# Chapter 2

# Accomplishments/Results/ Recommendations

*Chapter 2*

# *Accomplishments/Results/ Recommendations*

## Fire Management

### *Goal*

The overall goal of fire management is to support land and resource management goals and objectives. This program includes all activities for the protection of resources and other values from wildland fire. Fire and fuels programs are to be implemented consistent with Forest Plan Standards and Guidelines, Management Prescriptions, and the Pacific Northwest Plan.

### *The 2004 Fire Season*

The snow pack for the 2003 – 2004 winter was 110 to 129% of average, the precipitation summary as of May of 2004 was 90 - 109% of average. At the first of May, the Palmer Drought Index indicated near normal conditions throughout the state. As of the first of September the Drought Index was still showing normal conditions.

A total of 34 fires were reported in 2004: 10 lightening and 24 human-caused fires. Reported burned acres totaled 13. No industrial operations fires occurred in 2004. The Forest was successful in supporting the National fire fighting effort, dispatching a total of 116 personnel to other Regional and National fire assignments. Other fire management program activities (e.g. Prevention and Detection) were accomplished within expectations.

### *Monitoring Activities and Evaluation*

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

# *Fire Protection Objectives Monitored*

Two fire protection objectives are monitored in relation to levels considered in the Forest Plan. They relate to number of human-caused wildfires and the number of, size and intensity of wildfires based on 5 years of data.

The threshold of concern is, "no more than 20% departure from the expected number per decade". The Forest Plan anticipated that the human-caused occurrence would average 559 fires/decade or 56 fires per year and an estimated average annual acreage burned by wildfire of 408 acres (MHF-LRMP Chap. 4, p. 25). For the period 2000 - 2004, the average was 44 fires per year and 88 acres per year burned. These numbers are for human caused fires only and are well below the break points of 56 fires per year and 408 acres established in the Forest Plan. The average number of fires and acres per year for all causes for the last five years are, 56 fires per year and 170 acres per year burned. Table 2-1 displays number of fires and acres by cause.

Another area of concern is the number of, size of, and intensity of wildfires and are they within the levels considered in the plan. Table 2-2 displays acres by size class and Fire Intensity Level. Total acres burned increased by only 16 acres from the previous 5-year period (1999-2003). However there was an increase in acres impacted at the higher fire intensity levels. Acres at intensity level 3 (4-6 foot flame length) increased from 3 to 33. At intensity level 5 (8-12 foot flame length), acres increased over the previous 5-year period from 370 to 550 acres.

**Table 2-1. Fire Causes and Acres 2000-2004**

| Causes | Number | Percent | Acres | Percent |
|---|---|---|---|---|
| Lightening | 60 | 21.6 | 408 | 48 |
| Equipment Use | 5 | 1.8 | 9 | 1.1 |
| Smoking | 22 | 7.9 | 5 | .6 |
| Campfire | 124 | 44.6 | 19 | 2.2 |
| Debris Burning | 2 | .7 | .2 | 0 |
| Railroad | 0 | 0 | 0 | 0 |
| Arson | 22 | 7.9 | 7 | 8 |
| Children | 1 | .4 | .3 | 0 |
| Unknown | 42 | 15.1 | 401 | 47.2 |
| **Total** | **278** | **100** | **850** | **100** |

# *Fuel Treatment Objectives Monitored*

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

As part of the total fire and fuels management program, the forest also continued to meet the desired fuel residue profiles. All districts reported that they had met the profiles with less than a 10% deviation from what was stated in the environmental analysis or other forest standard. The goal for the hazardous fuel program is to coordinate a sound, collaborative approach for reducing wildland fire risk to communities, and to restore and maintain forest health within fire-prone areas. The forest had projected to treat 800 acres annually of hazardous fuels.

**Table 2-2. Summary of Wildfires – Acres Burned by Size Class 2000-2004**

| Size Class Fires (Acres) | Number of Acres Burned by Intensity Level | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| E (+200) | 1 | 0 | 0 | 0 | 0 | 370 | 0 | 370 |
| D (100-200) | 2 | 0 | 0 | 0 | 242 | 124 | 0 | 366 |
| C (10-99) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B (.26 – 9) | 62 | 11 | 33 | 36 | 3 | 8 | 0 | 91 |
| A (<.25) | 212 | 21 | 1 | 1 | 0 | 0 | 0 | 23 |
| **Total** | **277** | **32** | **34** | **37** | **245** | **502** | **0** | **850** |

Annual assessments of change in land condition (Fire Condition Class) from the previous year will determine how the goal is achieved. The 10 Year Comprehensive Strategy Implementation Plan will provide the appropriate performance measures to determine success of fuel treatments.

