# Monitoring and Evaluation Report

## Gifford Pinchot National Forest

Fiscal Year 2000

### **A. Introduction**

This document reports Forest activities and accomplishments of Fiscal Year 2000 and compares them to the Amended Forest Plan direction, and projected outputs and effects. 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 tenth year of implementing the Gifford Pinchot National Forest Plan which was approved on June 1, 1990.

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 2000 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:

- A. **Introduction** - This brief overview of what monitoring is about.
- B. **Monitoring Results - At a Glance** - summarizes monitoring results described in detail in Section C.
- C. **Monitoring Item Results** displays the individual results, evaluations and recommended follow-up actions for all items monitored in 2000.
- D. **Accomplishments** show trends in program accomplishments over FYs 1996-2000 and compares 2000 accomplishments to our assigned targets (85).
- E. **Expenditures** - Compares expenditures over the last 10 years and the composition of FY 2000 expenditures (page 87).
- F. **Forest Plan Amendments** - Lists all Forest Plan amendments, and briefly describes the content of each, and when it was approved (page 88).
- G. **Northwest Forest Plan Monitoring** - Included is the report from our third year of implementation monitoring conducted on the Gifford Pinchot as part of an owl region-wide monitoring program (page 89).

**Glossary of Terms** - Definitions of the technical terms used in this document (page 98).

## 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 5.

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 5) - Activities in compliance, character of potential Wild and Scenic River corridors was preserved.
	☺ * <b>Semi-Primitive Recreation</b> (page 6) – The single project implemented in the semi-primitive ROS class met standards.
	☺ * <b>Scenic Quality</b> (page 6) – There were no projects implemented in scenic viewsheds. Viewsheds were not monitored.
	☹ * <b>Wilderness Use and Condition</b> (page 7) – Wilderness use rebounded by 32 percent from 1999 to a level more comparable to recent use figures. In heavily used areas, resource conditions continue to be degraded.
	☺ * <b>Trail Condition</b> , (page 8) – The six trails monitored met management level standards but two did not meet maintenance standards.
	☹ * <b>Recreation Use and Facility Condition</b> (page 10) – Numerous dispersed camping sites, accessible by vehicle, are continuing to show evidence of overuse. Developed recreation facilities continue to show need for reconstruction or heavy maintenance.
HERITAGE RESOURCES	☹ * <b>Heritage Resource Protection</b> (page 11) – There were seventeen heritage resource sites associated with projects implemented in Fiscal Year 2000. Protective measures were effective for all but two sites.
WILDLIFE	☺ <b>Raptor Habitat</b> (page 12). The project near a goshawk nest was effectively mitigated.
	☺ <b>Legacy Features</b> (page 13) Retention tree and snag requirements were met on all projects. Plan intent for down wood requirements was met on all projects monitored.
	ⓘ <b>Survey and Manage</b> (page 14) During FY 2000, a total of 521 new sites were identified for flora and 171 sites fauna sites were identified.
GRAZING	☺ * <b>Grazing Practices</b> (page 22) 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)**

BOTANICAL	ⓘ	<b>Noxious Weeds</b> (page 23) 708 acres were monitored and noxious weeds were pulled on 340 acres.
	☺	<b>*Research Natural Areas</b> (page 23) - Standards and guidelines were met on the three RNAs monitored.
	☹	<b>*Botanical Special Interest Areas</b> – (page 24) Monte Carlo Botanical Area was monitored in FY 2000. Soil compaction and erosion were reported as a result of unauthorized vehicle travel
TIMBER	☺	<b>Adequate Reforestation</b> (page 25) – Three years after planting 100 percent of the 830 acres monitored was adequately stocked. 473 acres were planted in FY 2000.
	ⓘ	<b>Timber Harvest Methods</b> (page 26) - Harvest activity was approximately 51 percent of the amended Plan projection.
	☺	<b>Regeneration Harvest Units Size</b> (page 27) – Because there were no new timber management decisions in FY2000, there were no regeneration units to monitor.
	ⓘ	<b>Volume Sold</b> (page 27) - In 2000 the Forest awarded 2 million board feet. The goal for 2000 was 52 million board feet.
	☺	<b>Silvicultural Prescriptions</b> (page 28) – All prescriptions monitored met objectives.
SOIL AND WATER	☺	<b>Soil Productivity</b> (page 29) – The four units of the Tile Timber Sale monitored met the standard for compliance with the soil productivity standard.
	☹	<b>Best Management Practices</b> (page 29) – Three of the seven units monitored had minor departures from eight of the twenty-two BMPs that apply to timber management.
	ⓘ	<b>Stream Temperature</b> (page 31) – There are 10 water bodies on the Forest with temperatures above the state standard of 16 degrees C (61 degrees F).
	ⓘ	<b>Wind Water Quality Restoration Plan</b> (page 51) Wind Water Quality Restoration Plan will be completed by September 30, 2001.
FISHERIES	ⓘ	<b>Steam and Lake Surveys</b> (page 53) A total of 50 miles of streams and 16 lakes throughout GPNF were surveyed in 2000.
	☹	<b>Fish/Riparian S&amp;G Implementation</b> (page 54) In the five units monitored, one riparian reserve width was found to be narrower than required and riparian mitigation was not specified for a wet area.
	☺	<b>*Effectiveness of Riparian S&amp;Gs</b> (page 57) – Riparian standards appear to be effective in meeting objectives for shading, channel stability and sediment transport.
	ⓘ	<b>*PETs Fish Species</b> (page 59) – 86 Wind River Steelhead is the highest count since 1996. The Swift Reservoir bull trout population is up slightly from 1999.
	☺	<b>*In-Channel habitat Improvement Structures</b> (page 70) – Three structures were identified as “fully” meeting objectives and two were “partially” meeting objectives. One structure was identified as not meeting objectives.



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

<p><b>ROADS</b> ☺</p>	<p><b>Road Management</b> (page 72) - The Forest is at 106 percent of the projected goal for road closure. 287 miles of road have been decommissioned since 1994.</p>
<p><b>COMMUNITIES</b> ⓘ</p>	<p><b>Community Effects - Payments to Counties</b> (page 81) - The U.S. Treasury returned \$9.6 million dollars to the six counties with lands within the Forest administrative boundary. The Forest administered \$490 thousand in community assistance grants.</p>
<p><b>MINING</b> ⓘ</p>	<p><b>Mining Operating Plans</b> (page 83) – The Forest administered 210 Notices of Intent and 2 plans of operation in 2000. No cases of noncompliance were identified or reported</p>
<p><b>*All or part effectiveness monitoring.</b></p>	

## C. Monitoring Item Results

### 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. 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. - Project Monitoring in Potential Wild and Scenic River Corridors**

Corridor	Project	Standards Met
East Fork Lewis River	Riparian habitat restoration, boulders	Yes
East Fork Lewis River	Fish Structures	Yes
East Fork Lewis River	Road to Trail conversion	Yes
Wind River	Channel and Riparian Restoration	Yes

**Evaluation:** All projects completed in recommended Wild and Scenic River corridors, shown in Table 1, 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.

For both the East Fork and Wind River restoration projects, the objective was to enhance the steelhead habitat and populations. Steelhead are one of the outstandingly remarkable values for the Wind River. On the East Fork Lewis River, measures such as blocking vehicles access to the river and reducing dispersed campsites in the riparian areas will improve riparian habitat and contribute to improved scenic values.

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

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

## 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 natural appearing environment. Motorized recreation use is not permitted in the semi-primitive non-motorized category.

There was only one project implemented in the semi-primitive ROS class.

**Results:** In addition to ongoing routine trail maintenance, there was one project in areas identified as semi-primitive recreation areas in the Forest Plan. The Willow Spring Trail, No. 3A was constructed to provide a connection between the Loowit and Truman trails. It allows for loop hikes and a more direct route for scientific researcher to the Mount St. Helens crater area. The trail directs foot traffic and reduces overall human impacts.

**Evaluation:** The construction of the Willow Spring trail complies with the Plan standards and guidelines. The semi-primitive character of the area was 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.

There were no projects within scenic viewshed corridors.

**Results:** There were no projects within scenic viewshed corridors. Landscape-scale viewshed condition monitoring was not conducted in 2000. Viewsheds are normally monitored every 5 years to determine if changes in the condition have occurred.

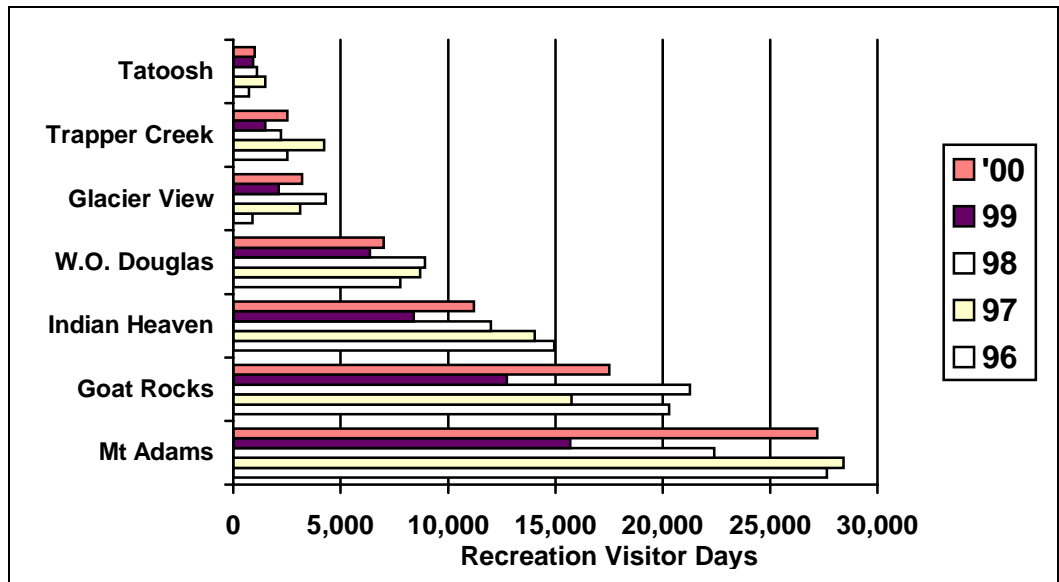
**Recommended Action to be Taken:** No corrective action required -- monitoring to continue.

Wilderness Use and Condition 4 ☹️

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

**Introduction:** The Forest currently has about 180,000 acres in seven wildernesses. 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 1996 - 2000**



**Results:**

- A. Wilderness Use - Figure 1 and Table 2 compare the 1996 through 2000 wilderness use. Visitor use increased by 32 percent for wilderness use across all seven wildernesses between 1999 and 2000.

Visitor use increased by 32 percent for wilderness use across all seven wildernesses between 1999 and 2000.

**Table 2. - Wilderness Use**

Wilderness	Recreation Visitor Days					1999-2000 % Change
	1996	1997	1998	1999	2000	
Mt. Adams	27,630	28,410	22,400	19,615	27,200	39%
Goat Rocks *	20,300	15,750	21,250	12,730	17,500	37%
Indian Heaven	14,960	14,030	12,000	8,968	11,200	25%
William O. Douglas *	7,780	8,700	8,920	6,370	7,000	9%
Glacier View	890	3,100	4,300	2,100	3,200	52%
Trapper Creek	2,520	4,230	2,200	2,188	2,500	14%
Tatoosh	730	1,500	1,100	910	1,000	9%
<b>TOTAL</b>	<b>74,810</b>	<b>75,720</b>	<b>72,170</b>	<b>52,881</b>	<b>69,600</b>	<b>32%</b>

\* Gifford Pinchot National Forest portion only.

- B. Limits of Acceptable Change (LAC). Limits of Acceptable Change is a measure of impacts associated with recreation use such as trampled area, vegetation loss at campsites, and mineral soil exposed. LAC monitoring was not done this year, but will be resumed next year.

**Recommended Actions to be Taken:** In the wildernesses, resource conditions that are degrading rather than improving are a clear indication of the needs for corrective action. Measures, such as rehabilitation, education, and attempts to confine damages to areas already impacted have worked to some degree to reduce impacts; however, it has become clear that these are not always effective, and that further actions are necessary to protect wilderness resources. In 1999, the Forest, with the input by wilderness users and other interested parties, decided to limit use at approximately current levels and began implementing measures designed to provide resource protection. In 2001, the following actions are scheduled to improve conditions in wildernesses:

1. Designate campsites in Indian Heaven Wilderness
2. Additional wilderness patrol rangers.
3. Promoting areas outside wilderness.
4. Begin discussions with the state on coordinating stocking of fish in heavily used areas.

A wilderness permit system to limit use at current levels is anticipated to be implemented in 2002. Additional use monitoring results from the 2001 National Recreation Use Survey being conducted on the Forest will provide additional information about users and use patterns that will be helpful in managing wilderness use.

A wilderness permit system to limit use at current levels is to be implemented in 2002.

## Trail Inventory and Condition

**Introduction:** On the Forest there are 1,490 miles of trails, including 317 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:**

#### **A. Trail Construction and Maintenance --**

Table 3 compares the amount of trails constructed or reconstructed in 2000 with the amount projected in the Forest Plan.

Table 3. - Trail Construction and Maintenance

Trail Activity	Miles from Forest Plan	2000 - Miles Accomplished	Percent of Plan Level
Construction or Reconstruction	34 <sup>1/</sup>	1.7	2
Maintenance	1490	768	50
<sup>1/</sup> Trail mileage average based on projects listed in Appendix A of the Forest Plan.			

On the Forest there are 1,490 miles of trails, including 317 miles within Wilderness.

768 miles of trails were maintained to standard.

One mile of trail reconstruction occurred on the 227.9 miles of trails designated for motorcycle use.

Approximately 768 miles (45 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).

- B. **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 4. - Trail Setting		
Trail Reviewed Name and No.	Planned Mgt. Level	Meets Management Level in Plan
Buck Cr. #54	I	Y
Hummocks #229	I	Y
Juniper Ridge #261	I	Y
Meta Lake. #210	I	Y
Middle Falls #31C	I	Y
Osborne Mtn. #250	I	Y

All trails monitored met mgt.level standards.

All trails reviewed meet management level standards. However, trails #210 and 31C didn't meet maintenance standards due to significant bridge and tread damage. They are proposed for reconstruction in FY 2002.

**Trail Use** - We responded to public comments concerning use conflicts on several trails across the Forest. Conflicts between hikers and motorized users are continuing to be reported on Langille Tr. #259 and Juniper Tr. #261. Attempts were made to address these issues and resource needs on both trails through the NEPA process, but were unsuccessful. Future resolution of appropriate trail use issues will need to be done during revision of the Forest Plan. Complaint was made against allowing motorized use on the Teeley Cr. Trail #251. A complaint was received on the Muddy Meadows Tr. #13, a horse/hiker trail, about mountain bike use. Craggy Peak Tr. 3 received a complaint about motorcycle use damaging trail tread, while the Swift Ski Trail #244 received complaints about snowmobiles on the climbing route above timberline on Mount St. Helens.

**Evaluation:** Two percent of the planned target for trail construction/reconstruction was accomplished compared with forty percent of the annual average mileage estimated in the Forest Plan last year. The budget for this work is considerably less than needed to reconstruct a deteriorating trail system and create new opportunities. In addition, more intensive survey and manage protocols for sensitive species require additional funding and time for doing the work. Trail mileage maintained increased slightly from last year. User conflicts were reported on fewer than 10 percent of the system trails and thus do not exceed the threshold of concern for complaints.

The budget is considerably less than needed to reconstruct a deteriorating trail system.

**Recommended Action to be Taken:** In 2001, revenues from NW Forest Pass user fees will be used to maintain trailheads and the trails they serve. The expected result is an increase in the number of trail miles maintained and 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.

Trail use conflicts continue to be problematic on several trails. Improved signing and more frequent patrols will reduce conflicts. Trail use issues will be addressed in the Forest Plan revision.

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

The Forest has about 120 developed recreation sites, not including visitor centers.

**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 Gorge. Accompanying the growth in demand has been a decline in 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 revenues from this user fee will help to meet operation and maintenance standards for these sites.

All but two of the Forest fee campgrounds are operated by concessionaires. This also included some day-use sites in 2000. This helps ensure that 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 goes toward operation and maintenance of these sites. However, camping outside of campgrounds (dispersed camping) continues to be popular and 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. As a result, fragile riparian areas can be impacted.

The majority of all developed sites are in need of repair or upgrading.

**Results:** In 2000, Flattop SnoPark was constructed. Orr Creek SnoPark and Kalama SnoPark both received new shelters. Two new toilets were installed, one at Walupt Lk Campground and one at Takhlakh Lake Campground. The SnoPark projects were the result of partnerships between the Forest Service, Washington State Parks, the State Interagency Commission on Outdoor Recreation and volunteers from equestrian and snowmobile clubs. However, the majority of all developed sites are still in need of repair or upgrading to meet new standards such as those for handicap accessibility.

Numerous dispersed camping sites, accessible by vehicle, are continuing to show evidence of overuse.

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 timber lands 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 along the East Fork of the Lewis River, site restoration and designating approved dispersed campsites in various locations.

Winter recreation sites received the most attention.

**Evaluation:** Winter recreation sites received the most attention last year as the result of co-funding opportunities with Washington State and willing volunteers. Other 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. Actions to address dispersed camping issues include the following:

Fee Demo will provide funds for improved maintenance.

- Implementation of the NW Forest Pass Fee Demo Project will provide additional funds for improved maintenance of several low development level campgrounds and dispersed camping areas, and increased FS recreation and law enforcement presence.
- Evaluation of some low-development level campgrounds may indicate the need to manage them as dispersed camping areas.
- Closure of some high use roads to overnight use should be considered.
- Reduced fish stocking should reduce use along several lakes and streams.
- Dispersed recreation management should be addressed in conjunction with other planning efforts such as habitat restoration on a watershed or drainage basis.

Monitoring of developed and dispersed sites should continue.

## Heritage Resource Protection <sup>11</sup>

**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.



There were 17 heritage resource sites associated with projects implemented during Fiscal Year 2000.

**Results:** There were 17 heritage resource sites associated with projects implemented during Fiscal Year 2000. The projects included the following:

Mining Reach Restoration	Mt. Adams District
Wind River Road Decommissioning	Mt. Adams District
East Fork Restoration	Mount St. Helens District
Copper Creek Bridge Replacement	Mount St. Helens District
Skeeter Timber Sale	Mount St. Helens District
Gage Timber Sale	Mount St. Helens District

Twelve of the heritage resource sites identified in these projects were found to be significant. These include several prehistoric archaeological sites, historic features associated with the Wind River Lumber Company Historic District, peeled cedars, and a historic cabin site.

Avoidance measures were prescribed for all of the significant sites. In the case of most sites, protective buffers range from 100 to 200 meters. Exceptions include watershed restoration activities in the Wind River Lumber Company Historic District. Equipment will be allowed to cross historic railroad grades where existing spur roads utilize portions grades or bisect them.

**Evaluation:** Protective measures failed in two cases. In the case of the East Fork Restoration Project, tree cutting, felling, and yarding occurred within the boundaries of prehistoric archaeological site #04052304. An initial field report indicates there was no damage to the site. In the case of the Mining Reach Restoration Project, a contractor was allowed to operate heavy equipment within the boundaries of prehistoric site #05072101. Initial inspection by an archaeologist indicates disturbance to a depth of at least 20 cm within an old road corridor across the site. The disturbance is within an area that had previously produced evidence of occupations dating between 740 – 1410 years B.P. and contained artifact densities of 1000 to 9600 artifacts per cubic meter.

**Recommended Actions:** A formal assessment of damages to site #05072101, in the Mining Reach Restoration Project, is required under federal law.

Recommended action from 1996-1999 pertaining to two prehistoric sites damaged by trail construction in the Mount St. Helens National Volcanic Monument was initiated in FY 2000. Field investigation of the damage and analysis of recovered artifact material was completed in the summer of 2000. An assessment report will be prepared in FY 2001.

Protective measures failed in two cases.

**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.

One project was near a goshawk nest site.

**Results:** Only one of the monitored projects had the potential to affect any of these species. The project is the Jammin Timber Sale on the Mt. Adams District. To protect a known goshawk nest site, a protective area with a radius of 660 feet was designated around the site, and a limited operating period was implemented for activities within 0.25 mile of the site. The closure period is March 1 through July 31. No timber felling was allowed within the protective area. The environmental analysis considered cumulative effects of the project and reaction to human intrusion.

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

**Legacy Features** 40 

Residual green trees and dead wood function as a bridge between past and future forests.

**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, provide shade and suitable habitat for many organisms and serve as refugia and centers of dispersal.

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:**

A total of four units from three different timber sale projects were monitored for legacy features. The Cowlitz Valley R.D. monitored Unit 6 of the Siler Owens Timber sale, 19 acres; Mount St Helens Monument monitored Units 6 and 14 of the Tile Timber Sale, 45 acres total; and the Mount Adams R.D. monitored Unit 2 of the East Timber Sale, 29 acres.

**Retention Trees**

Retention tree requirements were met or exceeded.

The Forest Plan prescribes that 15 percent of the harvest unit be retained, with 70 percent in patches and 30 percent scattered through the unit. Retention tree requirements were exceeded on the Tile and East Timber Sales, and were met on the Siler Owens Timber Sale.

**Down Wood**

The Northwest Forest Plan directs that existing coarse woody debris be protected during logging and that 240 linear feet per acre of decay class I and II logs be left after regeneration harvest.

In Tile Timber Sale, the contract allowed hard class III logs to be counted toward the down wood requirement. The primary difference between a hard class III log

The intent of the objective was met for down wood.

and a class II log is the presence of bark on the class II logs. Post sale monitoring counted only class I and II logs and found the amount of down wood deficient. The 240 linear feet of decay class I and II logs was not met, but we met the intent of the objective when the amount of hard class III are considered. A similar deficiency was noted in the Siler Owens Sale. Additional trees will be felled in Siler Owens to meet the standard.

This standard was met in the East Timber Sale.

**Snags**

Snags will be created from surplus retention trees.

We were unable to meet snag requirements with retained existing snags, however sufficient KV funds were collected to create snags from surplus retention trees.

Table 5. - Projects Monitored for Retention Trees, Snags, and Downed Log

Timber Sale Projects	Standards Met? (Yes or No)		
	Retention Trees	Snag	Down Woods Debris
Tile	Y	Y <sup>1</sup>	Y <sup>2</sup>
Siler Owens	Y	Y <sup>1</sup>	Y <sup>3</sup>
East	Y	Y <sup>1</sup>	Y

Standards for retention trees and snags were met.

**Evaluation:** Standards for retention trees and snags were met on all projects. The district biologist believes the hard class III logs on the Tile sale are providing the ecological function intended of the Class 1 and 2 logs and that the intent of the standard was met.

**Recommended Action to be Taken:**

A meeting of district wildlife biologists and timber sale administrators was held in the field during the summer of 2000. The purpose was to ensure that all parties understood the down log standard, and would be able to count and measure logs in the same way. In addition, there are fewer older timber sale contracts left that allow Class III logs to be counted toward this standard. For these reasons, the down log standard should be met in the future.

**Survey and Manage** <sup>44</sup> 

Surveys are required for about 400 rare and/or isolated plant and animal species.

**Introduction:** The Northwest Forest Plan (1994) provides for surveys for about 400 rare and/or isolated plant and animal species. These are species that, either because of genuine rarity or because of a lack of information about them, the Agencies did not know whether they would adequately be protected by other elements of the Northwest Forest Plan. These species are grouped in six

<sup>1</sup> Snag requirements will be met by creating snags from surplus retention trees.  
<sup>2</sup> The intent of the standard was met when hard class III logs are counted, see text.  
<sup>3</sup> Additional logs will be created from reserve trees.

categories based on relative rarity, ability to reasonably locate occupied sites and level of information know about the species.

Surveys before ground-disturbing activities were required for *Bondarzewia mesenterica*, *Otidea leporina*, *O. onotica*, *O. smithii*, *Polyozellus multiplex*, *Sarosoma mexicana*, *Sowerbyella rhenana*, and *Bridgeoporus nobilissimus* (fungi), *Hypogymnia duplicata*, *Lobaria linita*, and *Pseudocyphellaria rainierensis* (lichens); *Brotherella roellii*, *Buxbaumia viridis*, *Rhizomnium nudum*, *Schistostega pennata*, *Tetraphis geniculata*, and *Ulota megalospora* (bryophytes), and *Allotropia virgata*, *Botrychium minganense*, *B. montanum*, *Coptis asplenifolia*, *C. trifolia*, *Corydalis aquae-gelidae*, *Cypripedium fasciculatum*, *C. montanum*, *Galium kamtschaticum*, and *Platanthera orbiculata* (vascular plants) *Plethodon larselli*, *Plethodon vandykei* (amphibians), *Cryptomastix devia* *Hemphillia glandulosa*, *Hemphillia malonei*, *Prophysaon dubium* (mollusks) and *Strix nebulosa* (great gray owl).

