

United States  
Department of  
Agriculture

Forest Service



Pacific  
Northwest  
Region

# Wenatchee National Forest

Annual Report on Wenatchee Land and Resource  
Management Plan  
Implementation and Monitoring  
for Fiscal Year 2003

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# I. INTRODUCTION

## PURPOSE OF THE MONITORING REPORT

The Wenatchee Forest Plan was implemented in 1990 after extensive analysis and public review and comment. The Forest Plan was amended in 1994 by the Record of Decision and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (Northwest Forest Plan). Preparation of the Forest Plan is required by the National Forest Management Act of 1976. It provides standards, guidelines, land allocations, and philosophies that serve as the basis for all Forest Service management on the 2.2 million acre Wenatchee National Forest.

The purpose of this annual report is to provide information to the Regional Forester, Forest Leadership Team, and the public on how well the Forest Plan Goals and Objectives are being met. The monitoring and evaluation process will provide information to determine if:

- Laws, regulations, and policies are being following, including those found in the *Forest Plan* Management Area Prescriptions, and *Forest-wide* Standards and Guidelines, the Regional Guide, and Forest Service Handbooks.
- The management prescriptions are producing the predicted Goals and Objectives or Desired Future Conditions of the Forest environment.
- Cost and annual budgets of implementing the *Forest Plan* are within projected limits.
- The projected range of outputs is being produced; it will also evaluate effects.

A number of monitoring systems are already in place to comply with administrative and legal responsibilities. Forest Plan monitoring does not replace these systems, but rather complements them by addressing specific issues and concerns identified through the planning process.

## GENERAL INFORMATION

Monitoring consists of gathering data, making observations, and collecting and disclosing information. Monitoring is also the means to determine how well objectives of the Forest Plan are being met, and how appropriate the management Standards and Guidelines are for meeting the projected Forest outputs and protecting the environment. Monitoring is used to determine how well the assumptions used in development of the Forest Plan reflect actual conditions.

Monitoring and evaluation may lead to changes in practices or provide a basis for adjustments, amendments, or Forest Plan revisions. Monitoring is intended to keep the Forest Plan dynamic and responsive to change and new information.

## II. SUMMARY OF THE RECOMMENDED ACTIONS

The following categories of actions are used to summarize those monitoring items needing attention from the Forest Supervisor and Forest Leadership Team. Group Leaders responsible for each monitoring item have recommended actions based on their evaluations.

### Results are Acceptable/Continue to Monitor

The results for these monitoring questions are either acceptable (within the “Threshold of Variability” listed in Chapter V of the Forest Plan), or more than 1 or 2 years of data are needed to evaluate the results (continue to monitor). For some items, several years of data collection are necessary to evaluate the effectiveness or validity of the Forest Plan. Studies are being initiated to provide the baseline data and inventories necessary to answer these questions.

### Change Management Practices

The results for these monitoring questions exceeded the “Threshold of Variability” for a particular monitoring item question in Chapter IV. An evaluation of the situation indicates the need to change practices to comply with the Forest Plan.

### Further Evaluation/Determine Action

The results for these monitoring questions may or may not exceed the “Threshold of Variability”. Additional information is needed to better identify the cause of the concern and to determine future actions.

### Propose Forest Plan Amendment

Areas where results are inconsistent with the Forest Plan Objectives or the Forest Plan direction was not clear. The follow-up action requires either changing or clarifying the Forest Plan through the amendment process. The Forest Supervisor can make non-significant amendments; significant amendments require Regional Forester approval.

## Summary Table of Recommended Actions

|   | Continue Monitoring | Change Management Practices | Evaluation | Forest Plan Amendment or Revision | Recommendations   |
|---|---------------------|-----------------------------|------------|-----------------------------------|---|
| <b>RECREATION</b>                             |                     |                             |            |                                   |   |
| Management of Developed Recreation Facilities | X                   |                             |            |                                   | Continue monitoring as scheduled.   |
| Recreation Use                                | X                   |                             |            |                                   | Continue monitoring as scheduled.   |
| <b>WILD, SCENIC and RECREATIONAL RIVERS</b>   |                     |                             |            |                                   |   |
| Wild, Scenic And Recreational Rivers          | X                   |                             |            |                                   | Continue monitoring as Scheduled  |
| <b>SCENERY MANAGEMENT</b>                     |                     |                             |            |                                   |   |
| Scenic Resource Objectives                    | X                   |                             |            |                                   | <p><u>Blewett Pass Highway 97 Viewshed</u><br/>Continue working with the Department of Transportation and permittees to minimize signs and structures, and for roadside improvements.<br/>Continue to monitor and enhance high scenic quality along the travel route.</p> <p><u>White Pass Viewshed</u><br/>Continue working with White Pass Ski Company to improve signs, landscaping, and color scheme.<br/>Continue monitoring Highway 12 to maintain the highest possible scenic quality by designing all activities to retain the natural appearing scenery.<br/>Vegetation changes and structures along the Highway 12 viewshed should continue to be monitored and</p> |

|  | Continue Monitoring | Change Management Practices | Evaluation | Forest Plan Amendment or Revision | Recommendations   |
|--|---------------------|-----------------------------|------------|-----------------------------------|---|
|  |                     |                             |            |                                   | <p>enhanced to protect and improve scenic qualities. Continue working with Washing State Department of Transportation toward functional and aesthetically pleasing structures, safety, and danger tree removal.</p> <p><u>Shady Pass Forest Road 5900 Viewshed</u><br/> Maintain and enhance scenic quality while reducing fuels and improving forest health throughout the viewshed. Incorporate design arts into thinning projects to improve scenic quality. Future vegetation management along the viewshed should be designed to meet moderate to high scenic objectives. Varying stand densities, irregular spacing, clumping, and creating a variety of spaces (with contrasting variety and diversity of tree sizes) will enhance scenic quality.</p> |
| Landscape Character Goals                  | X                   |                             |            |                                   | Continue monitoring, as schedule, projects in priority areas of High Scenic Concern.  |
| <b>WILDERNESS</b>                          |                     |                             |            |                                   |   |
| Recreation Impacts on Wilderness Resources | X                   |                             |            |                                   | Continue monitoring as scheduled. Work on application of Limits of Acceptable Change standards for wilderness management, particularly in the one-day travel zone.  |

|  | <b>Continue Monitoring</b> | <b>Change Management Practices</b> | <b>Evaluation</b> | <b>Forest Plan Amendment or Revision</b> | <b>Recommendations</b>  |
|--|----------------------------|------------------------------------|-------------------|--|---|
| <b>CULTURAL RESOURCES</b>  |                            |                                    |                   |  |   |
| Cultural and Historic Site Protection                                | X                          |                                    |                   |  | Continue monitoring as scheduled. Continue to work on backlog of site evaluations.  |
| Cultural and Historic Site Rehabilitation                            | X                          |                                    |                   |  | Continue efforts as budget allows, to preserve and rehabilitate National Register eligible properties   |
| <b>COOPERATION OF FOREST PROGRAMS WITH INDIAN TRIBES</b>             |                            |                                    |                   |  |   |
| American Indians and their Culture                                   | X                          |                                    |                   |  | Continue recognition of cerns and issues regarding ceded lands and trust responsibilities. Continue government to government communications with tribes.  |
| Coordination and Communication of Forest Programs with Indian Tribes | X                          |                                    |                   |  | Continue to promote notification and communication with tribal entities.  |
| <b>WILDLIFE</b>  |                            |                                    |                   |  |   |
| Indicator Species: Primary Cavity Excavators                         | X                          |                                    |                   |  | Re-sample within the fire and salvage logging study area during 2006 or 2007 to monitor snag attrition and the response of primary cavity excavators.<br><br>Survey snags before and after timber harvest to determine if snag standards are being met. |

|                                     | <b>Continue Monitoring</b> | <b>Change Management Practices</b> | <b>Evaluation</b> | <b>Forest Plan Amendment or Revision</b> | <b>Recommendations</b>  |
|-------------------------------------|----------------------------|------------------------------------|-------------------|--|---|
| Land Birds                          | X                          |                                    |                   |  | <p>Complete post-prescribed fire monitoring of landbirds in the Pendleton Monitoring Study</p> <p>Complete post-treatment monitoring of landbirds in the FFS Study</p> <p>Initial monitoring results suggest that dry site restoration treatments may have beneficial effects to many bird species. Management recommendations will be made base on final monitoring results</p>            |
| Riparian Dependent Wildlife Species | X                          |                                    |                   |  | <p>Use data from the riparian amphibian monitoring as a pilot study to determine the statistical power of determining trends in amphibian populations under the current study design. Make adjustments to the monitoring effort according to the results of this analysis.</p> <p>Integrate the results of the riparian bird study into forest plan monitoring once they are available.</p> |
| Deer, Elk and Mountain Goat Habitat | X                          |                                    |                   |  | <p>Coordinate with the WDFW to obtain population monitoring data that can be integrated into this report for deer, elk, and mountain goats.</p> <p>Revise and refine the elk and deer habitat effectiveness models based on the results of the elk habitat</p>  |

|  | Continue Monitoring | Change Management Practices | Evaluation | Forest Plan Amendment or Revision | Recommendations  |
|--|---------------------|-----------------------------|------------|-----------------------------------|--|
|  |                     |                             |            |                                   | assessment and mule deer study. Integrate these models through forest plan revision and use the models in project level evaluations. The results of the mule deer study show that the current habitat effectiveness model that is being used does a poor job of predicting where the best mule deer habitat is located.  |
| Threatened and Endangered Species Northern Spotted Owl | X                   |                             |            |                                   | <p>Monitoring should include tracking the changes in the availability of suitable spotted owl habitat over time.</p> <p>Continue to monitor &gt;50% of the known spotted owl sites on the Forest in order to track trends in the number of young/site over time.</p> <p>Validate monitoring suitable spotted owl habitat and spotted owl productivity (young/site) to determine trends in the spotted owl population on the Forest.</p> <p>Cooperate with the Wenatchee Forestry Sciences lab to monitor how dry site restoration projects are influencing resource selection by spotted and barred owls during 2004-2006.</p> |
| Bald Eagle   | X                   |                             |            |                                   | Continue to monitor nests and document the number of young produced.   |

|                        | <b>Continue Monitoring</b> | <b>Change Management Practices</b> | <b>Evaluation</b> | <b>Forest Plan Amendment or Revision</b> | <b>Recommendations</b>  |
|------------------------|----------------------------|------------------------------------|-------------------|--|---|
| Peregrine Falcon       | X                          |                                    |                   |  | <p>Continue to monitor potential and active nest sites.</p> <p>Prepare site management plans for known nest sites.</p> <p>Implement and monitor measure to protect nest sites from sources of human disturbance.</p>  |
| Grizzly Bear           | X                          |                                    |                   |  | <p>Continue to update the core area GIS layer as projects are implemented and better information becomes available.</p> <p>Continue to implement the Sanitation Policy by making human garbage inaccessible to bears in our campgrounds and recreation sites.</p> <p>Continue to report and follow up on grizzly bear observations in order to gather sufficient information to determine the validity of the report.</p> |
| Gray Wolf (Endangered) | X                          |                                    |                   |  | <p>Track road densities in GIS to monitor habitat effectiveness for wolves.</p> <p>Cooperate on the development of a recovery plan or conservation strategy for the North Cascades.</p> <p>Continue to follow up and evaluate wolf reports and track these in a database.</p>   |
| Canada Lynx            | X                          |                                    |                   |  | <p>Continue to monitor projects within the range of the species.</p>  |

|   | <b>Continue Monitoring</b> | <b>Change Management Practices</b> | <b>Evaluation</b> | <b>Forest Plan Amendment or Revision</b> | <b>Recommendations</b>  |
|---|----------------------------|------------------------------------|-------------------|--|---|
| Survey and Manage Species: Chelan Mountain snail      | X                          |                                    |                   |  | Continue surveys of projects for survey and manage mollusk species.<br><br>Focus surveys of the Chelan Mountain snail to portions of the Entiat and Chelan Ranger Districts where extensive survey information shows they occur. Eliminate surveys on the Leavenworth Ranger District where extensive efforts over several years have not resulted in a single location of the Chelan Mountain Snail. |
| <b>WATERSHEDS AND AQUATIC HABITATS</b>                |                            |                                    |                   |  |   |
| Fish Management Indicator Species (MIS) Populations   | X                          |                                    |                   |  | Refer to section for multiple recommendations on several topics.  |
| Riparian Watershed Standard Implementation Monitoring | X                          |                                    |                   |  | Continue a variety of projects as funding and opportunities arise.  |
| Watersheds and Aquatic Habitats                       | X                          |                                    |                   |  | Refer to section for multiple recommendations on several topics.  |
| <b>ROADS</b>  |                            |                                    |                   |  |   |
| Road Management and Maintenance                       | X                          |                                    |                   |  | Continue monitoring as scheduled.<br><br>Continue Roads Analysis as outlined in the new Road Management Policy to determine the appropriate size and makeup of our existing road transportation system.   |

|                       | Continue Monitoring | Change Management Practices | Evaluation | Forest Plan Amendment or Revision | Recommendations  |
|-----------------------|---------------------|-----------------------------|------------|-----------------------------------|--|
|                       |                     |                             |            |                                   | Reduce maintenance levels and decommission (remove from the system) those roads no longer necessary where appropriate.   |
| <b>FIRE</b>           |                     |                             |            |                                   |  |
| Wildfire Occurrence   | X                   |                             |            |                                   | Continue monitoring as scheduled   |
| <b>MINERALS</b>       |                     |                             |            |                                   |  |
| Mine Site Reclamation | X                   |                             |            |                                   | The major problem with appropriate monitoring is not the process, but the available funding and staff. Continue to request funding that would allow 100 percent monitoring of all bonded mineral related activities, as has been the case over the last several years.   |
| Mine Operating Plans  | X                   |                             |            |                                   | <p>The objectives and standards and guidelines in the Forest Plan appear to be adequate, but the level of funding is inadequate to ensure total compliance. If determined to be desirable, request adequate funding that will allow monitoring of all mineral related activities.</p> <p>Based upon the administration and monitoring completed, a Forest Plan adjustment is not necessary at this time.</p> <p>Actively conduct programmatic resource surveys that will</p> |

|   | <b>Continue Monitoring</b> | <b>Change Management Practices</b> | <b>Evaluation</b> | <b>Forest Plan Amendment or Revision</b> | <b>Recommendations</b>   |
|---|----------------------------|------------------------------------|-------------------|--|--|
|   |                            |                                    |                   |  | accommodate anticipated mineral activities. This will allow the processing of Plans of Operation in a more timely and efficient manner.  |
| <b>GENERAL MONITORING OF STANDARDS and GUIDELINES</b> | X                          |                                    |                   |  | Continue to support the interagency effort in developing effectiveness monitoring protocols that will lead to answering the question: Are implemented Standards and Guidelines achieving the expected results? |

# RECREATION

Monitoring Item-

## Facility Management - Trails and Developed Recreation

The goal is to manage trail use to provide recreation opportunities in a wide range of recreation settings to provide safe, well-maintained, developed recreation facilities for the public commensurate with recreation demand. The monitoring questions are:

**Are trails providing the variety of opportunities intended in the Forest Plan?**

**Are trails with mixed users (e.g. horse/hiker, hiker/ORV) meeting the expectations for all intended users?**

**Are available developed recreation facilities meeting public demand?**

**Are developed recreation sites, areas, and facilities being adequately maintained to serve the public and protect resource values?**

The Wenatchee National Forest is undertaking an inventory of the trails and recreation facilities that are present on the Forest. This inventory shows the deferred maintenance costs for recreation facilities and trails. The data will be updated in the next few years.

Preliminary estimates are that for developed recreation, it will take a little over 2.5 million dollars to bring the facilities into compliance with Forest Service standards for maintenance. The estimate for eliminating the trails deferred maintenance backlog is just over 4.7 million dollars.

The Forest will be doing a Recreation Facilities Master Plan in the next couple of years that will look at which facilities and make decisions as to their future management. This could result in closure of some facilities and possible improvement of other facilities. This plan will realign our facilities with current budgets.

Recommendations

Continue monitoring as scheduled.

Monitoring Item-

## Recreation Use

The Forest Service has initiated National Visitor Use Surveys to measure recreation use on the National Forests. The Wenatchee National Forest was surveyed in 2001 and is being resampled in 2005.

The 2001 surveys for the Wenatchee coincided with a very active fire season, with an Area Command activated in Wenatchee. The Icicle Creek, north shore of Lake Chelan, and parts of the Okanogan N.F. were closed to public entry for substantial periods of time during that summer. There was also a complete campfire closure for most of the summer.

The total number of visits on the Wenatchee National Forest was 2,532,617; of that total, 300,584 were wilderness visits. This corresponds to 5,191,865 Recreation Visitor Days (RVD).

The visitor racial and ethnic composition was 76.9% white, with 23.1% minority group members (11.1% Hispanic).

The primary recreation activities were: Backpacking 16.7%, Developed Camping 10.9%, Driving for Pleasure 9.2%, Downhill Skiing 9.2 %, Picnicking 7.8%, and Cross-Country Skiing at 6.6%.

The Wenatchee is perceived to have large amounts of dispersed camping relative to the developed campground use. The NVUM data shows that this is not true. Developed camping represented 17.8% of the visits, with 10.9 of that the developed camping was the primary purpose of the visit. For dispersed camping it represented 5.9% of the visits with 3.0% for which it was the primary purpose.

Dispersed camping is a major issue with the Fisheries program. The Forest has devoted much time to mitigating the impact of dispersed camping on fish. This includes the “Respect the River” program which started on the Okanogan N.F. and has received Regional recognition.

The Wenatchee is known regionally as trail country. For the Wenatchee, trail use represented 34.2% of all visits to the Forest. The following table shows for the primary activity of trail visitors (percentages)

| <b>Trail Activity</b> | <b>% of Visitors</b> |
|-----------------------|----------------------|
| Backpacking           | 16.75%               |
| OHV's                 | 1.3%                 |
| Snowmobiles           | 4.2%                 |
| Hiking/Walking        | 4.0%                 |
| Horseback             | .8%                  |
| Bicycling             | .6%                  |
| X-Country Skiing      | 6.6%                 |

For the Wenatchee National Forest, winter use is 10.8 percent of trail use. The Wenatchee has an extensive ORV trail system that is world class. For this reason it has a reputation as a motorized mecca. However, as can be seen from the use numbers, there is more to the Wenatchee trail program than ORV use.

It is hard to get good trend data until the next NVUM survey. However, it appears that use on the Forest is steady. What is changing is the type of activities. There are fewer long hiking trips and more day hikes in the wilderness. Winter activities are growing rapidly, both snowmobiling and x-country skiing. There is a shift to more “extreme” type activities, such as high pointing, and also a shift to more genteel activities, such as walking and bird watching. It appears that the traditional activities like hunting, fishing, and camping are declining in relative use.

The Wenatchee National Forest recreation program is well balanced throughout all recreation activities. The high level of winter use means that the recreation season has no down time.

### **Recommendation**

Continue monitoring as scheduled.

## **WILD, SCENIC, AND RECREATIONAL RIVERS**

Monitoring Item-

### **Wild, Scenic, and Recreational Rivers**

The goal is to retain the character and attributes of rivers recommended for Wild, Scenic, or Recreational designation. The monitoring question is:

**Are resource management activities along recommended river corridors being conducted in a manner to provide protection at the appropriate level of classification?**

There were no projects implemented on the Forest in the past years that had the potential to affect the classification determined in the Forest Plan for recommended rivers. Until Congress acts on the recommendations the Forest Service continue to protect these rivers so that the classification is maintained.

### **Recommendation**

Continue monitoring as scheduled.

## **Scenery Management**

Monitoring Item –

### **Scenic Resource Objectives**

The objective is to manage vegetation and facilities that provide views, which are consistent with the stated scenic quality objectives for each management area. The monitoring question is:

**Do the cumulative effects of all resource activities within a viewshed meet the desired scenic condition?**

The Wenatchee National Forest (NF) landscape architect reviewed projects on Ranger Districts (RD's) to assess the potential cumulative effects of resource activities on scenery. Field review of project areas was done along three major viewsheds: Blewett Pass Highway 97, White Pass Highway 12, and Shady Pass viewsheds were selected for summary analysis in past years. Scenic resource analyses on

these viewsheds indicate that the viewsheds vary from natural appearing to an altered condition. There were no new projects implemented over the last year in Blewett Pass Highway 97 and Shady Pass viewsheds. Monitoring will continue on these viewsheds as future projects develop. White Pass viewshed is in a natural to slightly altered condition throughout the travel route. Vegetation changes throughout the travel route blend well with the natural diversity of landscapes from the Wenatchee National Forest boundary to White Pass. The scenic qualities of this viewshed are maintained at a very high level.

### **Scenic Areas of the 1994 Fire Restoration Projects**

Two areas were monitored this year: Round Mountain and Icicle Ridge on the Leavenworth and Lake Wenatchee RD's. A sample monitoring of these areas show slow recovery. These areas were burned during the 1994 fire. The landscape character was changed from a forested landscape pattern to a range of severely to mosaic burned landscape. The large scale burned landscapes, fallen down snags, and areas without green forested trees are the main cause of the catastrophic appearing landscape in the foreground and middleground views in the severely burned areas. Brown and gray colored snags have turned mostly gray and silver throughout the area. Snags left from the past restoration projects add to the diversity of the existing burned landscape character, but the snags have fallen faster in the past year.

The mosaic pattern of the burn in the Icicle River area provides a variety of small openings, patches of silver snags, and green up of the new emerging forest intertwined with the existing forest. The landscape scenic setting provides a diverse ix of form, line, color and texture inherent in the existing landscape character of the Cascade Mountain Range. The appearance of the Round Mountain area provides diverse variety of textures and colors. Color contrast of silver and gray snags area still standing to provide a scenic variety contrast of color within a green forested landscape as viewed from U.S. Highway 2, State Highway 209, and State Park swimming area at Lake Wenatchee. Silver gray snags add scenic variety and interest and appear natural within the forested landscape character. The design arts were integrated with the sciences to blend snag densities and the burned landscapes with the landforms to create a more sustainable landscape.

### **Recommendations:**

#### **Blewett Pass Highway 97 Viewshed**

Continue working with the Department of Transportation and permittees to minimize signs and structures, and for roadside improvements.

Continue to monitor and enhance high scenic quality along the travel route.

#### **White Pass Viewshed**

Continue working with White Pass Ski Company to improve signs, landscaping, and color scheme.

Continue monitoring Highway 12 to maintain the highest possible scenic quality by designing all activities to retain natural appearing scenery.

Continue working with Washing State Department of Transportation toward functional and aesthetically pleasing structures, safety, and danger tree removal.

Vegetation changes and structures along the Highway 12 viewshed should continue to be monitored and enhanced to protect and improve scenic qualities.

### **Shady Pass Viewshed**

Maintain and enhance scenic quality while reducing fuels and improving forest health throughout the viewshed.

Incorporate design arts into thinning projects to improve scenic quality. Future vegetation management along the viewshed should be designed to meet moderate to high scenic objectives.

Varying stand densities, irregular spacing, clumping, and creating a variety of spaces (with contrasting variety and diversity of tree sizes) will enhance scenic quality.

### **Scenic Areas of the 1994 Fire Restoration Projects**

Continue to monitor as scheduled.

Projects in Special Places and Areas of High Scenic Concern

Continue to monitor as scheduled.

### **Recommendation**

Last year's recommendation was to continue monitoring as scheduled; monitoring continued.

### **Monitoring Item –**

#### **Stand Character Goals**

The objective is to manage vegetation so that the stand character (species and structural mix) is moving in the direction specified for each Scenic Quality Objective (SQO). The monitoring question is:

#### **Are related standards and guidelines being implemented, and do they achieve stated goals and objectives, particularly scenic character goals?**

The desired future condition for scenery is a multi-story stand composition, variety and diversity of large trees in groves, clumps, and/or scattered throughout the landscape. The high degree of naturalness is desirable. Fire restoration and thinning projects to reduce fuels and promote healthy ecosystems have been initiated. This helps achieve a long-term forested environment with a more natural appearing landscape with scattered groups, individual large trees, and varying densities of vegetation patterns and a more open stand. The trend of harvest practices in the last 5 years has been towards partial cutting and thinning, where trees are left to achieve scenic quality and other resource goals. Another goal is to reduce the amount of contrast in the viewsheds. The trend is viewsheds recovering to more naturally appearing landscapes.

### **Recommendations**

Continue monitoring as scheduled.

# WILDERNESS

Monitoring Item-

## Recreation Impacts on Wilderness Resources

The goal is to perpetuate wilderness character, natural ecological processes, and provide recreation opportunities appropriate in wilderness. The monitoring question is:

### **Is recreation visitor use or management resulting in changes in the physical, biological, or social settings that approach Limits of Acceptable Change (LAC) Standards specified in the Forest Plan?**

The monitoring items for Wilderness come from the Budget Formulation and Execution System (BFES). The Wenatchee National Forests has seven designated Wilderness areas. The following table gives the expected outputs for Wilderness management on the National Forests. The wilderness area must meet 6 of the 10 following elements:

1. Number of wildernesses covered by fire plans that allow for the full range of management responses.
2. Number of wildernesses which were successfully treated for noxious/invasive plants.
3. Number of wildernesses where AQRV monitoring is conducted and baseline is established.
4. Number of wilderness education plans implemented.
5. Number of wildernesses with adequate standards, in which monitored conditions are within forest plan standards, and opportunities for solitude or primitive and unconfined recreation are stable or increasing.
6. Number of wildernesses with completed recreation site inventory.
7. Number of existing outfitter and guide permit operating plans which direct outfitters to model appropriate wilderness practices and incorporate appreciation for wilderness values in their interaction with clients.
8. Number of wildernesses with a full-range of adequate standards which prevent degradation of the wilderness resource.
9. Number of wildernesses with wilderness managers that have had their priority information needs addressed through data collection and corporate applications
10. Number of wildernesses with baseline workforce (from workforce assessment) in place for each wilderness.