For the reporting period there 1,345 acres planned for hazardous fuels treatment. The Forest accomplished 1357 acres. Of the total acres, 1115 were in the Wildland Urban Interface and Fire Regime 1.

Localized benefits will be realized as treatments are completed. Documentation of changes to broad long-term trends including risks to people and property, native species, watersheds, air quality, and long-term site degradation will take time. Prolonged decline of condition class especially in short interval Fire Regimes and around Urban Interface areas will show an increase in size and severity of fires. The resource damage and value lost will be expected to increase as well.

Benefits from treatment of Hazardous Fuels include:

- Improvement in the resiliency and sustainability of wildland components such as water quality, air quality, wildlife and fisheries habitat, and threatened, endangered, or other special status plant and animal species or habitat.

- Reduction in the amount of lands severely degraded by uncharacteristic wildland fire or by other disruptions to natural fire regimes.

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

- Increase wildland fire safety to the public and firefighters.

- Reduce risk of unwanted wildland fire to communities.

- Reduce risk to recreational opportunities and associated wildand attributes, view-sheds, cultural and historical resources and landscapes.

- Strengthen rural economic sustainability and increase opportunities to diversify local economies, such as through the use of biomass residues, which also reduces air quality impacts.

- Increase public education and understanding for the importance of implementing hazardous fuel risk reduction activities on both Federal and private lands.

- Help local communities with the development of Community Fire Plans.

# *Recommendations*

- Continue to coordinate a sound collaborative approach for reducing the wildland fire risk to communities, and to restore and maintain ecosystem health within fire-prone areas.

- Continue to collect and consolidate data to support the assessment of ecological conditions in the context of the Range of Natural Conditions for fire dependent ecosystems.

- Reduce hazard exposure to firefighters and the Public during fire suppression activities.

- Prioritize hazardous fuels reduction where the negative impacts of wildland fire are greatest.

- Ensure communities most at risk in the wildland-urban interface receive priority of hazardous fuels treatment.

- Continue to focus attention on condition class 2 and 3 in the short interval fire regimes.

# Air Quality

## *Prescribed Fire Emissions*

The overall goal is to manage prescribed fire emissions to meet the requirements of the State Implementation Plan (SIP) for the Clean Air Act. In addition Public health and environmental quality considerations will be incorporated into fire management activities undertaken for the hazardous fuels management program from the planning process forward.

The management activities that affect air quality by the Mt. Hood National Forest remained in compliance throughout the monitoring period (10/03 - 9/04). No deviations from the State's Smoke Management Plan occurred and compliance with all Forest Service and State Air Quality Guidelines were maintained. A total 1,647 acres were treated during the course of the period with a total of 4,130 tons being consumed. No intrusion into smoke sensitive areas occurred as a result of Forest management activities. Visibility in the Mt. Hood Wilderness Class I area was not impaired as a result of management activities.

All burning operations were properly recorded and submitted to Salem Smoke Management for approval and record purposes using the FASTRACS system.

### Conclusions

The Forest Service continues to reduce emissions from burning activities. The goal of the Forest Plan is to reduce emissions 63% by the end of the first decade of the Plan, and that is being achieved to date.

New direction from the National Fire Plan is to:

- Develop and promote efficient biomass residue uses consistent with management objectives in agency land management plans.
- Strengthen rural economic sustainability and increase opportunities to diversify local economies, such as through removal and use of biomass residues to reduce air quality impacts.

This direction provides an opportunity to further reduce emissions or increase acres treated without increasing emissions.

**Table 2-3. Prescribed Burning – FY 2004**

| Burn Type | Acres Treated by Area | | | | Total |
|---|---|---|---|---|---|
| | Barlow | Clackamas River | Hood River | Zigzag | |
| Piles | 192 | 340 | 0 | 0 | 532 |
| Underburn | 1,115 | 0 | 0 | 0 | 1,115 |
| Total Acres | 1,307 | 340 | 0 | 0 | 1,647 |
| Tons Consumed | 1,680 | 2,450 | 0 | 0 | 4,130 |

# *Lichen Biomonitoring*

Lichens are used by managers of the Mt. Hood National Forest in collaboration with the PNW Region Air Program to monitor air pollution on the Mt. Hood National Forest.