### **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 NF were selected as pilot Forests and data collected on Continuous Vegetation Survey plots. These plots included reserved as well as non-reserved land allocations. The goal of strategic surveys is to better document and understand the species rarity and range, and determine their distribution and habitat.

### **Results - Flora:**

A total of 521 new sites for Survey and Manage flora were documented on the Gifford Pinchot National Forest in FY 2000. Of these, 489 were located during district surveys and 32 were located as part of the Regional Strategic Survey effort. A total of 206 were species for which surveys were required before ground-disturbing activities. Mt. Adams reported 260 new sites, Cowlitz Valley 24, Mt. St. Helens 205. Thirteen were vascular plants, 81 lichens, 36 fungi, and 359 bryophytes. Table 6 summarizes the results of survey efforts and includes the number of new sites by Ranger District that were located in FY2000. Results of Regionally coordinated Strategic Surveys on the Gifford Pinchot National Forest are also provided.

521 new survey and manage plant sites were identified in FY 2000.

Table 6. FY 2000 Survey and Manage results for flora.

Surveys before ground-disturbing activity required	Species	Life Form	Number of Sites*				Forestwide Strategic Surveys
			MTA	CV	MSH	Total	
	<i>Antitrichia curtipendula</i>						1
x	<i>Buxbaumia viridis</i>	Bryophyte	12	10	5	27	2
	<i>Ptilidium californicum</i>	Bryophyte	99	3	73	175	14
x	<i>Rhizomnium nudum</i>	Bryophyte	5			5	1
x	<i>Schistostega pennata</i>	Bryophyte	4		8	12	
x	<i>Tetraphis geniculata</i>	Bryophyte	3		8	11	
x	<i>Ulota megalospora</i>	Bryophyte	83	6	40	129	3
	<i>Bondarzewia montanum</i>	Fungus	4			4	
	<i>Cantharellus formosus</i>	Fungus			15	15	
	<i>Cantharellus subalbidus</i>	Fungus	1			1	
	<i>Gymnopolis punctifolius</i>	Fungus	3			3	
	<i>Helvella elastica</i>	Fungus			3	3	
	<i>Ramaria gelatinaurantia</i>	Fungus	4			4	
x	<i>Sarcosoma mexicana</i>	Fungus	6			6	
	<i>Hydrothyria venosa</i>	Lichen	1			1	
	<i>Hypogymnia oceanica</i>	Lichen		4	25	29	
	<i>Lobaria hallii</i>	Lichen	5	1		6	
	<i>Lobaria oregana</i>	Lichen	5		9	14	6
	<i>Lobaria pulmonaria</i>	Lichen	15		8	23	1
	<i>Lobaria scrobiculata</i>	Lichen					1
	<i>Nephroma bellum</i>	Lichen					1
	<i>Pseudocyphellaria</i>	Lichen			2	2	2
	<i>Pseudocyphellaria</i>	Lichen					1
x	<i>Pseudocyphellaria</i>	Lichen			3	3	
	<i>Usnea longissima</i>	Lichen			3	3	
x	<i>Allotropa virgata</i>	Vascular plant	10		2	12	
x	<i>Corydalis aquae-gelidae</i>	Vascular plant			1	1	
<b>Total per District</b>			260	24	205		
Total for Strategic Surveys							32
<b>Total for Forest</b>							<b>521</b>

\*Results as of November 20, 2000. Records may change once specimen identification/verification is completed.

## **Results - Fauna**

3 amphibian sites and  
168 mollusk sites  
were located.

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 2000.

The table below 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.

**Table 7. FY 2000 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
<b>Great Gray Owl</b>	0	0	0	0	350	0	350
<b>Amphibians</b>	668		1,716		254		2,638
<i>Plethodon larselli</i>		0		2		0	2
<i>Plethodon vandykei</i>		0		1		0	1
<b>Mollusks</b>	3,980		1,318		877		6,175
<i>Cryptomastix devia</i>		44		0		1	45
<i>Hemphillia glandulosa</i>		0		5		17	22
<i>Hemphillia malonei</i>		0		5		37	42
<i>Prophysaon dubium</i>		39		0		20	59

In addition to these completed surveys, surveys on other projects were begun but not completed in FY 2000. The Cowlitz Valley District completed at least one amphibian survey visit on an additional 778 acres and one mollusk survey visit on an additional 690 acres. The Mount Adams District completed at least one amphibian survey visit on an additional 1,227 acres and one mollusk survey visit on an additional 1,435 acres.

## **Recommendations:**

Begin conducting surveys based on the requirements of the January 2001 *Record of Decision and Standards and Guidelines for the Amendments to Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*. Table 8 displays species requiring pre-disturbance surveys according to the *Record of Decision*. Continued specialized training for individuals conducting these surveys is recommended.

**Table 8.** Species, by Taxa Group, requiring pre-disturbance surveys on the Gifford Pinchot National Forest

<b>Lichens: 10 species requiring surveys; 5 added, 0 dropped</b>			
<b>FSEIS Pre-Disturbance Surveys Required</b>	<b>Species</b>	<b>Jan 2001 ROD Category</b>	<b>Documented (D) or Suspected (S) on the Gifford Pinchot</b>
✓	<i>Bryoria tortuosa</i>	A	S
✓	<i>Hypogymnia duplicata</i>	A	S
✓	<i>Leptogium burnetiae</i> var. <i>hirsutum</i>	A	S
✓	<i>Leptogium cyanescens</i>	A	S
✓	<i>Lobaria linata</i>	A	D
✓	<i>Niebla cephalota</i>	A	S
✓	<i>Platismatia lacunosa</i>	C	D
✓	<i>Pseudocyphellaria rainierensis</i>	A	D
✓	<i>Ramalina thrausta</i>	A	S
✓	<i>Teloschistes flavicans</i>	A	S

**Vascular Plants: 9 species requiring surveys; 0 added, 1 dropped**

FSEIS Pre-Disturbance Surveys Required	Species	Nov 2000 FSEIS Category **	Documented (D) or Suspected (S) on the Gifford Pinchot
	<i>Allotropa virgata</i>	Off	D
✓	<i>Botrychium minganese</i>	A	D
✓	<i>B. montanum</i>	A	D
✓	<i>Coptis asplenifolia</i>	A	S
✓	<i>Coptis trifolia</i>	A	S
✓	<i>Corydalis aquae-gelidae</i>	A	D (MSH, MTA)
✓	<i>Cypripedium fasciculatum</i>	C	D (MTA)
✓	<i>Cypripedium montanum</i>	C	S
✓	<i>Galium kamtschaticum</i>	A	S
✓	<i>Habenaria orbiculata</i>	C	S

**Bryophytes: 2 species requiring surveys; 0 added, 4 dropped**

FSEIS Pre-Disturbance Surveys Required	Species	Nov 2000 FSEIS Category	Documented (D) or Suspected (S) on the Gifford Pinchot
	<i>Buxbaumia viridis</i>	D	D
	<i>Ptilidum californicum</i>	Off	D
	<i>Rhizomnium nudum</i>	B	D
✓	<i>Schistostega pennata</i>	A	D
✓	<i>Tetraphis geniculata</i>	A	D
	<i>Ulotia megalospora</i>	Off	D



<b>Fungi: 1 species requiring surveys; 0 added, 7 dropped</b>			
<b>FSEIS Pre-Disturbance Surveys Required</b>	<b>Species</b>	<b>Nov 2000 FSEIS Category</b>	<b>Documented (D) or Suspected (S) on the Gifford Pinchot</b>
✓	<i>Brideoporus nobilissimus</i>	A	D
	<i>Bondarzewia mesenterica</i>	B	D
	<i>Otidea leporina</i>	B	
	<i>Otidea onotica</i>	F	
	<i>Otidea smithii</i>	B	D
	<i>Polyozellus multiplex</i>	B	D
	<i>Sarcosoma mexicana</i>	F	D
	<i>Sowerbyella rhenana</i>	B	D

<b>Amphibians: 2 species requiring surveys; 0 added, 0 dropped</b>			
<b>FSEIS Pre-Disturbance Surveys Required</b>	<b>Species</b>	<b>Nov 2000 FSEIS Category *</b>	<b>Documented (D) or Suspected (S) on the Gifford Pinchot</b>
✓	<i>Plethodon larselli</i>	A	D
✓	<i>Plethodon vandykei</i>	A	D

<b>Mollusks: 7 species requiring surveys; 0 added, 3 dropped</b>			
<b>FSEIS Pre-Disturbance Surveys Required</b>	<b>Species</b>	<b>January 2001 FSEIS Category</b>	<b>Documented (D) or Suspected (S) on the Gifford Pinchot</b>
✓	<i>Cryptomastix devia</i>	A	D
	<i>Deroceras hesperium</i>	B	S
✓	<i>Hemphillia burringtoni</i>	A	D
✓	<i>Hemphillia glandulosa</i>	C	D
✓	<i>Hemphillia malonei</i>	C	D
	<i>Hemphillia pantherina</i>	B	D
✓	<i>Lyogyrus new sp. 1</i>	A	S
✓	<i>Lyogyrus new sp. 2</i>	A	S
✓	<i>Prophysaon coeruleum</i>	A	D
	<i>Prophysaon dubium</i>	Off	D

<b>Birds: 1 species requiring surveys; 0 added, 0 dropped</b>			
<b>FSEIS Pre-Disturbance Surveys Required</b>	<b>Species</b>	<b>January 2001 FSEIS Category</b>	<b>Documented (D) or Suspected (S) on the Gifford Pinchot</b>
✓	<i>Strix nebulosa</i>	C	S

Table 9. Redefined Survey Categories Based on Species Characteristics			
Relative Rarity	Pre-Disturbance Surveys: Practical	Pre-Disturbance Surveys: Not Practical	Status Undetermined
Rare	Category A: 57 species Manage All Known Sites Pre-Disturbance Surveys Strategic Surveys	Category B: 222 species Manage All Known Sites  Strategic Surveys	Category E: 22 species Manage All Known Sites  Strategic Surveys
Uncommon	Category C: 10 species Manage High-Priority Sites Pre-Disturbance Surveys Strategic Surveys	Category D: 14 species Manage High-Priority Sites  Strategic Surveys	Category F: 21 species   Strategic Surveys

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

**Introduction - Grazing:** 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 1,500 cattle grazed on the 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; sheep allotment management plans are reviewed and reissued every five years. Every year 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 of resources, distribution of livestock, and maintenance of ecosystem health. Range improvements such as maintenance of fences, cattle guards, and water lines have been performed cooperatively by the Forest Service and the permittees.

Our monitoring utilizes photo plots of vegetation that aid in determining the condition and trends within certain plant communities 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.

Grazing is not permitted in research natural areas, botanical special areas, and most administrative sites.

**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 Mount St. Helens District in the areas of

Grazing is not permitted in research natural areas, botanical areas and administrative sites.

When grazing in or near riparian zones we ensure that the objectives for the Aquatic Conservation Strategy are fulfilled.

All grazing allotments were in compliance with standards and guidelines.

Twin Buttes, Mt. Adams and Ice Caves. Livestock use for the 2000 season totaled 1,732 head months for the Forest, which for the second year is 40 percent below the allowed and permitted head months. This one-year reduction was agreed to by the Twin Buttes Permittee to reduce any potential conflicts on Lynx habitat from grazing prior to US Fish and Wildlife completing its Lynx Biological Opinion.

**Evaluation:** During 2000 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

### Noxious Weeds <sup>46</sup>

#### Introduction

Noxious weeds are a problem because they can be toxic to wildlife, domestic livestock, and humans and they displace desirable plant communities. Ecosystem changes produced by noxious weeds can be dramatic and have highly adverse impacts to plant and animal environments. These types of changes impact all resources.

Noxious weeds were treated on 340 acres and 708 acres were monitored.

**Results:** Forty-four sites totaling approximately 708 acres were monitored across the Mt. Adams and Mt. St. Helens districts. Nine targeted noxious weed species were treated on 19 sites. These 19 sites are estimated to represent infestations of at least 340 acres. The 19 treatment sites are within the Mt. Adams Ranger District, Wind River Nursery, and Mt. St. Helens Ranger District.

**Recommended Action To Be Taken:** Continue with the prevention measures, inventory of infestations, and aggressive treatment. Consult the Forest Native Plant/Seed Policy when planning projects.

### Research Natural Areas (RNA) <sup>5</sup>

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 below. 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. 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
Steamboat Mountain	1999	yes
Cedar Flats	2000	yes
Thornton T. Munger	1999	yes
Monte Cristo	2000	yes

**Results:** In FY 2000 most standards and guidelines were met in the three RNAs monitored: Cedar Flats, Goat Marsh, and Monte Cristo.

- At Goat Marsh RNA, the trailhead and turnout has been used as a latrine and campsite. Corrective action was taken and the latrine area cleaned up.
- Knapweed populations declined due to hand-pulling at Goat Marsh RNA.

**Recommendations:** Although no noxious weeds were found in Cedar Flats RNA, tansy ragwort was found along the 25 road which borders the RNA. Because this species typically inhabits open, disturbed sites, it is unlikely to infiltrate the closed canopy of the RNA. If tansy ragwort is found invading the RNA (e.g., along trail) it should be pulled immediately. Consider replacing the fence along the 25 road with a less conspicuous large log that would serve to reduce bank erosion without attracting people to the RNA.

Additional cleanup of nearby dispersed campsites near Goat Marsh RNA is recommended to discourage unauthorized use of these areas.

Signing is lacking for the Monte Cristo RNA. Signs have been purchased and funds allocated for their installation in 2001.

## 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.

Thirty botanical areas have been designated on the Gifford Pinchot.

**Results:** Monte Carlo Botanical Area was monitored in FY 2000. Soil compaction and erosion was reported resulting from unauthorized vehicle travel between Trail 34/52 junction and Monte Carlo Peak.

**Recommendations:**

- Develop strategy to prevent further spread of St. John’s wort and oxeye daisy within Botanical Area.
- Consider signing to deter recreational vehicles.

**Adequate Reforestation** 50 

The standard and guideline for stocking varies by site, depending on elevation, exposure, soil and other factors. Adequate stocking can vary from 125 to 400 trees per acre.

Plantation Acres Surveyed	Acres Adequately Stocked	% Adequate Stocking
830	830	100%

Standards and guidelines regarding plantation stocking surveys (number of trees per acre) were met for FY 2000 on the Mt. Adams Ranger District and Mount St. Helens National Volcanic Monument. The Cowlitz Valley Ranger District did not complete surveys in FY 2000.

**Reforestation Initiated in 2000**

Reforestation of harvested areas was initiated on 473 acres that were hand planted. Within the next 5 years, these areas will be reviewed to assure adequate stocking levels are present.

Varying site conditions may require additional planting in the future if adequate stocking levels fall below the minimum stocking level requirements for the species and management objectives planted on the site.

**Other Tree Planting Activities**

Streamside tree planting	352 acres
Slope stabilization tree plantings	16 acres

Plantations monitored were adequately stocked.

Table 11 shows acres harvested by category of harvest method.

Table 11. - Timber Harvest Methods

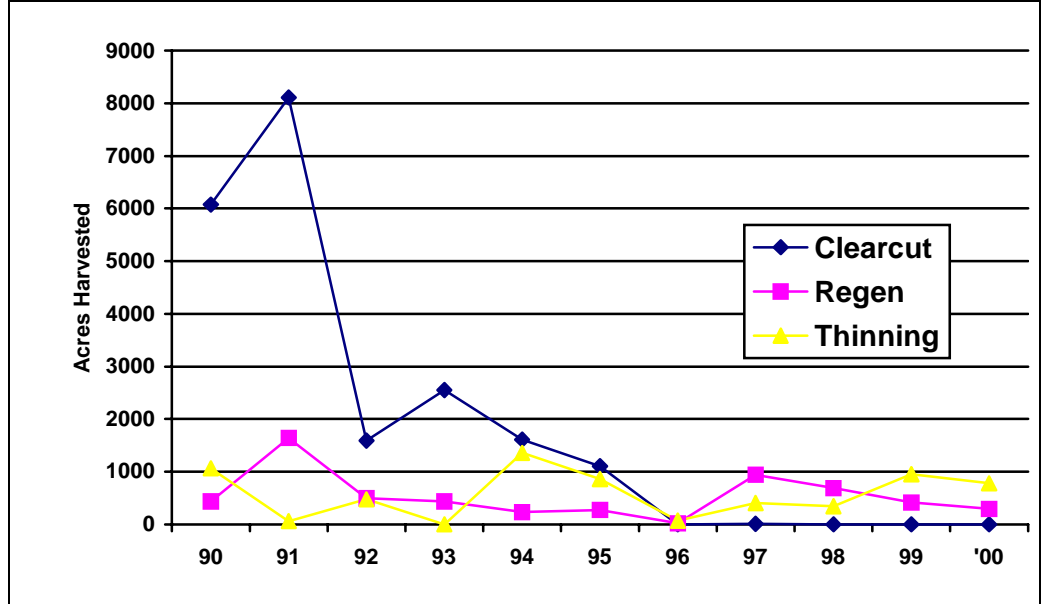
Silvicultural Practice	2000 Acres	NW Forest Plan Projection
Clearcut Harvest	0	0
Regeneration Harvest	295	1,454
Commercial Thinning	781	1,264
Salvage	0	N/A
<b>Totals</b>	<b>1,076</b>	<b>2,718 acres</b>

Past harvest methods are depicted below in table 2 which demonstrate the harvest methods used on the forest from 1988 – 2000. A perspective of harvest methods can be seen and also a change in direction of Silvicultural harvest methods by a reduction in clearcutting on the forest.

Figure 2 shows that the last clearcuts on the Forest were harvested in 1995. It also illustrates how harvest activities in total declined over the 1990s.

Acres harvested were 40% of Plan projections.

Figure 2. - Historical Harvest by Method



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

The Forest monitors harvest unit size and adjacency from the pool of regeneration units authorized by new decision signed during the year. Because there were no new timber management decisions in FY2000, there were no regeneration units to monitor.

**Volume Advertised to be Sold <sup>54</sup>** ⓘ

The FY 2000 sale goal was 52 MMBF or 99 Mccf (1000 ccf). Actual volume awarded from sales in FY 2000 was 2 MMBF or 4 Mccf.

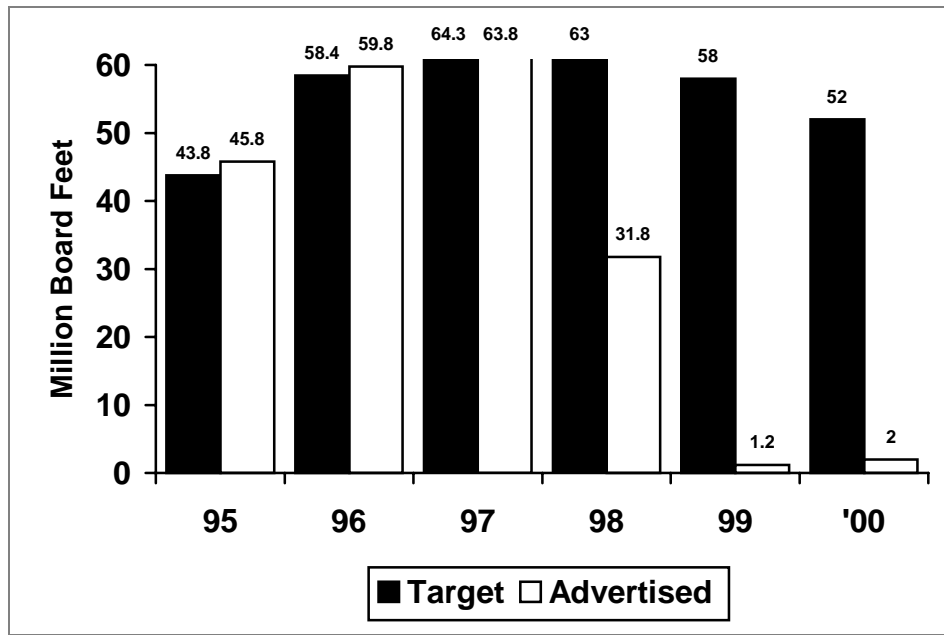
Award of sales was suspended in FY 2000 pending the completion of the amendment to the Northwest Forest Plan Survey and Manage standards and guidelines.

The Forest awarded 2 of its 52 million board feet sale goal in FY 2000.

Table 12. Volume sold in FY 2000.

Volume Sold MMBF	Volume sold MCCF	Projected Volume MMBF	Projected Volume MMCF	% of Projection
2	4	52	99	4%

Figure 3. - Target Accomplishment





**Silvicultural Prescriptions** <sup>56</sup> 

**Introduction:** The silviculture prescription is the result of examining forest stands and diagnosing treatment needs. It determines the methods and timing of silvicultural activities and assembles a written document which prescribes activities on the ground. These determinations take into account numerous factors involving silvics of the trees and the local site conditions but also other resource objectives and Forest Plan direction. The process consists of preparing a general prescription based on an environmental assessment. The interdisciplinary team develops the environmental assessment and establishes limits and objectives to be achieved based on Forest Plan goals and the standards and guidelines. The prescription is the tool, which is used to implement site specific actions for timber projects identified in an environmental assessment. The purpose of this item is to ensure that silviculturists are considering broad resource objectives with the prescription through the use of interdisciplinary resource objectives.

**Results:**

Harvest units were monitored this year in Matrix, Late Successional Reserves and Adaptive Management Area land allocations of the Northwest Forest Plan.

Table 13 identifies the features monitored for the units reviewed in 2000.

Prescriptions monitored met objectives.

Table 13. Prescription Monitoring

Quantity of Units Monitored	Management Allocation	Silvicultural Harvest Method	Features Monitored Live Tree Retention	Features Monitored Legacy	Meet Prescription Objectives
1	LSR	Commercial Thinning	Species Diversity Stocking	Wildlife Tree retention Down wood	Yes
1	AMA	Regeneration Moderate Forest Retention	Dispersed & Aggregate Retention	Wildlife Tree Retention Aggregates Down Wood Reforestation	Yes Except Change Will be made to species composition in the future
1	Matrix	Regeneration Light Forest Retention	Dispersed & aggregate Retention	Wildlife Tree Retention Aggregates Down Wood Reforestation	Yes Except Unit size TPA retained and down woody debris was exceeded
1	Matrix	Commercial Thinning	N/A	Wildlife Tree Retention Down wood	Yes
1	Matrix	Precommercial Thinning	Stocking & structure Species Diversity	N/A	Yes

Quantity of Units Monitored	Management Allocation	Silvicultural Harvest Method	Features Monitored Live Tree Retention	Features Monitored Legacy	Meet Prescription Objectives
1	Matrix	Regeneration Heavy Forest Retention	Dispersed & Aggregate Retention	Wildlife Tree Retention Aggregates Down Wood Reforestation	Yes Heavy Forest Retention meets hydrologic recovery objectives.
1	Matrix	Regeneration Light Forest Retention	Dispersed & aggregate Retention	Wildlife Tree Retention Aggregates Down Wood Reforestation	Yes
1	Matrix	Precommercial Thinning	Stocking Structure Species Diversity	N/A	Yes
1	LSR	Precommercial Thinning	Stocking Structure Species Diversity	N/A	Yes

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

**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% within the timber sale unit can have impaired soil productivity.

Units sampled are stratified by disturbance type and a subset of each class is evaluated for the degree and extent of soil productivity impairing conditions including compaction, displacement erosion and severe burning.

**Results:** Four units of the Tile Timber Sale were monitored for compliance with the soil productivity standard. All units were within the Forest Standard.

Although the units met the standard for soil productivity and the EA objectives for erosion control, the continued use of a loader grapple to accomplish sub-soiling is considered ineffective to reduce compaction. Sub-soiling using a loader grapple was estimated to be only 40-50% effective in the units monitored.

**Recommendation:** The use of loader grapples for sub-soiling should be discontinued as effectiveness has been limited in many areas. Other

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

The use of loader grapples for sub-soiling should be discontinued.

methods of sub-soiling have been demonstrated to be more effective and are readily available for similar costs.

## 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 1976 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 sediment, where activities have the potential to seriously and adversely affect water conditions or fish habitat.