Some of these standards are met in every wilderness area. However, no wilderness meets all the standards. In fact, only the Alpine Lakes Wilderness comes close to meeting six of the ten standards.

All the wildernesses are covered by fire plans that allow for the full range of management responses. The Naches Ranger District managed the Rattlesnake Fire during the summer of 2004. This Wildland Fire Use restored to natural processes 775 acres within the William O'Douglas Wilderness. The Forest meets this standard for all wildernesses.

Noxious and invasive plants were treated in the Goat Rocks Wilderness. The Lake Chelan Sawtooth Wilderness has had a noxious weed EIS completed and hand pulling completed on portions of the wilderness. The EIS gives authority for use of herbicides if necessary. So far hand pulling has been the appropriate response.

Air Quality Monitoring has been monitored for a decade at the Alpine Lakes Wilderness. This is the only wilderness with a formal monitoring station. Informal monitoring continues to be done within the other wilderness areas.

Wilderness specific education plans have not been prepared. The Forest has a education program covering all facets that is generic to wilderness. The Forest Plan established standards for solitude or primitive and unconfined recreation. The standard is that this trend should be stable or increasing. It appears that this standard is stable or increasing in zones outside the day use travel time. Those areas with significant day use are showing a decreasing trend. The Forest is continuing to monitor this standard.

Several wilderness areas have completed a recreation site inventories but these are rapidly becoming outdated. There is a need for updated information for this standard.

Outfitter and guide operating plans are being revised to reflect model wilderness practices and appreciation for wilderness. Most of the wilderness areas are now meeting this standard. The Forest Plan has established standards to prevent degradation of the wilderness resource. The most difficult standard to meet has been the bare ground standard which is much smaller than typical size need for groups traveling in the wilderness. It appears that bare ground disturbance is not expanding, but neither is it shrinking towards the standard. Further monitoring and analysis is being done on this issue. All wildernesses have a designated Wilderness Steward and information is being added into the INFRA-WILD data system.

The only area that meets the baseline wilderness workforce is the Enchantment core in the Alpine Lakes Wilderness. In other areas, staffing is below baseline, but all wilderness areas have some ranger presence if only on an intermittent basis.

## **Recommendations**

Continue monitoring as scheduled.

Continue to work on application of Limits of Acceptable Change Standards for wilderness management.

## **Cultural Resources**

### **Monitoring Item -**

### **CULTURAL AND HISTORIC SITE PROTECTION**

The goal is to protect heritage resources from vandalism, disturbance from project activities, and natural degradation. The monitoring questions are:

**Are the National Register characteristics of un-evaluated and significant heritage resource properties being protected?**

**Are all reasonably locatable heritage resources being discovered during project area reconnaissance?**

For FY 2003, a total of 112 separate consultations occurred in compliance with Section 106 of the National Historic Preservation Act and in accordance with the 1997 Programmatic Agreement regarding cultural resource management on National Forests in the State of Washington (PMOA). This slight increase in the number of consultations over FY 2002 reflects an increase in projects as well as an increase in the Forest's awareness regarding Section 106 consultation in general. Of these consultations, 47 projects required Section 106 consultation with the Washington State Historic Preservation Officer (SHPO) and 65 project consultations were handled internally per the 1997 PMOA. The number of large projects requiring concurrence by the State Historic Preservation Officer (SHPO) declined while the number of consultations for small projects with limited potential to affect historic properties increased.

Project planning acreage ranged from a high of 25,000 acres for the Blag Ecosystem Restoration project on the Leavenworth Ranger District to less than one acre. Acreage inventoried for cultural resources varied from a high of 3,265 acres for a fuel reduction project on the Naches Ranger districts to less than one acre for recreation residence improvements. A total of 7,733 acres were systematically inventoried and 71 new cultural resource sites were documented. Most of the new sites were located during inventories for fuel reduction and salvage-and timber sales with large planning areas. A total of 75 new and previously documented sites were formally evaluated for nomination to the National Register of Historic Places. This increase in the number of sites evaluated reflects increased emphasis in this area of the heritage program.

More than half of the projects requiring heritage support had little or no potential to affect cultural resources and included such activities as weed eradication, permit renewals, wetland restoration within existing stream-river systems, road decommissioning, easements, and thinning. Projects requiring inventory include prescribed burns, timber and salvage sales, allotment permit renewals, summer home improvements, burn area emergency rehabilitation for district fires, and recreation and facilities-related projects. The Forest has now documented nearly 1600 cultural resources.

Sites located within FY 03 project areas were avoided during project implementation. At least seven of the FY03 Section 106 project reports specifically recommended site and/or project monitoring to insure avoidance and/or identification of cultural resources. No site discoveries occurred. Four previously documented sites were inspected during a Passport in Time Project. One Forest Service project resulted in a determination of adverse effect by the State Historic Preservation Officer (SHPO). The project involved modification to a recreation residence on the Naches Ranger District. The home was determined eligible for the National Register of the Historic Places and the modifications proposed by the owner were determined to be adverse. In lieu of a Memorandum of Agreement to mitigate the adverse effect, the project was revised and a finding of "no adverse effect" was agreed upon by the agency, the SHPO, and the property owner.

Site protection and heritage awareness was emphasized through 20 separate events that included site tours, talks, displays, interpretive signage, newspaper articles, school and public presentations. A number of ranger district employees included heritage awareness in their own area-specific presentations. Three sites remain under site stewardship (Leavenworth Ski Hill, American Ski Bowl, and Red Top Lookout). Site stewards and site monitors contributed 80 hours to the heritage program. The public had an opportunity to participate in three "Passport in Time" (PIT) projects which emphasized artifact inventory and conservation. Projects included artifact identification, inventory and cataloging and some field survey and site documentation. PIT volunteers contributed 288 hours of service. This decrease in volunteer hours reflects a reduction in the heritage budget and an increase in the number of Forest undertakings requiring Section 106 consultation.

Monitoring Item -

### **Cultural and Historical Site Rehabilitation**

The goal is to rehabilitate damaged sites eligible for inclusion on the National Register of Historic Places. The monitoring question is:

**For sites eligible for inclusion in the National Register of Historic Places, is appropriate stabilization or rehabilitation of damage being completed?**

The Wenatchee National Forest now has eight individual memorandums of agreement and memorandums of understanding that provide strict guidelines for managing and rehabilitating National Register and National Register eligible sites on the Forest. In FY2003, a memorandum of agreement was completed for the management of Holden Village, a mining-era town site now owned and managed by Holden Village, Inc. The agreement stipulates which actions, from routine maintenance to restoration, require project-by-project consultation with the Forest Service and SHPO and which do not. It essentially streamlines the Section 106 process and saves the agency and the permittee considerable cost and time.

In 2003, recreation, engineering and facilities staff routinely consulted with Forest archaeologists regarding the maintenance or rehabilitation of Forest Service administrative sites, campground and trail shelters, and lookouts eligible for or listed on the National Register of Historic Places. Four historic properties were enhanced, restored, stabilized or rehabilitated. Activities included restoration of the Salmon La Sac Guard Station grounds via a Forest Enhancement grant for 32K. Improvements included the addition of an ADA toilet, construction of a pole fence around the building and installation of foot paths to the building from the road and the parking lot. The project will be completed in FY04. Historic culverts were restored and replaced in-kind along the Naches District's historic Copper City Road. The project is on-going. One trail project was redesigned to avoid a National Register-listed rock shelter. The existing trail at the site was obliterated and realigned to draw attention away from the shelter. Lastly, the Teanaway Guard Station on the Cle Elum District was entered into the cabin rental program.

# COOPERATION OF FOREST PROGRAMS WITH INDIAN TRIBES

## Monitoring Item -

### American Indians and Their Culture

The monitoring questions are:

**For those trust resources identified in treaties with American Indians, what are their conditions and trends?**

**Are sites of religious and cultural heritage adequately protected?**

**Do American Indians have access to, and use of Forest species, resources, and places important for cultural subsistence, or economic reasons, particularly those identified in treaties?**

The Wenatchee National Forest is sensitive to American Indian concerns and issues regarding reserved rights on ceded lands. The Forest recognizes and honors the 1855 Treaty signed with the confederated tribes and bands of the Yakama Indian Nation. Government-to-government consultation remains a critical element of the program.

A meeting to discuss government-to-government consultation protocol in 2002 indicated that our current process works well with each Tribal Council but there is clearly a need to establish a better protocol/process with the Colville tribal historic preservation officer (THPO). The process for identifying Traditional Cultural Properties (TCPs) in particular remains problematic with the Colville THPO because of differences in opinion regarding who should provide TCP information and how. Meetings with the Yakama Nation cultural committee and the Colville Confederated Tribes THPO are planned in FY 04-05 to sort out the process.

The Forest values its relationship with the Yakama Nation and the Colville Confederated Tribes and recognition of Treaty Rights and Trust responsibilities are paramount in our day-to-day operation. Fees for special forest products are waived for tribal members and privacy is provided for ceremonial activities.

## Monitoring Item -

### Coordination and Communications of Forest Programs with Indian Tribes

The goal is to coordinate with appropriate Tribal representatives for all projects in which Indians may have a concern. The monitoring questions are:

***Are American Indian rights being protected on National Forest lands?***

***Are projects with activities or areas of concern to Indians being coordinated with appropriate Tribal representatives?***

The Wenatchee National Forest recognizes that recognition of, and the honoring of, existing treaties and executive orders is crucial in government-to-government relations with the Yakama Nation, Confederated Colville Tribes and other interested tribes. Protection of American Indian treaty and religious freedom-rights are incorporated into Forest decision-making. Consultation with tribes that may have an interest in management activities is initiated at the earliest stage of project planning and is carried through to completion of the project. The heritage program shares project information through distribution of the Forest's Schedule of Proposed Actions (SOPA), Passport in Time newsletters, and on a case-by-case basis for all projects involving a decision notice or decision memo. Each year contact is made with tribal councils to identify appropriate contacts for various projects. The Memorandum of Understanding between the Yakama Indian Nation and the Forest Service continues to guide anadromous fish habitat management. The Yakama Indian Nation continues to participate in Provincial Advisory Committee activities for both the Eastern Washington Cascades Province and the Yakima Province.

## **WILDLIFE**

Monitoring Items-

### **Management Indicator Species Habitat - Primary Cavity Excavators**

The goal is to maintain viable populations of primary cavity excavators. The monitoring question is:

#### **Is primary cavity excavator habitat being managed in the proper amounts within land allocations?**

Primary cavity excavators (PCEs) are considered to be keystone species within forested ecosystems because of the important ecosystem processes and functions they carry out. One of these functions includes the creation of cavities that in turn, provide habitat for a wide variety of other birds and mammals. To monitor primary cavity excavator populations and their habitat use, two large studies have been conducted. These include monitoring primary cavity excavators within stand replacement fires that occurred in 1994, and monitoring the effects of vegetation management on the retention levels of snag habitat. The study of primary cavity excavators within the burned areas was carried out in 1998 and 1999. A summary of the results of this study are provided in the abstract that follows. More details of the study can be found in the paper that was published, which is available at the Forest Headquarters Office. This study was intended to monitor how primary cavity excavator populations responded to stand replacement fires and subsequent salvage logging. This study will be repeated (pending funding) during 2005 or 2006 to monitor the long term effects of fire and salvage logging on primary cavity excavators and their habitats.

#### **Monitoring of Primary Cavity Excavator Populations**

Haggard, M.E., and W.L. Gaines. 2001. Effects of Stand-Replacement Fire and Salvage Logging on a Cavity-Nesting Bird Community in Eastern Cascades, Washington. *Northwest Science* 75(4):387-396.

**Abstract:**

We monitored the response of cavity-nesting bird species in three snag density treatments (high = 37-80 snags/ha, medium = 15-35 snags/ha, and low = 0-12 snags/ha) during two breeding seasons, 4-5 years post-fire and logging in Douglas-fir and ponderosa pine forests. Snag surveys were used to describe habitat, and both breeding bird surveys and nest surveys were used to characterize the bird community. Stands with the medium snag density treatment had the highest abundance, species richness, and nesting population of cavity nesters. The reasons for this may be: 1) snags were not evenly distributed within a stand such that both clumped and dispersed snag density habitat were interspersed in this treatment, and 2) a greater proportion of ponderosa pine snags in medium density treatments may have attracted species that prefer ponderosa pine for nesting and foraging. Ponderosa pine was preferred for nest sites and large snags (>48 cm dbh) provided nesting habitat for more species than smaller snags. However, smaller snags were used for nesting and foraging by some species.

**Monitoring of Primary Cavity Excavator Habitats**

The second primary cavity excavator monitoring study was initiated in 2001 and was designed to determine the direct, short-term effects of timber harvest and harvest systems on snag numbers. In addition, a secondary objective was to monitor the effectiveness of meeting forest plan snag standards. To date, the fates of 639 snags over 266 acres of dry forest restoration projects have been monitored. Additional monitoring is underway to determine how different harvest systems and prescribed fires influence snag numbers, and to develop statistically accurate measures of snag attrition rates.

| Monitoring Unit | Unit Size | Before Harvest |               |             | After Harvest |               |             |
|-----------------|-----------|----------------|---------------|-------------|---------------|---------------|-------------|
|                 |           | 6-<10 in. DBH  | 10-20 in. DBH | >20 in. DBH | 6-<10 in. DBH | 10-20 in. DBH | >20 in. DBH |
| 1               | 20        | 59             | 64            | 18          | 15            | 35            | 12          |
| 2               | 30        | 55             | 61            | 8           | 20            | 44            | 6           |
| 3               | 26        | 41             | 25            | 3           | 26            | 12            | 3           |
| 4               | 18        | 29             | 11            | 3           | 23            | 11            | 3           |
| 5               | 87        | 98             | 142           | 23          | NA            | NA            | NA          |
| 6               | 15        | 13             | 15            | 5           | NA            | NA            | NA          |
| 7               | 70        | 56             | 35            | 10          | NA            | NA            | NA          |

NA= harvest has not occurred so that post-harvest monitoring is not yet complete.

**Recommendations**

Re-sample within the fire and salvage logging study area during 2005 or 2006 to monitor snag attrition and the response of primary cavity excavators.

Survey snags before and after timber harvest to determine if snag standards are being met.

Monitoring Item -

## Landbirds

The goal is to maintain viable populations of landbirds. The monitoring question is:

### **How do landbird populations respond to changes in their habitats that result from the implementation of the Dry Site Strategy?**

The conservation of landbirds has become an important management issue on national forest lands in recent years. In 2000 the Forest Service developed the Landbird Strategic Plan that outlined our landbird conservation program. An important element of this program is the development of scientifically credible monitoring programs to understand how forest management activities may influence landbird habitats and populations. On the Wenatchee National Forest, dry forest restoration has been the primary focus of the vegetation management program. Therefore, landbird monitoring efforts have been focused on understanding how dry site treatments may affect landbird habitats, abundance, foraging behavior, and nesting success. These monitoring efforts have been accomplished through two large monitoring studies; the Pendleton Study and the Fire and Fire Surrogate (FFS) Study.

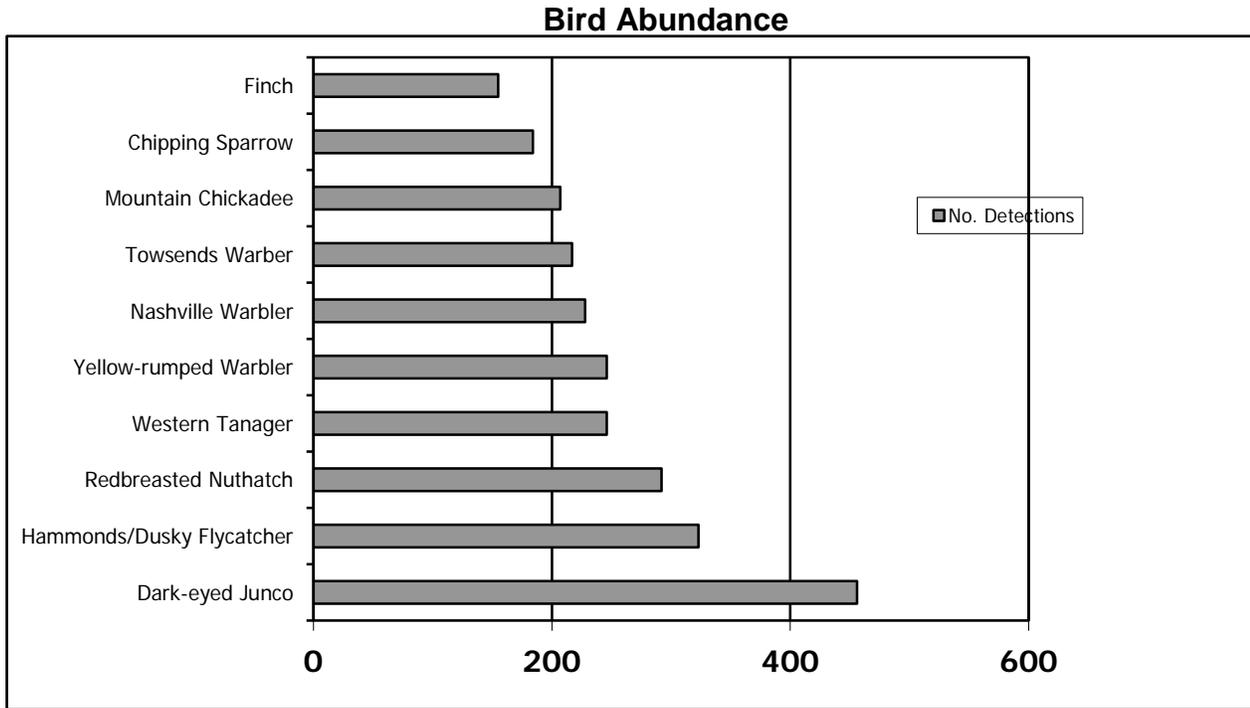
The Pendleton Monitoring Study was designed and implemented in cooperation with the Wenatchee Forestry Sciences Lab. The pre-treatment bird monitoring occurred in 1996 and 1997. The thinning portions of the dry site restoration treatments were completed in 2000 and post-thinning monitoring was carried out in 2001. In 2003 and 2004 prescribed fire treatments are being carried out and post-fire monitoring is expected to occur in 2005. The FFS Monitoring Study is a cooperative effort with the Wenatchee National Forest, Wenatchee Forestry Sciences Lab, and the University of Washington. This is an interdisciplinary study with wildlife being one of the disciplines that is included. In the FFS, pre-treatment monitoring was carried out in 2000 and 2001. Post-treatment monitoring is expected to occur in 2004 and 2005. Presented below are summaries from the progress reports from the Pendleton and FFS studies.

### **Monitoring the short-term (1-3 years) response of landbirds birds to thinning treatments implemented in the Pendleton Dry Forest Restoration project.**

We monitored the short-term response of land birds to forest restoration treatments in ponderosa pine forests located on the east-slope of the North Cascade Range. Restoration treatments were designed to create stand structure and composition similar to presettlement forests, which were influenced by a frequent fire regime. We detected changes in the abundance of four avian species in response to restoration treatments. Cassin's finches were more abundant while MacGillivray's warblers were less abundant in treated stands. Western bluebirds and house wrens were only detected after restoration treatments were implemented and we detected no changes in the abundance of brown-headed cowbirds. Pre and post-treatment dominant foraging guilds were low understory and ground insectivores and tree foliage insectivores. Neotropical migrants composed a sizeable portion (45%) of the avifauna in these forests. The MacGillivray's warbler was the only migrant to show a decline in abundance following restoration treatments. Our results indicate that restoration treatments that retained 20-30% of the total basal area and retained the largest trees had minimal short-term effects on land bird communities. Monitoring should be continued to understand the longer term (5-10 year) responses of land birds and to guide future forest restoration efforts.

## Monitoring the Response of Landbirds to Fire and Fire Surrogate Treatments

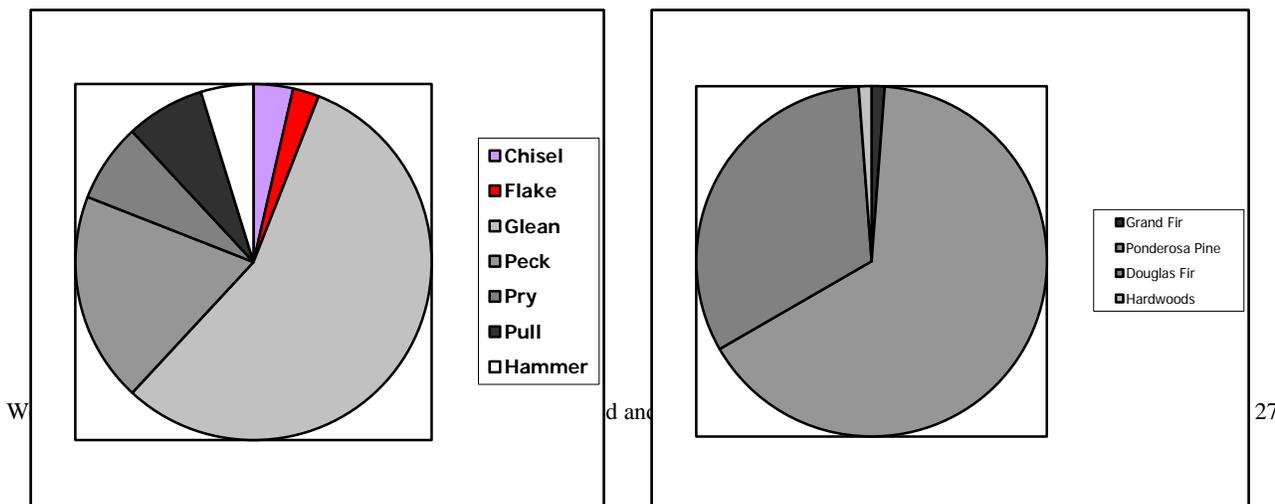
The following figures provide a brief summary of the kinds of information that is being collected for landbirds in the Fire and Fire Surrogate study. This information was collected during 2000 and 2001 in areas that had not been treated with a dry forest restoration prescription. In 2004 and 2005, these same areas will be re-surveyed to monitor landbirds after treatments have been completed. The information presented below is on bird abundance, foraging ecology of bark gleaning birds, and nesting success of landbirds.



This figure shows the number of detection made for the 10 most common bird species at point count stations. Approximately 4-6 point count stations were sampled within each of 12 dry forest study stands.

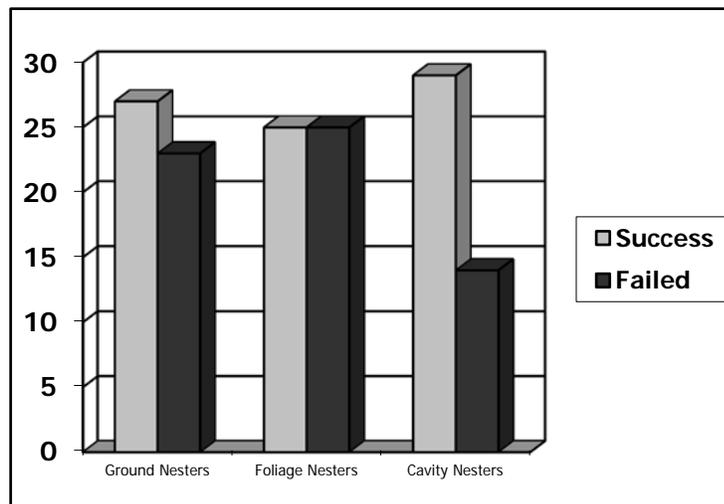
## Foraging Ecology

These figures show the foraging behaviors and habitats used by bark gleaner birds. Bark gleaning birds include brown creepers, woodpeckers, nuthatches, and chickadees, who glean insects out of the bark of trees.



## Nesting Success

Nesting success provides an important measure of the productivity of bird species and is important to monitor to understand how dry forest treatments may affect bird populations. As this graph shows, about 50% of the ground and foliage nest fail, while birds that use cavities for nest have a much higher success rate.



## Recommendations

Complete post-prescribed fire monitoring of landbirds in the Pendleton Monitoring Study in 2005.

Complete post-treatment monitoring of landbirds in the FFS Study in 2005.

Initial monitoring results suggest that dry site restoration treatments may have beneficial effects to many bird species. Management recommendations will be made base on final monitoring results in 2006.

Monitoring Item-

## Riparian Dependent Wildlife Species

The goal is to maintain viability of riparian dependent species. The monitoring question is:

### Is habitat being maintained for riparian dependent wildlife species?

Riparian habitats typically support the most productive and diverse wildlife populations in temperate forest landscapes. For these reasons, it is important to monitor the populations of wildlife species that are dependent upon riparian habitats. Two efforts have been implemented to monitor riparian wildlife

species. The first is an effort to monitor amphibians associated with stream riparian habitats. This effort was initiated in 1992 and is planned to be continued as a long-term monitoring effort (although it may need to be expanded or modified). This monitoring effort samples riparian habitats along small mountain streams within Douglas-fir and mixed conifer forests. The sample sites include areas of three different riparian management strategies (unharvested, riparian buffer, no buffer). The second study was conducted by the Wenatchee Forestry Sciences Lab (J. Lehmkuhl, Principal Investigator) to monitor bird populations in streamside riparian habitats. Results from the riparian bird study are not yet available but will be presented in future monitoring reports.