From 1994-1997, Mt. Hood botanists surveyed lichens and collected common species for chemical analysis. Air quality was assessed at each site using the lichen community composition (i.e., the relative proportion and abundance of sensitive vs. pollutants including nitrogen, sulfur, lead and other metals. These data are accessible from the USDS-FS-PNW Region Air Resource Management web page (http://www.fs.fed.us/r6/aq/ ) and serve as air quality baselines for Mt. Hood National Forest. More than 75% of Mt. Hood air scores fell within the two best air quality categories. Less than 14% of plots, had air scores in the fair range and 1.4% were rated as degraded with regard to air quality. A primary use of this ecological data (in conjunction with instrumented monitoring data) is to formulate the Federal Land Manager's response to permitting requests for new sources that could adversely affect Class I Wildernesses (Mt. Hood) or other Wildernesses or forest resources. Remeasurements of the biomonitoring plots began in 2004 and will continue over a 2-4 year period.

In addition to lichen monitoring, there are two other types of air quality monitoring data currently available for the Mt. Hood National Forest.

- The Interagency Monitoring of Protected Visual Environments (IMPROVE) program is a cooperative air quality monitoring effort between federal land managers, regional, state and tribal air agencies; and the Environmental Protection Agency. The IMPROVE monitoring program was established in 1985 to aid in the implementation of the 1977 Clean Air Act goal of preventing future and remedying existing visibility impairment in 156 Class I areas (national parks, wilderness areas, and wildlife refuges). The Mt. Hood National Forest maintains an IMPROVE aerosol sampler near Tom, Dick and Harry Mountain, just outside the southwest border of Mt. Hood Wilderness where visibility data and chemistry of airborne particulates is monitored. Data from the IMPROVE monitor can be accessed at http://vista.cira.colostate.edu/improve/

- The chemistry of rain and snowfall is monitored via the interagency National Trends Network – National Atmospheric Deposition program. Operation of the sole NADP monitor in Mt. Hood National Forest, located at the Bull Run watershed, was discontinued in 2003 after twenty years of service. It has been replaced by a new monitor on the Washington side of the Columbia River Gorge, in Skamania County near Washougal, co-located with a new IMPROVE site there. Data for both the Bull Run and Washougal NADP monitors are accessible from http://nadp.sws.uiuc.edu/. A trend analysis of nitrates, ammonium and sulfate deposition is underway for the Bull Run site.

# Range Management

## *Goal*

On lands determined as suitable and capable of producing range vegetation and within constraints imposed by Forest Plan Standards and Guides, provide forage for use by permitted domestic livestock.

## *Existing Condition*

Approximately 159,877 acres, or 15% of total acres on the Mt. Hood National Forest comprise 5 active grazing allotments. Vegetative composition within these allotments is a mosaic of grass and shrub lands, meadow complexes, timbered areas, and harvested lands. Harvested lands in these allotments generally produce forage for about twenty years before the trees re-grow and again dominate the site. This is called "transitory range".

Economic goods are provided to communities through the issuance of grazing permits to six local ranchers. A stable supply of summer forage on National Forest land adds an element of economic viability to these ranch operations. Notably, the ranch land in private ownership provides essential big game winter habitat for deer and elk, which is in critically short supply.

## *Monitoring Questions*

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

  AMP's contain several important components, which have been implemented as follows:
  1) Range improvements (fences) were constructed or maintained to gain better livestock control and ensure attainment of Forest Plan Standards and Guides related to riparian protection and allowable use of vegetation.
  2) Pertinent Forest Plan Standards and Guides have been incorporated into every livestock grazing permit. Permittee's are responsible for meeting the Terms and Conditions specified in these permits. 3) If a permittee does not comply with the Terms and Conditions, a "Notice of Non-Compliance (NONC)" may be issued.

  As stated in the 2003 Forest Plan Monitoring Report, two notices were issued for non-compliance with grazing permit Terms and Conditions. Actions requested by the Forest Service were performed by the permittees during the 2004 grazing season. However, these actions did not prove effective and another solution will be implemented in 2005 with permittee involvement. Monitoring of this situation will occur in 2005 and follow-up in 2006.