**Results:** Seven timber sale units within four timber sales were monitored for compliance with Best Management Practices (BMPs), Jammin Timber Sale Unit 8 and 11, Siler Owens Timber Sale Unit 6, Tower Timber Sale Unit 10, and Tile Timber Sale Units 6, 14b and 14c. Four of the units complied with all the BMPs. The Tower Timber Sale Unit 10 and Tile Timber Sale Units 6 and 14b had minor departures from eight of the twenty-two BMPs that apply to timber management.

Minor erosion (rills) exists on the short temporary road of Tower Timber Sale Unit 10 due to inadequate road drainage. This results in a minor departure from the BMP R-7 Control of Surface Road Drainage Associated with Roads.

**Recommendation:** Temporary roads need to be designed to control drainage so water does not concentrate and erode soil. Drainage control features on temporary roads need to be constructed prior to wet weather periods.

The Tile Timber Sale Contract did not show all streams to be protected on the sale area map although all streams had riparian reserves designated on the ground. This resulted in a minor departure from the BMP T-4 Use of Sale Area Maps for Designating Water Quality Protection Needs.

Pre-sale layout marked riparian reserves narrower than required for one stream located on the eastern edge of Tile Timber Sale Unit 14b. The lack of that stream designation on the sale area map contributed to the error. This resulted in a minor departure from the BMP T-7 Stream Side Management Unit Designation.

**Recommendation:** Assure all streams, wetlands or other protected areas are designated on sale area maps.

Machinery operated on slopes greater than 35% in Unit 14b due to a refinement in the unit's logging plan which was not incorporated into the contract. The disturbance resulting from machinery on these slopes was effectively mitigated by piling slash within the area thereby minimizing erosion. This was a minor departure from the BMP T-9 Determining Tractor Loggable Ground.

**Recommendation:** Assure contracts incorporate any refinements in logging plans.

Four of seven units monitored complied with all BMPs.

The quantities of seed (30 lbs/acre) and mulch (200 lbs/acre) specified for erosion control in the contract were too low which resulted in inadequate vegetation on the obliterated temporary road of Tile Timber Sale Unit 6. Erosion did not occur because the road was flat. This was a minor departure from the BMP T-14 Revegetation of Areas Disturbed by Harvest Activities.

**Recommendation:** Increase specified quantities of seed and mulch to assure adequate vegetation based on site specifics such as seed type and area slope.

The Contracting Officer Representative accepted erosion control work without consultation with an aquatic specialist prior to sale closure. This resulted in a minor departure from the BMP T-19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure. The closure of the timber sale occurred without effective erosion control on the obliterated road of Tile Timber Sale Unit 6 and skid trails within Tile Timber Sale Units 6, and 14b.

**Recommendation:** Emphasize the need to include the aquatic specialist in inspecting erosion control work prior to sale closure.

The temporary road (0.3 miles) in Unit 6 was not sub-soiled 18" deep over the complete area of disturbance as required in the contract. This diminished the productivity of the soil due to persistent compaction. This was a minor departure from the BMP R-23 Obliteration of Temporary Roads and Landings.

**Recommendation:** Emphasize the need to include soil or aquatic specialists in inspecting the adequacy of sub-soiling.

Presently, Contracting Officer Representatives have only a verbal agreement with operators on locations of servicing and refueling areas when quantities of fuel are less than 660 gallons in a single container or if total storage at a site exceeds 1320 gallons. This is a minor departure from BMP T-21 Servicing and Refueling of Equipment.

**Recommendation:** Include language in future timber sale contracts that provide a written designation of servicing and refueling areas.

### **Stream Temperature Monitoring**

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 stream 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 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 exceed 16° C are monitored annually.

There are 10 streams on the Forest that exceed the state standard.

During the summer of 2000, extra sites were monitored to investigate the thermal sources within the Upper and Lower Cispus River Watersheds. Information from these sites will be incorporated into the Upper Cispus River Water Quality Restoration Plan proposed for completion in September 2001.

Currently, ten listed water bodies for temperature are on lands managed by the Gifford Pinchot National Forest (Table 14).

Table 14. 303d listed waterbodies on the Gifford Pinchot National Forest.

Watershed	Stream	Location
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
Wind River	Bear Creek	Headwaters to confluence with Wind River
	Eightmile Creek	Headwaters to confluence with Panther Creek

#### Upper and Lower Cispus River Watersheds

Six streams in Upper and Lower Cispus River Watersheds exceeded 16° C during July 5 - September 15, 2000 (Table 15). The streams are East Canyon Creek, North Fork Cispus, Yellowjacket Creek, Greenhorn Creek, Iron Creek, and Cispus River (Table 15).

Table 15. Upper and Lower Cispus Watershed Stream Temperatures July 5 to September 15, 2000.

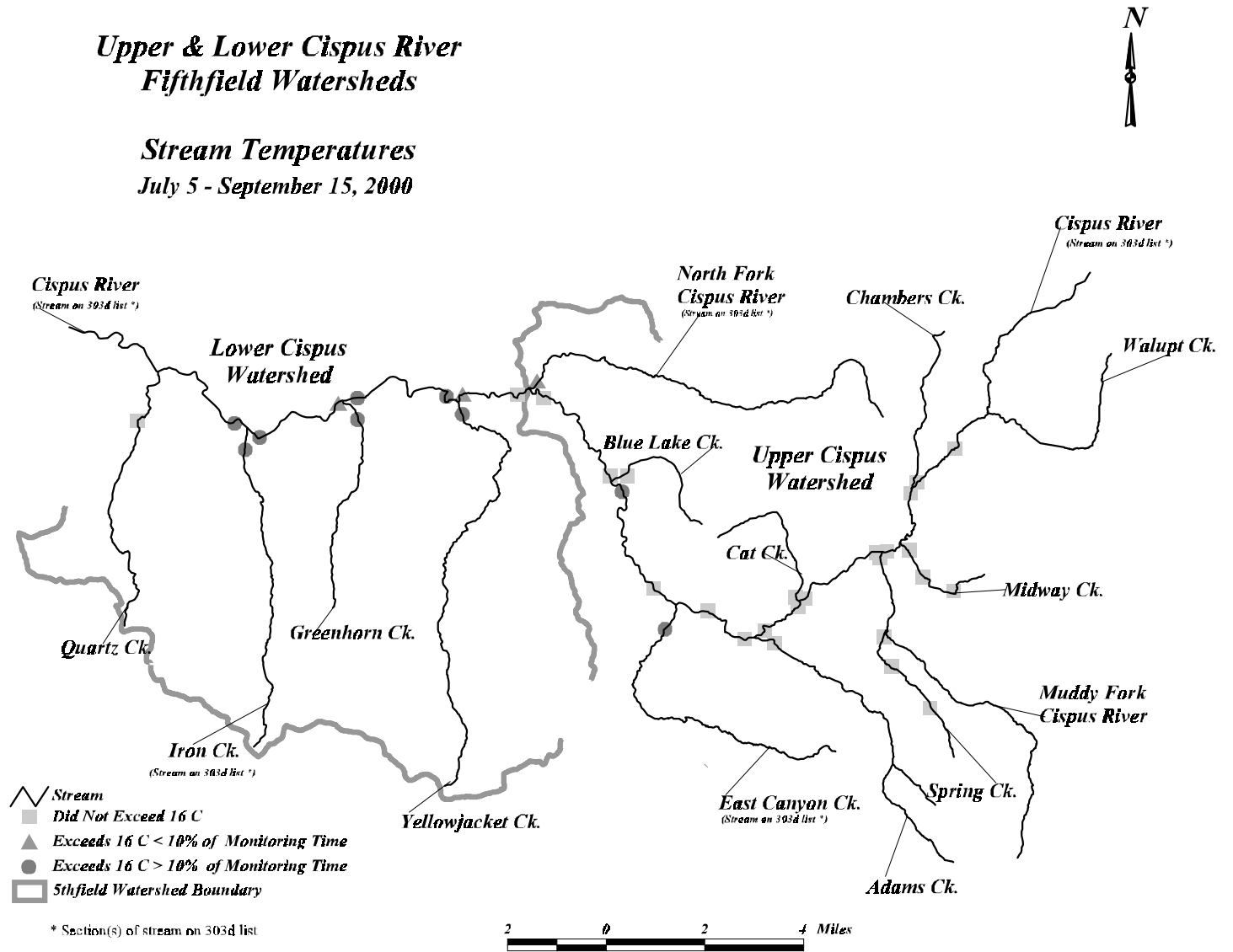
Streams In Downstream Order	Monitoring Location	Maximum Temperature (Degrees C)	Number Of Days Above 16.0° C	Maximum 7-Day Average Temperature (Degrees C)
Cispus River	2 miles above Chambers Creek	14.6	0	14.2
Cispus River	Just above Chambers Creek	15.2	0	15.0
Chambers Creek	Near confluence w/ Cispus R.	14.9	0	14.1
Cispus River	Just below Chambers Creek	14.9	0	14.3
Midway Creek*	Above Midway Meadows	13.2	0	12.6
Midway Creek*	Below Midway Meadows	12.3	0	11.7
Midway Creek*	Near confluence w/ Cispus R.	13.2	0	12.4
Spring Creek*	3 miles above Cispus River	8.1	0	7.8

<b>Streams In Downstream Order</b>	<b>Monitoring Location</b>	<b>Maximum Temperature (Degrees C)</b>	<b>Number Of Days Above 16.0° C</b>	<b>Maximum 7- Day Average Temperature (Degrees C)</b>
Muddy Fork	Near confluence w/ Cispus R.	10.3	0	9.7
Cispus River	Just below Muddy Fork	11.1	0	10.6
Cispus River	Just above Cat Creek	12.3	0	11.7
Cat Creek	½ mile above Cispus River	13.2	0	12.7
Cispus River	Just below Cat Creek	12.3	0	12.7
Cispus River	Just above Adams Fork	12.1	0	11.6
Adams Fork	0.8 miles above Cispus River	8.6	0	8.2
Cispus River	Just below Adams Fork	11.3	0	10.9
Cispus River	Just above East Canyon Creek	11.4	0	11.0
East Canyon Cr	Near confluence w/ Cispus R.	<b>16.8</b>	12	<b>16.4</b>
Cispus River	Just below East Canyon Creek	14.2	0	13.8
Cispus River	Just above Blue Lake Creek	<b>17.5</b>	12	<b>17.0</b>
Blue Lake Creek	Near confluence w/ Cispus R.	14.0	0	12.9
Cispus River	Just below Blue Lake Creek	13.1	0	12.5
Cispus River	Just above N. F. Cispus R	<b>16.0</b>	0	15.2
N.F. Cispus River	Near confluence w/ Cispus R	<b>16.2</b>	1	15.6
Cispus River	Just below North Fork Cispus R.	15.2	0	14.7
Cispus River	Just above Yellowjacket Creek	<b>16.1</b>	1	15.5
Yellowjacket Cr	Near confluence w/ Cispus R.	<b>17.8</b>	20	<b>17.4</b>
Cispus River	Just below Yellowjacket Creek	<b>18.8</b>	33	<b>18.3</b>
Cispus River	Just above Greenhorn Creek	<b>18.1</b>	18	<b>17.4</b>
Greenhorn Creek	Near confluence w/ Cispus R.	<b>20.2</b>	42	<b>19.1</b>
Cispus River	Just below Greenhorn Creek	<b>16.2</b>	6	15.8
Cispus River	Just above Iron Creek	<b>17.8</b>	19	<b>17.1</b>
Iron Creek	Near confluence w/ Cispus R.	<b>18.1</b>	24	<b>17.4</b>
Cispus River	Just below Iron Creek	<b>17.8</b>	20	<b>17.1</b>
Quartz Creek	1 mile above Cispus River	15.6	0	0

\* - Monitoring period was July 19 through September 21, 2000

**Bold – above 16°C**

Figure 4. Upper and Lower Cispus River Watersheds



Map 2007

- Seven of fifty-five stream sites that have been monitored for temperature in the Upper and Lower Cispus River Watersheds since 1991 exceed 16° C (Table 16). These streams are Chambers Creek, East Canyon Creek, Cispus River, North Fork Cispus River, Yellowjacket Creek, Greenhorn Creek, and Iron Creek.
- North Fork Cispus River has exceeded 16° C for a few hours during a day for 1-5 days during only 4 years of the 13 years it has been monitored.

Table 16. Historical Summary of Streams Exceeding 16° C Within the Upper and Lower Cispus River Watersheds.

<b>Stream Name</b>	<b>Monitoring Location</b>	<b>Years Monitored</b>	<b>Number Of Years Temperature Exceeded 16.0° C</b>	<b>Maximum Temperature (° C) During Monitoring Period (Year)</b>
Chambers Creek	Near confluence with Cispus River	1994, 2000	1	16.4 (1994)
East Canyon Creek	Above Dark Creek	1994, 1995	2	18.1 (1995)
East Canyon Creek	Below Dark Creek	1994	1	Raw data not available
East Canyon Creek	Near confluence with Cispus River	1994-1997 1999-2000	3	18.1 (1995)
Cispus River	Just above Blue Lake Creek	2000	1	17.5 (2000)
Cispus River	Above North Fork Cispus River	1994, 2000	1	16.0 (2000)
North Fork Cispus	Near confluence with Cispus River	1991-1995 1997-2000	4	16.3 (1992)
Cispus River	Just above Yellowjacket Creek	2000	1	16.1 (2000)
Yellowjacket Creek	Near confluence with Cispus River	1996, 1999, 2000	3	18.4 (1996)
Cispus River	Just below Yellowjacket Creek	2000	1	18.8(2000)
Cispus River	Above Greenhorn Creek	2000	1	18.1 (2000)
Greenhorn Creek	Near confluence with Cispus River	2000	1	20.2 (2000)
Cispus River	Just below confluence with Greenhorn Creek	2000	1	16.2 (2000)
Cispus River	Just above Iron Creek	2000	1	17.2 (2000)
Iron Creek	Near confluence with Cispus River	1996, 1999, 2000	3	18.1 (1996)
Cispus River	1 mile below confluence with Iron Creek	1991-1992 1996-2000	5	20.6 (1997)



## Tilton River Watershed

Tumble Creek did not exceed 16°C during the summer of 2000. The monitoring site was just above the confluence with the North Fork Tilton River. The maximum temperature was 15.5°C and the maximum 7-day average was 14.5°C.

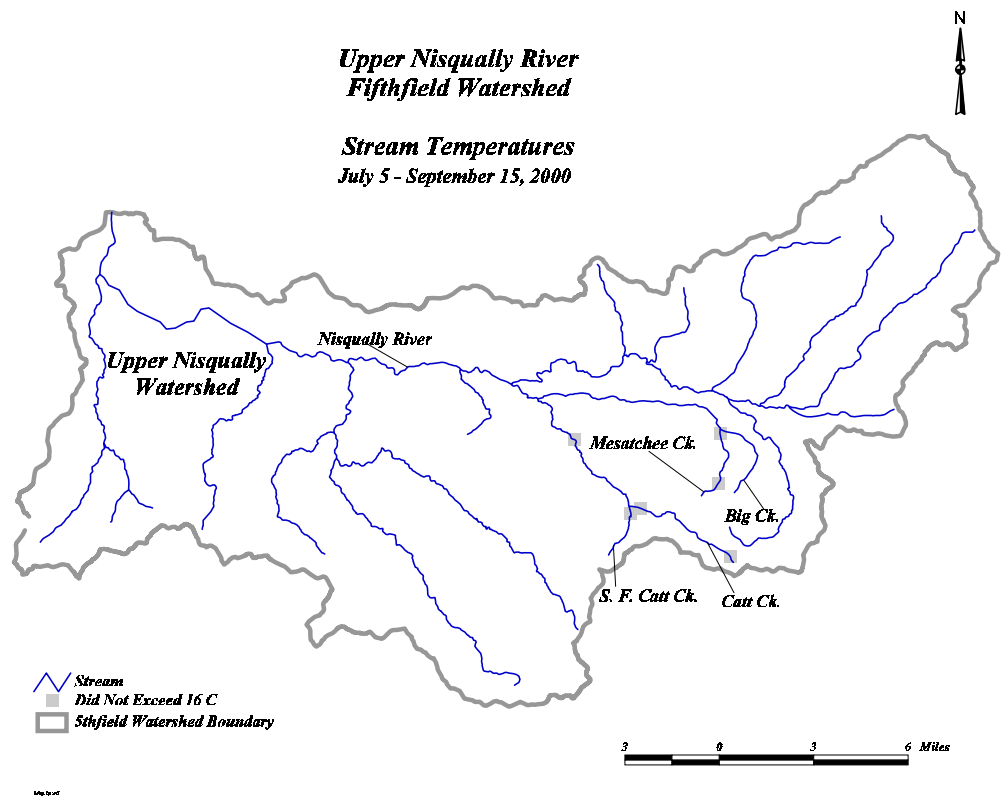
## Upper Nisqually River Watershed

Mesatchee Creek and Catt Creek stream temperatures were below 16°C within the Upper Nisqually River Watershed during the summer of 2001 (Figure 5, Table 17. Upper Nisqually River Watershed Stream Temperatures, July 5-September 15, 2000.

Table 18. Upper Nisqually River Watershed Stream Temperatures, July 5-September 15, 2000.

<b>Streams In Downstream Order</b>	<b>Monitoring Location</b>	<b>Maximum Temperature (Degrees C)</b>	<b>Number Of Days Above 16.0° C</b>	<b>Maximum 7- Day Average Temperature (Degrees C)</b>
Mesatchee Creek	Headwaters of Mesatchee Creek	11.9	0	11.1
Mesatchee Creek	Above confluence w/ Big Creek	12.5	0	11.8
Catt Creek	Headwaters of Catt Creek	7.9	0	7.6
Catt Creek	Above confluence w/ SF Catt Ck	13.4	0	12.5
South Fork Catt Creek	Above confluence w/ Catt Creek	15.3	0	14.4

**Figure 5. Upper Nisqually River Watershed**



## **Clear Fork Cowlitz River, Upper Cowlitz River and Middle Cowlitz River Watersheds**

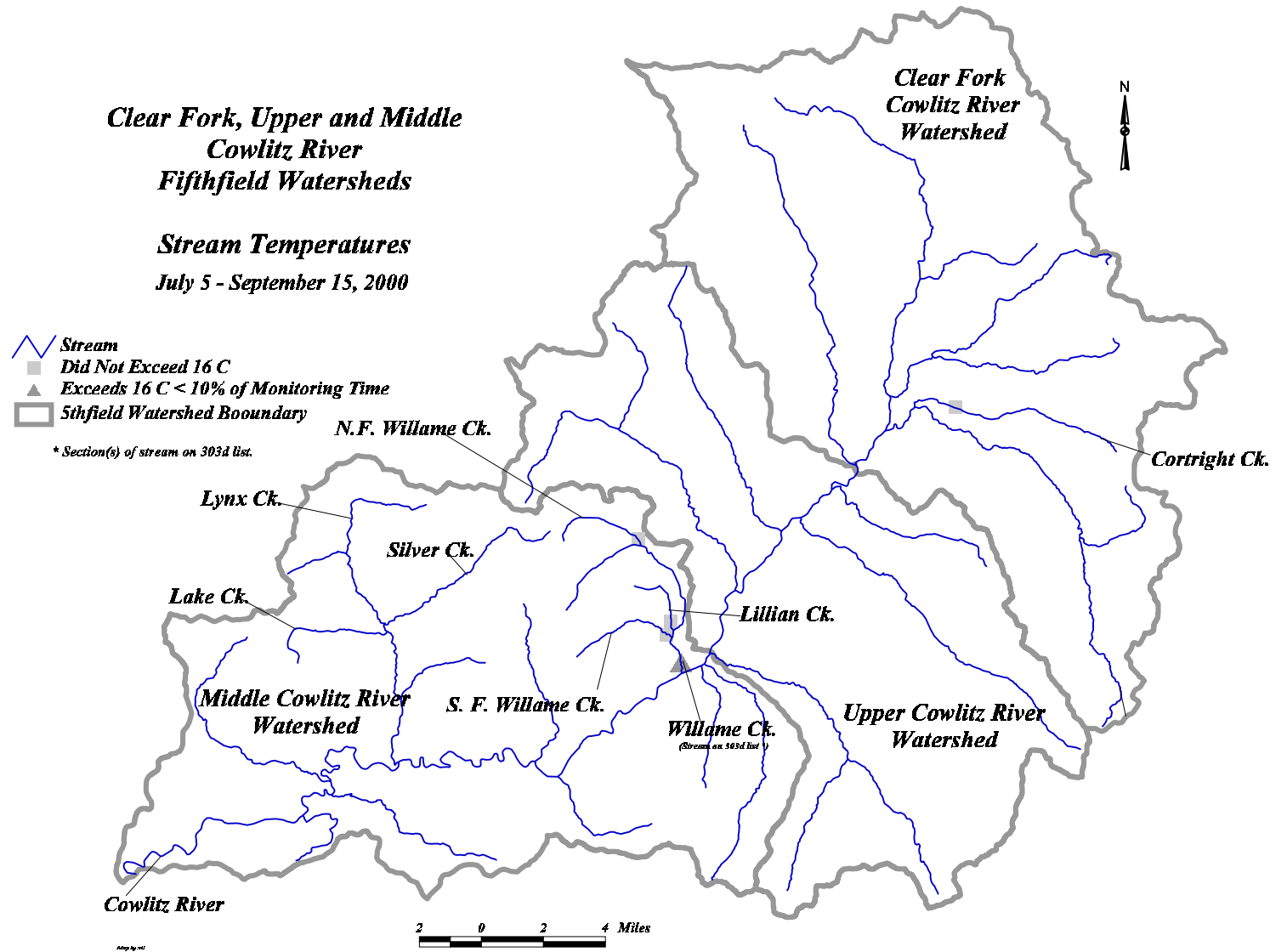
- Willame Creek exceeded 16° C during the period July 5 through September 15, 2000 (Figure 6)
- Thirty-five stream sites have been monitored for temperature on tributaries of the Cowlitz River at various times since 1992. Six streams of these exceeded 16° C (Table 19). All of these streams are within either the Willame Creek or Silver Creek Subwatershed. Willame Creek and Silver Creek are on the 303(d) list for elevated temperature.

Table 19. Stream Temperatures from July 5 through September 15, 2000 and Historical Stream Temperature Summary in the Clear Fork Cowlitz River, Upper Cowlitz River and Middle Cowlitz River Watersheds

Stream Name	Monitoring Location	Maximum Temperature (° C)	Number of Days Above 16.0° c	Maximum 7-Day Average Temperature (° C)	Years Monitored	Number Of Years Temperature Exceeded 16.0° C	Maximum Temperature (° C) During Monitoring Period (Year)
Cortright Creek	Above confluence with Cowlitz River.	13.3	0	12.7	2000	0	13.3
North Fork Willamee Creek	Just above confluence with Willamee Creek	15.3	0	14.4	1996, 1998-2000	2	16.3 (1996)
Lillian Creek	Just above confluence with Willamee Creek	15.6	0	14.9	1998-2000	1	17.0 (1998)
South Fork Willamee	Just above confluence with Willamee Creek	14.6	0	14.0	1998, 2000	1	16.4 (1998)
Willamee Creek	1/2 mile above confluence with Cowlitz R.	<b>16.1</b>	<b>1</b>	<b>15.2</b>	1998-2000	1	19.8 (1998)
Lynx Creek	Just above confluence with Silver Creek	*	*	*	1999	1	17.6 (1999)
Lake Creek	Just above confluence with Silver Creek	*	*	*	1999	1	18.9 (1999)
Silver Creek	1.2 miles above confluence with Cowlitz River	17.8	21	17	1992, 1995-2000	5	19.2 (1996)

\* - Site not monitored in 2000 **Bold – above 16°C**

Figure 6. Clear Fork, Upper and Middle Cowlitz Watersheds



### Upper Lewis River and Muddy River Watersheds

- Quartz Creek, Lewis River, Muddy River, and Clear Creek exceeded 16° C during the period June 15 through September 15 in the Upper Lewis River and Muddy River Watersheds (Figure 7).
- Ten stream sites that have been monitored for temperature in the Upper Lewis River and Muddy River Watersheds since 1991. Seven of these stream sites exceeded 16°C (Table 20).