**Results of amphibian monitoring in streamside riparian habitats within Douglas-fir mixed conifer forests. These results include sample sites from three riparian management strategies (unharvested, riparian buffer, no buffer). These results are based on using pitfall traps to obtain estimates of amphibian abundance.**

| Year          | Tailed Frog | Chorus Frog | Long Toed Salamander | Cascades Frog | Totals |
|---------------|-------------|-------------|----------------------|---------------|--------|
| 1992          | 31          | 0           | 0                    | 3             | 34     |
| 1993          | 31          | 0           | 0                    | 7             | 38     |
| 1995          | 35          | 0           | 1                    | 8             | 44     |
| 1996          | 29          | 0           | 1                    | 1             | 31     |
| 1997          | 15          | 0           | 0                    | 1             | 16     |
| 1999          | 15          | 1           | 0                    | 1             | 17     |
| 2001          | 29          | 0           | 0                    | 6             | 35     |
| 2002          | 22          | 0           | 0                    | 2             | 24     |
| 2003          | 45          | 0           | 0                    | 9             | 54     |
| <b>Totals</b> | 185         | 1           | 2                    | 27            | 215    |

The data presented in the above table shows no upward or downward trends in the captures of amphibians within the study sites. This relationship is not statistically significant for either the total number of captures ( $r^2 = 0.412$ ,  $F = 1.020$ ,  $p = 0.359$ ), for the tailed frog captures ( $r^2 = 0.477$ ,  $F = 1.471$ ,  $p = 0.279$ ), or for Cascades frog captures ( $r^2 = 0.185$ ,  $F = 0.176$ ,  $p = 0.692$ ). Continued monitoring is needed and consideration of expanding the monitoring to include additional sites to increase statistical power.

## Recommendations

Use data from the riparian amphibian monitoring as a pilot study to determine the statistical power of determining trends in amphibian populations under the current study design. Make adjustments to the monitoring effort according to the results of this analysis.

Integrate the results of the riparian bird study into forest plan monitoring once they are available.

Monitoring Item-

## **Deer, Elk (Forest) and Mountain Goat (High Elevation and Talus) Habitat**

Elk, mule deer and mountain goats use portions of the Wenatchee National Forest as summer, winter and transitional range. The monitoring question is:

### **Is habitat capability increasing, decreasing or being maintained?**

Managing ungulate populations requires a high level of coordination with the Washington Department of Fish and Wildlife (WDFW). They are responsible for the monitoring of ungulate populations and the results of these efforts need to be incorporated into future Forest Plan monitoring reports. An interagency assessment of the habitat capability for the elk herds on the southern end of the Forest was initiated in 2000 and completed in 2002. This assessment established baseline information on habitat capability and resulted in a more accurate habitat effectiveness model than is currently available. Habitat effectiveness is evaluated on a project level basis and is important to meeting the habitat goals for these species. Most importantly, the elk habitat assessment identified information gaps that are important for the management of the elk herds and the ecosystems that they play key roles in. One result of the elk habitat assessment was the initiation of a 5-year cooperative study with the WDFW, Wenatchee National Forest and Wenatchee Forestry Sciences lab to test the habitat model and gather better information about the elk herd and their habitat use. A summary and citation of the elk habitat assessment is provided below. In addition, citations for the elk study proposals are provided and are available.

#### **Abstract:**

Elk play important roles in ecosystem processes in forest and range habitats in the eastern Cascade Mountains of Washington. Complex relationships exist between habitat quality, elk numbers, elk condition, and the integrity of habitats sensitive to grazing. We compiled spatial data and constructed two spatially explicit Bayesian Belief Network models to evaluate the influences of land management alternatives on elk habitat capability and the risk of grazing impacts to sensitive habitats for the Colockum and Yakima elk herds in central Washington State. The BBN models used a decision tree structure and relied on available data and expert opinion to estimate the influence of dry site vegetation treatments, road management, and domestic ungulate and elk grazing on indices of habitat capability and risks to sensitive habitats. Dry forest restoration treatments and domestic ungulate grazing had little influence on these indices except within a few subwatersheds. Road management had the greatest potential to increase elk habitat capability, while elk grazing had the greatest influence on sensitive habitats.

During the winter of 2000 and throughout the year of 2001, the Wenatchee National Forest cooperated with the WDFW and Chelan County PUD on a study of mule deer in Chelan County. Currently, mule deer winter range habitat effectiveness is evaluated using a modified version of an elk habitat effectiveness model. This model was found to do a poor job of predicting the occurrence of mule deer during the winter. Therefore, the Chelan Mule Deer Study presented an opportunity to develop a winter range habitat effectiveness model using local data collected during this telemetry study. The study was completed in 2003 and the results will be integrated into Forest Plan revision. This model

will help evaluate trends in habitat effectiveness over time. A citation for this report is as follows and it can be obtained from the Forest Headquarters office in Wenatchee.

Concern has been expressed about the populations of mountain goats on the Forest, and in response, a cooperative effort between the Forest Service and the WDFW was developed to gather baseline information about their populations. Results of initial mountain goat surveys are shown in the following table.

**Results of helicopter surveys for mountain goats in watersheds located on the Wenatchee National Forest. These are preliminary results and surveys will be expanded in 2001 and 2002.**

| Date    | No. Animals | Kids | Watershed/Location |
|---------|-------------|------|--------------------|
| 9/13/00 | 2           | 1    | Icicle             |
| 9/27/00 | 3           | 0    | Icicle             |
| 9/13/00 | 1           | 0    | Wenatchee          |
| 9/27/00 | 9           | 2    | Peshastin          |
| 7/26/01 | 22          | 6    | Kachess            |
| 7/26/01 | 40          | 13   | Blaze Ridge        |
| 8/14/01 | 46          | 14   | Bumping            |
| 8/14/01 | 18          | 3    | Naches Pass        |
| 9/29/01 | 13          | 0    | Lake Wenatchee     |
| 9/30/01 | 2           | 0    | Enchantments       |

## Recommendations

Coordinate with the WDFW to obtain population monitoring data that can be integrated into this report for deer, elk, and mountain goats.

Revise and refine the elk and deer habitat effectiveness models based on the results of the elk habitat assessment and mule deer study. Integrate these models through forest plan revision and use the models in project level evaluations. The results of the mule deer study show that the current habitat effectiveness model that is being used does a poor job of predicting where the best mule deer habitat is located.

## THREATENED AND ENDANGERED SPECIES

Monitoring Item-

### **Northern Spotted Owl (*Strix Occidentalis Caurina*)**

The goal is to recover to a viable spotted owl population. The monitoring questions are:

**What is the level of spotted owl productivity?**

**Is spotted owl habitat being maintained or restored?**

Most spotted owl sites were monitored by the National Council for Air and Stream Improvement (NACSI), the Pacific Northwest Research Lab (PNW) for research purposes, or by the Wenatchee National Forest in 2001. Due to this partnership, 11 years of monitoring information on owls is available. Funding for this long-term monitoring study will run out at the end of the 2002 fiscal year. Monitoring of spotted owls will continue through the Northwest Forest Plan monitoring program which includes the Cle Elum study area (Forsman et al. 2002). A new study with additional partners will be initiated in 2003 to explore the effects of dry site treatments on spotted owl and barred owl resource selection.

**A summary of northern spotted owl monitoring information.**

| <b>Fiscal Year</b> | <b>Total Activity Centers Monitored</b> | <b>Number of Young Fledged</b> | <b>Number of Young/Activity Center</b> |
|--------------------|---|--------------------------------|--|
| 1991               | 170                                     | 98                             | 0.6                                    |
| 1992               | 184                                     | 207                            | 1.1                                    |
| 1993               | 200                                     | 38                             | 0.2                                    |
| 1994               | 187                                     | 128                            | 0.7                                    |
| 1995               | 150                                     | 74                             | 0.5                                    |
| 1996               | 150                                     | 83                             | 0.6                                    |
| 1997               | NA                                      | NA                             | -                                      |
| 1998               | 141                                     | NA                             | -                                      |
| 1999               | 108                                     | 26                             | 0.2                                    |
| 2000*              | 139                                     | 57                             | 0.4                                    |
| 2001               | 198                                     | 59                             | 0.3                                    |
| 2002               | 263                                     | 45                             | 0.2                                    |
| 2003               | 127                                     | 39                             | 0.3                                    |

\*Does not include data from the Cle Elum Ranger District.

An assessment of the monitoring data available for the Wenatchee National Forest was completed to determine if trends (upward or downward) occurred in the productivity at monitored owl sites. Using a simple linear model, no significant statistical trend was detected at this time. However, Foresman et al. (2002) showed a decline in the number of occupied spotted owl territories on their general study area of approximately 60% since 1992. Whether this decline is due to harvest of non-federal lands within the study area, the invasion of the area by barred owls, short-term weather patterns, or all of the above, is unknown (Foresman et al. 2002). Very little harvest of forests has occurred on federal lands within the study area since 1989, so there is no reason to believe that harvest of federal forests is exacerbating the problem (Foresman et al. 2002).

An update to the environmental baseline for spotted owls on the Wenatchee National Forest was completed in 2002 (Halupka 2002). This assessment showed that about 4,812 acres of suitable spotted owl habitat have been consulted on for removal or downgrading between 1994 and 2002. In addition, wildfires removed about 10,000 acres of suitable spotted owl habitat during the same time period (Halupka 2002).

**Recommendations**

Monitoring should include tracking the changes in the availability of suitable spotted owl habitat over time. Baseline habitat conditions were established in the Wenatchee National Forest Late-successional

Reserve Assessment in 1997 (USFS 1997). This information was updated in 2002 and should be revisited in 2007 to track habitat trends.

Continue to monitor >50% of the known spotted owl sites on the Forest in order to track trends in the number of young/site over time.

Validate monitoring suitable spotted owl habitat and spotted owl productivity (young/site) to determine trends in the spotted owl population on the Forest.

Cooperate with the Wenatchee Forestry Sciences lab to monitor how dry site restoration projects are influencing resource selection by spotted and barred owls during 2004-2006.

**Monitoring Item-**

**Bald Eagle (*Haliaeetus Leucocephalus*) Threatened**

The goal is species recovery. The monitoring questions are:

**Are existing nest sites producing young as anticipated?**

**Are nest, roost and perch sites being maintained?**

The data indicate an increasing number of bald eagle nest sites and the number of young produced over the past ten years. In 1999 and 2000, the number of known young that were produced was lower than the past several years. The reasons for this are unknown but may be a function of inability to monitor the nest fate closely or weather conditions. Monitoring of productivity in 2003 showed substantial increase and returned to levels reports in 1998.

**Table showing a summary of the bald eagle monitoring information.**

| <b>Fiscal Year</b> | <b>Known Nest Sites</b> | <b>Known Young Produced</b> |
|--------------------|-------------------------|-----------------------------|
| 1989               | 1                       | 1                           |
| 1990               | 2                       | 2                           |
| 1991               | 2                       | 2                           |
| 1992               | 3                       | 2                           |
| 1993               | 4                       | 4                           |
| 1994               | 4                       | 6                           |
| 1995               | 4                       | 7                           |
| 1996               | 5                       | 3                           |
| 1997               | 5                       | 4                           |
| 1998               | 5                       | 5                           |
| 1999               | 4                       | 1                           |
| 2000*              | 4                       | 1                           |
| 2001               | 4                       | unknown                     |
| 2002               | 5                       | unknown                     |
| 2003               | 6                       | 5                           |

\*Does not include data from the Cle Elum Ranger District.

## Recommendation

Continue to monitor nests and document the number of young produced.

Monitoring Item-

### Peregrine Falcons (*Falco Pergrinus*)

The goal is species recovery. The monitoring question is:

**How many sites are occupied?**

**How many young are being produced?**

The Wenatchee National Forest has achieved and exceeded the recovery goal of one active nest site. Two new nest sites were discovered in 1999 near Leavenworth. All "good or better" rated cliffs for peregrine nests have been entered into a Geographic Information System (GIS) and are being used to make project assessments.

On August 25, 1999, a notice was published in the Federal Register (64 Federal Register 46542) removing the peregrine falcon from the federal endangered species list. This is due to the continued successful recovery of this species, including several efforts made on the Wenatchee National Forest. This means that it will no longer be necessary to complete consultation with the USFWS on projects that could affect peregrine falcons. However, peregrine falcon nest sites will continue to be protected and monitored.

#### A summary of the peregrine falcon monitoring information.

| Fiscal Year | Known Nest Sites | Young Produced |
|-------------|------------------|----------------|
| 1988        | 0                | 0              |
| 1989        | 0                | 0              |
| 1990        | 0                | 0              |
| 1991        | 0                | 0              |
| 1992        | 1                | 3              |
| 1993        | 1                | 2              |
| 1994        | 2                | 5              |
| 1995        | 2                | 5              |
| 1996        | 2-10             | 4              |
| 1997        | 2-10             | 7              |
| 1998        | 2-10             | 3              |
| 1999        | 5                | 9              |
| 2000        | 5                | 8              |
| 2001        | 6                | 10             |
| 2002        | 6                | 11             |
| 2003        | 5                | 2              |

The above table shows the increasing number of known nest sites and young produced on the Wenatchee National Forest. The continued increase in productivity of the peregrines on the Forest has contributed to their successful recovery.

**Recommendations**

Continue to monitor potential and active nest sites.

Prepare site management plans for known nest sites.

Implement and monitor measure to protect nest sites from sources of human disturbance.

Monitoring Item-

**Grizzly Bear (Ursus arctos)**

The goal is species recovery. The monitoring questions are:

**Are Guidelines for the North Cascade Grizzly Bear Recovery Area being implemented as they become established?**

**How many class 1 and 2 grizzly bear reports are made annually?**

The Grizzly Bear Recovery Plan was completed in 1997 (USFWS 1997) for the North Cascades Ecosystem. Interim Access Management Guidelines and a Sanitation Policy were developed and approved for "No Net Loss" of core areas in 1998. An initial Forest-wide assessment of the availability of core areas was completed in 1998 and the results are shown in the table below. An assessment of the quality of the core areas to meet the seasonal needs of grizzly bears and to develop desired future conditions for the Bear Management Units (BMUs) was completed in 2002. Three additional bear-resistant structures were purchased and installed at high priority sites on the Forest.

**A summary of the grizzly bear core area monitoring information.**

| Bear Management Unit | Total Acres in BMU | Early Season % Core Area | Late Season % Core Area |
|----------------------|--------------------|--------------------------|-------------------------|
| Chiwawa              | 152,726            | 60                       | 55                      |
| Cle Elum             | 196,319            | Na                       | 35                      |
| Icicle               | 134,878            | 81                       | 73                      |
| Lower Lake Chelan    | 205,822            | 63                       | 54                      |
| Lower Entiat         | 169,801            | 21                       | 21                      |
| Lower Wenatchee      | 225,784            | 40                       | 41                      |
| Peshastin            | 131,124            | 40                       | 41                      |
| Stehekin             | 107,289            | Na                       | Na                      |
| Upper Lake Chelan    | 239,430            | 80                       | 25                      |
| Upper Wenatchee      | 146,333            | 73                       | 47                      |
| Swauk                | 161,619            | Na                       | 62                      |

This information provides an overview of the availability of core areas within the Grizzly Bear Management Units across the Wenatchee National Forest. This information is appropriate to the broad scale assessment that was conducted, but needs to be validated and updated at the project scale. The core areas available within BMUs have been updated for some areas and may not be reflected in this table.

**A summary of the grizzly bear sighting information.**

| <b>Year</b> | <b>Class 1 Observations</b> | <b>Class 2 Observations</b> | <b>Total Observations</b> |
|-------------|-----------------------------|-----------------------------|---------------------------|
| 1989        | 1                           | 3                           | 4                         |
| 1990        | 0                           | 9                           | 9                         |
| 1991        | 3                           | 3                           | 6                         |
| 1992        | 0                           | 0                           | 0                         |
| 1993        | 0                           | 0                           | 0                         |
| 1994        | 0                           | 0                           | 0                         |
| 1995        | 0                           | 0                           | 0                         |
| 1996        | 0                           | 1                           | 1                         |
| 1997        | 0                           | 1                           | 1                         |
| 1998        | 0                           | 0                           | 0                         |
| 1999        | 0                           | 0                           | 0                         |
| 2000        | 0                           | 0                           | 0                         |
| 2001        | 0                           | 0                           | 0                         |
| 2002        | 0                           | 0                           | 0                         |
| 2003        | 0                           | 0                           | 0                         |

**Recommendations**

Continue to update the core area GIS layer as projects are implemented and better information becomes available.

Continue to implement the Sanitation Policy by making human garbage inaccessible to bears in our campgrounds and recreation sites.

Continue to report and follow up on grizzly bear observations in order to gather sufficient information to determine the validity of the report.

Monitoring Item-

**Gray Wolf (Canis Lupus) Endangered**

The goal is species recovery. The monitoring questions are:

**How are forest roads affecting habitat?**

**How many reports of gray wolves occurred per year?**

Gray wolves (*Canis lupus*) historically occurred throughout the North Cascades. However, extensive predator control efforts and human expansion during the early to mid 1900's greatly reduced their numbers. Recently, gray wolves have been observed at a few locations within the North Cascades, including areas on the Wenatchee National Forest. These reports indicate that gray wolves may be recolonizing the Cascades from source populations in southern British Columbia. Presently no recovery plan or conservation strategy has been implemented for gray wolves in Washington. In 2002 a total of 19 projects were consulted on to determine their potential effects on gray wolves.

**A summary of the gray wolf sightings information.**

| Year | Number of Confirmed and Unconfirmed Gray Wolf Reports | Number Confirmed to be Gray Wolf |
|------|---|----------------------------------|
| 1990 | 2   | 1                                |
| 1991 | 24  | 1                                |
| 1992 | 3   | 1                                |
| 1993 | 0   | 0                                |
| 1994 | 0   | 0                                |
| 1995 | 0   | 0                                |
| 1996 | 0   | 0                                |
| 1997 | 2   | 0                                |
| 1998 | 3   | 0                                |
| 1999 | 1   | 0                                |
| 2000 | 1   | 0                                |
| 2001 | 5   | 0                                |
| 2002 | 1   | 0                                |
| 2003 | 2   | 0                                |

In the early 1990s considerable interagency efforts were made to investigate wolf reports to determine their validity. In 1993 these efforts were greatly reduced as a result of limited funding. Because of this, fewer reports have been made and no reports have been verified for several years. This has made it very difficult to track the number and distribution of gray wolf reports over time.

**Recommendations**

Track road densities in GIS to monitor habitat effectiveness for wolves.

Cooperate on the development of a recovery plan or conservation strategy for the North Cascades.

Continue to follow up and evaluate wolf reports and track these in a database.

**Monitoring Item-**

**Canada Lynx (*Lynx Canadensis*) – Threatened**

In 2000 the Canada lynx was listed as a Threatened species under the federal Endangered Species Act. Conservation of lynx is guided by the Canada Lynx Conservation Assessment and Strategy until a recovery plan is completed. Prior to the listing of lynx, surveys were initiated to determine the extent of lynx range in Washington and Oregon, as part of the National Lynx Survey. Several of the survey

stations were located on the Wenatchee National Forest. The results of these surveys are shown in the following table.

**Results of the 1999 -2001 lynx surveys conducted on the Wenatchee National Forest using hair snagging and DNA analysis.**

| Year | Total Hits | Bobcat | Cougar | Lynx | Other | Poor DNA |
|------|------------|--------|--------|------|-------|----------|
| 1999 | 22         | 7      | 1      | 0    | 6     | 8        |
| 2000 |            |        |        | 0    |       |          |
| 2001 | 31         | 8      | 0      | 0    | 8     | 12       |

\*Poor DNA means that analysis could not be completed.

**Recommendations**

Continue to monitor projects within the range of the species.

**Monitoring Item-**

**Survey and Manage Species**

Survey and Manage species were identified in the Northwest Forest Plan as species whose ranges are limited in extent and/or which we have little information about. On the Wenatchee National Forest these species include 7 mollusks, 2 amphibians, and the lynx. The management strategy for the mollusk and amphibian species is to conduct surveys prior to ground disturbance activities. In 2002 a number of Chelan Mountain snail sites were documented on the Entiat Ranger District and an additional location on the Chelan Ranger District. No sites were found on the Leavenworth Ranger District despite extensive survey efforts.

**Known Survey and Manage Sites for Amphibians and Mollusks**

| Year                     | Number of Survey and Manage Amphibian Sites | Number of Survey and Manage Mollusk Sites |
|--------------------------|---|---|
| 1997                     | 0   | 2   |
| 1998                     | 3   | 20  |
| 1999                     | 1   | 74  |
| 2000                     | 0   | 3*  |
| 2001                     | 1   | 3   |
| 2002                     | 0   | 5   |
| 2003                     | 1   | 0   |
| <b>Total Known Sites</b> | 4   | 78*                                       |

\*This number has been revised from last year to reflect clarifications in the taxonomy of the Chelan Mountain Snail. Site previously considered Chelan Mountain Snail on the Leavenworth Ranger District were determined to be another snail species that is not a survey and manage species.

## **Recommendations**

Continue surveys of projects for survey and manage mollusk species.

Focus surveys of the Chelan Mountain snail to portions of the Entiat and Chelan Ranger Districts where extensive survey information shows they occur. Eliminate surveys on the Leavenworth Ranger District where extensive efforts over several years have not resulted in a single location of the Chelan Mountain Snail.

Monitoring the effectiveness of the mollusk management protocols where they occur in the Dry Forests.

## **WATERSHEDS and AQUATIC HABITATS**

Monitoring Item-

### **Status of Management Indicator Species**

#### **Are viable populations of Management Indicator Species (MIS) being maintained?**

Aquatic Management Indicator Species on the Wenatchee National Forest include spring and summer Chinook salmon, sockeye salmon, steelhead, bull trout and west slope cutthroat trout. Spring Chinook salmon within the Upper Columbia (Wenatchee and Entiat subbasins) on the Forest are considered to be part of the upper Columbia Evolutionary Significant Unit (ESU) and are listed as Endangered under the Endangered Species Act (ESA). Spring Chinook salmon within the Upper Yakima and Naches subbasins (Naches and Cle Elum Ranger Districts) are in the Mid Columbia ESU and are not listed for protection under the Endangered Species Act. Summer Chinook salmon are not found within the boundaries of the Naches and Cle Elum Ranger Districts. Summer Chinook within the Entiat and Wenatchee subbasins (Entiat, Lake Wenatchee and Leavenworth Ranger Districts) are considered to part of a larger population that includes fish spawning in the Columbia River and tributaries, excluding the Yakima River, and are not protected under the Endangered Species Act.

As with spring Chinook, steelhead that occur on the Forest are included within two different ESUs; the Upper Columbia (Entiat, Lake Wenatchee and Leavenworth Ranger Districts) and Mid Columbia (Naches and Cle Elum Ranger Districts). Upper Columbia steelhead are listed as Endangered, while Mid-Columbia steelhead are listed as a Threatened species. There are no anadromous fish native to the Chelan Ranger District although Chinook salmon have been introduced into Lake Chelan as a sport fish.

The Wenatchee River and Lake Wenatchee supports one of only two viable sockeye populations in the Columbia River. The other sockeye population utilizes the Okanogan River and Lake Osoyoos.

Bull trout are found within all subbasins on the Forest although the species appears to be extirpated in Lake Chelan (Chelan Ranger District).

Westslope cutthroat trout are native cutthroat trout in the mid and upper Columbia. They are a Forest Service sensitive species.

Anadromous fish populations are monitored by the Chelan County PUD and U.S. Fish and Wildlife Service in the Upper Columbia. Results of the final spring and summer Chinook and sockeye in the Wenatchee are not available at this time. Chinook salmon surveys in the Entiat River are available from the U.S. Fish and Wildlife Service, Mid-Columbia Fishery Resource Office in Leavenworth, WA (see spring and summer Chinook Salmon Spawning Ground Surveys on the Entiat River, 2003 by Hamstreet and Carie).

Anadromous fish returns are monitored by the Yakama Nation in the Yakima River. Results are available at the Yakima-Klickitat project website, [www.ykfp.org](http://www.ykfp.org).

The Forest cooperates with the Washington Department of Fish and Wildlife (WDFW) and the U.S. Fish and Wildlife Service (USFWS) to conduct bull trout spawning surveys across the Forest and assists with steelhead surveys in the Entiat and Naches subbasins. Results of the bull trout surveys and Forest Service steelhead surveys will be reported here.

## Steelhead

**Entiat subbasin:** The following information is obtained from 2003 Spring Spawning Surveys for Rainbow/Steelhead Trout, Entiat Ranger District by Phil Archibald. This report is available from the Entiat Ranger District Forest Service Fishery Biologists Phil Archibald and Emily Johnson conducted the 2003 spring spawning surveys on the lower Mad River (RM 1-7) and Roaring Creek (RM 1-2), Biologists from the USFWS Mid-Columbia Fisheries Resource Office (FRO) initiated more extensive spawning ground surveys of the Entiat River this year. Data collected included date, time, weather conditions, water temperature, fish observed, redd identification by type (definite, probable, possible), and other relevant observations such as redd dimensions and water velocities. All redd and fish dimensions were estimated, as were surface water velocities over redds. Redds were enumerated sequentially for each stream in the order encountered.