**Table 20. Upper Lewis River and Muddy River Watersheds  
Stream Temperatures from June 15 through September 15, 2000 and Historical Stream Temperature Summary**

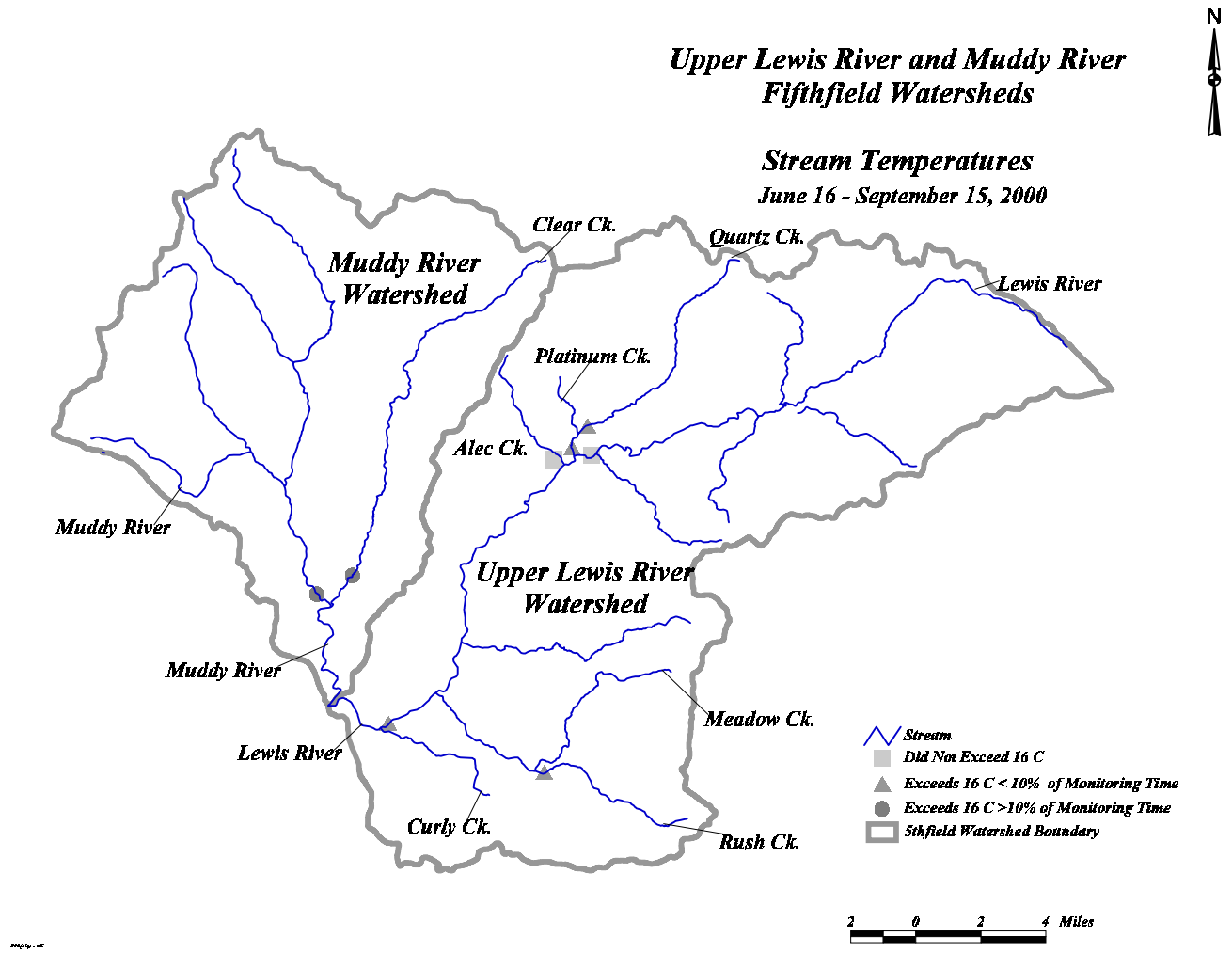
Stream Name	Monitoring Location	Maximum Temperature (° C)	Number of Days Above 16.0° C	Maximum 7-day Average Temperature (Degrees C)	Years Monitored	Number of Years Temperature Exceeded 16.0° C	Maximum Temperature (° C) During Monitoring Period (Year)
Lewis River	Above Quartz Creek	14.6	0	13.7	1999-2000	0	14.6(2000)
Quartz Creek	Above Platinum Creek	<b>17.6</b>	<b>5</b>	<b>16.4</b>	1999-2000	1	17.6 (2000)
Quartz Creek	Below Platinum Creek	<b>16.3</b>	<b>5</b>	<b>16.0</b>	1977-1979, 1982,1984,1988, 1997-2000	7	19.0 (1997)
Alec Creek	Near confluence with Lewis River	13.4	0	12.9	1998,2000	1	16.8(1998)
Rush Creek	Above Meadow Creek	11.8	0	10.7	1996, 1999-2000	0	15.3(1996)
Lewis River	Above Curly Creek	<b>16.8</b>	<b>4</b>	15.9	1975-1988,1991, 1996-2000	10	22.7 (1997)
Muddy River	Above Clear Creek	<b>19.8</b>	<b>60</b>	<b>19.0</b>	1991, 1996-2000	6	24.4 (1991)
Clearwater Creek	Above confluence with Muddy River	*	*	*	1996-1998	3	21.2 (1998)
Clearwater Creek	8 miles above confluence with Muddy River	**	**	**	1998-1999	2	18.8 (1998)
Clear Creek	Near confluence with Muddy River	<b>17.4</b>	<b>13</b>	<b>17.2</b>	1991, 1997-2000	4	22.9 (1991)

\* - site not monitored in 2000

\*\* - monitoring probe lost

**Bold – above 16°C**

Figure 7. Upper Lewis and Muddy Rivers Watersheds



**Yale Reservoir – Lewis River, and East Fork Lewis River Watersheds**

- Siouxon Creek exceeded 16°C on twelve days (Table 21).
- The East Fork Lewis River exceeded 16°C at the three monitoring stations (Figure 8). The East Fork Lewis River is on the 303(d) list for temperature below Moulton Falls (8 miles from the Forest Boundary).
- Copper Creek exceeded 16°C on six days.

Table 21. Stream Temperature from June 15 through September 15, 2000 and Historical Stream Temperature Summary in Yale Reservoir – Lewis River, and East Fork Lewis River Watersheds.

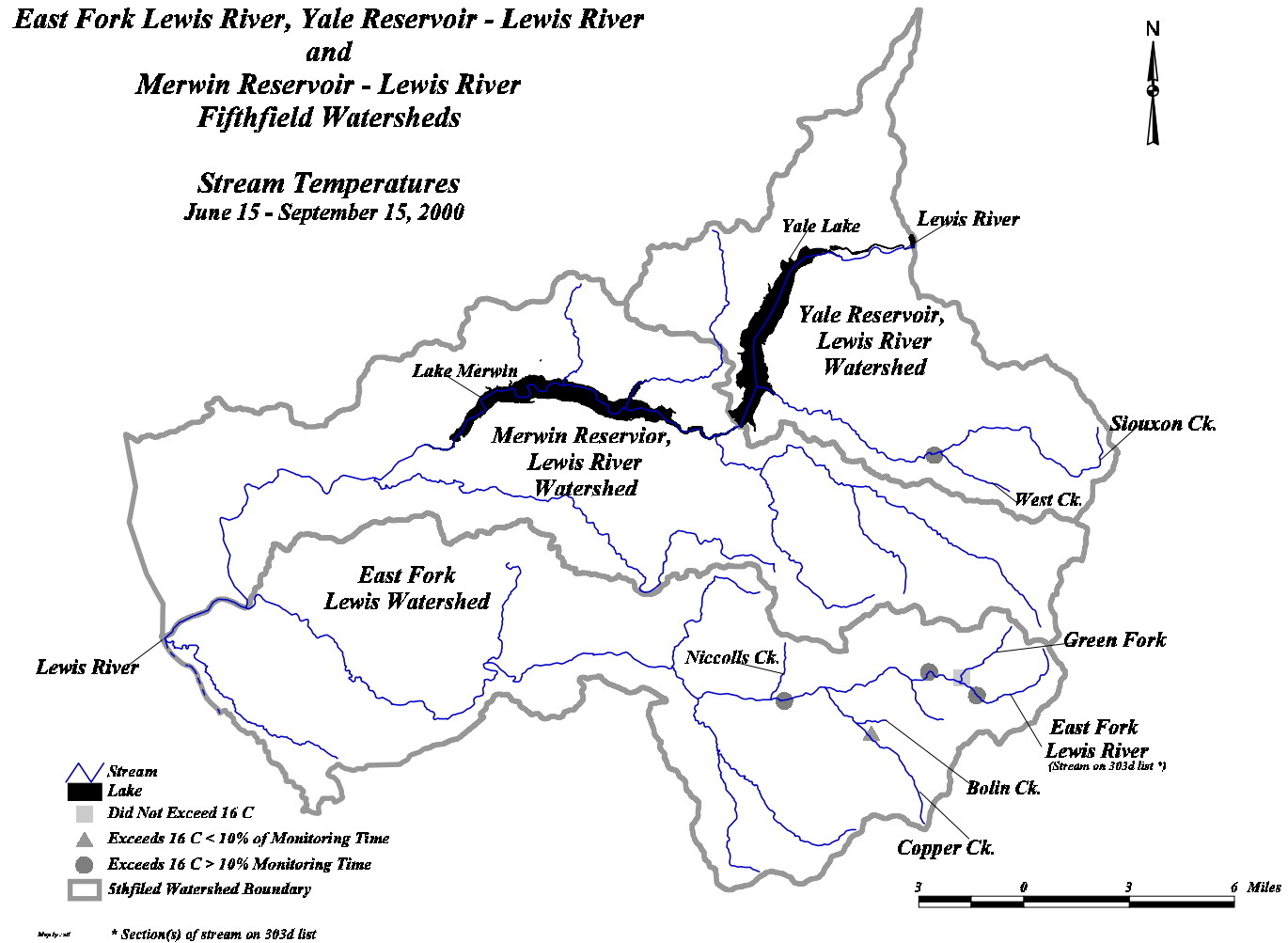
Stream Name	Monitoring Location	Maximum Temperature (°C)	Number of Days Above 16.0°C	Maximum 7-day Average Temperature (°C)	Years Monitored	Number of Years Temperature Exceeded 16.0°C	Maximum Temperature (°C) During Monitoring Period (Year)
Siouxon Creek	Below West Creek	<b>17.3</b>	<b>12</b>	<b>16.8</b>	1996-2000	5	22.0 (1997)
Canyon Creek	Above Big Rock Creek	*	*	*	1997-1998	2	16.9 (1998)
East Fork Lewis River	Above Green Fork	<b>17.5</b>	<b>13</b>	<b>17.1</b>	1999-2000	2	17.5 (2000)
Green Fork	Near confluence w/ East Fork Lewis River	15.0	0	14.5	1996-2000	2	22.0 (1997)
East Fork Lewis River	Below Little Creek	<b>17.9</b>	<b>16</b>	<b>17.2</b>	1999-2000	1	17.9 (2000)
Copper Creek	Above Bolin Creek	<b>16.7</b>	<b>6</b>	<b>16.1</b>	1977-1981, 1996-2000	7	20.8 (1997)
East Fork Lewis River	Below Copper Creek	<b>20.1</b>	<b>26</b>	<b>19.3</b>	1997, 1999, 2000	3	20.1 (2000)

\* - monitoring probe lost

**Bold – above 16°C**



Figure 8. East Fork Lewis and Lewis River Watersheds



## Wind River Watershed

Wind River exceeded 16° C at four monitoring stations from June 28 – September 26, 2001 (Figure 9). Two other streams within the Wind River Watershed exceed 16° C ; Black Creek and Trout Creek during this monitoring period (Table 22). Eightmile Creek and Bear Creek are on the 303(d) list for elevated temperatures.

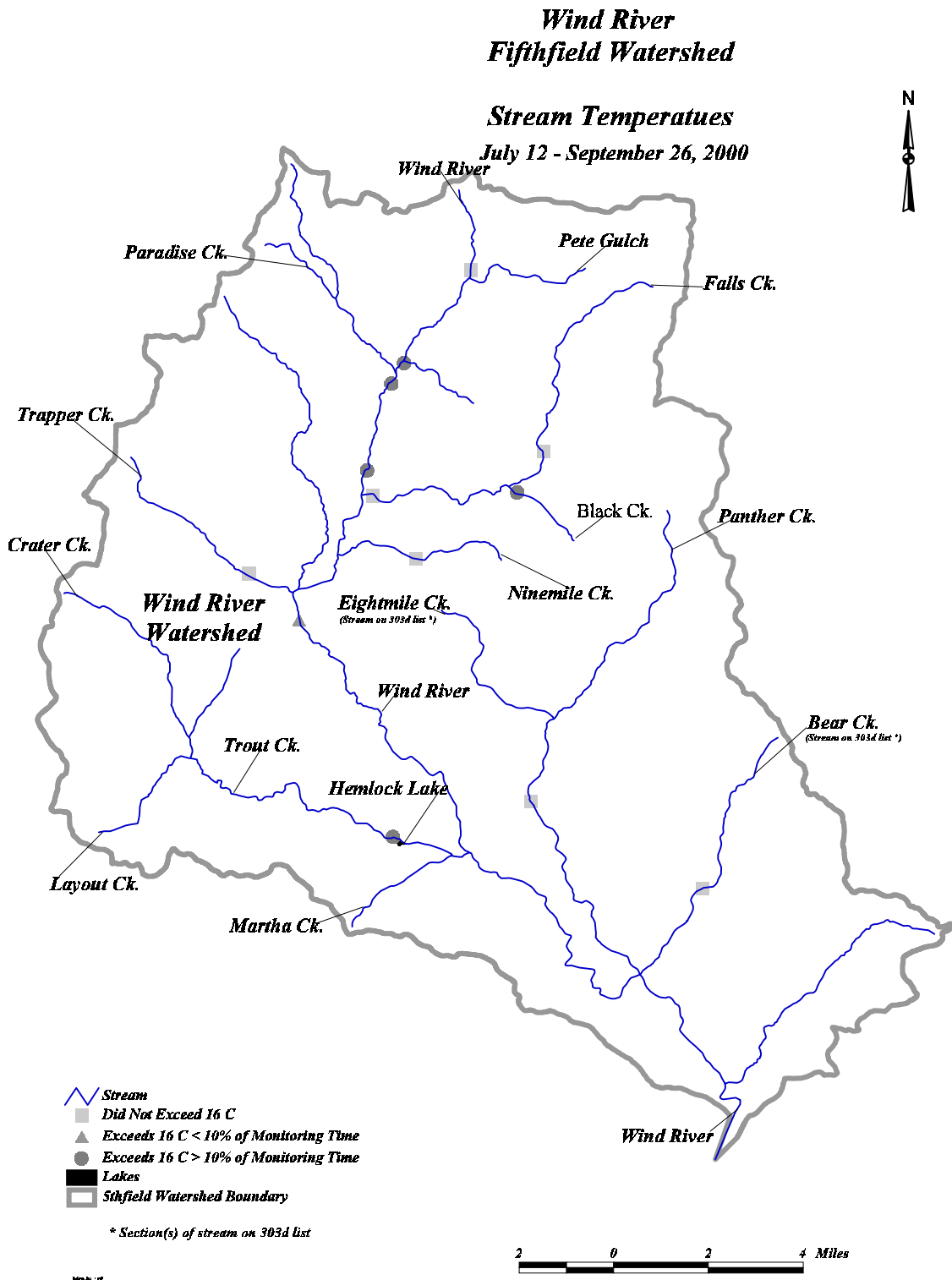
For the past eight years, Bear Creek had an average maximum temperature of 16.3oC and exceeded 16° C for an average of 20 hours per summer (less than 1% of monitoring period).

**Table 22. Wind River Watershed Stream Temperatures from June 28 through September 26, 2000.**

Streams In Downstream Order	Monitoring Location	Maximum Temperature (° C)	Number of Days Above 16.0° C	Maximum 7-day Average Temperature (° C)
Wind River	Above Pete’s Gulch Creek	14.9	0	13.0
Wind River	<b>Above Paradise Creek</b>	<b>17.1*</b>	<b>5*</b>	<b>18.3</b>
Wind River	<b>Below Paradise Creek</b>	<b>17.1</b>	<b>9</b>	<b>14.3</b>
<b>Wind River</b>	<b>Above Falls Creek</b>	<b>16.3</b>	<b>9</b>	<b>14.4</b>
Falls Creek	Above Black Creek	11.3	0	9.0
Black Creek	<b>Near confluence w/ Falls Creek</b>	<b>17.9</b>	<b>15</b>	<b>15.3</b>
Falls Creek	Near confluence w/ Wind River	15.1	0	13.1
Ninemile Creek	2 miles above Wind River	11.7	0	11.0
Trapper Creek	2 miles above Wind River	14.6	0	13.5
Wind River	<b>½ mile below Trapper Creek</b>	<b>16.3*</b>	<b>1</b>	<b>13.2</b>
<b>Trout Creek</b>	<b>Above Hemlock Lake</b>	<b>20.8</b>	<b>39</b>	<b>17.1</b>
Panther Creek	1 mile below Eightmile Creek	11.7	0	9.0
Bear Creek	2 1/2 mile above Wind River	15.8	0	14.4

**Bold – above 16°C**

Figure 9. Wind River Watershed



Twenty-four stream sites have been monitored for temperature within the Wind River Watershed at various times since 1977. Ten streams exceeded 16°C (Table 23).

**Table 23. Historical Summary of Streams Exceeding 16° C in the Wind River Watershed.**

Stream Name	Monitoring Location	Years Monitored	Number of Years Temperature Exceeded 16.0° C	Maximum Temperature (° C) During Monitoring Period (Year)
Wind River	Above Pete's Gulch Creek	1998-2000	1	16.5(1998)
Wind River	Above Paradise Creek	1995-1997 1999-2000	5	17.5(1995)
Wind River	Below Paradise Creek	1999-2000	1	17.1(2000)
Wind River	Above Falls Creek	1999-2000	2	16.6(1999)
Black Creek	Above Black Creek Swamp	1999	1	19.5
Black Creek	Below Black Creek Swamp	1999-2000	2	17.9(2000)
Falls Creek	Near confluence with Wind River	1998-2000	1	16.1(1998)
Ninemile Creek	2 miles above confluence with Wind River	1998	1	20.2
Trapper Creek	2 miles above confluence with Wind River	1977-1984 1986-1997 1999-2000	4	18(1981,86)
Wind River	½ mile below confluence with Trapper Creek	1978-2000	18	23(1980)
Crater Creek	Near confluence with Trout Creek	1993	1	19.0
Layout Creek	Near Confluence with Trout Creek	1993-1994	2	25.5(1994)
Trout Creek	Just below Layout Creek	1997	1	18.5
Trout Creek	½ mile below Layout Creek	1993-1994 1996	3	19.5(1994)
Trout Creek	Just above Hemlock Lake	1977-1993 1995-2000	22	25(1990,92)
Martha Creek	Near confluence with Trout Creek	1998	1	24.8
Bear Creek	2 1/2 miles above Wind River	1977-2000	16	18(1983,1986,1987)

## Little White Salmon River and White Salmon River Watersheds

- Four stream sites along the Little White Salmon River were monitored from June 26 – September 29, 2000 (Figure 10). Three of these four sites exceeded 16°C (Table 24).
- Cascade Creek within the White Salmon River Watershed was below 16°C from July 17 – September 29, 2000.

**Table 24. Little White Salmon River and White Salmon River Watershed Stream Temperatures from June 26 through September 29, 2000.**

Streams In Downstream Order	Monitoring Location	Maximum Temperature (°C)	Number of Days Above 16.0°C	Maximum 7- day Average Temperature (°C)
Little White Salmon River	2 miles above Lusk Creek	15.6	0	13.4
<b>Little White Salmon River</b>	<b>Just above Lusk Creek</b>	<b>16.3</b>	<b>4</b>	<b>14.2</b>
<b>Little White Salmon River</b>	<b>Above Berry Creek</b>	<b>17.2</b>	<b>10</b>	<b>14.0</b>
<b>Little White Salmon River</b>	<b>Above Moss Creek</b>	<b>18.9</b>	<b>42</b>	<b>16.0</b>
Cascade Creek	Near White Salmon Creek	14.4	0	10.0

Bold – Monitoring Station with Temperatures above 16°C.

- Five tributaries to the Little White River have been monitored at various times between 1995 to present without any detected temperatures above 16°C. Five sites along the Little White Salmon River have exceeded 16°C at various times since 1995 (Table 25)
- Twenty-three steam sites have been monitored for temperature within the White Salmon River Watershed. Five streams exceeded 16°C .

Figure 10. White Salmon and Little White Salmon Watersheds

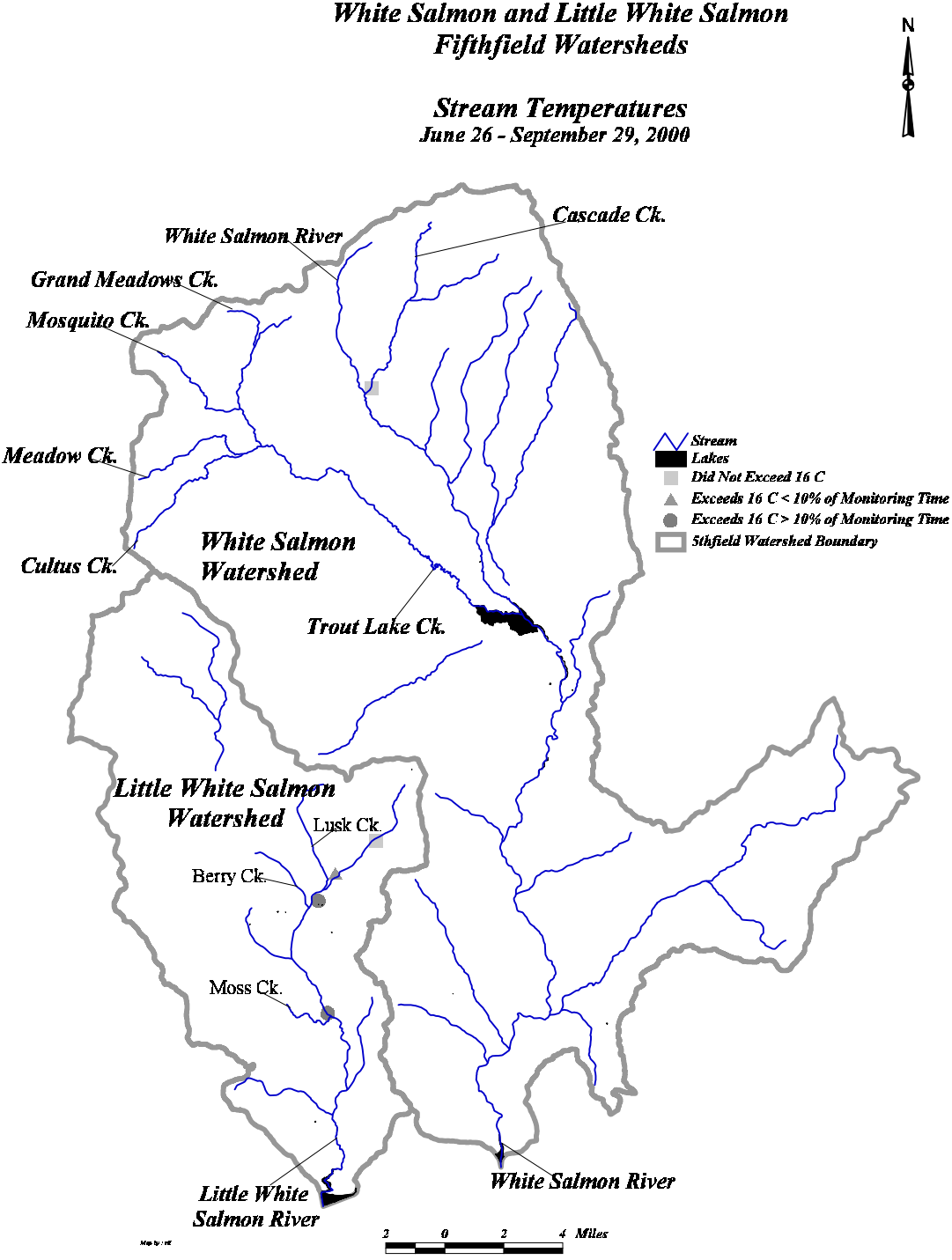


Table 25. Little White Salmon River and White Salmon River  
 Historical Summary of Streams Exceeding 16° C in the Watershed.

<b>Stream Name</b>	<b>Monitoring Location</b>	<b>Years Monitored</b>	<b>Number of Years Temperature Exceeded 16.0° C</b>	<b>Maximum Temperature (° C) During Monitoring Period (Year)</b>
Little White Salmon River	2 miles above Lusk Creek	1998, 2000	1	16.5 (1998)
Little White Salmon River	Just above Lusk Creek	1998-2000	2	17 (1998)
Little White Salmon River	Above Berry Creek	2000	1	17.2
Little White Salmon River	Below Berry Creek	1999	1	13.5
Little White Salmon River	Above Moss Creek (baseline)	1995-2000	6	20.2 (1998)
Trout Lake Creek	Just above confluence with Grand Meadow Ck.	1997, 1998	2	18.8 (1998)
Grand Meadow Creek	½ mi. above confluence with Trout Lake Creek	1997, 1998	1	17.8 (1998)
Trout Lake Creek	Above Mosquito Creek	1998	1	16.5
Mosquito Creek	Near confluence with Trout Lake Creek	1997, 1998	1	17.5 (1998)
Meadow Creek	1 mi. above confluence with Cultus Creek	1995-1996 1998	1	16.5 (1995)
Cultus Creek	½ mi. above confluence with Trout Lake Creek	1997-1998	1	17.5 (1998)
Trout Lake Creek	5 miles below Cultus Creek	1995-1996 1998	3	18.1 (1998)
Trout Lake Creek	7 miles below Cultus Creek	1996	1	16.5
Trout Lake Creek	½ mi. above confluence with White Salmon River	1995-1997	3	23 (1995)

## Wind Water Quality Restoration Plan

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. The Gifford Pinchot National Forest will follow the protocols specified in *A 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.

Wind Water Quality  
Restoration Plan will be  
completed by September  
30, 2001

The Wind River Water Quality Restoration Plan will be completed by September 30, 2001. The Wind River Water Quality Restoration Plan will focus on three major human caused alterations of natural processes and increases to stream temperatures:

- 1) reduced riparian shade from past riparian timber harvest, and development for residential housing, agriculture (orchards, nurseries) and recreation opportunities (campgrounds).
- 2) increased sedimentation from roads and developed areas, and
- 3) sediment contributions from low gradient stream channels in poor condition as a result of riparian timber harvest and large woody debris removal within the subwatershed

This management plan will focus on subwatersheds contributing 7 percent or more of the flow (drainage area) to the mainstem Wind River as measured at the mouth of the subwatershed tributaries. This focuses on streams that have sufficient flow quantity to influence stream temperatures and excludes only two subwatersheds, Little Wind River and Brush Creek. All these subwatersheds have anadromous fish habitat although minimal amounts exist within Falls Creek due to a natural fish barrier (water fall).

Solar radiation is the primary source of heat to a stream in forested ecosystems. The amount of solar radiation reaching a stream is the function of the amount of direct access the sun has to the stream and the exposed surface area-to-volume ratio of the stream (width to depth ratio).

Solar radiation reaching  
a stream depends on the  
amount of shade and the  
width of the stream.

**Stream Shade** Riparian vegetation can provide shade to stream surfaces, thus reducing the amount of solar radiation reaching the stream. The effects to shade within the Wind River will be estimated from a GIS based application based on the procedure in Chapter VII, Temperature of the EPA publication *An Approach to Water Resources Evaluation of non-point Silvicultural Sources* (EPA,1980). This model determines effective stream width and shadow characteristics to obtain total solar radiation to a stream. Tree height determines the length of shadow, while stand density influences the amount of light that passes through a stand. Stream orientation and channel width influence how much solar radiation reaches a stream each day. By modeling current and site potential vegetated conditions, solar loading (total energy expressed as BTU/sq.ft./day) to the streams can be calculated for both current and potential conditions.

**Channel Width** Channel width influences how much solar radiation reaches a stream. Channel widths can increase due to elevated sedimentation levels in a subwatershed. Within the Wind River Watershed, the primary human caused



Within the Wind River Watershed, the primary human caused sediment sources are roads, developed areas, and disturbed lower gradient stream reaches.

sediment sources are roads, developed areas, and disturbed lower gradient stream reaches. Locations where roads cross streams are a primary source for sediment delivery to streams from the road prism. Developed areas, where vegetative cover has been removed and not allowed to recover, contribute sediment to streams. Developed areas within the Wind River Watershed include orchards, areas used for livestock or agriculture, commercial and residential developments, and heavy recreational use areas. Disturbance to riparian areas due to timber harvest or development can increase solar radiation by ultimately increasing stream bank cutting and/or the rate of slope and bank failures resulting in channel widening of lower gradient stream reaches. These human caused sources will be assessed to estimate their contribution of increasing channel widths.

Also, the effects of Trout Creek widening resulting from Hemlock Dam and the existing reservoir will be assessed. Hemlock Dam is a 20 foot concrete structure on Trout Creek, approximately 2 miles from the confluence with the mainstem Wind River. Over the years, the reservoir has filled with sediment transported down the Trout Creek Subwatershed. This has resulted in a wide shallow reservoir with little shading at the margins. Water temperatures in excess of 80° F have been measured in the reservoir.

**Restoration** Restoration projects to improve shade and decrease stream widths will focus on passive and active management activities. With the implementation of the Northwest Forest Plan and its associated land allocations (i.e. riparian reserves) and standards and guidelines (i.e. Aquatic Conservation Strategy) stream and riparian conditions will improve as direction guides the allowance of natural processes to exist to the extent possible. In addition, active restoration projects have been completed and will be proposed. Efforts will concentrate within the highest priority subwatersheds. Proposed projects will include management activities to increase tree growth or stand density above the current or natural rate, road projects to reduce sediment delivery to streams and stream projects to decrease bank instability of wide, low gradient streams.

**Reference**

US Environmental Protection Agency. 1980. Approach to Water Resources Evaluation of non-point Silvicultural Sources (A Procedural Handbook). EPA-600/8-80-012.  
USDA Forest Service. 1999. Forest Service and Bureau of Land Management Protocol for Addressing Clear Water Act Section 303(d) Listed Waters. 21 pgs.

**Introduction:** Stream surveys conducted in 2000 to assess fish habitat conditions on GPNF followed Region Six’s Level II Stream Survey Protocol, v.2.

Information collected from lake surveys provides an assessment of potential natural reproduction, stocking schedules, and restoration opportunities. In addition, lake surveys identify local areas that may be sensitive to impacts such as recreation. From this information fish stocking schedules are determined, and recreational use and restoration recommendations are made. Volunteers from Target Earth and WDFW biologists assisted with fish habitat and riparian area inventories, bathymetric mapping, water chemistry analysis, and fish population sampling in lakes.

**Results:** A total of 50 miles of stream throughout GPNF were surveyed in 2000. Stream survey data was analyzed and reports were completed that can be acquired from the respective ranger district office.

A total of 50 miles of streams and 16 lakes throughout GPNF were surveyed in 2000

In 1999 and 2000, 3 lakes on Cowlitz Valley Ranger District, 10 lakes on Mt. Adams Ranger District, and one lake on Mt. St. Helens National Monument Area were surveyed. The Cowlitz Valley Ranger District conducted lake surveys on Blue Lake, Olallie Lake, and Chain-of-Lakes. These lakes are located at an elevation of just above 4,000 feet in densely forested watersheds. Blue Lake has a surface area of 128 acres, and the average depth is 84 feet. Olallie Lake has a surface area of 15.6 acres, and the average depth is 9.6 feet. Chain-of-Lakes consists of six separate shallow lakes totaling 25 acres. All of the lakes are oligotrophic with high water quality. Blue Lake also has exceptional water clarity, and is one of the more pristine lakes on the Forest.

Figure 11. Blue Lake on the Cowlitz Valley Ranger District



Lake spawning surveys were conducted in Packwood and Walupt Lakes. Results indicate fish populations for these two lakes is stable or improving. Packwood

and Walupt Lakes are the only two lakes on Cowlitz Valley Ranger District that have native fish populations. Fish populations in other lakes are probably the result of historical fish stocking efforts.

**Fish/Riparian S&G Implementation** 62a 

**Introduction:** The Forest Plan outlines specific standards and guidelines to ensure protection of fish and riparian resources. The emphasis of this monitoring item is to determine whether fish and riparian standards and guidelines are implemented through project planning and implementation. This monitoring item is evaluated at the project-level. Specific questions addressed are:

- What riparian mitigation was planned for the project?
- Was planned mitigation consistent with standards and guidelines?
- Was the project contract written to include provisions to meet standards and guidelines?
- Was the project implemented in compliance with standards and guidelines?

A variety of project types (i.e., timber sale, road construction, recreation development, watershed restoration, etc.) may be evaluated under this monitoring item. Timber sale and stream restoration projects were the focus for this year’s monitoring effort. The Forest’s three ranger districts selected three timber sales (Jammin, Siler Owens, and Tower) and one stream rehabilitation project (Mining Reach Riparian and Channel Rehabilitation) for review (Table 26). The same projects are evaluated, under *Effectiveness of Riparian S&Gs*, page 57. Five harvest units were evaluated. Project implementation dates ranged from 1997-2000 and all projects were planned under the 1994 *Northwest Forest Plan*.

Table 26. - Projects Monitored

Ranger District	Project Name	Timber Sale Unit	Planning Vintage	
			1990 <sup>1</sup>	1994 <sup>2</sup>
Mt. Adams	Mining Reach Riparian and Channel Rehabilitation	NA		√
Mt. Adams	Jammin Timber Sale	11		√
MSH NVM	Tile Timber Sale	6, 14		√
CowlitzValley	Siler Owens Timber Sale	6		√
Cowlitz Valley	Tower Timber Sale	10		√

<sup>1</sup> Project planned under 1990 Gifford Pinchot National Forest Plan.  
<sup>2</sup> Project planned under 1994 Northwest Forest Plan.

## **Results:**

### **Riparian Mitigation Planned**

All of the projects employed mitigation measures to protect riparian resources.

All of the projects employed mitigation measures to protect riparian resources. However, Unit 10 in Tower Timber sale contained one “wet area” that had no riparian mitigation identified in the environmental assessment. Best management practices (BMPs) were listed for the Tower Timber Sale as a whole. These BMPs are, as well as their effectiveness, are described in Best Management Practices monitoring item, page 30. Mining Reach Riparian and Channel Rehabilitation was planned as a riparian restoration project. Riparian mitigations for the timber sales were developed during the project planning process as part of required environmental analysis. Mitigations included:

- Establishment of riparian buffers along streams and wet areas.
- Designation of streams on sale area maps.
- Directional tree felling away from riparian reserves.
- Felled trees should be yarded away from streams.
- No landings or temporary roads located within riparian reserves.
- Stream crossings (road reconstruction) would follow management guidelines in the Washington Department of Fish and Wildlife Hydraulic Permit.

### **Planned Mitigation Consistent with S&Gs?**

In all cases, planned riparian mitigation measures were consistent with Forest Plan Standards and Guidelines. However, there were no specific riparian mitigations listed for Unit 10 in Tower Timber Sale other than BMPs.

### **Contracts Written to Include Necessary Provisions?**

In all cases, the contracts were written to reflect the planned riparian mitigation. They included erosion control requirements, directional felling, and specific yarding requirements.

### **Were projects implemented in compliance with S&Gs?**

One riparian buffer was found to be narrower than is required.

Of the four units monitored, unit 14 in Tile Timber Sale was the only unit with a riparian buffer narrower than required. The other three unit’s buffer widths ranged from 171 to 262 feet. There are no specific S&Gs for restoration work by which to evaluate the Mining Reach Riparian and Channel Rehabilitation project.

**Evaluation:** The riparian no-cut buffer on one intermittent stream in unit 14 in Tile Timber Sale was narrower than required. The remainder of the units were in compliance with fish and riparian standards and guidelines. Appropriate mitigation measures were identified in the planning process; the measures were subsequently tracked through contracting process and then appropriately implemented on the ground. However, the Tower Timber Sale environmental assessment failed to specify riparian mitigations for any wet areas found. Although BMP’s were identified, they are general enough to exclude specific requirements for wet areas. The Mining Reach Riparian and Channel Rehabilitation contract was uniquely written as a rental agreement, consequently, there was no contractual language specifying mitigation measures. In this case tracking mitigation measures was largely the responsibility of the Forest Service Contract Officer Representative.

The EA failed to specify riparian protection for wet areas.

The 2000 monitoring effort indicates the Forest has made a transition to the 1994 Forest Plan standards and guidelines.

Effects of the proposed mitigation measures were all positive. All mitigation measures were reported to have met their desired objectives. No observable impacts to fish and riparian resources were documented by the fish biologist, hydrologist, and soil scientist staff members conducting these evaluations.

The 2000 monitoring effort indicates the Forest has made a transition to the 1994 Forest Plan standards and guidelines. Because all projects evaluated were planned under the 1994 Northwest Forest Plan, there seemed to be far less confusion than previous years when projects were planned under the 1990 Forest Plan and monitored against the 1994 Northwest Forest Plan.

**Recommended Actions to be Taken:**

Successful planning and implementation is attributed to several factors including the following:

Continue to have fish biologist, hydrologist, and soil scientist personnel participate in locating and classifying streams and wet areas prior to completion of the timber sale contract (preferably during preparation of the environmental analysis).

Specify riparian mitigations in environmental assessments and contracts for streams and wet areas.

Continue to provide necessary training for timber sale layout and marking personnel to ensure that all streams and wet areas are properly identified and treated in accordance with specified mitigations.

Thorough ground surveys should be extended outside the immediate planning area boundary a distance of two site-potential tree-heights. This precautionary measure helps ensure that all adjacent streams and wet areas are treated appropriately.

Projects implemented with a rental agreement contract should be actively administered by a contracting officer's representative (COR) to ensure the successful implementation of planned mitigation.

## Effectiveness of Riparian Standards and Guidelines 62b

**Introduction:** The intent of this monitoring item is to determine if planned mitigations are effectively meeting *Forest Plan* management objectives for protection of riparian, fish, and water resources. The same projects investigated under *Fish/Riparian S&G Implementation* (Table 26, page 54) are evaluated here. Three specific questions shall be answered:

1. Is channel stability maintained?
2. Is stream shading maintained?
3. Are sediments originating from management activities reaching the stream course?

### **Results:**

#### **Maintenance of Channel Stability**

Channel stability was maintained or improved for all projects evaluated. The minimum planned riparian treatment was achieved on the ground in all cases. In the case of Tile Timber Sale Unit 14, the no-cut riparian buffer width that was narrower than required had an adequate number of trees to help maintain channel stability. Mining Reach Riparian and Channel Rehabilitation project noted several improvements to channel stability including a 58 percent increased channel stability with the installation of large wood bank revetments.

#### **Maintenance of Stream Shading**

Stream shading was adequately maintained along all streams examined. One of the long-term restoration objectives for the Mining Reach Riparian and Channel Rehabilitation project estimates a time-frame of 100 years to significantly improve stream shade. Stream shade objectives are not expected to be met until riparian stands fully mature (approximately 100 years). No water temperature data were provided for any of the projects evaluated.

#### **Sediment Transport to Affected Stream Course**

Sediment originating at the project was not observed reaching any of the associated stream channels or wet areas for the four sales monitored. Instream restoration work, similar to the Mining Reach Riparian and Channel Rehabilitation project, typically produces a short-term pulse of sediment during implementation that is confined to the local area. Post implementation monitoring results showed bank erosion has been reduced from <50 percent. In addition, the 2000 trees that were placed within the bank full and flood prone channel to stabilize bars and collect coarse and fine sediment should help reduce excessive sediment transport.

**Evaluation:** Riparian standards and guidelines were effective in meeting Forest Plan management objectives for protection of riparian, fish, and water resources. In all cases prescribed mitigations were followed as specified, and appear effective. While we had the benefit of seeing the effects of one rainy season, a more thorough evaluation of riparian standard and guideline effectiveness was made following two winters for the Jammin Timber Sale. Instream restoration and riparian silviculture work on the Mining Reach Riparian and Channel Rehabilitation project has set the stage for providing long-term positive benefits on promoting improved channel stability and instream sediment conditions.

Channel stability was maintained or improved for all projects evaluated.

Sediment originating at the project was not observed reaching the associated stream channels.

Riparian standards and guidelines were effective in meeting management objectives.

Enhancing stream shade is a long-term proposition that will not be realized for several decades.

The Forest Plan standards and guidelines are not focused on restoration projects such as the Mining Reach Riparian and Channel Rehabilitation. As a result, the proper evaluation of restoration projects requires a well-defined, quantifiable objective. Mining Reach Riparian and Channel Rehabilitation project did a good job of defining and documenting objectives (e.g. increase large wood to >120 pieces/mile) which facilitated a post-implementation review.

Other standards that could potentially be used to evaluate the effectiveness of instream restoration include: Policy Implementation Guide (PIG), National Marine Fisheries Service's Environmental baseline, Watershed Analysis, or the Forestwide health assessment.

**Recommended Action to be Taken:**

Continue monitoring until objectives have been met.

Revise format to incorporate non-traditional projects (e.g. restoration projects, recreation sites)

Define some quantifiable numerical standards for restoration monitoring.

Examine alternative sources of standards (e.g. PIG, NMFS environmental baseline matrix, or Forestwide health assessment) for evaluating restoration project effectiveness.

Establish a provincial source of standards that better represent potential conditions on the Forest rather than a general standard such as those in the NMFS environmental baseline matrix.

**Proposed, Endangered, Threatened, and Sensitive (PETS)  
Fish Species <sup>62c</sup> ⓘ**

**Introduction:** The list of PETS fish species occurring on Gifford Pinchot National Forest (GPNF) includes six threatened, proposed, and candidate fish species. These species include:

Status	ESU (Evolutionary Significant Unit) or DPS (Distinct Population Segment)
Threatened	Columbia River bull trout ( <i>Salvelinus confluentus</i> )
Threatened	Lower Columbia River and Middle Columbia River steelhead trout ( <i>Oncorhynchus mykiss</i> )
Threatened	Lower Columbia River and Puget Sound Chinook ( <i>Oncorhynchus tshawytscha</i> )
Threatened	Columbia River chum ( <i>Oncorhynchus keta</i> )
Proposed	Southwestern Washington/Columbia River coastal cutthroat ( <i>Oncorhynchus clarki</i> )
Candidate	Lower Columbia River/Southwest Washington Coho ( <i>Oncorhynchus kisutch</i> )

The U.S. Forest Service (USFS) sensitive species policy requires that species, populations, Evolutionarily Significant Unit (ESU), or Distinct Population Segments (DPS) with viability concerns or tending toward Federal listing be given special management emphasis to ensure their continued existence. Part of this special emphasis is the development of careful monitoring plans through partnerships to assess and document local fish population and habitat conditions following the implementation of ongoing and proposed activities on national forest land. The following is a discussion of different monitoring tools used to assess fish and habitat conditions for two listed species on the Forest.

**Steelhead (*Oncorhynchus mykiss*)**

The Lower Columbia River Steelhead ESU is federally listed as Threatened by the National Marine Fisheries Service under the Endangered Species Act. The steelhead is an anadromous form of rainbow trout that inhabits several rivers and streams throughout GPNF. Adult steelhead spawn in rivers and streams by laying their eggs in depressions in the gravel called "redds". Fry emerge from the gravel and rear for one to three years in freshwater before migrating to the ocean as smolts where they grow to adults. The number of fish present may serve as an indicator of stream health. However, many factors other than habitat quality influence the population size and structure of anadromous fish such as angling, hydroelectric facilities, ocean conditions, avian and marine mammal predation, and hatchery introductions.

This year's monitoring efforts continue to emphasize adult steelhead counts for the Wind and East Fork Lewis Rivers. In addition, smolt population estimates

Forest Service sensitive species policy requires that species with viability concerns be given special management emphasis to ensure their continued existence.



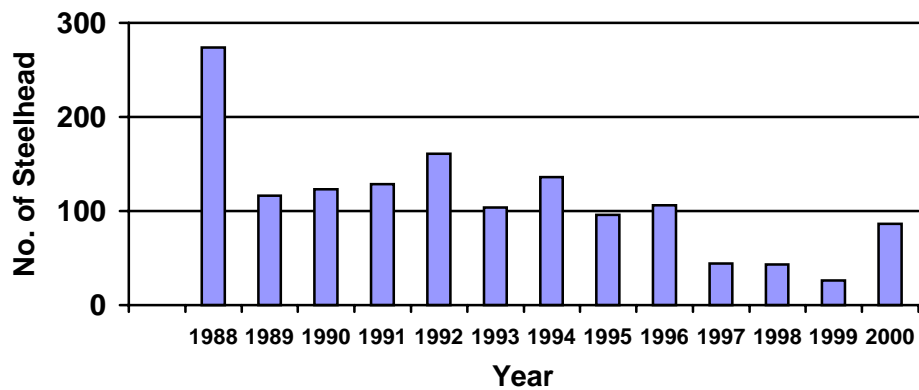
continue to be an important part of the fisheries program at the Wind River Ranger Station. While data provided here are insufficient to determine population viability, these data do provide useful information on population trends. The majority of the monitoring program in the Forest's fisheries program is accomplished through the development of outside partners, such as Washington Dept. Fish and Wildlife (WDFW).

**Results:**

**Wind River Steelhead Snorkel Survey** - The USFS combined with six partners, totaling over 35 individuals, to conduct the 13<sup>th</sup> annual Wind River Steelhead snorkel survey. The objectives of the survey were to obtain a count of steelhead for trend comparison with the past 12 years' results, and to provide mark/observation data for estimating the actual number of steelhead in Wind River. The snorkel survey covered 28 miles of water and provided resource managers with another outstanding piece of information on adult steelhead. Total adjusted wild steelhead counts this year was 86 (Figure 12). This count is the highest since 1996 and compares favorably with last years count of 26 and the recent five year average of 63.

Six agencies and organizations partnered in conducting the 2000 Wind River Steelhead survey.

Figure 12. Wind River adult steelhead snorkel survey counts from 1988 to 2000.



In 1999 the number of fish observed was the lowest recorded count documented since surveys began in 1988. In 1999 the WDFW to issue an emergency sport angling closure for steelhead

The 2000 Wind River steelhead snorkel survey was expanded to include a Peterson mark recapture estimate. A population estimation was generated based on observations of fish marked at Shipherd falls adult trap. Of the 52 wild steelhead tagged at Shipherd falls, 22 and 21 were observed on two days worth of snorkeling. The population estimate of the resulting data is 243 steelhead with confidence limits at 203 and 304 at 95%. As a comparison to last year, it was estimated that the wild steelhead population was only 104 fish during the survey. This year's wild steelhead population estimate is 2.3 times larger than last years.

Biologists are very concerned about the long-term viability of the Wind River steelhead population.

Although there was an increase in the Wind River steelhead population this year, biologists are very concerned about the long-term viability of this population. The current population is less than one-quarter of state escapement goals (1000 adults). The snorkeling results help the WDFW biologists make critical fishing regulation changes each year and serve as a monitoring tool for restoration efforts.

**Wind River State of the Steelhead.** The Wind River "State of the Steelhead" project is a vital, ongoing public and interagency effort between Bonneville Power Administration (BPA), USFWS, WDFW and GPNF that allows resource managers to keep current on local watershed health. All creeks discussed in this section belong to the Wind River basin. The project includes the following surveys:

**Redd Surveys:** The objectives of redd surveys are to evaluate population trends, identify preferred spawning sites relative to habitat and restoration sites. Biologists from WDFW and GPNF have surveyed established index reaches within the Wind River basin since 1987. The importance of data from 1994 to 1999 is illustrated in the following discussion. For three consecutive years, 1994 to 1996, spawning was not observed in Layout Creek, a major spawning tributary within Trout Creek. In 1996 and 1997, approximately 1,200 trees were placed in Layout Creek to increase bank and channel stability. In 1998 and 1999, eighty and ninety percent of all spawning observed in the Trout Creek watershed was observed in Layout Creek. While this increase in spawner utilization and preference cannot be directly attributed to restoration it does indicate that restoration efforts may be helping.

13 redds were  
observed in the Wind  
River Watershed

Redd surveys in 2000 were difficult due to the low number of returning adult spawners. Surveys were conducted on 24 miles of index spawning reaches on mainstems and tributaries. A total of 13 redds were observed in the Wind River watershed. Three redds were observed in Trout Creek above Hemlock Lake and in the Trout Creek Flats below the confluence of Old Growth Channel and Layout Creek. Four redds were observed in the Mining reach, 2 in Paradise Creek, 2 in Ninemile Creek, 1 in Dry Creek, and 1 on private land below Beaver Campground.