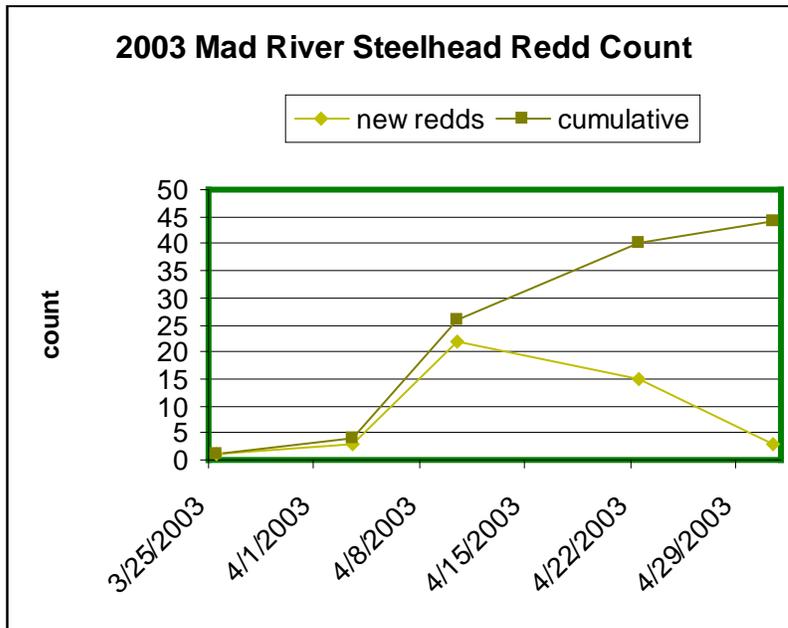
A total of 44 steelhead redds were identified in the Mad River between rivermiles (RM)1 and 7.2, consisting of 38 definite redds (30 percent with spawners present) and 6 probable redds. Twelve adult steelhead (16 to 28 inches estimated total length), were observed on or near redds in the Mad River. Two rainbow/steelhead redds and one 20-inch adult steelhead were observed in Roaring Creek at approximately RM 1.5 on April 10.

### Steelhead/Rainbow trout redd counts on the Mad River, 1997 through 2003.

| Year           | 1997              | 1998      | 1999   | 2000    | 2001    | 2002   | 2003   |
|----------------|-------------------|-----------|--------|---------|---------|--------|--------|
| Definite Redds | 8                 |           | 0      | 3       | 15      | 14     | 38     |
| Probable Redds | Not distinguished |           | 3      | 5       | 2       | 3      | 6      |
| RM surveyed    | 1 to 3            | No survey | 1 to 4 | 1 to 10 | 1 to 10 | 1 to 7 | 1 to 7 |

The results of our spawning ground surveys likely represent the majority of steelhead spawning in the Mad River. The definite redds observed at Mad River mile 1.3 and RMs 5.1-7.2 were at locations where steelhead redds have been seen in previous years. The 2003 red count represents a 159 percent increase over the 2002 redd count. This is likely due in part to the increased ocean survival that has been evidenced by escapement increases of all Mid-Columbia River anadromous fish over the last several years and increased effort (in time and space) of spawning ground surveys on the Mad River which have benefited from the knowledge gained since 1997. Spawning peaked during the expected time period, early April, in the Mad River.

**Mad River steelhead redd chronology, 2003**



For the years 2000-2002, ground-survey redd location were compared to the telemetry detected locations of radio-tagged steelhead in the Entiat and Mad Rivers reported by English et al. (2001). The 2000-2002 ground surveys documented steelhead redds at all of the stationary (>1 month) detection locations during the observed spawning period each year (early-March through late-April) except for the Entiat River near the Crum Canyon site, which has not been surveyed.

**Naches Subbasin:** The Forest has been working with the Washington State Department of Fish and Wildlife (WDFW) to obtain a better idea where steelhead may be spawning in small tributaries to the Naches River.

Personnel from the Naches Ranger District surveyed Nile Creek, a tributary to the Naches River on May 2 and May 20. The May 2 survey was a spot survey conducted while personnel were on other business. One large redd, presumed to be a steelhead was observed approximately 0.3 miles up from the 1611 crossing of the North Fork Nile.

About three miles of Nile Creek, from the National Forest boundary to the F.S. Road #1611 culvert were surveyed on May 20. A total of 16 redds were observed, seven of which were presumed to be

steelhead redds and nine were thought to be rainbow trout redds. Steelhead use of Nile Creek was suspected but now has been confirmed.

Personnel from WDFW surveyed about 3.5 miles of Oak Creek, a small Tieton River tributary starting at Highway 12. Two adult steelhead and some smaller fish, presumably rainbow trout, were observed near a redd. More surveys are needed on Oak Creek to better determine steelhead use.

## **Bull Trout**

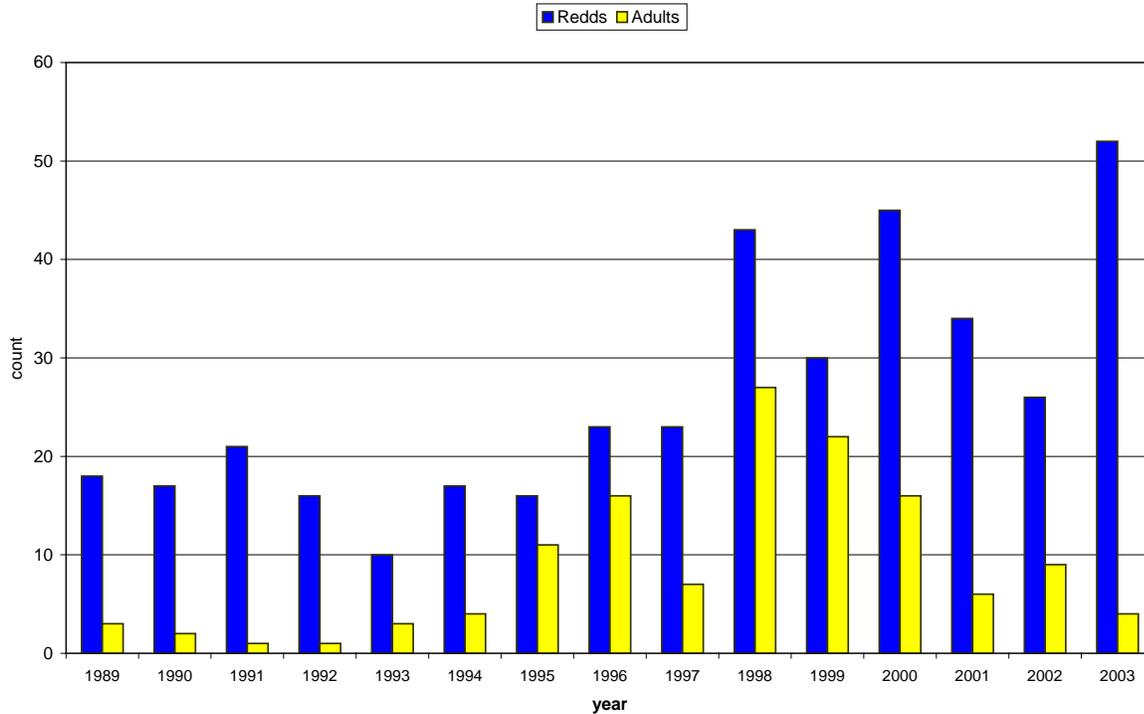
**Entiat Subbasin:** The Forest has been cooperating with WDFW to conduct bull trout spawning surveys in the Entiat River since 1989. The Mad River is the primary spawning and rearing stream in the Entiat subbasin. The following information is taken from, 2003 Bull Trout Spawning Survey of Mad River (WDFW Index Reach from Young Creek to Jimmy Creek) by Phil Archibald and Emily Johnson. The full report is available at the Entiat Ranger District.

Bull Trout migrate into, spawn and rear in the mainstem Mad River and have been observed in lower Cougar Creek, in lower Tillicum Creek and lower Young Creek. Natural barriers exclude fish from the remaining Mad River tributaries (Windy Creek, Miners Creek, Berg Creek, Billy Creek, Alma Creek, Wilma Creek and numerous unnamed tributaries). Bull trout are also known to spawn and rear in the Entiat River up to Entiat Falls (RM 34). However, the Mad River holds the largest known spawning population in the Entiat System.

Bull trout spawning surveys (redd counts) have been conducted by WDFW and the Forest fisheries specialists in the Mad River, from Young Creek to Jimmy Creek, in the fall of each year since 1989. Incidental sightings of bull trout redds within the Entiat River have been documented (1 redd at RM 27 USFWS-FRO 1999, at RM 18 and 19 USFWS-FRO 1996 and just below Entiat Falls at RM 33 USFS 1993 to 2003), however a full survey has not been completed on the Entiat River. In 2002, a short survey from the USGS gaging station below Entiat Falls to Entiat Falls (0.25 miles) was conducted by Forest Service personnel. This section was surveyed again in 2003. A total of 57 redds (52 in the Mad River and 5 in the Entiat River) were counted in 2003, which is the highest number of redds since surveying began in 1989. The increase in redd counts is primarily attributed to the bull trout angling closure instituted in 1992 and the total angling closure of the Mad River from the mouth to Jimmy Creek instituted in 1995 by Washington Department of Fish and Wildlife.

A total of 52 bull trout redds (consisting of 46 definite redds and 6 probable redds) and 4 adult bull trout were identified in segment 1 of the Mad River. All of the adult fish were observed on or near redd sites below the Alma Creek log jam. No redds, possible redds or bull trout were observed upstream from the Alma Creek log jam. However, in previous years (1999-2002), small bull trout (approximately 6-8 inches length) have been observed in the second segment of the index reach during spawning surveys.

### Bull Trout Redds and Adults Mad River Index Reach 1989-2003



In 2003, 5 bull trout redds and 5 adult bull trout were observed between Entiat Falls and the Gaging Station 0.25 miles downstream during a bull trout survey conducted by Forest Service fisheries personnel. Spawning activity was first observed at the gaging station site on September 19th and a preliminary survey from the gaging station to Entiat Falls was conducted September 23, 2003. A final survey of this reach was conducted September 30, 2003. This reach was surveyed in 2002 and 7 bull trout redds were documented.

This year's spawning survey results indicate that recovery of the bull trout population in the Mad River is occurring under the current environmental conditions and fishing regulations. Video counts of bull trout migrating through the adult fish ladders at Rocky Reach Dam and Rock Island Dam also provide evidence of recovery in bull trout populations in the mainstem Columbia River nearby. Additional future annual data are needed to further monitor the species and confirm the apparent upward trend of this population in the Mad River. The results from the 2003 survey (52 redds) showed a 46 percent increase over the fifteen-year average number of redds (24.2 redds per year).

**Wenatchee Subbasin:** The following information was obtained from a report prepared by: Cindy Raekes, Fisheries Technician, USFS Lake Wenatchee – Leavenworth RD, Judy DeLaVergne, Fish and Wildlife Biologist, USFWS Central WA Field Office, Barbara Kelly-Ringel, Fish Biologist, USFWS Mid Columbia FRO and titled *Bull Trout Monitoring Results 2003*.

The Wenatchee National Forest, in cooperation with the U.S. Fish and Wildlife Service (USFWS), has been monitoring bull trout spawning on index streams throughout the Forest since 1989. The Lake Wenatchee Ranger District has been responsible for monitoring bull trout spawning on three Chiwawa

River index streams since 1992 (Chikamin Creek, Rock Creek, and Phelps Creek); in recent years the redd surveys have expanded to non-index reaches of stream throughout the Wenatchee subbasin where bull trout spawning is known or suspected to occur. The 2003 surveys will contribute to the long term monitoring efforts and are expected to reveal trends in current bull trout populations and their status in the Wenatchee subbasin.

**Chikamin Creek (index reach):** A total of 18 redds were counted during the survey effort. This year's total is 55% below the 15-year average of 40 redds. Few fish were observed during the surveys and none were observed actively spawning.

**Numbers of redds and bull trout observed by reach and by survey date in Chikamin Creek, 2003**

Redds equally were

|                | Survey Date | Water Temp (°F) | Redd Count        | Total Redds | Bull Trout Observed |
|----------------|-------------|-----------------|-------------------|-------------|---------------------|
| <b>Reach 1</b> | Sept. 23    | no measure      | 4 def.            | 4           | 2 live, 1 dead      |
|                | Oct. 7      | no measure      | 9 def.<br>1 prob. | 10          | 0                   |
| <b>Reach 2</b> | Sept. 23    | no measure      | 3 def.<br>1 prob. | 4           | 1                   |
|                | Oct. 7      | 48°F            | 6 def.<br>2 prob. | 8           | 0                   |
| <b>Total</b>   |             |                 |                   | <b>18</b>   | <b>4</b>            |

distributed throughout the two survey reaches, unlike upper reach spawning preferences observed since 1995. In 1995, we began distinguishing between upper and lower Chikamin. For the period 1995 to 2003, upper reach spawning preferences have been recorded for seven of the nine survey years (in 1995 and 1998 more redds were recorded in lower Chikamin however, only a difference of eleven and nine redds, respectively). This upper reach spawning trend has resulted in speculation that bull trout may prefer spawning in upper Chikamin for two reasons; competition from eastern brook trout populations in lower Chikamin and Minnow Creek, and suitable spawning substrates are more abundant in upper Chikamin.

On the surface, Chikamin Creek appears to have higher quality habitat (deep pools with abundant instream large wood) than the other Chiwawa index streams (Rock and Phelps); yet subtle geologic and geomorphic differences between the Chiwawa River index streams may explain the smaller bull trout population spawning in Chikamin Creek. Chikamin Creek does not lie in the Wenatchee Highlands subsection, as do the other Wenatchee basin index reaches; rather it lies in the Cle Elum and Lake Wenatchee Mountains subsection. The most striking differences between these land types is the presence of sandstone outcrops (Chumstick formation), which has a higher degree of hill slope failures than those which occur in Rock and Phelps Creeks, resulting in a greater abundance of fine gravel and sand substrates in Chikamin Creek (particularly in Reach 1).

The Maple Creek Fire and suppression activities were located upstream of Chikamin Creek and did not appear to affect migration and spawning in Chikamin Creek based on previous redd counts.

**Rock Creek (index reach): Numbers of redds and bull trout observed by reach and by survey date in Rock Creek, 2003.**

|                | Survey Date | Water Temp. (°F) | Redd Count          | Total Redds | Bull Trout Observed |
|----------------|-------------|------------------|---------------------|-------------|---------------------|
| <b>Reach 1</b> | Sept. 17    | 43.7             | 16 def.<br>7 prob.  | 23          | 16                  |
|                | Sept. 29    | 48.3             | 37 def<br>17 prob.  | 54          | 5                   |
| <b>Reach 2</b> | Sept. 17    | 44.0             | 24 def.<br>19 prob. | 43          | 34                  |
|                | October 1   | 48.0             | 57 def<br>21 prob.  | 78          | 8                   |
| <b>Reach 3</b> | Sept. 17    | 43.0             | 37 def.<br>16 prob. | 53          | 29                  |
|                | Oct. 1      | 42.0             | 69 def.<br>29 prob. | 98          | 4                   |
| <b>Total</b>   |             |                  |                     | <b>230</b>  | <b>96</b>           |

A total of 230 redds were identified along index reaches 1-3 (RM 0.5 – 5.4). Year 2003 redd counts for the index reach are slightly higher than the 15-year monitoring average (222 redds). Personnel from the Central Washington Field Office (USFWS) conducted the surveys on Reach 1.

The Maple Fire, which was actively suppressed between the dates of September 5 and October 10, burned in the Chiwawa drainage upstream of Rock Creek. There were very few suppression activities centered near Rock Creek that would have directly affected bull trout migration and spawning however, spike camps for firefighters were located at two campgrounds adjacent to Rock Creek. Fire and associated suppression activities did not appear to have affected spawning and migration in Rock Creek. Even though the redd count dropped 18% from last year, this year’s count is well within the observed redd count fluctuations over the 15-year sampling period and the 15-year average.

Throughout the monitoring period, spawning activity in Rock Creek has been the greatest in the Chiwawa River and the Wenatchee River subbasin, representing a population stronghold for bull trout in the Wenatchee subbasin.

**Phelps Creek (index reach):** A total of 59 redds were counted over three field visits, representing the highest count for Phelps Creek over the 15 year monitoring period. This count represents a 49% increase over the 14-year average of 29 redds (1997 survey year not counted in the average due to an incomplete survey). Additionally, 10 bull trout redds were tallied from two surveys on a non-index reach of Phelps Creek; these redds were located in the segment of Phelps Creek from the 6200 road bridge down to the confluence with Chiwawa River. Four bull trout were observed on the first survey (9/22), while none were observed on the second survey (10/6). These redds are included in the totals for the Wenatchee Subbasin.

### Numbers of redds and bull trout observed by survey date in Phelps Creek, 2003

|                | Survey Date | Water Temp. (°F) | New Redds         | Total Redds | Bull Trout Observed |
|----------------|-------------|------------------|-------------------|-------------|---------------------|
| <b>Reach 1</b> | Sept. 18    | 46°              | 21 def<br>16 prob | 37          | 27                  |
|                | Sept. 29    | 48°              | 37 def<br>20 prob | 57          | 9                   |
|                | Oct. 14     | 43°              | 41 def<br>18 prob | 59          | 2                   |
| <b>Total</b>   |             |                  |                   | <b>59</b>   | <b>38</b>           |

The Maple Fire and associated suppression activities were located approximately three river miles downstream from Phelps Creek. Suppression activities did not appear to have direct effects on migrating bull trout based on the record redd counts in Phelps and the upper Chiwawa.

The fairly consistent redd counts in Phelps Creek may be partially attributable to the nature of the substrate and to the seemingly restricted location of potential spawning gravels along stream margins where they may be more protected from scour, thus consistently present and available from one year to the next.

**Upper Chiwawa (non-index reach):** This reach begins at the confluence of Phelps Creek (RM 30.2) and continues 3.2 miles up the mainstem Chiwawa to the passage barrier approximately ¼ mile upstream of Buck Creek. USFS and USFWS crews have surveyed this segment since 2000. In 2003, two complete surveys were conducted. The redd tally this year represents an 18% increase over last year's count and is the highest redd count in the 4-year survey period.

### Numbers of redds and bull trout observed by survey date in Upper Chiwawa River, 2003.

|                | Survey Date | Water Temp. (°F) | Redd Count           | Total Redds | Bull Trout Observed |
|----------------|-------------|------------------|----------------------|-------------|---------------------|
| <b>Reach 1</b> | Sept. 22    | 49°              | 53 def.<br>20 prob.  | 73          | 41                  |
|                | Oct. 7      | 48°F             | 85 def.<br>19 prob.. | 104         | 6 live, 1 dead      |
| <b>Total</b>   |             |                  |                      | <b>104</b>  | <b>48</b>           |

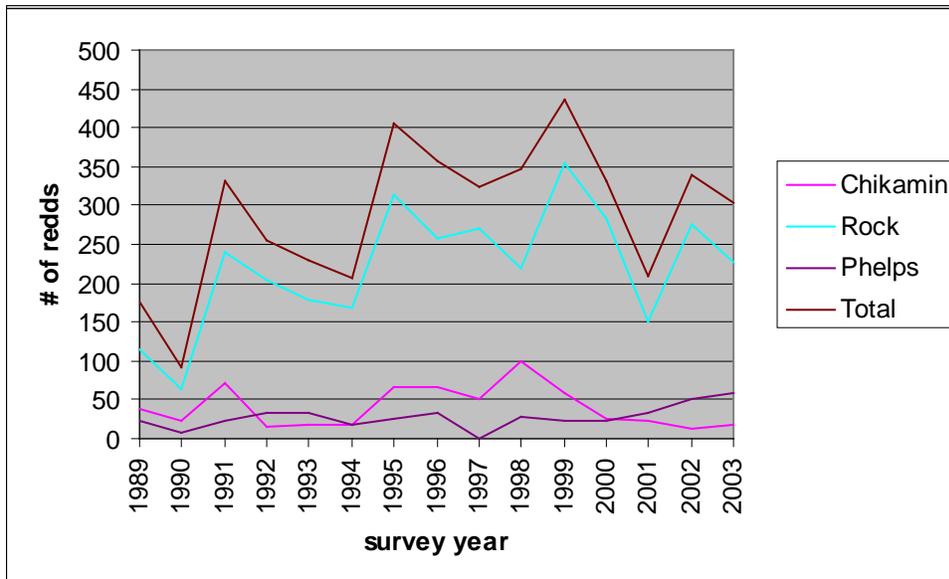
Both forks of Buck Creek up to barrier falls (approximately 100 feet upstream of mouth on both forks) were surveyed and tallied a total of three redds. These are included in the Wenatchee subbasin totals. Note: there is a reporting difference in the location of the barrier falls on Buck Creek between this report and the Bull Trout Draft Recovery Plan, which states "Buck Creek from its mouth on the Chiwawa River upstream 0.4 miles to a barrier falls provide essential spawning and rearing habitat for the Chiwawa River local population." The Maple Fire and suppression activities do not appear to have

had a direct effect on bull trout migration into the upper watershed for spawning based on the record high redd counts in Phelps Creek and upper Chiwawa this year

**Summary of bull trout redds on Chiwawa watershed index streams.**

| Stream         | 89  | 90 | 91  | 92  | 93  | 94  | 95  | 96  | 97  | 98  | 99  | 00  | 01  | 02  | 03  |
|----------------|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Chikamin Creek | 39  | 22 | 71  | 16  | 19  | 19  | 66  | 67  | 52  | 99  | 59  | 25  | 24  | 12  | 18  |
| Rock Creek     | 114 | 64 | 239 | 205 | 179 | 169 | 313 | 258 | 271 | 220 | 355 | 284 | 151 | 276 | 227 |
| Phelps Creek   | 23  | 7  | 22  | 34  | 32  | 19  | 26  | 33  | 1*  | 28  | 22  | 22  | 33  | 52  | 59  |
| Total          | 176 | 93 | 332 | 255 | 230 | 207 | 405 | 358 | 324 | 347 | 436 | 331 | 208 | 340 | 304 |

**Redd summary for Chiwawa watershed index streams, 1989-2003.**



**White River Watershed**

Panther Creek (index stream): Panther Creek has been surveyed since 1983, and the index reach is from the mouth to a barrier falls at RM 0.7. In 2003, 16 definite, 2 probable, and 2 possible redds were counted for a total of 18 bull trout redds during three USFWS surveys between September 15 and October 14. Only two live bull trout were observed during the surveys. Water temperatures varied from 52.0superscriptF to 43.0oF (11.0oC to 6.0oC) on the survey dates.

**Numbers of redds and bull trout observed by survey date in Panther Creek, 2003**

|                | Survey Date  | Water Temp.   | New Redds  | Total Redds | Bull Trout Observed |
|----------------|--------------|---------------|--|-------------|---------------------|
| <b>Reach 1</b> | September 15 | 52°F (11.0°C) | 0 redds  | 0           | 0                   |
|                | September 29 | 47°F (8.5°C)  | 8 def.<br>1 prob.<br>2 poss.                     | 9           | 1                   |
|                | October 14   | 43°F (6.0°C)  | 8 def.<br>1 prob.                                | 9           | 1                   |
| <b>Total</b>   |              |               | <b>16 definite<br/>2 probable<br/>2 possible</b> | <b>18</b>   | <b>2</b>            |

\* Incomplete count due to high water/inaccessibility

The range for the 16 completed surveys since 1983 is 11 to 48 redds, mean 29, SD 11.6. The 2004 redd count is one of the four lowest counts (11, 11, 18, 18), and these four have occurred within the last 7 years. The trend in numbers of bull trout spawning in Panther Creek appears to be downward. It is a relatively small spawning reach, and counts have been highly fluctuating. Bull trout redd counts have been higher in the White River than in Panther Creek, and if they constitute one population, then the low counts may not be as much of a concern. However, a genetic survey of fish from Panther Creek and White River has not been completed to determine their relationship.

**Upper White – (non-index):** The White River has been surveyed since 1999. From 1999 to 2001 only Reach 1 was surveyed, from the confluence with Napeequa River to Panther Creek (RM 11.0 – 13.1). Since 2002, Reach 2 from Panther Creek to White River falls (RM 13.1-14.3) has also been surveyed. In 2003, the USFWS surveyed both reaches two times. Survey dates were from September 16 to October 14, and temperatures decreased during this period from 52.0oF to 44.5oF (11.0oC to 7.0oC). Thirty-four definite and 13 probable redds were counted for a total of 46 redds. Only 2 (4.3%) of these redds were in Reach 2. Previous redd counts in the White River have ranged from 10 to 88, mean 43, SD 28.7.