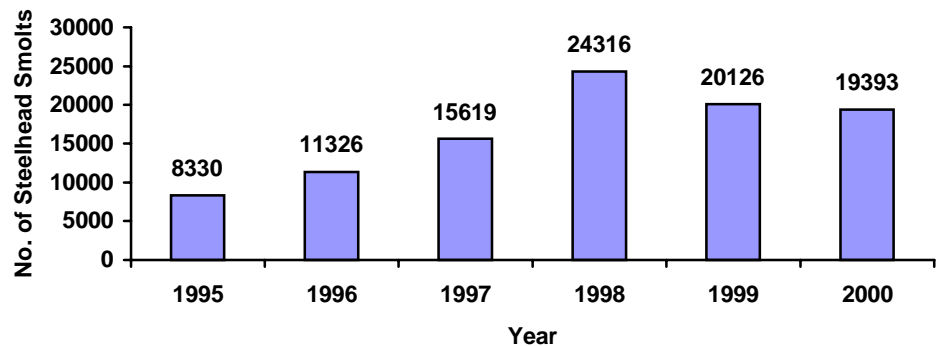
**Smolt Traps:** Smolt trap data is used in conjunction with redd surveys, snorkel surveys and adult trap data to evaluate steelhead smolt production, migration timing, fresh and marine water survival by sub-watershed. The USFWS, WDFW and USFS have operated rotary screw traps within the basin since 1995 (Figure 13). The resulting data has allowed us to quantify increases in freshwater survival and declines in ocean survival. In addition, the data has allowed us to focus out-year restoration proposals on specific sub-watersheds, such as the upper Wind River. Continued operation of the traps on the Wind River will provide analysis of population trends and additional year's data will provide necessary information to further refine production estimates.

Figure 13. Smolt trap being placed on Wind River by Brian Bair, Fish Biologist at Wind River Ranger District, Gifford Pinchot National Forest.



Population estimates are based on the total number of steelhead smolts captured at the mouth of the Wind River. The reported 2000 estimates are the midpoint of the 95% confidence limits for trap efficiencies. Smolt trap mark and recapture data requires intensive refinement and analysis to produce statistically valid estimates due to the large number of variables influencing the efficiencies of the traps. For the 2000 smolt emigration, an estimated 19,393 smolts exited the Wind River basin (Figure 14).

Figure 14. Wind River smolt population estimates from 1995 to 2000.



**Adult Traps:** Objectives for adult traps are to segregate hatchery and wild steelhead, verify redd survey observations, and monitor adult population trends in Trout Creek. Adult trap data has allowed us to keep hatchery and wild stocks from interbreeding in the upper portions of the Wind River basin. The information is used to make significant changes in fishing regulations, as well as management of Hemlock Dam’s fish ladder and the dam itself. The Clark Skamania Flyfishers, White Salmon Steelheaders, and WDFW and USFS biologists have been operating the adult trap on Trout Creek’s fish ladder at Hemlock Dam since 1992 (Figure 15).

Figure 15. Adult steelhead being removed from adult trap on Trout Creek's fish ladder at Hemlock Dam.



Only 8 adult steelhead were captured and released above Hemlock Dam to spawn.

The 1999-2000 run of wild steelhead in Trout Creek was grim at best; only 8 adult steelhead were captured and released above the dam to spawn. However, there is room for cautious optimism. Eighteen adult wild steelhead have been passed above Hemlock Dam for the first part of the 2000-2001 run (5/1/00-10/12/00).

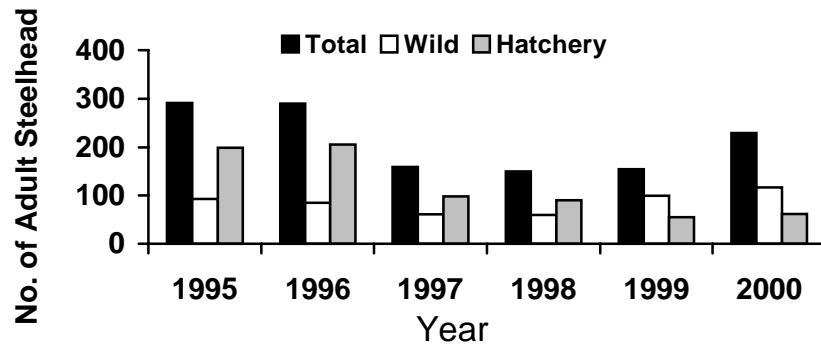
Washington State University (WSU) conducted an analysis of the Trout Creek system to identify factors limiting fish passage at Hemlock Dam. Several options to improve fish passage and water quality at Hemlock Dam were developed and analyzed. The WSU completed a detailed implementation plan, economic assessment and a cost – benefit analysis. Their analysis supported dam removal as the most effective means of addressing environmental concerns and the most cost effective way to meet GPNF's goals.

**East Fork Lewis Steelhead Snorkel Survey.** For the past six years, WDFW in cooperation with Clark-Skamania Flyfishers, Trout Unlimited, US Fish and Wildlife Service (USFWS), and USFS biologists has organized a snorkel survey along the East Fork Lewis River.

The objective of the survey is to count adult summer-run steelhead. Snorkel counts are completed in mid-summer on an average of 30 miles of mainstem and tributaries. The survey area in 2000 included the mainstem of East Fork Lewis River from Sunset Falls (RM 32.7) to below Mason Creek (RM 5.9). Steelhead are counted as wild, hatchery, and unknown.

The 2000 observations were 72 hatchery, 62 wild, and 94 unknown steelhead. Based on the percentage of hatchery and wild fish observed the unknown fish are assigned to the hatchery or wild category. The adjusted wild count for 2000 is 117 steelhead and 112 for hatchery. The number of wild steelhead counted for 2000 is the highest since the survey was initiated in 1995 (Figure 16).

Figure 16. East Fork Lewis River steelhead snorkel counts from 1995 to 2000.



99 wild adult steelhead were counted in the East Fork Lewis River.

Wild steelhead counts for the years 1995 through 1999 are 93, 85, 61, 60, and 99, respectively. The lowest number of wild steelhead observed through snorkel surveys was in 1998. For the past two survey years more wild steelhead have been observed than hatchery. Hatchery steelhead counts for the years 1995 through 1999 are 198, 205, 98, 90, and 55, respectively. High hatchery counts in 1995-96 are the result of larger hatchery smolt releases. In 2000, wild steelhead observed accounted for 51 percent of the total number of steelhead observed.

The above numbers do not represent the total number of steelhead in East Fork Lewis River. Steelhead will enter the river after the surveys and some fish hiding in whitewater, large woody debris, boulders, and deep pools are not observed during the surveys. The numbers are used as an index to compare trends between years. They represent a minimum count.

**Evaluation: Population Viability and Influencing Factors**

Many factors in addition to habitat are known to affect anadromous fish populations. Global weather patterns, specifically the drought years from the late 1980s through 1993, have exacerbated the effect of declining habitat conditions. Sport and commercial fishing have also taken their toll. Continued harvest of depressed stocks further contributes to their decline. The Wind River steelhead population continues to show a declining trend over the 10-year record of surveys. Losses of riparian vegetation, altered streamflow and sediment regimes have reduced the ability of the watershed to reach its full potential in supporting aquatic life. Impacts are manifested by increased water temperatures, reduced pool quality and abundance, reduced woody debris in streams, and increased stream width-to-depth ratios (*Wind River Watershed Analysis*, 1996).

In Wind River, smolt to adult steelhead survival for the past four years has been below 1 percent based on smolt trap, snorkel and redd survey data. Seven to twenty percent was considered good to excellent survival in Washington rivers such as the Kalama River and Snow Creek (Dan Rawding, WDFW Lower Columbia Steelhead Biologist, pers. comm.).

In Trout Creek freshwater survival has been good to excellent in recent years. Trout Creek adult and smolt trap data show that egg to smolt survival has ranged from 2.4 percent to 17.8 percent in the past six years. This survival is attributed to good fresh water conditions and low densities of juveniles present in the basin. Adult returns and subsequent low numbers of juveniles reduce direct and indirect

Many factors in addition to habitat are known to affect anadromous fish populations.

In Trout Creek freshwater smolt survival has been good to excellent in recent years.

competition that promotes higher survival. In addition, there has been a 30percent decline in the number of days juvenile fishes were exposed to water temperatures >16° C.

The upward trend in smolt production is probably due to reduced water temperatures and higher stream flows during summer months.

Wind River water temperatures exceed Washington state's water quality standards (1977-1995) and were recorded above lethal limits on a widespread basis in the watershed in 1992. Increased precipitation beginning in the winter of 1993 has continued through 1997 resulting in better stream flows, although temperatures have consistently exceeded the state water quality standard (Watershed Analysis, 1996). The upward trend in smolt production from 1995-1997 is probably due in a large part to reduced water temperatures and increased stream carrying capacity resulting from higher stream flows during summer months.

Smolt production estimates are given as a range based on confidence limits of trap efficiencies. Smolt trap mark and recapture data requires intensive refinement and analysis to produce statistically valid estimates due to the large number of variables influencing the efficiencies of the traps. Continued operation of the traps on the Wind River will provide excellent analysis of population trends and additional years data will provide the necessary information to further refine the production estimates.

For Wind River, adult steelhead population data is based on the annual Wind River Snorkel survey organized by WDFW and USFS. The 1999 count of wild steelhead was 26, 41 percent below the 5year (1995-2000) average and the lowest return since the survey was first conducted in 1980. The 2000 snorkel survey rebounded to 86 adults counted which was 36 percent greater than the five-year average. Petersen mark and recapture estimates of tagged fish at the Shipperd Falls trap are in progress at the time of this report and are unavailable for a total run estimate at this time.

Hemlock dam has been highlighted as a major contributing factor to Wind River's declining steelhead population.

Ineffective fish passage and mortality at Hemlock Dam has been highlighted as a major contributing factor for Wind River watershed's declining steelhead population based on assessments WDFW's *Limiting Factor Analysis* (1999) and Washington State University's *Hemlock Dam Fish Passage Evaluation and Restoration* (1999). Additionally, according to State officials, passage at Bonneville Dam accounts for 10 to 15 percent mortality of outmigrating smolts on the Columbia River.

The reluctance of management agencies and beneficiaries of the Columbia River salmon runs to reduce their harvest despite dwindling populations has resulted in a higher percentage of the runs being harvested. Based on smolt to adult survival estimates, approximately 99 percent of all steelhead out-migrating from the Wind River as smolts are lost to dams, harvest, disease and predators.

The Forest Service is undertaking an extensive effort to restore watershed conditions in the Wind River and East Fork Lewis systems.

The Forest Service is currently undertaking an extensive effort to restore watershed and habitat conditions in the Wind River system. Major restoration efforts have been completed in Trout Creek, a primary spawning and rearing tributary to Wind River. Efforts include road decommissioning, riparian vegetation improvement, and fish habitat enhancement. Substantial habitat restoration work was completed along Trout Creek and the mainstem of Wind River in 2000. Further efforts are planned for 2001 and 2002. Additionally, the Forest Service is an active participant in a multi-agency, multi-partner approach to building a basin-wide recovery effort for wild steelhead in the Wind River basin.

The Forest Service is currently pursuing an aggressive watershed and habitat

restoration effort in the East Fork Lewis River system upstream of Sunset Falls. Substantial habitat improvements are planned for implementation on Forest Service lands by the end of 2001 field season.

**Recommended Action to be Taken:**

- Continue watershed restoration partnership efforts aimed at Wind River steelhead recovery.
- Promote the development of a watershed restoration partnership recovery approach for steelhead in the East Fork Lewis River.
- Implement planned watershed and habitat restoration identified in watershed analysis for East Fork Lewis River.
- Monitor and develop a report on restoration results.
- Continue to develop mark recapture estimates for steelhead adults and smolts on the Wind River.
- Develop a biological monitoring plan (e.g. adult escapement and freshwater survival) for East Fork Lewis River.
- Develop active partnerships and actively pursue salmon recovery initiative funding to continue restoration and monitoring efforts in East Fork Lewis River.

**Bull Trout (*Salvelinus confluentus*)**

**Introduction:** Bull trout in the Lower Columbia River Distinct Population Segment (DSP) are listed as threatened under the Endangered Species Act by USFWS. Since juvenile bull trout require exceptionally cool, clean water, they are considered a good management indicator of watershed condition and aquatic ecosystem health. A verified population exists in the North Fork Lewis River system above Merwin Dam, with the majority of fish occurring above Swift Dam. Preliminary information suggests that the Kalama River and Yellow Jacket Creek may have an existing or historic bull trout population. However, no verifiable evidence exists. The Lewis River population is considered adfluvial while the life history of the other two populations is unknown. Adults spend the majority of their life cycle in Swift Reservoir, ascending its tributaries each year to spawn.

Bull trout population monitoring has been conducted in partnership with the WDFW and PacifiCorp since the early 1990's. In 2000, USFWS joined in this effort and provided funding to GPNF for conducting bull trout surveys.

**North Fork Lewis River.** Early monitoring efforts with WDFW focused on determining population size and viability through collection of catch per unit effort data. Beginning in 1994, population estimates were derived using a mark-visual observation method. Adults are captured in the reservoir in the spring, uniquely marked, then released. In the late summer and early fall, repeated snorkel surveys are used on a weekly basis to observe the ratio of marked to unmarked adults active on spawning grounds. Using a Joint Hypergeometric Maximum Likelihood Estimator (JHE), a population estimate is calculated along with a 95% confidence limit.

Two conditions are modeled in deriving the JHE. They include the following:

1. A 10 percent reduction in the number of reservoir marked adults appearing on the spawning grounds (based on prior year radio telemetry studies), and

2. A 10 percent tag loss.

PacifiCorp, Trout Unlimited, WDFW, and USFS personnel conducted snorkel counts in two streams where bull trout spawn to count the number of tagged and untagged bull trout; Pine and Rush Creeks. The resulting data is used to estimate bull trout population size each year.

The objective of this multi-year partnership is to collect information about bull trout migration timing, distribution, habitat use, and habitat preferences so we can develop site-specific recovery plans for the species. We captured thirty-two adult fish at the reservoir headwaters during May 2000 with short-term gill net sets. Fish were marked with a floy tag (tags that look like a colorful 2" piece of spaghetti) and released back into the reservoir. We also discovered that the 1996 flood changed the spawning time of fish in the North Fork Lewis River – for unknown reasons, spawning now occurs 2 to 3 weeks earlier than before the floods.

**Bull Trout Surveys.** Since the listing of bull trout, GPNF, WDFW, and USFWS have been discussing the likelihood of the species' presence in several drainages on national forest system land. Discussions revolved around known fish distributions and habitat conditions, such as water temperature, stream surveys, snorkel surveys, creel samples, electro fishing surveys, and anecdotal information. Further review and close examination of various types of historical and current survey records excluded the presence of bull trout in several drainages. In others, poor quality and lack of data could not verify the absence of bull trout or potential bull trout habitat.

The objectives of bull trout surveys completed in the year 2000 using the *Interim Protocol for Determining Bull Trout Presence* where possible on GPNF, are 1) to determine presence or absence of juvenile bull trout with statistical rigor in areas of suitable habitat in the upper White Salmon drainage and Cowlitz Valley consultation areas (USDI Forest Service Level I Consultation, 1999), and 2) to evaluate applicability of the *Interim Protocol for Determining Bull Trout Presence* developed by the American Fisheries Society. Data obtained is expected to help refine the extent of suitable bull trout habitat at a stream reach level, and will confirm presence or absence with a given level of confidence using best available survey methods.

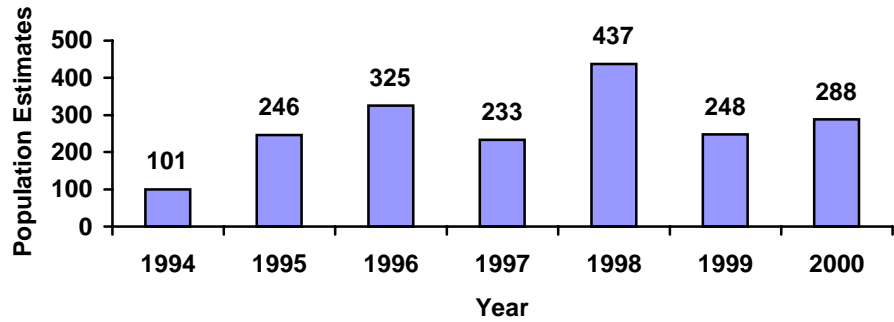
**Results:**

**North Fork Lewis River.** Sixty-five bull trout were tagged in Swift Reservoir by WDFW. A total for four snorkel surveys were completed by WDFW and USFS in Pine Creek and another four in Rush Creek, tributaries to North Fork Lewis River. Population estimates were then computed for each week resulting in a combined population estimate of 288 (Figure 17). We are 95% sure that the spawning population size is between 242 and 352 adults.

65 bull trout were tagged in Swift Reservoir.



Figure 17. - Bull trout spawning population estimates for Swift Reservoir.



The 2000 estimated population size for spawning bull trout in Swift Reservoir is close to the 7-year average of 268. Since fish in Swift Reservoir were tagged, we can only estimate the Swift Reservoir spawning population that utilize Pine and Rush Creeks on national forest system land. Swift Reservoir population estimates for Pine and Rush Creek snorkels showed no difference, indicating that in 2000 equal portions of these two spawning populations were tagged. In 2000, 7 of 65 tags were observed in Pine Creek indicating approximately 11 percent of the run or 32 individuals spawned in Pine Creek.

**Bull Trout Surveys.** Criteria used to select streams for the bull trout survey were the presence of little or no data on stream condition or fish species, known watersheds or areas that required consultation where Forest personnel felt bull trout were not present, and general curiosity. A total of twelve streams were selected, six in the Upper White Salmon drainage and six in the Cowlitz Valley area (Table 27).

**Table 27. Streams selected for bull trout surveys in 2000 on GPNF.**

Upper White Salmon	Cowlitz Valley
Buck Creek	Catt Creek
Cascade Creek	South Fork Catt Creek
Morrison Creek	Cortright Creek
Ninefoot Creek	Mesatchee Creek
White Salmon River (RM 36 to 42)	Midway Creek
Wicky Creek	Spring Creek

No bull trout were found during surveys in the Upper White Salmon and Cowlitz drainages.

A report for Cowlitz Valley and Upper White Salmon areas with results of the survey is available from the Forest Fisheries Biologist. In summary, no bull trout were observed during the surveys conducted in 2000 on GPNF in these drainages (Table 28).

Table 28. Summary of bull trout surveys conducted in selected streams in Cowlitz Valley and Upper White Salmon areas on GPNF.

Stream Name	Stream Miles Surveyed	Survey Period	Fish Species <sup>a</sup>	Summer Max Stream Temp (° C)	Range of Stream Gradient (%)
Upper White Salmon River					
Wicky Ck	1.5	7/20, 7/21	None	8.5	4-15
Morrison, Crofton Ck	4.5	7/25 – 7/28	None	14	5-8
Ninefoot Ck	2.5	7/13, 7/24	ONMY	11.3	7-14
White Salmon <sup>c</sup>	6.2	8/1 –2, 8/7, 8/9, 8/11, 9/11	ONMY	9.9	
Cascade Ck	3.2 <sup>b</sup>	8/16-8/26	ONMY	14.4	5-9
Cowlitz Valley					
Catt Ck	3.1	8/14 – 8/15	ONMY, ONCL	13.4	3-6
South Fork Catt Ck	0.6	8/15	None	15.3	15
Cortright Ck <sup>d</sup>	2	8/17	SAFO, ONMY, ONCL	13.3	3-10
Mesatchee Ck	1.6	8/16	None	12.5	5-10
Midway Ck	3.1	8/21 – 8/22	SAFO	13.3	5-15
Spring Ck	4	8/23-8/24, 8/28	SAFO	15.6	2-4

<sup>a</sup>ONMY = *Onchorynchus mykiss*, ONCL = *Onchorynchus clarki*, SAFO = *Salvelinus fontinalis*

<sup>b</sup>Cascade Ck was broken into two 400 meter segments over 2.0 miles of stream.

<sup>c</sup>Includes four unnamed tributaries to upper White Salmon.

<sup>d</sup>Cortright Ck was broken into four 800 meter segments throughout the entire stream.

Suitable bull trout habitat exists in the Upper White Salmon and Cowlitz Valley survey areas, but it is considerably fragmented by natural barriers. Ample local waterfalls and high gradient streams may serve as impediments to fish movement and preclude the establishment of a bull trout population in streams surveyed.

**Evaluation:** Population Trend and Influencing Factors

Bull trout population trends on GPNF appear to be in flux. A major flood in February 1996 hindered the reliability of the year’s population estimate because of the difficulty in sampling fish during the spring. .

Certain tributaries to Swift Reservoir, such as the Muddy River, contain sub-optimal habitat for bull trout. Despite restrictive angling regulations on Swift Reservoir and its tributaries, illegal take of bull trout still occurs on occasion. Lack of fish passage facilities at Swift Dam isolate the Swift Reservoir population from mixing and re-establishing with the isolated population of a Yale Lake tributary.

Factors affecting the bull trout population above Swift Dam are habitat quality, illegal harvest, and the hydroelectric facil

Population status on the Kalama River and Yellow Jacket Creek is unknown. The only known evidence of bull trout for Yellow Jacket Creek is an anecdotal report from a temporary WDFW employee.

**Recommended Actions to be Taken:**

Continue supporting education and law enforcement efforts to curb illegal take of bull trout.

Where supported by a Roads Analysis, close spur roads to vehicular access that are known to be used for illegal harvesting of bull trout.

Install adult traps in partnership with Trout Unlimited and WDFW to obtain actual spawner escapement counts.

Participate in FERC relicensing efforts on the North Fork Lewis River system to address bull trout needs in relationship to existing hydroelectric facilities.

Continue to conduct/presence absence surveys for all bull trout areas believed to contain suitable habitat.

Maintain partnerships with other agencies to coordinate bull trout survey efforts.

Verify WDFW reports on bull trout in Kalama River and Yellow Jacket Creek.

**In-Channel Habitat Structures 62d** 

**Introduction:** Stream habitat restoration activities have been implemented on the Forest since the early 1980s. Activities generally focus on improving habitat availability and quality. The majority of restoration efforts have focused on improving habitat for anadromous species, primarily steelhead. Monitoring provides important feedback for improving in-channel habitat structure designs and applications for future efforts.

Structure monitoring in 2000 was conducted on the Layout Creek Rehabilitation project. These structures were specifically designed to enhance fish habitat. Fish biologists surveyed six structures on the project site evaluating the function and performance of individual structural development. Specific data were collected to provide insight on structure success (Table 29).

Three structures were identified as “fully” meeting objectives and two were “partially” meeting objectives. One structure was identified as not meeting objectives

Table 29. - In-channel Habitat Improvement Projects evaluated in Layout Creek during 2000.

Structure ID #	Structure Type	Structure Composition	Structure Length	Intended Function	Structure Meeting Objectives?	Current Location	Maintenance Needed
97-1	Bank Protector	Multiple Log	Partial	Bank Protection	Fully	In place	No
97-2	Bank Protector	Multiple Log	Partial	Bank Protection	Partial	Shifted	No
97-3	Bank Protector	Multiple Log	Partial	Gravel Recruitment	Fully	In place	No
97-4	Bank Protector	Multiple Log	Partial	Gravel Recruitment	Partial	Shifted	Yes
97-5	Log Jam	Multiple Log	Full	Bank Protection	No	Shifted	No
97-6	Log Jam	Multiple Log	Full	Bank Protection	Fully	In place	No

## **Results:**

Six structures were evaluated in 2000 on Layout Creek. Structures were made of anchored large wood and designed to function as bank protectors. Three structures were identified as “fully” meeting objectives and two were “partially” meeting objectives. One structure was identified as not meeting objectives. Three structures remained in the same location as they were placed and three shifted location on site. Only one structure was identified as requiring maintenance.

## **Evaluation:**

The overall project goal for the evaluation site was to dissipate energy along the stream bank and recruit gravel for fish habitat.

Primary project treatments included keying in individual logs along the gravel bar and creating low profile log complexes. Careful project design based on intensive study and analysis of physical and ecological characteristics of the site resulted in 100 percent effectiveness of structures.

The Layout Restoration Project incorporated structural designs not represented in the adopted Regional monitoring protocol. For example, bar retaining structure type codes and associated structure type objectives are not available in the Regional protocol. District personnel conducted this monitoring effort using an expanded protocol to fit the unique structural designs and treatment applications. Adoption of an expanded Regional protocol is needed. Important monitoring data may be obscured or information lost with the limitations of the existing Regional protocol.

Adoption of an expanded Regional protocol is needed.

Effectiveness monitoring should be conducted during a time period when the structures are functioning as designed. Surveys conducted during low flow make it difficult to recognize all processes influencing the success or failure of individual treatment sites. For example, the bank protection structures evaluated on Layout Creek are designed to function at high flows and would best be evaluated under design flows.

**Recommended Actions to be Taken:** The following actions are recommended:

Emphasize interdisciplinary involvement during project initiation and design. Assure, at a minimum, the design team has the following mix of skills and expertise:

- An understanding of fluvial geomorphic processes.
- An understanding of hydraulic processes and relationships.
- An understanding of life cycles and ecology of fishes present in project area.
- Practical experience with heavy machinery and construction of in-stream structures.

Establish a Forest monitoring protocol, compatible with the Regional protocol, that addresses all types of in-channel habitat improvement designs and applications.

Conduct surveys during the period when structures are designed to function.

Increase sample size of in stream structure monitoring.

Develop a long-term sampling scheme of representative structures and stream types across the Forest.

## Road Management <sup>70</sup>

### Introduction:

The Forest has begun conducting Roads Analysis as prescribed by the national Roads Management Policy which became final in January 2001. A requirement of the new policy is that managers assess the benefits and ecological costs of roads in a roads analysis. One of the outcomes of roads analysis is the identification of roads that have risks to the aquatic and terrestrial ecosystem but are needed for the transportation system. Another is the identification of roads that are candidates for closure or decommissioning, either because they are unneeded or cause unacceptable environmental impacts.

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 wet 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.

### Summary of Wind River Watershed Roads Analysis

The Wind River Watershed Roads Analysis follows the six-step process identified in the Forest Service publication *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System* (USFS, 1999). The objectives of the Roads Analysis are to provide information formulating a road network that over the long term has the following attributes:

- Safe and responsive to public needs and desires
- Affordable and efficiently managed
- Minimizes ecological effects on the land and water
- Balances available funding with management needs.

The analysis assesses and numerically evaluates benefits and resource costs of each road segment, and categorizes roads based on need and resource risk. The analysis assesses 349 (70%) of the 498 miles of road within the Wind River Watershed. These are the roads managed by the Mt. Adams Ranger District. Recommendations

We account for how much overall decommissioning is done on the Forest and also how much decommissioning and new construction is done in Key Watersheds.

are based on the comparison of needs and risks. The analysis considered public needs for roads based on the experience and local knowledge of Forest Service recreation staff. Subsequent public involvement is planned.

The roads analysis used data from GIS and other available sources and databases though it was not field verified.

Analysis results distinguish roads needed for future management or use by the public and roads with higher risks to terrestrial or aquatic resources. The analysis prioritizes roads based on resource risks, which will help prioritize future road improvements, and/or decommissions.

Three categories of issues (socio-economic, aquatic or terrestrial) are used to assess and numerically evaluate benefits and resource costs. Multiple issues, evaluation criteria and associated objectives were developed within each category (see Table 30, page 74.)

The current road network meets the objective of providing access and travel ways. However, the decline in road maintenance funds limits the ability to adequately maintain the existing road system. The road maintenance funds focus on protecting user safety, which limits resource protection measures particularly on roads designated with a lower maintenance level. Current funding does not allow the level of brushing, grading, or drainage structure maintenance set forth in the road maintenance guidelines. This analysis is unable to provide recommendations that would fully reduce the road network to a level commensurate with current District road maintenance funds because of the extensive needs for the roads to conduct District management activities and provide access to the public.

The roads analysis was unable to provide recommendations that would reduce the road network to a level commensurate with available road maintenance funding.

### **Specific recommendations**

- Retain all multi-purpose roads and those roads that provide access to administrative sites (240 miles, 69%). Of these roads, prioritize maintenance, possible upgrading, or special management for roads that will be retained but have a high level of aquatic risks (100 miles).
- Eliminate from the road network, the roads of limited value to current District management or to public uses (49 miles, 14%).
- Prioritize for decommissioning those roads that were rated as high impact to aquatic resource values ( $\cong$  5 miles)
- Re-evaluate need and resource risks for single purpose roads at a project scale to determine recommendations. Roads rated as high aquatic (17 miles) or terrestrial risk within these categories will be examined first.

Table 30. Road related issues and evaluation objectives within the Wind River Watershed.

Group	Issue	Objectives
<b>Socio-Economic</b>	Administrative Uses	Road access to administrative sites or private property access
	Fire Suppression	Road access to sites and areas important to detection or suppression of fire
	Recreational Uses	Road access to developed or concentrated dispersed recreational areas
	Timber Harvest Stand Improvement	Road access to potential harvest sites in Matrix land allocation Road access to sites that need silvicultural treatment
	Miscellaneous Forest Products	Road access to source areas of miscellaneous forest products including berries, bear grass, mushrooms, etc.
	Late Successional Reserve Stewardship	Road access to silviculturally treat Late Successional Reserve objectives (stands < 80 years)
<b>Aquatic</b>	Surface Erosion from Roads	Reduce sediment to the aquatic system
	Channel Condition – Mass Wasting	Reduce effects as a result of road related mass wasting
	Habitat Condition	Increase development of riparian vegetation to improve stream shade, floodplain function and channel process
	Streamflow Modification	Reduce sediment input, increase channel connectivity and decrease hydrologic connectivity between roads and streams
	Cumulative Effects – Flow Modification	Reduce cumulative effects of harvest and roading on runoff mechanisms
<b>Terrestrial</b>	Unique habitats	Improve biological function of unique habitats
	Interior Forest Habitat Fragmentation	Reduce fragmentation of interior forest habitat
	Riparian Reserves	Improve migration and dispersal corridor function in riparian reserve
	Threatened, Endangered and Sensitive Species Biological Winter Range	Improve biological function at TES species breeding sites Improve habitat quality and security cover for deer and elk

**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 1.5 miles of open road per square mile. This is the same as last year, following a 17 percent decrease in density in the previous year.

**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 1,314 miles of road closed by effective year-round closures, or seasonally for BWR or other resource needs. This alone puts the Forest at 106 percent of the projected goal. In addition, 287 miles of road have been decommissioned since 1994.

Current road density in biological winter range is 1.5 miles per square mile.

The Forest is at 106 % of the Forest Plan road closure goal.

Table 31. - Roads in Key Watersheds

KEY WATERSHED	1994 Road Miles	Miles Decommissioned in FY 2000	Miles Decommissioned since 1994	Miles Constr. Since 1994	2000 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	0	7	0	63	-7
White Salmon	129	0	17	1	113	-16
Wind River	433	11	60	0	373	-60
Totals	1,885	15	140	2	1,747	-138

**KEY WATERSHEDS:** Table 31 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 density in each key watershed. As can be seen from Table 31, this objective has been achieved; there are now 7.3 percent fewer miles of roads in key watersheds on the Forest than there were in 1994, and no Key Watershed has experienced an increase in road mileage.

Table 32 lists road projects completed on the Forest during calendar year 2000. These figures will differ from those in program accomplishment table (Table 37, page 85). Table 37 figures are compiled on a fiscal year basis.

Table 32. Road Projects completed from January – December 2000.

Road Project Type	Road Number	Miles	Watershed
Bridge Installation	Road 78	0.1	Upper Cispus River
Bridge Installation	Road 2329	0.1	Upper Cispus River
Bridge Replacement	Road 54	0.1	Merwin Lake, Lewis River
Culvert Installation	Road 23 MP34	0.1	Upper Lewis River
Culvert Installation	Road 24 MP8	0.3	White Salmon River
Culvert Replacement	Road 90	0.1	Upper Lewis River
Culvert Replacement	Road 8831	0.1	White Salmon River
Culvert Replacement	Road 25 MP39	0.1	Muddy River
Culvert Upgrade	Road 42	0.1	Wind River
Culvert Upgrade	Road 32	0.1	Upper Lewis River
Road Construction	Road 51	5.1	Upper Lewis River
Reconstruction	Road 7802	0.3	Upper Cispus River
Reconstruction	Road 2816	0.1	Lower Cispus River
Reconstruction	Road 29	3.2	Lower Cispus River
Reconstruction	Road 2900115	1.6	Lower Cispus River
Reconstruction	Road 2900116	2.7	Lower Cispus River
Reconstruction	Road 7605	3.6	Lower Cispus River
Reconstruction	Road 7713	0.3	Lower Cispus River



Road Project Type	Road Number	Miles	Watershed
Reconstruction	Road 4720	1.0	Middle Cowlitz River
Reconstruction	Road 2304	1.2	Middle Cowlitz River
Drainage Improvement	Road 4700	4.2	Middle Cowlitz River
Drainage Improvement	Road 4740015	0.8	Middle Cowlitz River
Reconstruction	Road 6030	0.2	Little White Salmon
Reconstruction	Road 83	0.5	Swift Reservoir
Slide Removal	Road 23 MP35	0.1	Upper Lewis River
Ditch Repair	Road 24 MP 8	0.3	White Salmon River
Ditch Cleaning	Road 90 MP 35-38	0.4	Upper Lewis River
Reconstruction	Road 4720	6.7	Middle Cowlitz River
Reconstruction	Road 4730	0.2	Middle Cowlitz River
Reconstruction	Road 4725	0.1	Middle Cowlitz River
Reconstruction	Road 4725.023	2.3	Middle Cowlitz River
Stabilize/Close	Road 2900149	1.0	Lower Cispus River
Stabilize/Close	Road 2516043	0.4	Lower Cispus River
Decommission	Road 2130 & spurs	4.2	Upper Cowlitz River
Decommission	Road 2130044	0.4	Upper Cowlitz River
Decommission	Road 4610 & spurs	5.0	Upper Cowlitz River
Decommission	Road 1256077	0.7	Middle Cowlitz River
Decommission	Road 7106095	0.7	Tilton River
Decommission/To Trail	Road 29	1.2	Upper Cispus River
Decommission	Road 7708	2.9	Lower Cispus River
Decommission	Road 2500210	0.2	Lower Cispus River
Decommission	Road 2900116	0.1	Lower Cispus River
Decommission	Road 7700126	0.4	Lower Cispus River
Decommission	Road 7713 & spurs	4.4	Lower Cispus River
Decommission	Road 2800098	2.3	Lower Cispus River
Decommission	Road 2800099	1.0	Lower Cispus River
Decommission	Road 2818	0.4	Lower Cispus River
Decommission	Road 2510 & spurs	4.4	Lower Cispus River
Decommission	Road 2911	2.1	Lower Cispus River
Decommission	Road 2562540	2.3	Muddy River
Decommission	Road 5100 & spurs	10.3	Upper Lewis River
Decommission	Road 62 & spurs	2.8	Wind River
Decommission	Road 30 spurs	5.7	Wind River
Decommission	Road 60 spurs	2.0	Wind River
Decommission	Road 6052 spurs	1.6	Wind River
Decommission	Road 64 spurs	1.0	Wind River
Decommission	Road 67 spurs	1.1	Wind River
Decommission	Road 4207	0.8	East Fork Lewis
Decommission	Road 4725.023	1.5	East Fork Lewis

**Evaluation:**

**BIOLOGICAL WINTER RANGE (BWR):** Road closure effectiveness in BWR range has not changed appreciable since 1999, after an increase the previous year. Money for repairs of flood damage from the 1996 and 1997 floods temporarily increased funding levels, but this funding source was not available to the Forest Service in FY 2000.

Table 33. – Road Density for BWR on the Gifford Pinchot N. F.

If all the roads in BWR that are prescribed for closure could be effectively closed, we would have achieved a road density of 1.2 mile per square mile of BWR.

Road Density in Deer & Elk Winter Range	
Miles of open road	651
Land Area (sq. mi.)	431
Road Density	1.5 mi./mi. <sup>2</sup>

The 1.5 mile figure may under-represent actual closures during the critical period, since during the years that BWR is needed by elk and deer populations, many more roads are closed to vehicle traffic by snow.

**GENERAL ROAD CLOSURES:** The goal of 1,230 miles of closed road was intended to include roads no longer used for vehicular traffic, so this should not only include roads permanently barricaded or seasonally closed by means of gates, but also those roads we have decommissioned and taken permanently out of service. Since the Plan took effect, 287 miles of system roads have been decommissioned, (72 miles in 2000) bringing the total of roads closed permanently or at least part of every year to 1,601 this year, which is far in excess of the goal. The need to mitigate the effects of storm-damaged roads on streams resulted in funds being available in prior years to decommission many roads that would otherwise have waited years to receive funds. Most of the mileage decommissioned this year was the result of contracts let in 1999 that did not finish work that year. Decommissioning has been a priority in recent years, but unless funding is found to continue the program, there will be much less in the immediate future.

287 miles of roads have been decommissioned since 1994.

**KEY WATERSHEDS** The Forest requirement to maintain or decrease the road density in each key watershed has been met again this year. As Table 31 shows, there are now 7.3 percent fewer miles of roads in key watersheds on the Forest than there were in 1994, and no Key Watershed has experienced an increase in road mileage. There has been only two miles of new road construction in key watersheds since 1994. The Key Watersheds with the most decommissioning are the Wind River and Lewis River watersheds, with 60 and 40 miles of road decommissioning since 1994, respectively.

**Recommendation:** Continue to check for the effectiveness of road closures, repair road closure devices that are breached or ineffective, and locate funding to continue to close unneeded roads. It would also help to use more effective types of road closures, though this is more expensive. Historical records indicate that gate closures are about 25 percent more effective than berms.

**FISH CULVERT INVENTORY**

The Gifford Pinchot NF will conduct a detailed fish culvert inventory in Fiscal Year 2001. Approximately 500 culverts will be inventoried. Priority will be culverts crossing streams with anadromous fish shown in Table 34

Table 34. Priority Watersheds for Culvert Inventory

Wind River	Upper Cispus River
East Fork Lewis River	Middle Cowlitz River
Muddy River	Upper Cowlitz River
Swift Reservoir-Lewis River	Clear Fork Cowlitz River
Upper Lewis River	Tilton River
Lower Cispus River	

The inventory will categorize the culverts into one of three categories:

- Adequate for fish passage
- May not be adequate for fish passage, additional analysis required
- Not adequate for fish passage.

Culvert improvement/replacement projects will be proposed for culverts in the “Not adequate for fish passage” category. Additional analysis of culverts will be completed in subsequent years where needed to determine fish passage status and/or formulate improvement projects.

**EFFECTIVENESS MONITORING OF ROAD DECOMMISSIONS**

Road decommissions were monitored on Roads 2572 and spur 130, and 2586 during summer of 2000. The objectives of a road decommission are to recreate stream bed and stable banks with minimal erosion at road stream crossings, prepare the road surface so water infiltrates and roots penetrate, reduce the potential for fill failures, and eliminate vehicular traffic. Past monitoring efforts indicated road stream crossings were areas that most often did not meet these objective. Implementation activities should be improved to reduce erosion and sediment delivery at the road stream crossings. Detailed monitoring efforts for Roads 2572 and 2586 concentrated on the culvert removal areas at road stream crossings. An interdisciplinary team, consisting of an engineer, hydrologist and botanist, assessed the effectiveness of culvert removal areas using the Gifford Pinchot Forest-wide Effectiveness Monitoring Protocol.

**Culvert Removal**

The objective of removing culverts is to recreate the streambed and banks in a stable configuration with minimal erosion. Monitoring revealed that the primary reason for stream bank instability and therefore subsequent excessive erosion was the steepness of the newly created stream bank. Several implementation activities result in steep stream banks. Causes stem from practices such as errors of equipment operators in implementing the designed stream configuration, placement of removed fill too close to the culvert removal area and/or limited area to place removed fill.

**Steep Stream Banks** The steep stream banks resulted in erosion and sediment delivery to streams from a variety of conditions such as stream undercutting the toe of the slope, placement failure of erosion matting, and limited vegetation re-establishment. Future road decommissions should take extra measures to assure stream banks slopes are as low as possible. Slope configuration affects the ability to implement best management practices, such as erosion matting and seeding establishment, which reduce erosion and sediment delivery.

**Recommendations** Aquatic specialists should be on site for the removal of the first set of deep culverts (greater than 20 feet) so that equipment operators, contracting officers or inspectors and aquatic specialist can discuss logistics of attaining the desired stream configuration at the site. The aquatic specialist can

The objective of removing culverts is to recreate the streambed and banks in a stable configuration with minimal erosion.

explain consequences of steep stream banks and emphasize the need to minimize bank slopes.

A set back zone between the top of the newly created stream bank and the placed fill should be specified as at least 10 feet and include a waterbar or other drainage feature that would route water away from the newly created stream bank.

Hauling fill may be necessary where inadequate space exists to place large quantities of fill.

Extra erosion control measures should be implemented where site conditions necessitate steep stream bank configurations.

Figure 18. Steep stream banks and road ditch runoff resulted in poor erosion matting effectiveness at one stream crossing on Road 2586.



**Narrow Stream Widths** Other reasons for unstable streambeds and banks were narrow stream width and incomplete removal of fill from streambed although the consequence of these on Road 2572 and 2586 were minor.

The primary erosion control measures at the culvert removal areas were erosion matting and seeding. The effectiveness of the erosion matting to control erosion ranged from 25-80 percent. As stated above, steep banks limited the effectiveness of the erosion matting due to placement failure and lack of ground contact. Other factors limiting the effectiveness of the erosion matting were fill and/or road drainage displaced matting anchors, elk passage ripped matting and matting thickness/material impeded seed establishment.

Seed was spread and alder planted at the culvert removal areas. Ground cover after one full year ranged from 5-80 percent. Steep banks limited the effectiveness of ground cover establishment due to run-off washing down seed and the problems associated with matting displacement. Where erosion matting was correctly placed, reduced vegetation

establishment was caused by the thickness of the matting, the incorporated plastic woven material and possibly lack of moisture during the dry season.

Figure 19. Poor vegetation establishment resulting from steep stream banks, use of plastic woven material and lack of moisture during the dry season.



Red alder was the dominant native species colonizing the treatment area. Extensive establishment of red alder exists in places where red alder seed was blown in by the wind. The red alder seedling provided an excellent ground stabilizing cover along with providing nitrogen to the soil. Red alder's survival was high (>60%). Other native species colonizing the culvert removal areas were pearly everlasting (*Anaphalis margaritacea*), horsetail or scouring rush (*Equisetum*), willow weed (*Epilobium sp.*, *Empetrum sp.*), grasses (*Eleusis* and *Deschampsia*) and others in lesser amounts.

Noxious weeds were present at some of the culvert removal areas. Species present were Bull thistle, yellow thistle, tansy ragwort, and legumes (vetch, clover). The clover invasion was a concern due to its aggressive growth habit and associated moisture competitiveness.

**Recommendations** Combinations of slash placement (including fir branches) and mulch should be considered a replacement to erosion control matting. The matting may be an impediment to seed establishment.

A set back zone between the top of the newly created stream bank and the placed fill should be specified as at least 10 feet and include a waterbar or other drainage feature that would route water away from the newly created stream bank.

Establish a minimal foot trail at the culvert removal areas. It is believed that elk will follow the trail and trampling of erosion matting and/or newly established vegetation will be reduced.

Replace seed with mulch application after completion of soil disturbance. Then,

seed in the fall when the soil is moist and seeds will stick and not be blown away.

Optimize the use of native seeds in the erosion control seed mix. Avoid clover in the seed mix. Commercial certified weed-free seed mixes should be free of clover.

Future monitoring of the vegetation establishment at these culvert removal area would provide additional information on the preliminary indications that the erosion matting is impeding vegetated growth.

## Community Effects – Payments to Counties

**Introduction:** By an act of Congress in 1908, 25 percent of revenues are paid to the counties in proportion to the amount of national forest system land in each county. The act stipulates that the money generated is to be spent on public schools and roads.

County receipts on the Gifford Pinchot National Forest are generated primarily by timber harvest. Collections from recreation, mining, grazing, and administrative uses account for less than 5 percent of the total receipts.

Beginning in 2001 counties will have a new way of receiving money from the federal government. The “Secure Rural Schools and Community Self-Determination Act of 2000” stabilizes payment levels to their historic high and provides that 15 – 20 percent of the funds be used for local projects 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 a 15-member Resource Advisory Committee (RAC) made up of local citizens

The new legislation is slated to guide payment activities for the next six years through fiscal 2006.

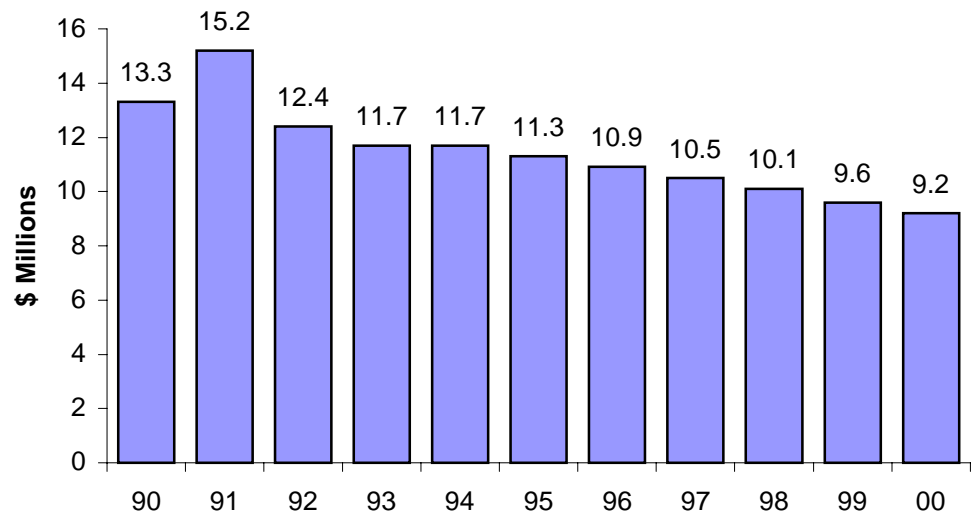
**Results:** Over \$9.6 million was returned to the six counties with lands in the Forest boundary. If payments were based on actual receipts from timber harvested, less than \$1.5 million would be returned to the counties. Instead, payments were computed under a provision of the Interior and Related Agencies 1993 Appropriations Act which provided for 1994 payments to counties of not less than 85 percent of the five-year average payments for fiscal years 1986-90 for those National Forests affected by decisions on the northern spotted owl. Beyond 1994, guaranteed payments are reduced 3 percent per year until 2003. Under the law, payments for 2000 were computed as 67 percent of the 1986 to 1990 average. The current distribution among counties within the Forest boundary is displayed in, Table 35, page 82.

\$9.6 million was returned to the 6 counties within the Forest boundary.

Table 35. – Community Effects—Payments to Counties

County	Percent Total Distribution	2000 Distribution
Clark	0.1	8,298
Cowlitz	2.6	229,319
Klickitat	1.1	105,741
Lewis	28.3	2,615,560
Skamania	65.1	6,007,519
Yakima	2.8	259,761
<b>Total</b>	100%	9,226,199

Figure 20. – Payments to Counties



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 designed to provide both financial and technical assistance to natural resource-based communities and rural development organizations striving to diversify and revitalize local economies. In 2000, the program, called Rural Community Assistance, invested \$490,050 thousand in the infrastructure of communities surrounding the Forest. Grants by county in the past three years are tabulated in Table 36.

The Rural Community Assistance program invested \$633 thousand in communities surrounding the Forest.

Table 36. – Rural Community Assistance Grants

County	1996	1997	1998	1999	2000
Cowlitz	400,200	90,538	2,500	0	86,750
Klickitat	302,832	227,600	178,700	129,000	117,500
Lewis	417,754	223,691	32,000	167,75	76,600
Wahkiakum	48,200	28,000	105,000	62,785	98,000
Clark	23,426	0	0	0	0
Skamania	118,560	192,050	164,000	273,280	111,800
Pierce	7,314	15,000	0	0	0
Total	\$1,318,286	\$776,879	\$482,200	\$632,840	\$490,050

### Mining Operating Plans <sup>91</sup>

**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 administered in 210 Notices of Intent and 2 Plan of Operations for mining activities. Each district administered about 70 NOI’s and Mt. Saint Helens had 1 POO and Mt. Adams had the other POO.

Most of the minerals involved salable (common variety) mineral resources. The districts administered many small use permits for rock during FY 2000. Mt. Adams also had 2 rock permits 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 type 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 40,000 tons. Most of this rock was crushed for use as aggregate or paving rock. Some was utilized for rock fills or riprap for stabilization of slopes. The remainder was used for various repair projects dating from storm events over the last 4 years.