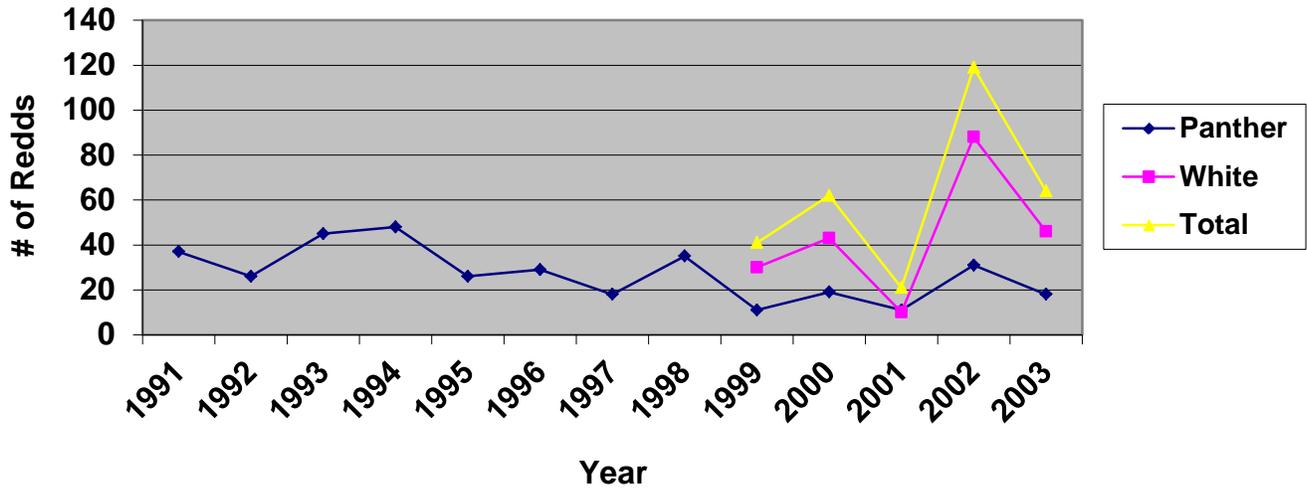
**Numbers of redds and bull trout observed by survey date in Upper White River, 2003.**

|                                  | Survey Date | Water Temp.  | New Redds                          | Total Redds | Bull Trout Observed      |
|----------------------------------|-------------|--------------|------------------------------------|-------------|--------------------------|
| <b>Reach 1</b><br>(RM 11.0-13.1) | Sept. 25    | 52 (11.0°C)  | 22 def.<br>10 prob.                | 32          | 0-#104 and #112 detected |
|                                  | Oct. 6      | 48 (9.0°C)   | 10 def.<br>2 prob.                 | 12          | 0                        |
| <b>Reach 2</b>                   | Sept. 16    | 52 (11.0°C)  | 1 def.                             | 1           | 0                        |
| (RM 13.1-14.3)                   | Oct. 14     | 44.5 (7.0°C) | 1 prob.                            | 1           | 0                        |
| <b>Total</b>                     |             |              | <b>33 definite<br/>13 probable</b> | <b>46</b>   | <b>0</b>                 |

The White River is an important bull trout spawning area. It is important to count redds in it and Panther Creek to monitor trends in the White River basin. However, there has been some difficulty in differentiating bull trout redds from the spring Chinook redds and sockeye salmon redds in the White

River. This decreases the confidence in the counts. Collecting additional information on redds such as substrate size and overall size of the redd can help in differentiating which species built them.

**Redd summary for Panther Creek and the White River, 1991-2003.**



**Little Wenatchee**

**Little Wenatchee River – Hidden Creek to Falls (non-index):** The Little Wenatchee River has been surveyed every year since 1999. The reach extends from the road at the Hidden Creek dispersed campsites at RM 6.3 up to the cascades falls at RM7.8. The number of redds observed has varied from 1 to 3 redds. This year’s surveys occurred on October 1 and 15, of 2003 and were conducted moving in an upstream direction. There were no bull trout redds observed over the survey period. There were 6 whitefish between 12 – 16” in size, one westslope cutthroat trout about 14.5”, and 1 dead sculpin about 3” observed while snorkeling the primary pools during the first survey. Spring Chinook spawning in this reach complicates the identification of bull trout redds. There were fewer Chinook redds observed in this reach compared to 2002. Bull trout have not been observed spawning in this reach nor have any bull trout been observed during the spawning surveys. These survey reaches are not accessible to spring Chinook salmon.

**Numbers of redds and bull trout observed by survey date in Little Wenatchee River, 2003**

| Survey Date | Water Temp. (°F) | Redd Count | Total Redds | Bull Trout Observed |
|-------------|------------------|------------|-------------|---------------------|
| October 1   | 45°F             | 0          | 0           | 0                   |
| October 15  | 48.2°F           | 0          | 0           | 0                   |
|             |                  |            | <b>0</b>    | <b>0</b>            |

**Nason Creek Watershed**

**Mill Creek (non-index):** Mill Creek has been surveyed every year since 1996. The reach surveyed extends from the mouth in Nason Creek to approximately RM 0.6 at a potential barrier falls. The

number of redds in Mill Creek has varied from 1 to 10 since 1996. This year's surveys occurred on September 15, and October 7 and 20 and were conducted in an upstream direction. Redds ranged in size from 5 x 5 ft. to 2 X 1.5ft. No adult bull trout were observed during the surveys. However, two weeks earlier, one large, approximately 24", radio tagged adult bull trout was seen upstream of the culverts, under a very large boulder, just upstream of the power lines. Water temperatures averaged 58.7 and air temperatures average 47 degrees Fahrenheit. The last survey was done during a very hard rainstorm on October 20, 2003 and water levels rose sharply during the survey.

**Numbers of redds and bull trout observed by survey date in Mill Creek, 2003.**

| Survey Date  | Water Temp. (°F) | Redd Count        | Total Redds | Bull Trout Observed |
|--------------|------------------|-------------------|-------------|---------------------|
| September 15 | 51.8°F           | 1 def.<br>1 prob. | 2           | 1                   |
| October 7    | 43.7°F           | 2 def.<br>1 prob. | 3           | 0                   |
| October 20   | 45.5°F           | 2 def.<br>1 prob. | 3           | 0                   |

**Upper Nason – from Mill Creek to Bygone Byways Interpretive Trail (non-index):**

Nason Creek has been surveyed every year since 1997. The survey extends from the mouth of Mill Creek at RM 20.5 to a barrier falls at RM 21.7. The number of redds in Nason Creek has varied from 0 to 6 since 1997. This year's surveys occurred on September 23, and October 8 and 20 and were conducted moving in an upstream direction. No bull trout or redds were observed. Water temperatures averaged 43.7 and air temperatures averaged 64.6 degrees Fahrenheit. On October 20, the last survey, water levels rose substantially due to the severe rainstorm and the survey was not fully completed because of limited visibility and safety concerns.

**Upper Wenatchee Watershed**

**Chiwaukum Creek (non-index):** USFS and USFWS crews have surveyed Chiwaukum Creek since 2001. The surveyed sections correspond with Reach 2 and Reach 3 of the 1993 Stream Survey (USFS). Reach 2 begins at the confluence with Skinny Creek (RM 0.6) and ends at the confluence with Foolhen Creek (RM 3.4). Reach 3 is from RM 3.4 to a bedrock cataract with several barrier falls located at approximate RM 6.3. In 2003, the USFWS surveyed Chiwaukum Creek on three dates. The September 23 survey started in Reach 2 near RM 2.9 and ended in just over 5 hours near RM 5.5. On September 30, the survey started near RM 5.0 and ended at the barrier falls at RM 6.3 and lasted a little more than 2 hours. On October 16, two people surveyed from RM 3.4 to RM 4.8. Temperatures during surveys varied from 49.0oF to 39.0oF (9.5oC to 4.0oC).

**Numbers of redds and bull trout observed by survey date in Chiwaukum Creek, 2003.**

|  | Survey Date  | Water Temp.  | New Redds  | Total Redds | Bull Trout Observed |
|--|--------------|--------------|--|-------------|---------------------|
| <b>Reach 2<br/>RM 2.9-3.4</b>              | September 23 | 49°F (9.5°C) | 0  | 0           | 0                   |
| <b>Reach 3,<br/>lower -<br/>RM 3.4-5.5</b> | September 23 | 49°F (9.5°C) | 19 def.<br>7 prob.                               | 26          | 12                  |
| <b>Reach 3,<br/>upper –<br/>RM 5.0-6.3</b> | September 30 | 48°F (9.0°C) | 14 def.<br>2 prob.<br>1 poss.                    | 16          | 4                   |
| <b>Reach 3,<br/>lower –<br/>RM 3.4-4.8</b> | October 16   | 39°F (4.0°C) | None visible                                     | 0           | 0                   |
| <b>Total</b>                               |              |              | <b>33 definite<br/>9 probable<br/>1 possible</b> | <b>42*</b>  | <b>16</b>           |

\* Should be considered an incomplete count.

**Numbers and sizes of bull trout observed in Chiwaukum Creek, 2003.**

|                            |           |           |           |           |
|----------------------------|-----------|-----------|-----------|-----------|
| Estimated length in inches | 15 – 17.9 | 18 – 20.9 | 21 – 23.9 | 24 – 26.9 |
| Number of bull trout       | 2         | 8         | 2         | 4         |

Three radio-tagged male bull trout migrated into Chiwaukum Creek in 2003. Two had been tagged in Icicle Creek (#105 in 2001 and #130 in 2002). Bull trout #132 was tagged at Tumwater Dam in 2003. Numbers 105 and 130 have been documented overwintering in the Wenatchee River downstream near Icicle Creek. Number 132 has been located during the winter of 2003/2004 in the Wenatchee River near the town of Dryden. If this fish moves in 2004 or we visually assess it, then it can be verified that it successfully overwintered.

The count of 42 redds was greater than counts the previous two years of 29 and 35 redds. However, all counts should be considered incomplete because the reach has not been completely surveyed after spawning was thought to be completed. It will be important in the future to get complete counts in this stream to determine current productivity and determine trends.

**Peshastin Watershed**

**Ingalls Creek (non-index):** Portions of Ingalls Creek have been surveyed by USFS crews since 2000. The portions surveyed have focused on Ingalls Creek beginning at the Ingalls Creek Trail (#1215) trailhead upstream to a migration barrier; the barrier is located about halfway between Falls Creek and Cascade Creek, in T23N, R16E, Section 25 (see the 2001 Survey Report for a map and complete description). The area of study is approximately seven river miles long and is only accessible by trail.

**Summary of redd counts on Ingalls Creek, 2003.**

|   | Survey Date | Water Temp. (°F) | Redd Count | Total Redds | Bull Trout Observed   |
|---|-------------|------------------|------------|-------------|-----------------------|
| Falls Creek upstream to barrier                             | Sept. 27    | no measure       | 4 prob.    | 4           | large school of 4-12" |
| Falls Creek downstream to intermittent trib. on north slope | Oct. 4      | no measure       | 1 prob.    | 1           | 0                     |
| Intermittent trib. downstream to trailhead                  | Oct. 11     | no measure       | 4 prob.    | 4           | 0                     |
| Total   |             |                  |            | <b>9</b>    | <b>~ 15</b>           |

In 2003, USFS and USFWS surveyors conducted one complete survey on the seven-mile reach; sections of Ingalls Creek were surveyed on separate dates (one survey per section) during the Crystal fire, which burned during the spawning period, to ensure protection of redds during suppression activities. Redd surveys identified a total of nine probable redds. The surveys began on September 27, beginning at the Falls Creek confluence and ending at the waterfall barrier. Subsequent surveys continued downstream as suppression and rehabilitation activities progressed down valley and concluded at the Ingalls Creek Trailhead. Nine redds were identified and flagged; two redds were located upstream of the Falls Creek horse camp. Two redds were located immediately downstream of the waterfall barrier. One redd was located in the vicinity of a campsite (Cowboy Camp) in Section 29, and four redds were located in Section 34, approximately two miles downstream of Cowboy Camp. Small bull trout (4-10 inches) were observed in a pool with large wood complexes between the two upper redd sites (upstream of Falls Creek). No bull trout were observed spawning.

Bull trout are known to be present throughout Ingalls Creek. Presently, it is believed that there is a non-migratory type in the upper reaches of Ingalls and a migratory type in the lower reaches, however, a physical feature (barrier) has not been identified that would segregate the migratory from the non-migratory type. More work is needed to determine if the fish observed in upper Ingalls are indeed a resident form and to determine to what extent (if any) migratory bull trout access Ingalls Creek.

### **Upper Yakima and Naches Subbasins**

The Washington Department of Fish and Wildlife has the lead for monitoring bull trout populations in the Naches and Upper Yakima subbasins (Naches and Cle Elum Ranger Districts). Forest service personnel assist with the surveys. The following table is provided by Eric Anderson, WDFW.

**Summary of bull trout spawning surveys (redd counts) in index areas of the Yakima sub-basin, 1984-2003 ((R=Resident, F=Fluvial, F/R=Fluvial/Resident, AD=adfluvial). WDFW Files, Yakima, WA.)**

|                             | 84        | 85        | 86        | 87        | 88        | 89        | 90         | 91         | 92         | 93         | 94         | 95         | 96         | 97         | 98         | 99         | 00         | 01         | 02         | 03         |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Yakima River (F)</b>     |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Keechelus to Easton Reach * |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            | 2          | 1          | 0          | 0          |
| <b>Ahtanum Creek (R)</b>    |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| N.F. Ahtanum Cr.            |           |           |           |           |           |           |            |            |            | 9          | 14         | 6          | 5          | 7          | 5          | 7          | 11         | 20         | 17         | 12         |
| (Shellneck Cr.)             |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| M.F. Ahtanum Cr. *          |           |           |           |           |           |           |            |            |            |            |            |            | 1          | 1          |            | 0          | 10         | 1          | 6          | 8          |
| S.F. Ahtanum Cr. *          |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            | 5          | 14         | 13         | 7          |
| <b>Naches River (F)</b>     |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Rattlesnake Cr. *           |           |           |           |           |           |           | 2          |            |            |            | 4          | 26         | 38         | 46         | 53         | 44         | 45         | 57         | 69         | 54         |
| (L.Wildcat Cr., Shell Cr.)  |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| American R.                 |           |           |           |           |           |           |            |            |            |            |            |            | 25         | 24         | 31         | 30         | 44         | 36         | 27         | 30         |
| (Union Cr., Kettle Cr.)     |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Crow Cr.                    |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            | 19         | 26         | 6          | 9          | 9          |
| <b>Rimrock Lake (AD)</b>    |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| S.F. Tieton R. *            |           |           |           |           |           |           | 32         |            |            | 38         | 167        | 95         | 233        | 177        | 142        | 161        | 144        | 158        | 141        | 190        |
| (Bear Cr.)                  |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Indian Cr. *                | 29        | 69        | 16        | 35        | 25        | 39        | 69         | 123        | 142        | 140        | 179        | 201        | 193        | 193        | 212        | 205        | 226        | 117        | 100        | 101        |
| <b>Bumping Lake (AD)</b>    |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Deep Cr. *                  |           |           |           |           |           | 17        | 15         | 84         | 78         | 45         | 12         | 101        | 46         | 126        | 98         | 107        | 147        | 51         | 120        | 57         |
| N.F. Teanaway River (F/R)   |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| NF Teanaway/DeRoux Cr. *    |           |           |           |           |           |           |            |            |            |            |            |            | 2          | 0          | 0          |            | 0          | 0          | 0          |            |
| <b>Kachess Lake (AD)</b>    |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Box Canyon Cr.              | 5         | 4         | 3         | 0         | 0         | 0         | 5          | 9          | 5          | 4          | 11         | 4          | 8          | 10         | 16         | 17         | 10         | 14         | 15         | 8          |
| Kachess R (upper) *         |           |           |           |           |           |           |            |            |            |            |            |            |            |            | 0          |            | 15         | 14         | 0          | 16         |
| <b>Keechelus Lake (AD)</b>  |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Gold Cr.                    | 2         | 2         | 21        | 15        | 12        | 3         | 11         | 16         | 14         | 11         | 16         | 13         | 51         | 31         | 36         | 40         | 19         | 15         | 31         | 9          |
| <b>Cle Elum Lake (AD)</b>   |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Cle Elum R. (upper) *       |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            | 0          | 0          | 0          | 0          |
| <b>Summary</b>              | <b>36</b> | <b>75</b> | <b>40</b> | <b>50</b> | <b>37</b> | <b>59</b> | <b>134</b> | <b>232</b> | <b>239</b> | <b>247</b> | <b>403</b> | <b>446</b> | <b>602</b> | <b>615</b> | <b>593</b> | <b>630</b> | <b>704</b> | <b>504</b> | <b>548</b> | <b>501</b> |

\* Incomplete survey; index area not fully defined or adequately monitored: Yakima R. 2000-2001, M.F. Ahtanum 1996-2001, S.F. Ahtanum 2000, Rattlesnake 1990-1995, S.F. Tieton 1990-1993, Indian 1984-1987, Deep 1989-1990, N.F. T Redds in small tribs (parenthesis) included in total stream count Teanaway 1996-2002, Kachess 1998, Cle Elum 2000-2001. Redds in small tribs (parenthesis) included in total stream count

The status of bull trout populations in the Yakima River system is a concern. The Rimrock Lake, Bumping Lake, Kachess Lake, Keechelus Lake and Cle Elum Lake populations are isolated above dams. Only the Rimrock Lake populations (Indian Creek and South Fork Tieton River) appear to be strong, however Indian Creek redd counts between 2001 and 2003 are about one-half the numbers observed between 1999 and 2000. The Bumping Lake population redd counts are variable, with 2001 and 2003 redd counts half that observed in 1997-2000 and in 2002. Bull trout populations in Kachess Lake and Keechelus Lake are small and access to spawning streams can be impeded by low flows due to reservoir drawdown. Low flows and blocked access due to drawdown is probably one reason for

low number of redds observed in Gold Creek. No good index area or concentrations of spawning fish have been observed in the Cle Elum River above Cle Elum Lake.

Redd counts in the Naches River tributaries of Rattlesnake Creek and American River have been fairly stable, but total numbers are low especially when compared to populations in the Wenatchee subbasin. Crow Creek is the one exception. Cle Elum and Teanaway River populations appear to be very low.

The US. Fish and Wildlife Service (see surveys for Bull Trout presence in the Upper Cle Elum River Basin by Steve Mallas, Mid-Columbia Fishery Resource Office in Leavenworth, WA) snorkel surveyed the Cle Elum River above Cle Elum Lake. Only 26 bull trout were observed in the project, and only two exceeded 8 inches. With the exception of the Rimrock Lake and possibly Bumping Lake population, bull trout population numbers in the Yakima appear depressed and at risk of extinction.

### **Fish Distribution Surveys**

The Forest conducts fish distribution surveys annually on selected streams to determine and monitor the distribution of aquatic species. In 2003, fish distribution surveys were completed on 39 miles of stream. Reports are not available for any of these surveys except for Agnes Creek (see below), but results have been entered into the Forest's fish distribution database.

The South Fork Agnes Creek was snorkel surveyed to in an attempt to determine if bull trout are present. Bull trout were historically present in the Lake Chelan system but the species appears to have been extirpated. The survey went from the confluence with Agnes Creek to one-quarter mile upstream from the confluence with Swamp Creek. The mouth of Swamp Creek was also surveyed. Only rainbow trout were observed during the survey. The Snorkel Survey of Agnes Creek, August 2003 is available at the Entiat Ranger District or at the Okanogan and Wenatchee National Forest Headquarters Office in Wenatchee, WA.

## **Recommendations for Wenatchee Subbasin**

### **Steelhead Recommendations**

**Entiat:** With respect to the 8/11/97 ESA endangered listing of upper Columbia River steelhead, more and better information on this species is needed for quality Biological Assessments. It is recommended that spring spawning surveys be continued. Based on the results and knowledge gained during the past five years of steelhead spawning surveys, it is recommended that an index reach on the Mad River between RM1 and 7 be established. This Mad River index reach will be our primary focus in the future. We will continue to seek assistance from WDFW and USFWS MCRFRO to expand survey areas (Entiat River) and increase survey frequency and continue implementation of a standardized survey protocol.

Initiate a spawning survey and redd identification refresher training with all agency personnel responsible for monitoring trends to ensure consistent observations and evaluations are maintained within and between subpopulations in the Columbia River DPS.

Coordinate redd identification training with Chelan County PUD staff in areas where spring Chinook redds and bull trout redds overlap, to reach consensus on how each agency observes and records redds.

Refine the survey methodology for the Ingalls Creek population, in order to determine the appropriate monitoring tool within cost constraints. The location and length of the Ingalls Creek survey challenges us with regards to our budget and time limits on our field season. Furthermore, we have gained very little information while conducting redd surveys in past years. As a potential alternative to redd surveys, we propose day and night snorkeling to gain a cursory understanding of distribution, relative densities, and life history (residual or migratory, based on fish sizes). Another possibility would be to arrange for some type of remote sensing equipment to be used at the diversion to see if migratory bull trout can negotiate the diversion.

Continue to survey Chiwaukum Creek, Reach 3 (Foolhen Creek to barrier at RM 6.3), do not recommend surveying lower Chiwaukum Creek.

Consider earlier and later surveys on Chikamin Creek in addition to investigation of the 0.5 mile segment of Chikamin Creek (from Marble Creek up to the beginning of the index reach), to determine if reduced spawning in Chikamin Creek is a result of timing and/or habitat conditions (the sandy substrate hypothesis) and to get a more accurate account for this stream.

Verify location of barrier(s) on Buck Creek.

Within the Nason Creek watershed, identify other potential spawning areas and further identify timing of spawning.

Develop a tracking database with data forms that will make data collection consistent and data searchable. (USFWS is developing a trial database for 2004).

Within the Little Wenatchee watershed, identify other potential spawning areas and further identify the timing of spawning (particularly further downstream in the mainstem Little Wenatchee River).

Future bull trout spawning surveys should record stream temperatures in degrees Celsius to be consistent with the available literature.

### **Recommendations for Upper Yakima and Naches Subbasins**

**Naches:** Continue to determine the extent of steelhead use in Naches River tributaries and extend efforts to the upper Yakima. Work with WDFW to better strategize how to best accomplish the task.

Continue surveys and attempt to better determine status of the populations in the Cle Elum, North Fork Teanaway and Yakima River above Easton Reservoir. Information about spawning and rearing areas will help determine where management action may be needed to protect the populations.

Continue to monitor for poaching and places where low flows may impede access to spawning areas. Particular areas of concern are Box Canyon Creek (Lake Kachees), Gold Creek (Lake Keechelus) American River near Union Creek.

Monitoring Item-

## **Riparian/Watershed Standard Implementation Monitoring**

The monitoring question is:

**Are Standards, Guidelines and Related Best Management Practices (BMPs) for fish habitat and riparian areas defined in the Forest Plan being applied in the design and execution to timber sales, watershed restoration, and other projects where fish/riparian standards are a concern?**

### **Respect the River Program**

**Cle Elum Ranger District:** Riparian and watershed implementation monitoring focused on the “Respect the River” program. The “Respect the River” program was developed to maintain and restore riparian habitat that is being impacted by recreation use. The program combines restoration with public education to improve riparian habitat while providing for recreation use. A monitoring protocol has been developed to both inventory recreation sites adjacent to streams and track changes in habitat condition over time.

The Cle Elum Ranger District has been surveying and restoring dispersed camping sites since 1998. In 2003, the program was expanded to include volunteer campsite stewards. The objective of the steward program is to instill in forest users a sense of stewardship for the land, and to have people on hand, in this case volunteers, to assist with monitoring restoration work. Ten people committed to the campsite steward program and participated in volunteer workdays.

**Lake Wenatchee and Leavenworth Ranger District:** “Respect the River” monitoring in 2003 consisted of completing dispersed recreation site inventory in the Chiwawa watershed. The Chelan County 4H Forestry Program was utilized over a two week period to complete surveys on three multi-site camping areas and two single dispersed sites in the lower Chiwawa. The inventories totaled 328,945 sq ft (7.5 acres) of impacted areas from camping and road access. Bank erosion and stability, water quality (human waste), and reduced riparian vegetation were the most often observed impacts. The 2003 surveys completed a 2-year partnership with the 4H Forestry program to inventory sites in the Chiwawa watershed, which directly contributed to the development of a restoration plan that includes campsite re-design (locate sites away from river), road closures, vehicle and site designation with gravel and barriers, and revegetation with native plants. In the process, the 4H participants received education in natural resource mapping, river-friendly camping practices, the value of riparian areas to aquatic habitats, and fish biology.

**Naches Ranger District:** Over 1,800 people were contacted and provided information regarding river friendly camping at dispersed recreation sites. Monitoring of sites resulted in removal of three tons of garbage from dispersed recreation sites, dismantling or breaching over 55 “play” dams and placed or maintained interpretative signs at over 30 campsites. Continued monitoring and maintenance is needed.

### **Soil Improvement**

The Leavenworth Ranger District monitored implementation of soil improvement work associated with the Flatfish Timber Sale. Flatfish Unit 1 was thinned during 2002 with tractor yarding over dry ground. The unit subsequently had slash and broadcast burning completed in 2003. Skid trails used for

implementation of the prescription were subsoiled with a winged subsoiler in the spring of 2003. Monitoring of the efficacy of the subsoiling operation was accomplished by measuring relative penetration depth of a stainless steel probe on semi-random transects across and perpendicular to skid trails. A total of 35 transects were sampled on ten skid trails. Each transect consisted of 12-13 samples spaced approximately one foot apart.

Twenty random samples of ground with no evidence of machine impact and twenty-two random samples of clearly impacted ground serve as comparisons for samples from treated sites. The average depth of penetration for the treated sites was approximately 11 inches, while the non-impacted average was approximately 19 inches, and the impacted average was two inches.