The Forest administered 210 Notices of Intent and 2 plans of operation



An area of concern is the potential for adverse effects to fish habitat from recreational suction dredging.

An area of concern that has been raised is the potential for adverse effects to fish habitat from recreational suction dredging on certain streams within the Forest. The required hydraulic permits limit mining activity and its timing, based on guidelines set up in a state publication *Gold and Fish* which contains rules and regulations for mineral prospecting and placer mining in Washington State (WDFW Publication GF-1-99).

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

**Recommended Action:** Monitor the level of activity by recreational suction dredgers. Encourage the state to 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.

## C. Accomplishments

The following table compares program accomplishments for FY's 96-00:

Output	Units	Outputs					2000 Target
		1996	1997	1998	1999	2000	
Developed and Dispersed Recreation Use	Recreation Visitor Days	3,981	5,600	5,518	4,480	5,152**	*
Wilderness Use	(thousand)	74.8	76.1	72.2	44.7	69.6	*
Trail Const/Recon.	Miles	46.7	10.9	66	13.7	1.7	*
Trails Maintained	Miles	256	627.3	832	668	76.8	*
<b>Wildlife Habitat Improvement:</b>							
Structural	Structures	1,253	28	19	0	0	*
Nonstructural	Acres	433	199	250	1,200	849	550
<b>Wildlife Indicator Species:</b>							
Deer	Habitat Capability	18,450	18,300	18,150	18,000	17,850	*
Elk	Animals	4,610	4,570	4,530	4,490	4,450	*
Mountain Goat	Animals	290	290	290	290	290	*
Net Sell Volume	MMCF	11.3	12.0	9.4	0.66	0.26	10
	MMBF	57.8	61.9	48.8	3.3	1.3	52
Volume Harvested	MMBF	11.3	41.0	34	30	17.8	*
Reforestation	Acres	1,801	3,888	1,342	923	891	871
Fuel Wood	MCF	328	295	141	279	178	*
Precommercial Thin	Acres	3,123	2,643	2,087	1,419	2,012	1,788
Release	Acres	0	257	438	25	14	*
Fertilization	Acres	0	74	0	0	0	*
Grazing	HMs	1,732	2,756	1,736	1732	1732	
Watershed Improvement	Acres	50	72.3	53	55	77	*
Instream Restoration	Miles	3.0	1.9	2.5	2.1	7.1	8.5
Air Quality	Particulate/ Tons	41	30.2	16.8	N/A	85.1	
Fuel Treatment	Acres	1,279	316	0	629	15	180
*There are no Regional targets for these items.							
**Estimated							

**D. Accomplishments (continued)**

Output	Units	Output					2000 Target
		1996	1997	1998	1999	2000	
<b>Timber Purchaser Roads:</b>							
• Construction	Miles	2.9	0	0	0	0	*
• Reconstruction	Miles	15.1	41.5	14.3	1.1	0	*
<b>Allocated Funding (Roads):</b>							
• Construction	Miles	0	6	0	0	0	*
• Reconstruction	Miles	10.8	31.4	0	48.0	31.7	*
• Decommissioning	Miles	25	37	47	42	72.3	*
<b>Roads Open to:</b>							
• Passenger Cars	Miles	808	828	822	822	833	*
• High Clearance	Miles	2,402	2388	2,352	2,319	2631	*
<b>Roads Closed</b>	Miles	1,017	1009	1,004	995	600	*
<b>TOTAL ROAD SYSTEM</b>	Miles	4,261	4225	4,178	4,136	4064	*
Returns to Govt.	\$ Million	2.7	6.1	6.8	4.1		*
Payments to Counties	\$ Million	10.9	10.4	10.0	9.6	9.2	*
<b>Landlines:</b>							
• Located	Annual Mi.	6	4	3.8	6	2	2
• Maintained	Annual Mi.	6	7	7	2	5	15
Congressionally Designated Boundaries	Miles	6.5	2.5	4.3	0	3	1
Total Expenditures	\$ Million	32	35	36	29	24	*
*There are no Regional targets for these items.							

## 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 directly related to receipts from timber sales or other activities on the Forest. With few exceptions, receipts collected on the Forest are returned to the US Treasury. In FY 1997, the Forest began collecting user fees on the Mount St. Helens National Volcanic Monument. Eighty percent of the user fees collected on the Monument in 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.

The chart below display expenditures on the Gifford Pinchot National Forest over the ten years we have implemented the Forest Plan.

Figure 21. - Total Expenditures 1991-2000

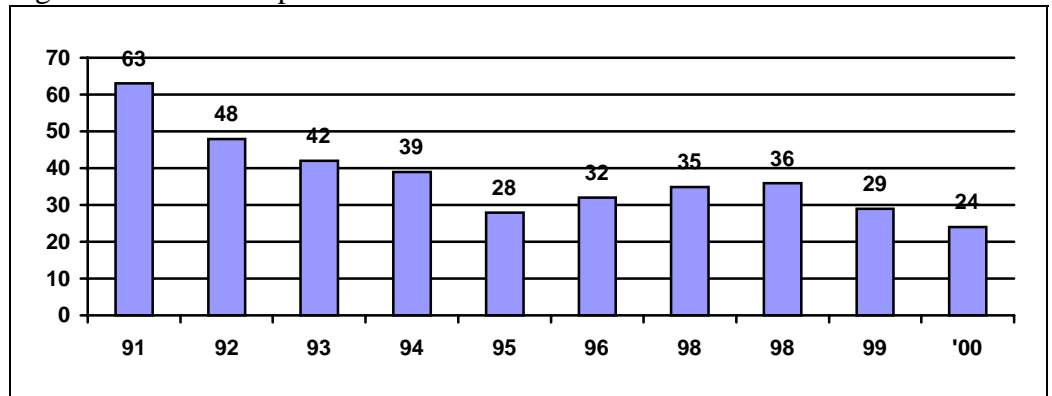
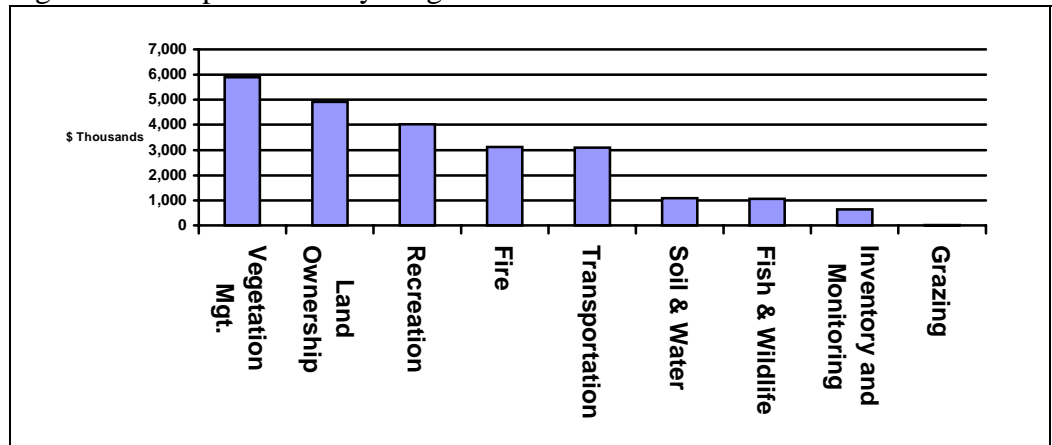


Figure 22 shows the composition of 2000 expenditures by program area. Land Ownership includes lands and mineral, general administration, and facilities expenditures. Fire, in Figure 22, includes salary paid to Gifford Pinchot employees for fighting fire off-Forest.

Figure 22. - Expenditures by Program Area



## **F. Forest Plan Amendments**

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

Table 38. - List of Forest Plan Amendments

<b>Amendment No.</b>	<b>Approved</b>	<b>Description</b>
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 across gentle terrain to access the base area of Chair 5 within a Tier 2 Key Watershed in an Inventoried Roadless Area. It also corrects the Gifford Pinchot FEIS Appendix C map for the White Pass Roadless Area to move the southeast line to the Forest Boundary, as displayed on the original maps for the White Pass Inventoried Roadless Area.
14	4/19/99	Decision Notice - Amends wilderness management standards and guidelines, particularly those related to determining limits of acceptable change.

## **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. The Middle Cispus and Upper Cowlitz watersheds were selected for review in 2000. Below is an excerpt from the monitoring report filed by the Gifford Pinchot and Southwest Washington Province.

2000 Province Implementation Monitoring  
Southwest Washington Province  
October 4, 2000

### **Introduction**

This year's monitoring effort departed from previous years in that we reviewed the watershed in an office setting, rather than going to the field. District resource specialists presented brief overviews and led discussions of conditions and trends in the watershed for each resource program area. Presentations emphasized how the watershed analysis contributed to project decision making. Because the Upper Cowlitz watershed is largely wilderness and late-successional reserve and has been the site of few projects since the adoption of the Northwest Forest Plan, the emphasis of the presentations was on the Middle Cispus watershed.

In response to feedback received in previous years, our intent was to formulate an itinerary for a field trip based on areas of interest raised in the discussions and review of the questionnaires. Only three of the PAC were available to attend the field trip. Those who could attend felt a field trip would contribute little to their understanding of how the district was using watershed analyses in the decision process and the field trip was cancelled.

### **Attendance:**

Province Advisory Committee

Name	Affiliation	Name	Affiliation
Ron Lee	EPA	Lee Carlson	Yakama Nation
David Jennings	Gifford Pinchot Task Force	Pam Repp	USFWS
Bob Dick	Northwest Forestry Association	John Squires	Friends of the Cowlitz

**Forest Service:**

<b>Name</b>	<b>Position</b>	<b>Name</b>	<b>Position</b>
Harry Cody	District Ranger	Jack Thorne	District Recreation Program Manager
Buddy Rose	District Planner	Steve Markman	District Aquatics Program Manager
Bob Klatt	District Engineer	Tom Kogut	District Wildlife Biologist
Ed Tompkins	District Silviculturist	John Roland	PIMT Lead

**Watershed Presentations**

Bob Klatt- District Engineer

Bob displayed a map showing problem roads, those that had been decommissioned, and those that had been stabilized.

Over 500 flood sites qualified for ERFO funding for repair after the 1996 floods. Other projects were funded by Supplemental Flood, which allowed us to upgrade ERFO projects and do restoration in areas not related to the flood.

Road maintenance funding has been on the decline since the early 90s.

The focus today is on safety, virtually all road maintenance funding is spent on safety related projects – there is little money left for restoration.

Majority of roads in the watershed are level 1 and 2 which are getting little attention.

Q: What is the strategy to reduce road related sediment, how is FS prioritizing projects?

A: ATM identified red flag areas (<30% functional). Initial projects for watershed restoration focused on areas with highest concentration of red flag areas. This systematic process was somewhat derailed by the 96 flood. Emphasis the since 96 has been flood repair. Restoration funds have dried up. The deferred maintenance system and roads analysis are cause for optimism.

Comment: Most sediment delivery occurs during floods. Much comes from stream meanders, debris flows, natural slides, and slides associated with roads. Low maintenance level roads contribute very little sediment, relative to other sources.

Comment: Chronic sediment delivery may be a significant problem. Low level roads are a significant contributor of chronic sediment.

Comment: Old burns are also a source of chronic sediment delivery. In this watershed most low maintenance level roads are on the ridge tops; little sediment from roads is getting to the steams.

Q: Is road condition information in GIS?

A: INFRA with its link to ArcView will provide GIS functionality. We are in the process of building the INFRA database.

Comment: It would be helpful to outside groups for the FS to identify road decommissioning opportunities. Such information could be used to lobby for funding.

Q: Did the 1996 flood damage restoration projects?

A: Many of the initial restoration projects were located high in the watershed, and were less effected by the floods.

Tom Kogut – District Wildlife Biologist

Tom shared information on the survey and manage species surveyed for in the watershed. The district spent \$125 thousand on surveys. Because of the surveys the

number of known sites for some species has increased dramatically (*Cryptomastix devia*, *Prophysaon dubium*). Other species are never or rarely found (Van Dykes, Larch Mtn. Salamander).

Most surveys are project related but the district has also surveyed for species of interest, unrelated to projects. The district has surveyed for mountain goat in the South Ridge area of the Upper Cowlitz watershed. They are experiencing a loss of mountain goat habitat from meadow encroachment related to fire suppression. The district is also involved in Lynx surveys.

The district no longer conducts spotted owl surveys but relies on limited operating periods to mitigate for potential loss of nesting stands during that breeding season. When a nest tree is found (or the project in any way effects the spotted owl) they consult with USFWS. Typically, the harvest unit boundary is adjusted to exclude the nest tree. We do other things to mitigate for loss of habitat, such as modifying unit location, avoiding suitable habitat, adapting prescription and applying the High Potential Nesting Habitat model.

PNW Research Station is conducting spotted owl demographic surveys. There is a concern regarding the migration of barred owl into spotted owl habitat and the possibility of interbreeding. A PAC member shared a theory that the barred owl may be attracted by thinning treatments.

Tom relayed a success story where nest boxes were placed in a 90 year old stand lacking suitable nest trees in the Upper Cowlitz watershed. One of the nest boxes is occupied by a successfully reproducing spotted owl pair.

The district is involved in habitat improvement projects in the watershed including creating snags by topping trees, creating large woody debris structures by stacking smaller down wood available in thinnings and installing duck boxes. As recommended by the watershed analysis the district is managing to provide optimal cover for mountain goat and deer and elk. There is also an emphasis on maintaining connectivity and limiting fragmentation within the watershed.

#### Steve Markman – District Aquatic Program Manager

There are over 1,100 miles of streams in the Middle and Upper Middle Cispus River watersheds, which includes 40 miles of the Cispus River. There were 315 miles of roads constructed between 1926 and 1990; portions of some of these roads have resulted in or contributed to debris slides, slumps, sheet erosion, and rills. However, sediment from roads appears to be a small portion of the total sediment contributed to streams. Most sediment carried by streams is probably natural, and occurs during flood events. This does not diminish the importance of properly designing and maintaining roads to minimize their contribution of sediment to streams. Old burned areas are also a chronic source of sediment.

The Watershed Analysis identified four hydrologic alterations of streams that are linked to logging and roads: increases in peak flows, channel widening, reduction in the number and size of pools, and lack of large woody debris. However, a large part of streambank erosion is natural and not linked to human activities. Furthermore, many stretches of eroding streambanks cannot be stabilized at a reasonable cost. The District has been placing large woody debris in streams where it has a high likelihood of staying in place; the intent is to allow the stream to meander within the floodplain and rework the large woody debris. There are currently no in-stream projects in the Middle Cispus watershed.



The Watershed Analysis does not identify specific sites for restoration; however, several road systems were listed as candidates for erosion control work or decommissioning. Between 1995 and 1997, the District treated 33 erosion control sites totaling about 80 acres. Since 1996, the emphasis has been on flood damage repair. Effectiveness monitoring of restoration sites is seldom conducted because it is not specifically funded. Restoration projects can often be monitored adequately with “before” and “after” photographs. A report describing effectiveness monitoring was completed in 1997.

The District has a number of streams in the Middle and Upper Cispus River watersheds that have exceeded the Washington state standard of 16.0 degrees centigrade for class AA waters. Several of these streams are currently on the 303d list for elevated temperature, and several other streams are candidates for 303(d) listing. In order to pinpoint the sources of elevated stream temperatures, the Cispus River and ten of its tributaries were monitored for temperature at a total of 38 sites from July 5 through September 15. In the future, streams containing bull trout may be monitored for temperature until mid-October to include the spawning season for those fish.

The stream conditions described in the 1995 Middle Cispus Watershed Analysis changed significantly as a result of the flood event of 1996. Because of this, the watershed analysis may be revised in 2001. The District is currently re-delineating the 5<sup>th</sup> field and 6<sup>th</sup> field watershed boundaries of the Middle and Upper Cispus River watersheds. The Middle and Upper Cispus River watersheds will be joined into one 5<sup>th</sup> field watershed.

#### Jack Thorne – District Recreation Program Manager

Most of the dispersed recreation use occurs near water and some may be in conflict with aquatic conservation strategy objectives. We do not have accurate data on recreation use but know it is expanding. Motorized use on trails is low, typically 1-2 riders per day per trail, up to 14 per day per trail. Existing data and observations are not sufficient to estimate total use, although use of individual trails indicates that use is very low. There are about 10 miles of motorized trails within the Dark Divide roadless area within this watershed. Motorized trails in the area are difficult and require a high skill level, close attention, and suitable equipment to use safely. The low use keeps impacts within acceptable limits. Most of the motorized trails are on ridge tops, away from streams. District attempts to improve the Langille-Juniper system were thwarted by a lawsuit contesting alleged environmental impacts and the adequacy of the analysis.

Developed campgrounds in the watershed are not well designed for the larger RVs that have become popular in recent years. The Cowlitz Valley District provides campgrounds with a moderate level of development that provide a more primitive camping experience than some state and private campgrounds.

We are lacking adequate funding to do an inventory of conflicts between recreation and ACS objectives. None of the recreation sites ranked high in priority for restoration with supplemental flood funds compared to road problems. Keenes Horse camp and the Spring Creek dispersed site are two sites which may be in conflict with ACS objectives.

A member of the PAC expressed his concern about stream bank damage caused by horses at Walupt Creek and Gertrude Lake. The District acknowledges that impacts at Gertrude Lake were unacceptable, but occurred despite our best efforts at wilderness patrol and enforcement of regulations and policies. The District will continue efforts to prevent such impacts, and will continue to rehabilitate such impacts in Wilderness as funds and priorities allow.

The accepted horse watering site, on the west side of the bridge over Walupt Creek, gets limited use, as indicated by its current condition. Gravel has been placed on the access path and stream bank, with much of it remaining as of October 24, 2000. Given the nature of impacts common to every location where trails and trail users cross streams, this site is in relatively excellent condition with very little surface erosion evident. The District does not believe that this site is a significant source of sedimentation or pollution of Walupt Creek.

#### Ed Tompkins – District Silviculturist

Less than 12 percent of the watershed is in low elevation forest types (western hemlock), the high elevation forest type is primarily Pacific silver fir. About 18 percent of the watershed is non-forest. Analysis of the vegetation shows that the aggregate size composition in 1994 was very similar to that of 1880. The distribution today, however, is much more fragmented than it was in the past, and there is less interior habitat. In the absence of large disturbances or changes in management allocations, 80 percent of the watershed will be comprised of late-successional vegetation in 100 years. Over half of the watershed is in the Adaptive Management Area. The AMA guide for the area has imposed restrictions on timber harvest beyond that anticipated by the Northwest Forest Plan.

The watershed analysis emphasized:

Blocking up areas of fragmented vegetation.

The district has been avoiding fragmenting interior habitat. Most harvest has been commercial thinning.

Simulate fire effects.

The district is managing mid-seral stands to simulate natural disturbance events.

Avoid unstable lands.

Potentially unstable lands were included in the inventory of riparian reserves.

#### **Recommendations for future monitoring**

The SW Washington Province was assigned the Smith Point and Cispus, NF WAUs as the watersheds to be monitored. WAUs are a hydrologic unit used by the Washington DNR. Forest Service conducts watershed analysis based on 5<sup>th</sup> field watershed boundaries. On advice from the Regional Office, we overlaid the WAU map with our map of 5<sup>th</sup> field watersheds to determine which 5<sup>th</sup> fields corresponded most closely with the assigned WAUs and conducted our monitoring based on those 5<sup>th</sup> field watersheds. See Figure 23. We suggest that in the future watershed assignments be made based on 5<sup>th</sup> field watersheds rather than WAUs.

Though views were mixed, some members of the PAC preferred the seminar format used this year compared to the “show-me trip” approach employed in the past. They also appreciated the participation of the full compliment of district resource specialists and the quality of their presentations.

While we found the questionnaire to be improved from last year, we were troubled by questions that suggest that determination of consistency with ACS objectives is made through the watershed analysis (3f, 7d). We believe the WA should provide descriptions of conditions, trends, hydrologic function, and general recommendations at the watershed scale, but site-specific conditions, effects of projects and determinations of consistency with the ACS is the role of the NEPA analysis. Question 7d implies that RM-

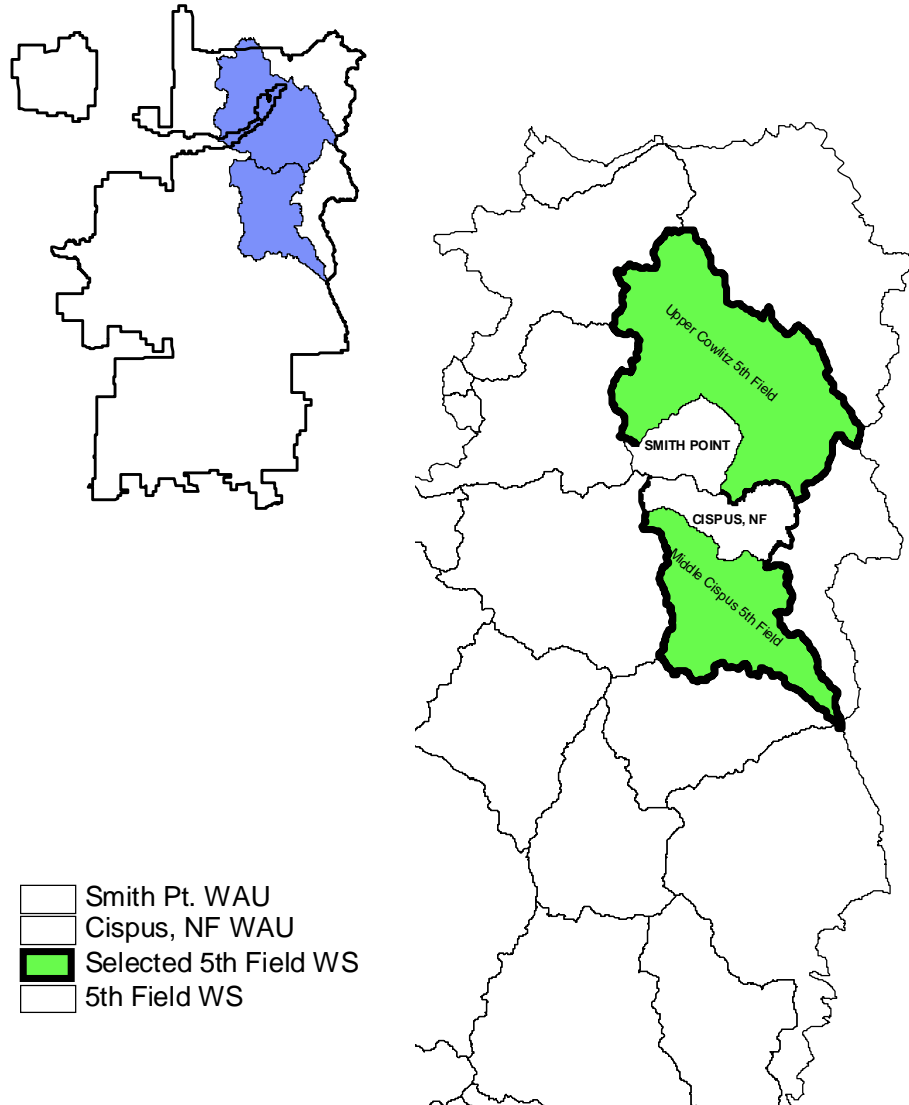
1 requires documentation in the WA of evaluations of recreation facilities within riparian reserves. We do not find direction to document those evaluations in the WA in RM-1. We were uncertain of the intent of question 4d in regard to the language “**have or will** contribute to watershed restoration.” Was the intent to describe projects already implemented and to include anticipated future projects? Was the “have or will” intended to acknowledge that some projects such as road decommissioning may require longer time frames to show benefits to ACS objectives? A PAC member also noted that for some questions more complete references would help to ensure a complete understanding of the intent of the questions.

The PAC would like to see participation by members of the REO or Regional Implementation Monitoring Team in these reviews to assist in clarifying NFP direction and the intent of the questionnaires.

Figure 23. WAUs and 5<sup>th</sup> Field Watersheds

## 2000 PIMT Selected Watersheds

Southwest Washington Province



## **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.

## 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.

**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. Streambanks, 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.

**Semiprimitive 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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Mitch Wainwright	Wildlife
Rick McClure	Heritage Resources
Ruth Tracy	Hydrology
Tom High	Soils
Diana Perez	Fisheries

# Gifford Pinchot National Forest Administrative Units