Of the ten trails sampled, none of the treated transects had depths of penetrations that were at or below the un-treated average depth of penetration. Conversely four of the ten transects had depths of penetration that were near or exceeded the average un-impacted depth of penetration. At the scale of all trails in the unit, it would appear that the subsoil is effective at decreasing compaction to levels below that of the untreated sites, and in some cases actually decreasing compaction to levels below even the un-impacted sites.

On the scale of the individual transect, all of the 33 treated transects showed penetration depths that were greater than the untreated sites. Two transects did not show much improvement and were near, but better than the average untreated sites. Nineteen of the thirty-three transects were markedly better than the untreated sites, but did not allow penetration to the depths of the un-impacted sites. Twelve of the thirty-three sites allowed penetration to depths near or greater than the unimpacted sites.

In general, there was minor to moderate mixing of the O and A soil horizons into the subsoil. Furrows were sometimes very large, but this was generally the result of catching boulders or larger woody debris in the tines. If vegetation was present prior to subsoiling, it was reduced following treatment but maintained. All of this is in marked contrast to traditional rock rippers, which typically show excessive mixing of subsoil and the O and A horizon, generally do not maintain any vegetation, and result in heavy furrowing.

Based on this monitoring, it appears that the winged subsoiler is effective at improving compacted sites, and placing them in a condition where vegetation can recover and water is free to infiltrate, rather than leaving the site as surface flow. Over the long term, this will help reduce erosion from impacted sites and provide for better water management.

#### **Monitoring Item-**

#### **Watershed/Aquatic Habitat Monitoring**

The monitoring question is:

**Are stream and habitat improvement projects meeting aquatic habitat objectives as stated in the Forest Plan, Policy Implementation Guide (PIG), and Salmon Summit ?**

## Sediment

The Wenatchee National Forest Land and Resource Management Plan states that spawning gravel will consist of no more than 20 percent fine sediment < 1.00 mm. Fine sediment is a natural component of streambeds, however, elevated levels of fines resulting from accelerated erosion can adversely affect salmonid spawning and rearing success. Fine sediment monitoring was completed on the Entiat, Leavenworth, Cle Elum and Naches Ranger Districts. Information from the Cle Elum monitoring is not available at this time.

**Entiat Ranger District:** The following information was obtained from 2003 Sediment Monitoring Report, Entiat River Mad River by Phil Archibald. The complete report is available at the Entiat Ranger District. This was the eleventh consecutive year of evaluation of fine sediment conditions by the McNeil core sampling method in the Entiat River (RM 0.5-34) and the tenth consecutive year for the lower Mad River. Four stream reaches are monitored in the Entiat River: Reach 1 - Stormy Creek to Preston Creek, Reach 2 - National Forest boundary to Fox Creek, Reach 3 - Box Canyon to Entiat Falls, and Reach 4 – RM 0.5 to Keystone. The one reach monitored in the Mad River is between RM 1.3 to Pine Flat Campground.

This year's results compare reasonably well to the eleven-year reach grand means in the Entiat and Mad Rivers. The 2003 mean percent fines for Entiat River Reach 1 was 13.37 percent compared to an eleven-year grand mean of 18.98 percent. The same comparison for Reach 2 was 11.94% versus 14.85%, Reach 3 was 6.58 versus 12.78, Reach 4 was 19.86 versus 16.92, and Mad River was 12.14% versus 16.93%. Three sampled reaches (1, 3, and Mad River) showed substantial decreases (range 28 to 45%) from last year. Reaches 2 and 4 showed a fine sediment increase of 5% and 3% respectively from 2002 to 2003. The 11-year trend for Reach 1 is unclear, but can be interpreted to be a long-term decrease. The 11-year trend for Reaches 2 and 3 appears to be a long-term decrease. The 11-year trend for Reach 4 appears to be a long-term increase. The 11-year trend for the Mad River is apparently stable within arrange of 12% to 19%.

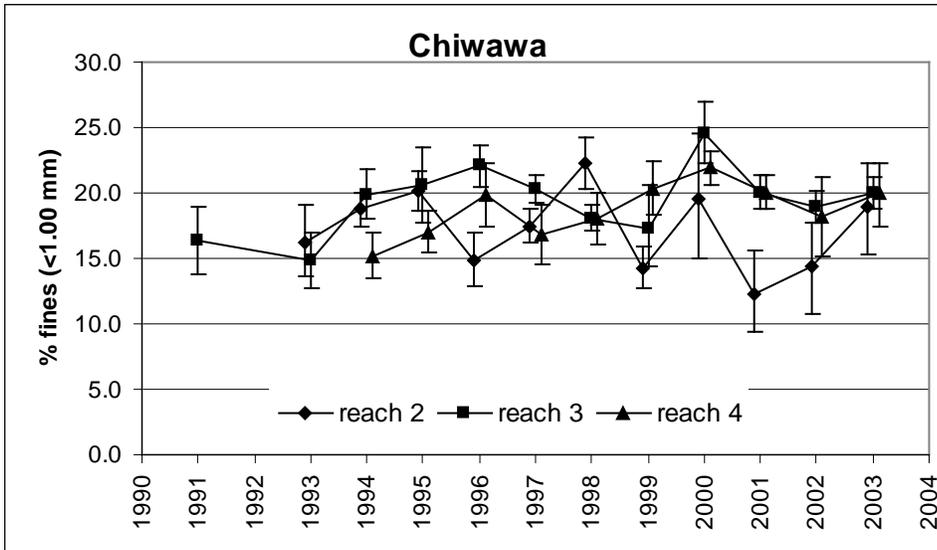
The eleven-year trends in fine sediment have been variable and may be explained by annual precipitation and runoff. Higher flows of longer duration tend to favor fine sediment transport rather than deposition.

**Lake Wenatchee and Leavenworth Ranger Districts:** McNeil core samples were collected from pool tail outs and riffles in the Chiwawa River, Chikamin Creek, Mission Creek, Devil's Gulch, and Sand Creek in order to determine the percent of the substrate comprised of fine sediment (< 1.00 mm in diameter). The following was obtained from 2003 Sediment Survey Report for the Chiwawa River, Chikamin Creek, Mission Creek, Devil's Gulch, and Sand Creek, available at the Leavenworth Ranger District or Okanogan and Wenatchee National Forest Headquarters Office.

**Chiwawa River:** Percent fines in all three reaches are close to, or have exceeded, the Forest Plan standard of 20% at some point in the last eight years. Percent fine sediment levels in 2003 increased in all sampled reaches from those collected in 2002. The phase shifted relationship between Reach 2 and 3 between 1995 and 1999 suggest flushing of fines from Reach 3 to Reach 2. According to the 1992 stream survey, Reach 3 is depositional section of the river characterized by a wide (>600 feet), U-shaped valley floor; and a low gradient (1%) meandering channel with numerous associated cut banks. The number of cut banks in Reach 3 (8) was greater than the numbers observed in Reaches 2 (4) and 4

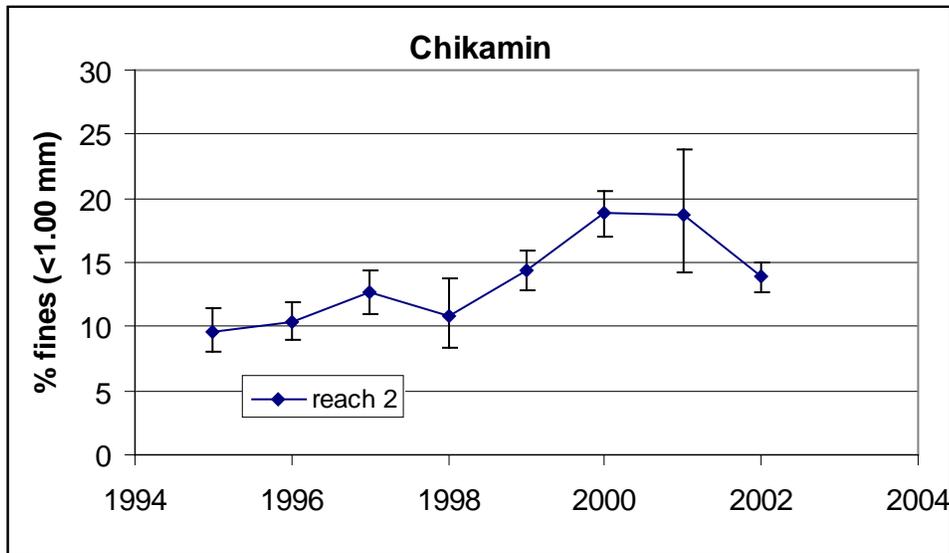
(4) in 1992. In 2003, the fine sediment levels in all reaches were barely below the Forest Plan standards. After the decrease in fine sediment found in 2001 and 2002, future activities in the watershed should continue to be carefully evaluated for the potential to increase the amount of fine sediment entering the river. The Maple Creek fire of 2003 may have an effect on fine sediment levels in the future.

**Fines (diameter <1.00 mm) in Reaches 2-4 of the Chiwawa River. Error bars represent 80% CI**



**Chikamin Creek:** Chikamin Creek was not sampled in 2003 due to access restrictions caused by the Maple Creek Fire. While in previous years the volume of fine sediment has been consistently low in Chikamin Creek (1995-1999), 2000 to 2002 highlights a significant increase in percent fines. A cause for the increase has not yet been identified, but verification of correct sampling site may lead to a causal factor. The volume of fine sediments has been consistently below the standard of 20% in Chikamin Creek for the 8 years sampled (1995-2002). Chinook juveniles rear and adults spawn in the confluence (with Chiwawa River) area and each 1 of Chikamin Creek. Non-resident bull trout spawn in Chikamin Creek. Increases in fine sediment could adversely affect these populations. Increased sediment delivery to Chikamin Creek also has the potential to affect the Chiwawa River, which it flows into. The data collected over the past 8 years provides a baseline against which to evaluate future effects of the Gold Ring mine, located in the headwaters of Chikamin Creek, or the effects of other management activities such as timber harvesting on Chikamin Flat (private land).

**Percent fines in Chikamin Creek, Reach 2 sediment samples between 1995 and 2001.**



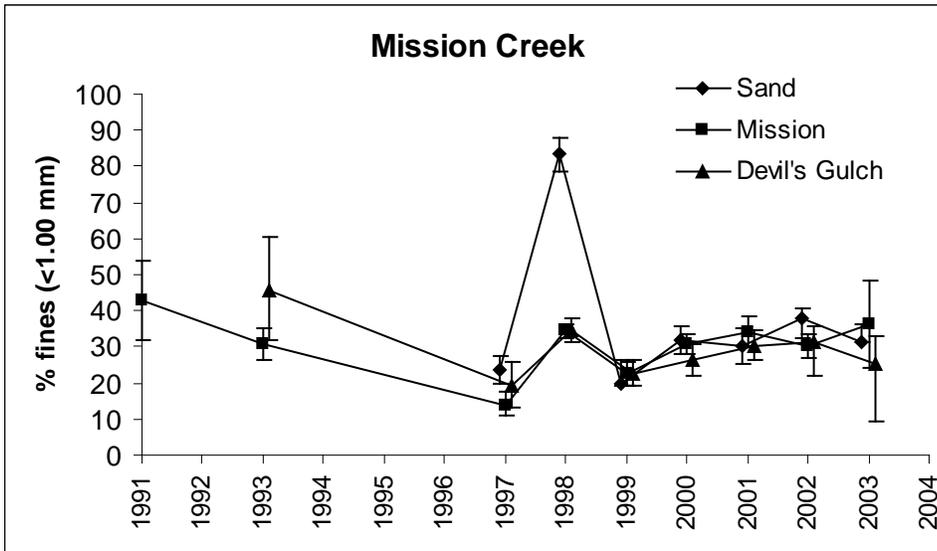
**Mission Creek, Devil’s Gulch, and Sand Creek:** Percent fines in Devil’s Gulch continued to decrease in 2003 from an overall increasing trend in percent fines from 1997 to 2001. Percent fines in Mission Creek showed an increase in 2003, but with a large error in the precision of the measurement. Whereas, percent fines in Sand Creek decreased in 2003. Levels of percent fines in all creeks within the Mission Creek watershed have been well above the Forest Plan standards since sampling began in 1997. Substantial increases of fine sediment in 1998 were likely due to a late spring (early July) erosional event in the Mission Creek watershed.

In 1998, Sand Creek greatly exceeded the Forest Plan standards for fine sediments, likely a result of a debris flow in this drainage (Little Camas tributary) in the spring of 1998. However, there was a marked decrease in percent fines during 1999, suggesting that the pulse of fines supplied by the erosional event has been flushed through the system. The 1998 peak was a concern because according to the 1993 Sand Creek Stream Survey Report, there is a small reproducing population of steelhead trout in this creek, in addition to rainbow and cutthroat trout. Steelhead trout were observed spawning in Reach 1, which is the reach the sediment samples were taken from. The 1993 report cites management activities such as timber harvesting and associated roads, all terrain vehicles and horse trails as adversely affecting fish habitat in this creek. All have the potential to increase fine sediment delivery to the stream and adversely affect fish habitat. However, the peak in 1998 shows that periodic erosional events not related to management can contribute significant sediment pulses to the system and in fact may overwhelm any signal from suspected chronic sources. Sand Creek is in the Mission Creek watershed, which is characterized by steep hill slopes and highly erosive sandstone. Periodic erosional events are probably normal for this system.

Levels of fines in Mission Creek and Devil’s Gulch also increased in 1998, likely a result of the July 1998 storm event in Devil’s Gulch. Observations indicated that a majority of the sediment from the event deposited on floodplains above the sampling site. Levels of fines in Mission Creek and Devil’s Gulch have decreased since their peak in 1998, again suggesting that fines entrained in channel networks have been flushed downstream. Historically, Chinook and steelhead spawned in Mission Creek. Presently Mission Creek supports rainbow trout and brook trout populations; and Devil’s Gulch supports rainbow trout (1989, 1990, 1991 Mission Creek Stream Survey Reports, 1992 Devil’s

Gulch Stream Survey Report). The Mission Creek watershed is characterized by steep hill slopes (50-70% gradient) dominated geologically by highly erosive Swauk sandstone. This is a highly erosive system and the level of fines in the streambed fluctuates in relation to major erosional events in the drainage.

**Mission Creek, Devil's Gulch and Sand Creek percent fines. Error bars represent the 80% CI.**



### Naches Subbasin

The Forest, in cooperation with the Yakama Nation and Plum Creek Timber Company annually monitors fine sediment in the Naches subbasin. With this year's monitoring work, the data set for the Little Naches covers a time period of 19 years for historical 'index' reaches and 12 years for an expanded sampling area which includes tributary streams. The following information was obtained from the March 19, 2004 memo from Jim Matthews, Yakama Nation to Little Naches Sediment Monitoring (SMP) Participants, Sediment Sampling Results from the Little Naches and South Fork Tieton. A copy of the memo can be obtained from Jim Matthews, Yakama Nation, the Naches Ranger District or the Okanogan and Wenatchee National Forest Headquarters Office.

**Little Naches River:** Compared to 2002, major decreases in average fine sediment levels (greater than two percentage points from the previous year) were observed on three of the sample reaches; Little Naches Reach 1, Little Naches Reach 2 and North Fork Reach 2. Slight decreases in average fines (less than two percentage points were found on five sample reaches compared to last year; South Fork Little Naches Reach 1, Little Naches, Reach 3, Bear Creek, Reach 1, Bear Creek, Reach 2 and Pyramid Creek, Reach 1. Moderate increases of nearly two percentage points were seen on two sampling reaches; Little Naches, Reach 4 and North Fork, Reach 1. Variability between samples within the reaches was generally similar or slightly less than last year. Six of the ten sampling reaches had a lower standard deviation than last year. To a great degree, the field sampling techniques have been refined and have reduced the amount of variability between samples.

Review of the results from the two historical reaches (Little Naches, Reach 1 and North Fork, Reach 1) provides a greater time period of record for evaluating sediment trends in the drainage. Sampling began on these two reaches in 1985. In the early years of 1985-1986, average fine sediment levels

were fairly low (8-10%). From 1987 until 1993, reach average fine sediment increased markedly up to 19-20%. Considerable road building and timber harvest activity occurred at that time. The Falls Creek Fire also was during that time period. After 1993, the fine sediment levels declined for two or three years at these historical sample locations before moving back up. From 1998 through 2001, the rate of fine sediment in these reaches remained relatively constant between 16 and 18%. This year the average fine sediment levels in these two reaches are similar and were 13.2% for the Little Naches Reach 1 and 11.2% for the North Fork Reach 1.

**South Fork Tieton Monitoring:** One reach on the South Fork Tieton River near Minnie Meadows was sampled for the fifth consecutive year to monitor bull trout spawning habitat conditions. This year, the average fine sediment levels less than 0.85mm decreased from the high value found in 2002 (8.9% in 1999, 12.9% in 2000, 12.9% in 2000, 17.3% in 2002, and 13.3% in 2003).

## Temperature

The Forest has an on-going program to monitor water temperatures. In accordance with the Clean Water Act (CWA) of 1977, which set federal standards for water quality, the State of Washington developed state standards to meet or exceed the CWA 303(d) list of federal standards. There are five water quality parameters that have standards set by the State, including water temperature. Water temperature is a key component of fish habitat and aquatic ecology. Cold water fish species such as trout and salmon are particularly sensitive to very high and very low temperatures. Water temperature criteria set by the State (Class AA Streams <60.8°F, Class A Streams <64.4°F) and water temperature criteria set by the Wenatchee Forest Plan (<61°F), focus mainly on summer maximum water temperatures. However, harsh winter rearing conditions could be more limiting than summer increases in stream temperatures within some streams, such as, but not limited to, the Entiat and Mad Rivers. Annual water temperature data are used for multiple purposes including; the development of a regional data base that may be used to revise Washington State temperature standards for eastside streams, for future iterations of Watershed Analyses and by future Forest Plans to describe desired future conditions, to support the water quality element in the Washington State Watershed Planning and by District personnel in project analysis for proposed actions on National Forest System lands and in biological assessments for three ESA listed species (bull trout, spring Chinook salmon and steelhead trout).

All districts participate in the water temperature monitoring program. At this time data analysis for 2003 has only occurred on the Entiat and Chelan Ranger Districts and the Lake Wenatchee and Leavenworth Ranger Districts.

**Entiat and Chelan Ranger Districts:** The following information is from the 2003 Stream Temperature Monitoring Report, Entiat and Chelan Ranger Districts. The report is available from the Entiat Ranger District or the Okanogan and Wenatchee National Forest Headquarters Office.

In order to describe water temperature reference conditions of streams and rivers within the Entiat and Chelan Ranger Districts, and to evaluate water temperature conditions in CWA 303(d) listed waterbodies (e.g. mainstem Entiat River), a water temperature monitoring program was instituted by the USFS. In 1993 the Entiat Ranger District began monitoring summer maximum stream temperatures within the Entiat and Mad River watersheds and tributaries to Lake Chelan. In 1998, the stream temperature monitoring program was expanded and a network of continuous-recording

thermographs was placed at multiple locations in the mainstem Entiat and Mad Rivers for an extended period of time (late-March to early-November). This expanded network of stream temperature monitoring will be continued in order to provide information on the thermal regime of these watersheds and to contribute to District and Forest efforts to describe reference conditions. The Entiat Ranger District data also supported SNTEMP model calibration of water temperature in the Entiat River by providing observed water temperatures for the years 1995-2002 to the Washington State Department of Ecology (WDOE).

Water temperatures monitored by the Entiat Ranger District included 9 streams and rivers (33 stations) within the Entiat and Mad River watersheds and 10 streams (12 stations) on the Chelan Ranger District. Additional stream temperature monitoring data provided by the Entiat National Fish Hatchery (USFWS) for RM 7.1 of the Entiat River are included.

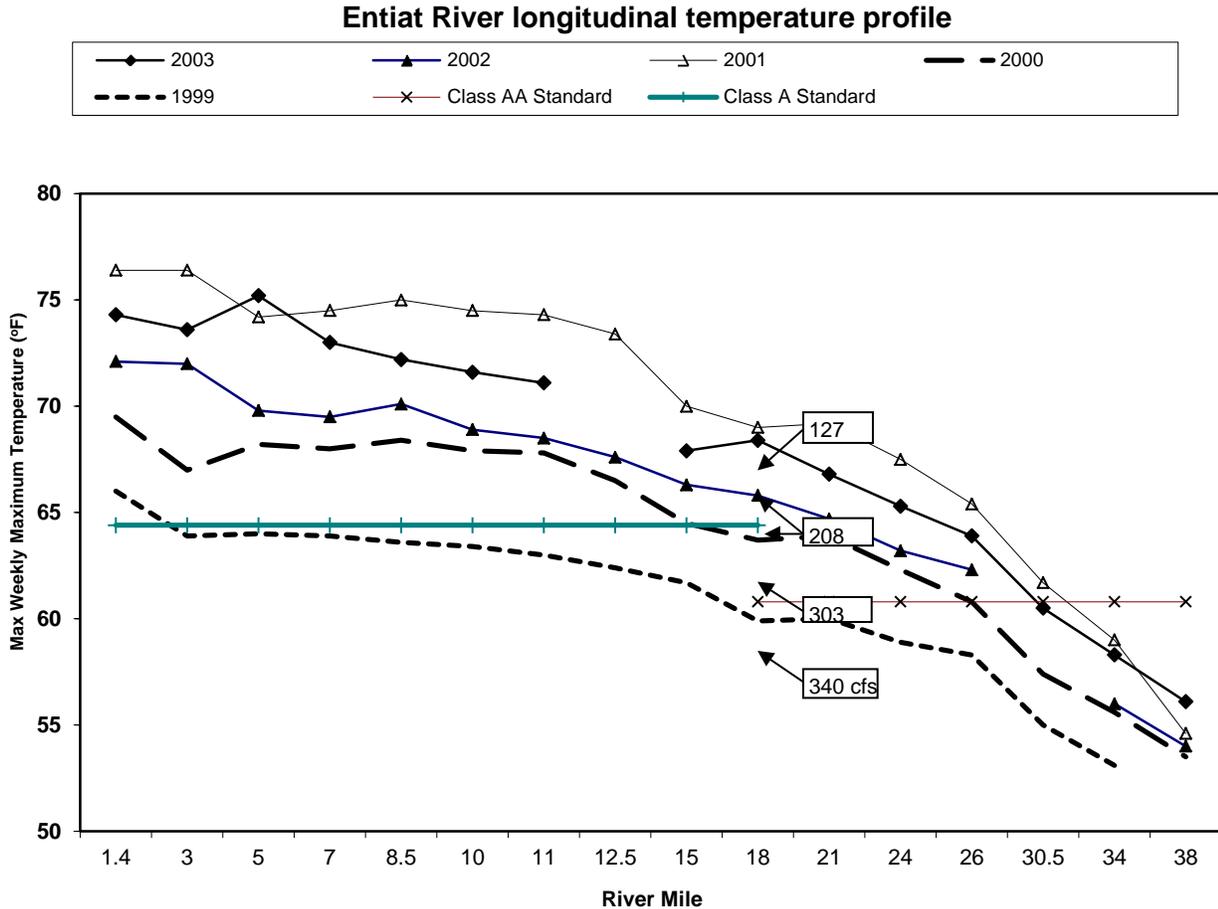
The following discussion incorporates analysis from multiple sources, including; historical stream temperature data and current stream temperature data collected and analyzed by USFS personnel (USFS 1993-2003); Stream Network Temperature Model Analysis (SNTEMP) for the Entiat watershed Planning Unit Draft WRIA 46 Management Plan (2004), the Thermal Infrared Aerial Remote Sensing Survey (TIR), stream temperature data from WDOE gauging stations, Entiat River Gain/Loss Study, the Entiat valley aquifer depth study and information about the Entiat geology and alluvial valley.

**Entiat River:** Temperature exceedances in the Entiat River occur during mid to late summer when low flows, high air temperatures and high insolation rates coincide. They are usually of short duration and diurnal in nature. A 1994 review of ambient monitoring results by WDOE for Water Years (WY) 1978 - 1991 noted that high water temperature in the afternoon during late-summer and fall was the major water quality standard not met (Ehinger 1994). Ambient water quality data collected at the Keystone site from July 1959 to September 2003 also show a pattern of late summer temperature exceedances occurring during the months of July, August and September. The lower Entiat River was included on the 1996 303(d) list of impaired or threatened waters for temperature and instream flows, and is currently listed on the draft 2002 303(d) list for temperature.

The following trend in summer stream temperatures is based on data collected by the USFS (1993-2003) and confirmed by the Thermal Infrared (TIR) Flight (2001) and SNTEMP model:

- The North Fork of the Entiat River near its confluence with the Entiat River tends to be warmer than the mainstem from the middle of July until early September;
- Substantial warming tends to occur between RM 38 (Cottonwood campground) and RM 21 (Dill Creek Bridge);
- A “moderating zone” extends from RM 18 (USGS gage) downstream to RM 15 (Roundy Creek confluence) during the hottest part of the summer, with maximum stream temperatures differing by only tenths of a degree from late July to early October;
- Between RM 10.8 and RM 10.2, where the Mad River flows into the Entiat River, stream temperatures tend to be equivalent indicating that the Mad River does not have a great influence on Entiat River water temperatures;
- In 2003, another “moderating zone” extended from RM 8.5 downstream to RM 5.3;
- Stream temperatures gradually warm from RM 5.3 to RM 1.4, with maximum temperatures recorded near the Keystone bridge;

- Exceedances about RM 20 generally occur from early August to early September; from RM 21 downstream, exceedances are of progressively longer duration, beginning in late July and continuing until mid-September.



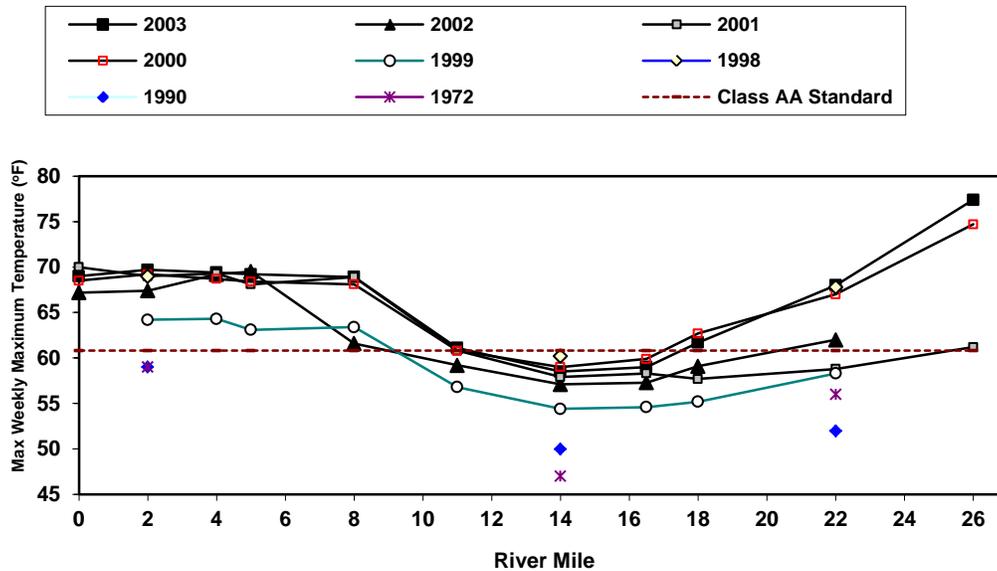
Elevation, geology, including bedrock at the surface, glacial deposits and the influence on groundwater aquifers seems to explain much of the changes in the thermal profile. Flows and annual climate seem to help explain variability between years.

Mad River: The Mad River temperature data set spans 63 years, making it the longest-term record available for the Entiat subbasin. As the Mad River is essentially unaffected by direct management of riparian and valley bottom vegetation from RM 4.0 to the headwaters, a distance of nearly 20 miles, it represents a possible "reference" stream useful for assessing "natural variability" and may provide an important piece of information for natural water temperature regimes in similar land type associations. Thermograph data collected by the USFS Entiat Ranger District from 1993-2003 indicate that maximum water temperatures in excess of 61°F in the lower Mad River occur consistently. The following trend in Mad River summer water temperatures has been identified:

- At Mad Lake where the river originates, stream temperatures are substantially warmer at the outlet of this high elevation (5900 feet) shallow lake;
- Stream temperatures gradually cool going downstream until reaching the Cougar Creek area (3400 feet);

- Re-warming progressively occurs from Cougar Creek downstream to Tillicum Creek (1400 feet);
- Tillicum Creek then provides a cooling influence evidenced by lower stream temperatures at the confluence with the Entiat River than those observed just above the Tillicum confluence.

**Mad River longitudinal temperature profile RM 0-26.**



Two major implications of the Mad River temperature regime come to mind. The first is that the cooling zone, Jimmy Creek to Cougar Creek is also the primary bull trout spawning zone of the Mad River and of the entire Entiat subbasin. A log jam formed downstream of Cougar Creek in 1999, forcing the bull trout to spawn in the warming zone. This log jam has persisted as an upstream migration barrier from 1999 to 2003. Consequences of spawning in the warming zone (or lack of) will not be detectable for several years. The second implication is that the Mad River is essentially unaffected by direct management of riparian and valley bottom vegetation from RM 4.0 to the headwaters, a distance of nearly 20 miles. As such, it represents a possible "reference" stream useful for assessing "natural variability" and may serve as a basis for revising Forest Plan temperature standards. We are not proposing that Forest-wide temperature standards be based solely on the Mad River but rather that the Mad River profile may provide an important piece of information for natural water temperature regimes in similar landscapes.

**Lake Chelan Tributaries**

Tributaries on the North Shore of Lake Chelan have experienced intense wildfires over the past two years. Portions of Safety Harbor Creek, Fish Creek and Falls Creek were burned during the 2001 Rex Creek Fire and portions of Falls Creek, Grade Creek, Poison Creek, Gold Creek and Mitchell Creek burned during the 2002 Deer Point Fire. Temperature monitoring sites were placed in these streams to monitor effects related to these wildfires.

Fish Creek appears to have been the most severely affected by the Rex Creek Fire and exceeded Forest Plan temperature standards for 7 weeks during the late summer of 2003 (July to September). When

monitored in 1998 and 1999, the summer maximums of Fish Creek did not exceed Forest Plan standards. Therefore high temperatures in recent years are most likely a response to the fire. Safety Harbor Creek had no temperature exceedances in 2003.

Poison Creek, which burned severely in the 2002 Deer Point fire, exceeded 61°F on eight days in 2003. When monitored in 1999, Poison Creek had a maximum stream temperature of 54.9°F. Lower Mitchell Creek exceeded Forest Plan standards for approximately 9 weeks during the summer of 2003, however, this is typical for Mitchell Creek, which also exceeded the 61°F standard when it was monitored prior to 2002 and the Deer Point Fire. Prince Creek exceeded Forest Plan Standards for six monitored days in 2003, however the thermograph was dewatered on July 18th and the extent of exceedances are not known. Prince Creek was monitored during the summer of 2000, during which time stream temperatures exceeded 61°F on one day.

On the south shore, exceedances to the daily maximum temperature limit occurred and were of short duration (4 days) at the mouth of Twenty-Five Mile Creek. The highest daily maximum stream temperature observed was 63.4°F. Additional temperature monitoring sites were added in the South Fork and North Fork of Twenty-Five Mile Creek in 1999 to monitor effects related to a major wildfire in this area in 1998. Neither location has exhibited unstable thermal regimes nor exceeded Forest Plan standards since monitoring. Stream temperatures in the south fork have been consistently higher than those observed in the North Fork even though the 1998 fire primarily affected the north fork drainage. First Creek, located downlake of Twenty-Five Mile Creek, did not exceed stream temperature standards and continued to exhibit stable summer maximum temperatures despite influences of the 1994 Tyee Fire on that drainage.

### **Conclusions for Entiat and Chelan**

Based on all water temperature data compiled for the Mad River drainage, we believe that the thermal regime described again in this report is firmly established. Longitudinal profile data from the Entiat River indicate that the Entiat River has its own unique thermal regime, which has been confirmed by the WADOE using the SNTMP model and TIR Flight imagery. In the Chelan subbasin, clear differences exist in stream temperature regimes between the north and south shore tributaries at lower elevation sites and within the upper and lower monitoring sites of the north shore tributaries. We also conclude, based on several years of stream temperature monitoring results (1994-2003), that present Forest Plan Standards are simply not attainable in all Entiat and Chelan waters in all years. Future iterations of Watershed Analyses and Forest Plan revisions should take into consideration deviations from current water temperature standards that appear to be related to natural conditions within watersheds.

### **Lake Wenatchee and Leavenworth Ranger Districts Temperature Monitoring**

The following information was obtained from the 2003 Temperature Monitoring, Wenatchee National Forest, Leavenworth and Lake Wenatchee Ranger Districts. The complete report is available at the Leavenworth Ranger District or the Okanogan and Wenatchee National Forest Headquarters Office.

Summer stream temperature was monitored at 37 sites during 2003 on the Leavenworth and Lake Wenatchee Ranger Districts. Air temperatures were monitored at 8 of these sites. Streams listed under Section 303(D) of the Clean Water Act are denoted with \*\*. Streams were chosen to reflect various

amounts of management within watersheds (timber harvest, roads, etc.) and suspected natural temperature fluctuations.

Daily water temperatures were monitored in all streams from late May through late September. Twenty-five of the monitoring sites exceeded daily maximum temperature standards at some point during the monitoring period, while 27 of the sites exceeded the seven-day average maximum temperature standards at some point during the period. It is believed that some of the temperatures are in error. Some of the data loggers were lost or vandalized.

### Lake Wenatchee Temperature Monitoring Sites

| Stream  | Legal             | Elevation | Description  | Years Monitored |
|---|-------------------|-----------|--|-----------------|
| Beaver Creek, North Fork                          | T26N R18E Sec.4   | 2400'     | 40' downstream from intersection of creek and 6103 road.   | 1997-2003       |
| Beaver Creek South Fork                           | T26N R18E Sec.9   | 2400'     | 50' downstream of intersection of creek and 6103 road.   | 2000-2003       |
| Chikamin River                                    | T28N R17E sec 21  | 2420'     | 150' downstream of bridge on road 62   | 1997-2003       |
| Chiwawa River 1 (formerly Chiwawa River)          | T27N R18E sec 30  | 1960'     | Just east of the intersection of spurs 120 and 125 on 6121 road (includes air temperature)         | 1995-2003       |
| Chiwawa 2   | T27N R17E sec 13  | 2100'     | In Goose Ck cmpgr, 200' south of s. most campsite along dirt bike trail.                           | 1998-2003       |
| Chiwawa 3   | T28N R17E sec 7   | 2400'     | Approx. 1.8 miles past end of pavement, dispersed site, trail leads to river                       | 1998-2003       |
| Chiwawa 4   | T29N R16E sec 25  | 2500'     | 150' beyond north end of Schaefer Creek campground.  | 1998-2003       |
| Chiwawa 5   | T30N R16E sec 27  | 2800'     | 200' north of intersection of Buck Creek Trail bridge over Phelps Creek (includes air temperature) | 1999-2003       |
| Chiwawa River above diversion ditch               | T27N R18E sec 30  | 2000'     | Immediately upstream of the irrigation ditch diversion.  | 1998-2003       |
| Chiwawa River below diversion ditch               | T27N R18E Sec. 30 | 2000'     | Immediately upstream of fish screen  | 1998-2003       |
| Chiwawa River at fish screen                      | T27N R18E Sec. 30 | 1860'     | Immediately upstream of fish ladder  | 2001-2003       |
| ** Little Wenatchee 2 (formerly Little Wenatchee) | T27N R16E sec 18  | 1960'     | Immediately down slope of road 65, 1.5 miles east of intersection with road 6502                   | 1993-2003       |
| Little Wenatchee 1                                | T27N R16E sec 5   | 1880'     | Across Two River gravel pit to picnic table on river. (includes air temperature)                   | 1998-2003       |
| Little Wenatchee 3                                | T27N R15E sec 11  | 1990'     | Down slope of road 65, 0.1 miles northwest of road 215.  | 1998-2003       |
| Little Wenatchee 4 (Rainy Creek)                  | T27N R15E sec 10  | 2100'     | 100' upstream of bridge over creek on road 6701  | 1998-2003       |

| Stream                               | Legal                | Elevation | Description   | Years Monitored |
|--------------------------------------|----------------------|-----------|---|-----------------|
| Little Wenatchee 5                   | T27N R15E<br>sec 9   | 2100'     | Access from 6701 road, head north down small drainage approximately 1.2 miles northwest of junction of roads 6701 and 6700      | 1998-2003       |
| Little Wenatchee 6 (Lake Creek)      | T27N R15E<br>Sec 26  | 2480'     | Off of road 6701, immediately southwest of unorganized campground just northwest of bridge over Lake Creek.                     | 1998-2003       |
| Little Wenatchee 7                   | T28N R15E<br>sec 36  | 2440'     | Access from road 6500, down steep slope 0.5 miles southeast of junction with road 6504  | 1998-2003       |
| Little Wenatchee 9                   | T28N R14E<br>sec 14  | 3000'     | Approx 200' downstream of foot bridge on Caddy Creek Trail (includes air temperature)   | 1998-2003       |
| ** Nason Creek near Coles Corner     | T26N R17E<br>sec 9   | 1940'     | Approximately 0.6 miles northeast of Coles Corner on Highway 207, take road and trail to river. Is near old Kahler Glen Bridge. | 1993-2003       |
| ** Nason Creek near the mouth        | T27N R17E<br>sec 17  | 1900'     | Across from milepost 4 on HWY 207 (includes air temperature)  | 1993-2003       |
| Phelps Creek                         | T30N R16E<br>sec 22  | 2840'     | Cross bridge to Trinity, turn right, follow trail to aquarod site   | 1998-2002       |
| Phelps Creek above diversion         | T20N R16E<br>Sec.22  | 3500'     | Immediately upstream of diversion on right bank   | 2001-2003       |
| Rock Creek                           | T29N R17E<br>sec30   | 2500'     | Approx. 200' upstream of bridge over creek on road 6200   | 1998-2003       |
| Trinity Spillway                     | T30N R16E<br>Sec. 27 | 2760'     | Immediately downstream of power plant outflow   | 2001-2003       |
| White River 2 (formerly White River) | T27N R16E<br>sec 5   | 1900'     | Just downstream of bridge to Sears Creek  | 1995-2003       |
| White River 1                        | T27N R16E<br>sec 5   | 1880'     | 50' downstream of bridge on road 65. (includes air temperature)   | 1998-2003       |
| White River 3                        | T29N R15E<br>sec 35  | 2300'     | Up White River Trail at end of road to just beyond footbridge at wilderness boundary.   | 1998-2003       |
| White River 4                        | T29N R15E<br>sec 22  | 2400'     | Just upstream of junction between Indian Creek and White River. (includes air temperature)                                      | 1998-2003       |
| White Pine Creek                     | T26N R15E<br>sec 27  | 2400'     | Near mouth  | 2003            |

Twenty-six of the streams monitored exceeded daily maximum temperature standards at some point during the monitoring period. Of monitored streams on the Lake Wenatchee District, Beaver Creek and

the north fork, Chiwawa River 3-5, Phelps Creek, and Little Wenatchee 4, did not exceed the standard. White River 1 did not exceed the standard but data was lost, and it is likely that there were exceedences during this period.

### Leavenworth District Temperature Monitoring Sites

| Stream                              | Legal                | Elevation | Description   | Years Monitored |
|-------------------------------------|----------------------|-----------|---|-----------------|
| Chiwaukum Creek                     | T25N R17E<br>sec 5   | 1880'     | Upstream of Route 2 bridge 100'. Accessed from road to dispersed campsite just southeast of bridge. | 1993-2003       |
| Devils Gulch                        | T22N R19E<br>sec 18  | 1720'     | Immediately downstream of 2 <sup>nd</sup> bridge on Devils Gulch Trail.                             | 1996-2003       |
| Icicle Creek                        | T24N R17E<br>sec 27  | 1320'     | 150' below Snow Creek Bridge  | 1997-2003       |
| Icicle Creek above stream gage      | T24N R17E<br>Sec. 28 | 1520'     | On left bank immediately upstream of gaging station   | 2001-2003       |
| Ingalls Creek                       | T23N R17E<br>sec 26  | 2360'     | 50' downstream of bridge at Ingalls Creek Trailhead   | 1998-2003       |
| Mission Creek                       | T22N R19E<br>sec 6   | 1460'     | Just below bridge on staff gauge at FS boundary   | 1994-2003       |
| Peshastin Creek above Ingalls Creek | T23N R17E<br>sec 25  | 1830'     | Above with Ingalls Creek, 100' upstream of Wenatchee NF sign.                                       | 1993-2003       |
| Peshastin Creek above Negro Creek   | T23N R17E<br>sec 36  | 2240'     | 100' upstream of Negro Creek confluence.  | 1994-2003       |
| Peshastin Creek below Ingalls Creek | T23N R17E<br>sec 25  | 1800'     | Below junction with Ingalls Creek, 400' downstream of Wenatchee NF sign.                            | 1995-2003       |
| Sand Creek                          | T22N R19E<br>sec 6   | 1440'     | 0.3 miles upstream of confluence with Mission Creek at FS boundary.                                 | 1995-2003       |
| Wenatchee River                     | T24N R17E<br>sec 10  | 1200'     | 300' downstream of the old flume. (includes air temperature   | 1997-2003       |

On the Leavenworth District, all sites exceeded this standard. However, Chiwaukum Creek and Ingalls Creek only exceeded the standard once. During the 2003 monitoring season, streamflows were below average for the period of record.

In general the number of exceedences for all sites in 2003 were higher than 2002, but below the last low flow year of 2001.

Possible explanations for the Chiwawa site exceedences include; change in fluvial geomorphological indexes in the lower reaches (high width/depth ratios; geomorphic land type differences from upper reaches, a relative reduction in the quantity of cold water inputs from tributaries when compared to upper reaches, and possible influence from roads. It is interesting to note that the number of exceedences was lower below the ditch diversion than above the diversion.

It is likely that the same factors play a role in exceedences found in the Little Wenatchee. One other possibility though is the generally lower flows that are characteristic of the Little Wenatchee. Lower flows in the Little Wenatchee may be a result of smaller sub-basin size when compared to the White River or Chiwawa River, lower average basin elevation (which results in lower snow packs and base flows). These factors need to be quantified for a better understanding of their effects on stream temperature in these basins. The upper two Little Wenatchee sites had more days above standards than in 2001. Causal factors may include low flows in headwaters due to an extremely low snow pack during 2000-2001.

Nason Creek is simply always out of compliance. Fluvial geomorphological characteristics, land type characteristics, floodplain confinement by development, and a stream orientation that provides efficient solar interception are probable causes.

In Mission Creek, both the Mission Creek site and the Devils Gulch site showed exceedence frequencies that were fairly typical. All of the sites in the Mission Creek drainage showed increases in both the maximum and 7-day average standards when compared to the 2002 season.

Since monitoring began in 1994, Mission Creek has not met state standards for temperature. Furthermore, there is no clear trend towards attainment or increases in exceedence. Temperatures from Devils Gulch (an unmanaged portion of Mission Creek upstream of the Mission site) suggest that temperatures may naturally exceed state standards. Since 1996, monitoring of the un-managed Devils Gulch site has also exceeded 61 degrees F. at some point during the summer.

In the Peshastin drainage, all sites showed fairly typical responses, with Ingalls Creek providing a major influx of cold water to the system.

Once again, since little management thought to be critical to stream temperature, such as clearing of riparian vegetation, road building etc., has occurred in the past year throughout all of the drainages, it is likely that the increase in non-compliance days reflects a regional trend of warmer temperatures for key periods in the summer of 2003.

Twenty-eight of the streams monitored exceeded the maximum temperature 7-day average standard. On the Lake Wenatchee district, sites not exceeding this standard include: Beaver Creek, north fork Chiwawa River 3 through 5; and Phelps Creek sites. White River 1 did not exceed this standard, but data was lost, and it is likely that the standard was exceeded during this period. White River 4 only exceeded this standard once.

As in years past, many of the streams listed under section 303(d) of the Clean Water Act did not meet state temperature standards during 2003 (61 degrees F). Monitoring of Peshastin Creek again shows that temperatures are highly dependant on the sampling site. Temperatures from the site immediately below Ingalls Creek exceeded state requirements for maximum temperature less often than those above Ingalls Creek.

Both Icicle River and Wenatchee River were monitored for the first time in 1997. Again, results from the 2003 monitoring shows that the Icicle River exceeded state standards at some point during the summer. Lower temperatures and exceedences later in the season for the lower Icicle site are likely a result of increased release from Snow Lake. Continued monitoring is suggested to further clarify trends and attainment potential of these sites.

## Stream Habitat Surveys

The Forest completed surveys on Bear Creek, Silver Creek, Waptus River and Cooper River (Cle Elum Ranger District), North Fork Entiat (Entiat Ranger District) Devil's Gulch (Leavenworth Ranger District) and Bumping River (Naches Ranger District). All surveys were conducted using the Region 6 Hankin-Reeves Level II Protocol (USFS Stream Survey Handbook, Pacific Northwest Region 6, 2003). Streams were usually snorkel surveyed to determine fish distribution. At this time a report is only available for the Bumping River.

**Bumping River Survey:** The following information was obtained from the Upper Bumping Stream Survey Report, Naches Ranger District. This report is available at the Naches Ranger District or Okanogan and Wenatchee National Forest Headquarters Office

The Bumping River was surveyed from Bumping Lake upstream about 11 miles to its origin at a spring. The upper Bumping River drains approximately 124,000 acres, the majority of which is in the William O. Douglas Wilderness. Only the first reach of the survey, about .75 miles was outside the wilderness. One objective of the survey was to obtain information from a stream in a natural or reference condition.

The survey was divided into seven stream reaches. None of the reaches surveyed met Wenatchee National Forest Plan standards for pool numbers and only Reach 3 met the standard for pool depth. Fine sediment levels appeared high based on Wolman pebble counts, but no core samples have been taken so fines in spawning gravel are not known. Large woody debris numbers met Forest Plan standards in Reaches 1-3. Reaches 4-7 had large wood amounts in excess of the amount estimated in the Bumping and American watershed Analysis completed in 1998.

Stream temperatures sampled during the survey exceeded the Forest Plan standard in the lower four reaches. The upper three reaches were within the temperature standard. Temperatures were recorded over the summer by data-logging thermometers. The data logging thermometers placed in Reach 2 and Reach 5 verified the survey's temperature findings. The data-logging thermometer recorded approximately 46 days where the 5-day average temperature exceeded 58o F and 11 days where the temperature reached at least 61o F.

Percent unstable stream banks were highest (at 2.7%) in Reach 1 and lowest in Reach 3 (0.3%). The dominant fish species found in all reaches were brook trout. Brook trout were introduced around 1949 and are well established through the drainage. Bull trout were found in Reach 1 up to a cascade waterfall, and use the reach for spawning and rearing.

Recreation use was observed to be higher than expected along the river. This use has resulted in soil compaction and loss of vegetation. The use needs to be monitored, and it is recommended that expansion of existing sites and new sites should be limited.

## Recommendations

**Sediment Monitoring:** Continue sediment sampling indefinitely in the reaches currently sampled to (1) support future iterations of Watershed Analysis with time/trend data, (2) continue tracking the effects of disturbance including wildfire, flood and management, and (3) provide invaluable fine

sediment data for Forest Plan revision, biological assessments for ESA-listed steelhead, spring Chinook salmon, and bull trout.

It is recommended that sediment monitoring projects (other than Naches) continue to be performed by a Washington Conservation Corps crew trained by Forest Service personnel to ensure sampling consistency. Naches sediment monitoring should continue with cooperative efforts with the Yakama Nation.

Further investigation is needed to determine sediment sources and contribution made by management disturbance, natural disturbance and background levels of fine sediment.

**Temperature Monitoring; Entiat and Chelan:** Repeat the expanded longitudinal monitoring network in Mad River and major tributaries in 2004.

Reestablish the expanded monitoring network in the Lake Chelan drainages in 2004.

Repeat the longitudinal monitoring network in the Entiat River (10 stations approximately 2 miles apart on the lower River) with the cooperation of private landowners, Chelan County Conservation District, USFWS, WADOE and USEPA to provide on-loan monitoring devices in 2004.

At three locations on the Entiat River (RM 1.4, RM26 and RM 18) monitor water temperatures over winter to further assess effects of water temperature on Chinook salmon egg incubation and to predict times to emergence of fry.

Cooperate with USGS to install temperature monitoring devices at gage stations (Keystone, Ardenvoir).

Use the triggered-start mode for Optic StowAway Temperature Loggers. The delayed-start mode used for some devices in 1998 resulted in immediate shutdown of some older devices.

Continue to emphasize quality control of all temperature measuring devices prior to deployment to assure accurate results. More frequent field checks will be performed for timely detection of improperly functioning devices.

Water temperatures in the drainages burned by the 1994 Tye Fire, 1998 Twenty-Five Mile Creek Fire, 2001 Rex Creek Fire and 2002 Deer Point Fires should be monitored to assess cumulative effects and recovery.

Coordinate with other agencies (USFWS, YIN, WADOE, USEPA) to exchange water temperature data and expand baseline temperature data base.

Review historical records (USGS, STORET data @EPA, FS Experimental Forest research data) to expand baseline temperature data base in preparation for next iteration of Watershed Analysis and Forest Plan revision.

**Temperature Monitoring; Lake Wenatchee and Leavenworth:** The Optic Stow-Away Temperature loggers worked quite well. Sites were visited three times during the season. This is

necessary as the rapid fluctuations in water levels, particularly on the rivers and larger creeks can leave the loggers out of water. Care should be taken in the areas with a lot of tourist traffic to either conceal the logger or move it further away from trail access. If the stowaways are left in high traffic areas, the PVC housing should be gray or black. A number of stowaways had to be relocated to deeper water during the season. This might be remedied by using long cables to begin with and locating the stowaways in the deepest water accessible with chest waders. Since most of the stowaway harnesses were rigged with rocks to keep the stowaway on the bottom, lead waits should be considered in the future. They would be easier to rig and more likely to stay attached to the stowaway. Time could also be saved in locating the stowaways during the season by recording their locations with a digital camera in conjunction with, rather than relying on the written descriptions. These written descriptions are not always sufficient to guide someone to the site that may have never been there.

Care should be taken to insure that loggers are placed to capture the representative temperature of the reach. To achieve this goal, effort should be expended to place loggers on the southerly side of the stream (for maximum shade benefit), well into the channel for maximum mixing and dewatering protection, and anchored to the bottom with lead weights.

Prior to deciding on streams to be monitored for the 2003 field season, a review of monitoring sites and goals for the monitoring program should be conducted and documented. Monitoring should probably continue on sites with a long history. Sites in Mission, and Peshastin should be monitored in 2003 as well, to continue to retrieve data prior to and during management activities in these drainages. Stratification of the basins on the districts may help in highlighting priorities for future monitoring. Stratification may be based on stream flow, geomorphology, consumptive use etc.

If funding becomes available, thought should be given to supplementing at least one recorder per stream with an automated stage recorder. Once the rating curve for the stream is established, analysis of the discharge/temperature relationship would be possible

## TIMBER AND RELATED SILVICULTURAL ACTIVITES

During FY 2003, the Forests reviewed monitoring items in the Wenatchee National Forest Land and Resource Management Plan. Several items were redundant with other reports that are available to the public. For example, harvest (cut and sold) is reported in annual attainment reports as well as in the Timber Sale Statement of Accounts. Reforestation is reported annually in the growth and survival report which is sent to Congress. Other items that were monitoring report items in the LRMP are no longer relevant, such as requirements to report acres harvested by management area. Management areas have been significantly modified since 1994 when the President's Northwest Forest Plan was approved. The Northwest Forest Plan did not result in a recalculation of Allowable Sale Quantities or an estimate of harvested acres by revised management area. Current harvest practices differ substantially from what was anticipated and projected under the LRMP.

## **Monitoring Item-**

### **Timber Sale Program Quantity and Allowable Sale Quantity**

This reporting item will no longer be included in the annual report. The volume sold and harvested is reported in various ways that are readily available to the Public. Volume sold and harvested is reported for each quarter and annually by fiscal and calendar year on the following website:

[www.fs.fed.us/r6/nr/fp/FPWebPage/FP70104A/Cut%20and%20Sold%20Report.htm](http://www.fs.fed.us/r6/nr/fp/FPWebPage/FP70104A/Cut%20and%20Sold%20Report.htm)

## **Monitoring Item-**

### **Reforestation**

Reforestation will no longer be included in this report. This information is published annually by the National Forest System and published on the Forest Service website. The 2003 report is published at:

<http://www.fs.fed.us/forestmanagement/reports/reforest-tsi/2003/AppsABFY2003RefTSIReport.pdf>

## **Monitoring Item-**

### **Timber Harvest Unit Size, Shape, Distribution, and Location**

Timber sales on the Entiat, Wenatchee River, and Cle Elum Districts were reviewed in the field by the Forest Silviculturist and district personnel. Harvest units complied with Forest Plan direction. Harvest units generally avoided riparian areas.

## **Monitoring Item-**

### **Insects and Diseases**

Aerial survey information for the annual insect detection surveys are posted on the web at:

<http://www.fs.fed.us/r6/nr/fid/data.shtml>. Disease information and animal damage information are unchanged from prior monitoring reports.

## **ROADS**

## **Monitoring Item-**

### **Road Management / Maintenance**

The goal is to ensure that the transportation system is being managed and or maintained to the appropriate standard to serve the planned resource management objectives.

| Maintenance Level                             | Objective Level Miles in INFRA Database | FY 2003 - Miles Maintained to Objective Level |
|---|---|---|
| Level 1 (Closed/in storage)                   | 1899                                    | 1047  |
| Level 2 (High Clearance)                      | 2838                                    | 694   |
| Level 3 (Passenger Car – single lane, gravel) | 845                                     | 360   |
| Level 4 (Pass. Car – single lane, improved)   | 122                                     | 53  |
| Level 5 (Pass. Car – Double lane, paved)      | 64                                      | 18  |
| <b>Total Objective Miles</b>                  | <b>5768</b>                             | <b>2172</b>                                   |

The Wenatchee National Forest continues to experience the effects of the loss of maintenance performed and/or paid for by Timber Purchasers. In the past, the timber sale program has accounted for approximately 1 to 1.5 million dollars of maintenance annually. If appropriated road maintenance funds are not increased, there could be a significant reduction in the amount of roads available to the public as well as a reduction in the level of comfort and ease of access. This year, 45% of the Maintenance Level 1 (closed) roads, and 71% of the Maintenance Level 2-5 (open) roads were not maintained to full road management objectives. The Wenatchee National Forest is continuing a comprehensive process of Access and Travel Management, and this year will continue a Roads Analysis process that is likely to identify additional roads to close or obliterate/decommission.

From 1995 to 2003, the effects of the reduced timber program combined with the aftermath of the large wildfires on the northern portion of the Forest continued to impact the transportation system. An increase in our total road miles was discovered through the process of converting our road inventories into centralized databases and displaying them on a geographic information system (GIS) map layer. In 1995 we reported a total of 5,090 total system miles, while our FY 2003 annual road accomplishment report listed 5,768 total miles. It is believed much of this increase in miles is due to re-opening of old roads (which had previously been removed from the system), to manage the large areas impacted from wildfire. Another reason for the increase can be attributed to the addition of miles from existing roads on parcels of land acquired through exchange with private landowners.

In 1999 and 2000, the Forest Service began a national effort to determine the backlog of deferred maintenance on the road system. When this was completed on the Wenatchee National Forest, it was determined that the Forest needed approximately \$62 million to eliminate its deferred road maintenance.

A new national roads management policy requires that a science-based Roads Analysis be completed to determine an appropriate balance between the benefits of access and the costs of road-associated effects to the ecosystem. This analysis needs to be completed at both the forest and watershed scale to provide a road system that is safe, responsive to public needs, environmentally sound, affordable, and efficient to manage.

## Recommendations

Continue monitoring as scheduled.

Continue Roads Analysis as outlined in the new Road Management Policy to determine the appropriate size and makeup of our existing road transportation system.

Reduce maintenance levels and decommission (remove from the system) those roads no longer necessary where appropriate.

## **FIRE**

Monitoring Item-

### **Wildfire Occurrence**

The number of acres burned for all categories of fires except those caused by lightning are within the Forest Plan standard of +/- 15%. Lightning events are not predictable or controllable in terms of the number of wildfires that occur.

| <b>Cause</b> | <b>5-yr fire average<br/>1998-2002</b> | <b>5-yr acre average<br/>1998-2002</b> | <b>No. of fires by<br/>cause<br/>2003</b> | <b>Acres<br/>2003</b> |
|--------------|--|--|---|-----------------------|
| Campfire     | 42                                     | 8,707                                  | 26  | 1,303                 |
| Children     | 0.6                                    | 1                                      | 0   | 0                     |
| Debris Burn  | 0.8                                    | 1                                      | 3   | 5                     |
| Equipment    | 4                                      | 3                                      | 0   | 0                     |
| Incendiary   | 3                                      | 43                                     | 3   | 5                     |
| Lightning    | 50                                     | 15,628                                 | 25  | 3,868                 |
| Misc.        | 18                                     | 11                                     | 14  | 2                     |

### **Recommendation**

Continue monitoring as scheduled.

## **MINERALS**

Monitoring Item -

### **Mine Site Reclamation**

The goal is to ensure that disturbed lands are reclaimed to a use consistent with the rehabilitation standards and guidelines.

This report includes large and small historic mine sites under the Comprehensive Environmental Recovery, Compensation and Liability Act (CERCLA) and the non-CERCLA Abandoned Mine Land

(AML) program. It also includes reclamation associated with small scale mining activities such as one to three person underground mining and it includes drill, backhoe and underground mineral exploration and small tonnage sand & gravel, pit run, and building stone removals (mineral material permits and contracts). Also included are recreational-level prospecting including panning, metal detecting, rocker box operations, and 2 to 4 inch suction dredge operations. As was the case in preceding years, during FY2003, there were no moderate- or large-scale exploration or mining activities on the Forest, and there were no leasable energy or non-energy related mineral activities.

Monitoring of CERCLA and historic AML sites and current operations during FY2003 indicates that approximately 325 acres were in a disturbed status from mining-related activities on the Wenatchee National Forest. (This figure has been revised upward from the FY '02 report due to an effort to make a better assessment, but it does not reflect an actual change in disturbed acres. It does not include mineral material [rock] sources.) A large portion of the disturbed acres (approximately 120 acres) involve the historic Holden Mine Site. The Holden Mine is under a CERCLA remediation study, with implementation estimated to begin in 2006 or 2007. Approximately 109 acres of disturbance involve other historic AML sites across the forest. As inventories are completed and funding is made available, many of these sites will be evaluated for restoration. Approximately 97 acres of disturbance were the result of recent small-scale mining operations that were approved over the recent past and continue. A small portion of these disturbed acres represents new disturbances in FY 2003. A small portion was satisfactorily reclaimed and met reclamation objectives. Many of the sites were not reclaimed because the operations were ongoing. Several operators have been instructed through notices of noncompliance to bring their operations into compliance with regulations and/or their approved operation plans.

Due to the lack of funding and staffing, many of the very small-scale prospecting and mining activities such as recreational panning and suction dredging, building stone collection, and rock hounding were not monitored. Experience has shown that reclamation for the majority of these activities is not necessary due to the very small and non-significant impacts associated with them.

There were 12 ongoing mining operations where the Forest Service maintained a reclamation bond. They represent surface disturbing operations of such an extent that reclamation would be required. Reclamation bonds may be used to fund reclamation if the operator fails to perform. All bonded plan of operation-level mining activities were monitored and appropriately administered.

The objectives in the Forest Plan appear to be adequate, and reclamation bonds and regulatory authority provide for compliance when the objectives are not achieved.

The available information indicates that over the past years, 100 percent of the bonded operations have been monitored.

During the same period, overall monitoring for all mineral activities is estimated to have ranged between about 35 percent and 70 percent. Many very small activities, sometimes termed recreational exploration and mining, occur without Forest Service knowledge, and therefore without Forest Service monitoring. Considering the low impacts of most of these activities, additional monitoring may not be warranted. Funding at below Forest Plan levels will continue to limit the ability of the Forest Service to monitor all mineral activities.

Prospecting, exploration and mining for precious and base metal minerals have remained relatively constant over the previous five-year period. Activities to remove small quantities of mineral materials have also remained relatively constant.

### **Changes/updates in the Monitoring Plan**

Reclamation standards for individual plans of operations are adopted, considering laws, regulations, Forest Plan standards and guidelines, and industry standards, during the plan approval process. When administering mineral-related activities and compliance with reclamation objectives of the plans, mineral administrators ensure that operators comply with the provisions in their approved plans, including their reclamation plans. Validation is accomplished through periodic compliance checks conducted by Ranger District Mineral Administrators. It appears that no change is needed in the monitoring process. However, additional funding and staffing would make the process more effective.

The current level of mining activity is less than the 10-year average. However, because these activities occur at the initiative of the private sector, and because mineral activities fluctuate with the economy, with mineral demand, and with mining industry and recreational interest, no long-term trends are implied. It appears that Forest Plan goals and objectives are being met.

### **Recommendations**

The major problem with appropriate monitoring is not the process, but the available funding and staff. Continue to request funding that would allow 100 percent monitoring of all bonded mineral related activities, as has been the case over the last several years.

If additional funding is provided, conduct additional monitoring to ensure adequate reclamation is being completed on non-bonded operations. Where it is not being properly completed, take regulatory action to require the operator to do the required reclamation.

Monitoring Item -

### **Mine Operating Plans**

The goal is to ensure that mining notices of intent to operate and plans of operations are processed in a timely manner and administered to standard, complying with regulation, Forest Management goals, and Forest Plan standards and guidelines.

Notices of intent are generally processed within the fifteen-day time frame established in regulations (36 CFR 228, subpart A). Notices are processed by evaluating the described work and either returning a letter to the proponent that acknowledges the notice as sufficient, or, if the authorized officer determines that surface impacts may be significant, a letter is sent requiring that a plan of operations be submitted. Plans of operations are often not processed within the thirty-plus-sixty day time frame that is established in Forest Service mining regulations. The primary reason is the time necessary for the Forest Service to compliance with Federal environmental laws, their implementing regulations, and appeal regulations.

The Forest provided approximately 71 mineral materials permits or contracts (sand and gravel, pit run, building stone, landscape rock, etc) to the public in accordance with regulations at 36 CFR 228, subpart C. These sales were for relatively small volumes of material at a cost that ranges between \$1.00 and about \$50.00 per contract. Materials were removed from specified existing material sources and sometimes from along forest road cuts. These were short term, primarily single entry operations.

Approximately 100 Notices of Intent, Plans of Operations, and mineral material sales were processed in FY2003, with a total of about 150 active plans or notices (many were multi-year activities). Of these, about 40 percent of the total operations were administered (monitored) to standard. However, all of the bonded operations (12) were administered to standard. The operations that were not administered were anticipated to have such small impacts that monitoring was considered not necessary. Most of these small activities are recreational in nature and occur briefly and/or are conducted over the weekends.

The number of new notices of intent and plans of operations that are submitted to the Forest has remained relatively constant over the previous five-year period. Mineral material requests appear to be slightly higher than in the recent past. Recent inventories of recreational-level activities (suction dredging, panning, sluicing, metal detecting, etc) indicate that many are simply not complying with notification requirements. Additionally, because these activities occur at the initiative of the public, and because they fluctuate with the economy, with mineral demand, and with mining industry and recreational interest, it is difficult to decipher a trend. Mining activities on Federal lands also fluctuate in response to the difficulties that the proponent perceives in the approval process. These difficulties may be time delays in obtaining approval to operate, limitations in access or the type of equipment that may be used, or imposition of seasonal operating period restrictions to avoid impacts to resources. It is reasonable to conclude that Forest Plan standards and guidelines that place possibly significant limits, restrictions, or delays on the operator do not promote a favorable climate for the mineral industry or the recreating public.

There is no apparent increased or decreased trend in the number of actual mineral operations (except for small mineral material permits). Due to a lack of funding, lack of available trained personnel, and other priorities, not all mineral activities were monitored. As a consequence, the actual percentage of operations meeting goals and objectives is not known. Nonetheless, the monitoring that is occurring does indicate that Forest Plan Goals and Objectives are generally being met.

## **Recommendations**

The objectives and standards and guidelines in the Forest Plan appear to be adequate, but the level of funding is inadequate to ensure total compliance. If determined to be desirable, request adequate funding that will allow monitoring of all mineral related activities.

Based upon the administration and monitoring completed, a Forest Plan adjustment is not necessary at this time.

Actively conduct programmatic resource surveys that will accommodate anticipated mineral activities. This will allow the processing of Plans of Operation in a more timely and efficient manner.

# GENERAL MONITORING of STANDARDS AND GUIDELINES

Monitoring Item-

## General Standards and Guidelines

The goal is to ensure implementation and validation of Forest Plan Standards and Guidelines including those in the Northwest Forest Plan. Monitoring seeks to assure Wenatchee National Forest goals, outputs, and the desired future condition. The monitoring questions are:

### **Are Forest Plan Standards and Guidelines being implemented?**

### **Are implemented Standards and Guidelines achieving the expected results?**

Proposed projects are reviewed for consistency with Forest Plan Standards and Guidelines during the National Environmental Policy Act process. After the signing of the Northwest Forest Plan, training sessions were held to ensure that Wenatchee National Forest employees understood the rationale and Standards and Guidelines within the Northwest Forest Plan. These training sessions and reviews are done on a continuing basis.

The Northwest Forest Plan established an interagency monitoring program on implementation monitoring. The procedures were developed in Fiscal Year 1995. In 1996 and 1997, the Forest led an interagency team comprised of various members of the Provincial Advisory Committee in conducting monitoring of how management activities such as timber sales, roads, and restoration projects complied with the Standards and Guidelines contained in the Northwest Forest Plan Record of Decision. This monitoring program on the Forest documented a high level of project-level compliance. This interagency monitoring program was expanded in 1998 to include "watershed-level" monitoring as well as "project-level" monitoring. Watershed-level monitoring is an important step beyond project-level assessments. Monitoring at this landscape scale:

- Helps fulfill the legal commitment to monitor at all scales.
- Allows management activities (projects) to be assessed in regard to achieving Northwest Forest Plan goals.
- Provides a more balanced view of the Forest's compliance by complementing project-level reviews with an assessment of more pro-active Northwest Forest Plan requirements associated with the management of "areas" such as Key Watersheds and Late-successional Reserves. Typically, requirements associated with landscapes at the watershed scale address planning, prioritizing, and integration of activities.

The 2003 Monitoring of both the Eastern Washington and Yakama Provinces focused on density management projects with fuel reduction elements within Late-successional Reserves. Monitoring consisted of an office review and a field review.

### **Review findings from Yakima Province - Sunip and Swamp Devil Timber Sales and Prescribed Fire Projects**

- Information from the Watershed Assessment and Late-successional Reserve Assessment

(LSRA) was appropriately utilized to determine adequate levels of woody debris and snags to be retained.

- Discussion focused on the need to develop adequate standards and guidelines specific to the conditions of drier Eastside Ecosystems.
- Participants felt that a field review was a valuable and good use of their limited time. They felt that it provided a good opportunity to bring forth issues for discussion and stimulated new ideas and perspectives.

### **Review findings from Eastern Washington Cascade Province – Grouse and TPR Timber Sales**

- Use of “over snow” logging techniques was very effective in reducing ground disturbance or damage to residual timber stand.
- Difficult to meet Coarse Woody Debris (CWD) requirements when the unit does not contain original size classes for meeting that standard (TPR). Larger material was retained, but some sites were not capable of meeting the requirement.
- Landings and roads met Aquatic Conservation Strategy. Much of the discussion focused on these techniques and contract measures designed to achieve this compliance strategy.
- In the Grouse Sale, general opinion was that the stands could have been thinned heavier and that there was still a fire risk with the remaining fuel loading. However, there was good snag levels and CWD on site.
- The area reserved for wildlife in the Grouse Sale was inspected and found to have been protected from project activity, but that grazing activity was causing ongoing impacts. The spring would have been better protected by developing a watering trough outside the area and fencing the riparian area to have better met the ACS.

A great deal of discussion focused on the challenge of applying Standards and Guidelines to eastern Cascades dry forest plant communities, including the capability to meet requirements for large woody debris and snags, and the application of riparian buffers and riparian protections.

### **Recommendation**

Continue to support the regional interagency effort in developing effectiveness monitoring protocols that will lead to answering the question; are implemented Standards and Guidelines achieving the expected results?

# IV. FOREST PLANNING UPDATE

There was one amendment to the Wenatchee Forest Plan in 2003. This amendment assigned a land allocation to a small parcel of acquired land in the Stevens Pass Area. The allocation assigned was RE-3, which allows use of the site as a communications site and also designated the parcel as LRS (Late –successional Reserve) to conform with the 1992 Northwest Forest Plan amendment to the Wenatchee Forest Plan.

## Forest Plan Amendments

| Amendment   | Date  | Location                              | Description   |
|-------------|-------|---------------------------------------|---|
| Amendment 1 | 10/90 | Forest-wide                           | Amendment by Secretary of Agriculture vacating ROD for Northwest Regional Guide Supplement, and returning Spotted Owl Habitat Areas (SOHAs) to the land classification of the adjacent land.  |
| Amendment 2 | 03/92 | Forest-wide                           | ROD signed by Regional Forester (Region 6) for FEIS on Management of the Northern Spotted Owl in the National Forests, which directed each National Forest to insure that all management activities are consistent with the management directions adopted by the ROD.           |
| Amendment 3 | 05/92 | Forest-wide                           | General corrections and definitions made or added to the 1990 Forest Plan   |
| Amendment 4 | 06/92 | Sec 16<br>T22N, R11E                  | Site-specific amendment for reallocation of 300 acres in the Snoqualmie Pass (Ski Acres) area from ST-1 Scenic Travel, Retention, to RE-1 Developed Recreation. This amendment was later rescinded.   |
| Amendment 5 | 07/92 | Sec 20 & 21<br>T28N, R 21E            | Site-specific amendment to modify the VQO on 5 acres in the RE-3 allocation from Retention to Modification, and to allow harvest and disposal of trees for the purpose of constructing a flood control debris channel on Slide Ridge.   |
| Amendment 5 | 10/92 | Forest-wide                           | <i>[Note: there was a duplication of amendment numbers.]</i> Adjustments to the Activity Schedules provided in the 1990 Forest Plan.  |
| Amendment 6 | 07/95 | T.7N,<br>R19-21E<br>Multiple Sections | Site-specific amendment to assign allocations to lands within the Bear-Potato Recovery project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands. |

|              |       |  |  |
|--------------|-------|--|--|
| Amendment 7  | 07/95 | Sec. 27 & 35<br>T.2 5N, R.17E.           | Site-specific amendment to assign allocations to lands within the Freund Recovery project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands.             |
| Amendment 8  | 07/95 | Section 27<br>T24N, R17E                 | Site-specific amendment to assign allocations to lands within the Boundary Butte Recovery project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands.     |
| Amendment 9  | 09/95 | T24-25N,<br>R17E<br>Multiple<br>Sections | Site-specific amendment to assign allocations to lands within the Tumwater Recovery project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands.           |
| Amendment 10 | 10/95 | T24N,<br>R16-17E<br>Multiple Sections    | Site-specific amendment to assign allocations to lands within the Eightmile Recovery project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands.          |
| Amendment 11 | 02/96 | Section 16<br>T26-27N,<br>R19E           | Site-specific amendment to assign allocations to lands within the Tye Ridge Wildfire Recovery project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands. |
| Amendment 12 | 04/96 | T25N, R20E<br>Multiple Sections          | Site-specific amendment to assign allocations to lands within the Roaring-Mills project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands.               |
| Amendment 13 | 04/96 | T 24-25N<br>R19-20E<br>Multiple Sections | Authorization of grazing on a temporary pasture outside an existing livestock allotment.   |

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| Amendment 14 | 02/97 | T 27N,<br>R.18-19E.<br>Multiple Sections   | Site-specific amendment to assign allocations to lands within the Mad-Hornet Wildlife Recovery project area acquired by the Forest Service since publication of the Forest Plan. Lands were allocated to the same management prescriptions given the surrounding National Forest lands.                |
| Amendment 15 | 01/98 | Eldorado Creek, portions of North Fork Teanaway River watershed, and portion of upper Beverly Creek, Cle Elum RD, Kittitas Co. | Change Eldorado Creek RNA from a candidate RNA to an established RNA.  |
| Amendment 16 | 06/97 | Fish Lake Bog, Lake Wenatchee RD, Chelan Co.   | Establishment of Fish Lake Bog RNA   |
| Amendment 17 | 11/97 | Snoqualmie Pass AMA (I-90 Corridor)  | Establishment of standards and guidelines and management direction for the Snoqualmie Pass AMA as directed by the Northwest Forest Plan amendment  |
| Amendment 18 | 09/98 | Section 22<br>T22N, R19E   | Site-specific amendment to assign an allocation to a parcel of land within the Sand Ecosystem Restoration project area acquired by the Forest Service since publication of the Forest Plan. The parcel was allocated to the same management prescriptions given the surrounding National Forest lands. |
| Amendment 19 | 09/98 | Section 12, T21N, R13E<br>Section 36, T22N, R11E<br>Section 8, T19N, R13E  | Site-specific amendment to allow for wetland crossings by access road segments to private inholdings where no other options exist.   |
| Amendment 20 | 09/99 | Section 22, T27N, R17E   | Site-specific amendment to adjust allocation line between Matrix allocation and SI-2 allocation to coincide with natural topographic features, forest stand habitat conditions, and an existing county road.   |
| Amendment 21 | 07/99 | T18-20N<br>R12-15E<br>Multiple sections  | Forest Plan amendment to assign allocations to lands acquired from Plum Creek Timber Company as part of the legislated I-90 Land Exchange.   |
| Amendment 22 | 04/94 | Forest-wide  | Northwest Forest Plan Amendment of the Wenatchee National Forest Plan  |
| Amendment 23 | 01/01 | Forest-wide  | Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines of the Northwest Forest Plan Amendment  |

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| Amendment 24 | 05/03 | <p>E1/2 SE1/4 Sec. 11, T26N, R13 E.</p> <p>N1/2, SW1/4 Sec. 11, T26N., R13E (North of Chelan County line)</p> | <p>Site-specific amendment to assign the RE-1Administratively Withdrawn Allocation to a parcel of land within the Skyline Ridge Communication Site project area, acquired by the Forest Service since publication of the 1990 Forest Plan.</p> <p>Site-specific amendment as described above to assign RE-3 LSR Allocation to this parcel.</p> |
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## LIST OF PREPARERS

|                    |   |
|--------------------|---|
| William Armes      | Timber and Related Silviculture Activities<br>Silviculturist            |
| Susan Carter       | Forest Plan Update<br>Forest NEPA, Appeals and Litigation Coordinator   |
| Powys Gadd         | Cultural Resources and Indian Tribes<br>Forest Archeologist             |
| William Gaines     | Wildlife<br>Forest Wildlife Biologist                                   |
| Jacqueline Haskins | Watersheds and Aquatic Habitats<br>Fisheries Biologist                  |
| Robert Hulet       | Road Management<br>Engineer   |
| Barbara Jackson    | Scenery Management<br>Forest Landscape Architect                        |
| Shari Miller       | Wildfire Occurrence<br>Fire Planning Specialist                         |
| Vladimir Steblina  | Forest Recreation & Wilderness Program Manager<br>Forest Economist      |
| Richard Stearns    | Minerals Management<br>Area Mining Examiner                             |
| Amy Tinderholt     | Recreation, Wild and Scenic Rivers and Wilderness<br>Recreation Planner |