- *Are we meeting Forest Plan objectives for range?*

  In the 1990 Forest Plan, objectives for range were quantified and expressed as an output called "animal unit months" (p. four-14). The current Forest Service measurement of this output is called "head months". Actual livestock use was 3,382 Head Months (HM's) out of a total 3,684 HM's under permit.

# *Monitoring Range Ecosystem Function and Productivity*

## Long Term Vegetative trends

An important aspect of ecosystem function and productivity is related to vegetation. Studies to monitor existing condition and long-term trend in vegetation are in place on all allotments using photo trend methodology. Plots are visited once every 5 to 7 years to record plant species diversity, percent bare soil, plant vigor and other factors, and record changes over time. These measurements, along with other observations made by a professional Range Conservationist, indicate that overall range vegetative condition is stable or improving.

## Short Term – Forage Utilization Studies

Forage utilization Standards and Guidelines were developed to ensure that adequate vegetation is left after grazing. Plant health and vigor can be sustained if grazed properly. Utilization monitoring studies were conducted on all allotments. These studies are used to monitor the consumption of the current years forage by both permitted livestock and wildlife. Of the twenty-nine established monitoring sites, which are visited annually, twenty are located within riparian areas. Of those 20 sites, 90% (18) met Forest Plan Standards and Guidelines for forage utilization, while 10% (2 sites), did not. The remaining nine sites are located within the uplands, and 100% (9 sites) met Forest Plan Standards and Guidelines.

# *Recommendations*

Monitoring indicates the majority of acres within grazing allotments are meeting or moving toward Forest Plan objectives. While this is a desirable situation, there are interactions and relationships to other resources that merit discussion.

As mentioned above, three of the monitoring sites located within riparian areas indicated forage utilization levels above those established in Forest Plan Standards and Guides. Permit administration and compliance is vital to ensure that instructions given to grazing permittees are carried out on the ground. Funding to accomplish this task is becoming scarcer. Solutions to this problem need to be identified.

As discussed in the Timber section of this monitoring report, numbers of acres harvested have dropped significantly over the past several years. This results in fewer acres of “transitory range” (as mentioned above) and therefore, less forage. This trend is expected to continue. On allotments where transitory range makes up a substantial portion of the available forage, there is a concern that livestock will rely more heavily on meadows and riparian vegetation. Some of these meadows and riparian areas are also heavily used by recreationists and provide important wildlife habitat. These trends and conflicts should be analyzed through the NEPA process as we proceed with updating allotment EA’s so that appropriate resource decisions can be made.

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

# Noxious Weeds

Noxious weeds or invasive plants are monitored because they displace native vegetation, alter species composition of vegetation on forest and range lands, reduce the productivity of desired commodities on national forest land, reduce species diversity, and adversely affect recreational quality. Monitoring is conducted on weed control treatments, known infestations, and new infestations. Monitoring weed control treatments gives us information used to determine the effectiveness of weed treatments and how best to allocate financial and personnel resources. Monitoring weed infestations provides us with important information on their impact (e.g., location, areal extent, and rate of spread) and makes it possible to target the most important sites to treat. As an example, treating a newly discovered, small infestation of aggressive non-native hawkweed now will prevent a large costly effort in the future.

## *Goal*

To control noxious weed infestations and prevent their spread in accordance with the Mt. Hood National Forest Noxious Weed Plan, the Final Environmental Impact Statement (FEIS) for Managing Competing and Unwanted Vegetation, and the Mt. Hood National Forest Land and Resource Management Plan.

## *Existing Program*

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

In 2004, efforts were focused on the control of hound's tongue (*Cynoglossum officinale*), knapweed species (*Centaurea* spp.), common toadflax (*Linaria vulgare*), and tansy ragwort (*Senecio jacobaea*) east of the crest of the Cascade Range, and knapweed and non-native hawkweeds (*Hieracium aurantiacum* and *H. pratense*) west of the crest.

**Table 2-4. Acres of Noxious Weed Treatment in FY04**

| | Acres Treated by Method |
|---|---|
| Chemical | 885 |
| Manual & Mechanical | 9.6 |
| Biological | 0 |
| Fire | 0 |
| **Total** | **895** |

## *Monitoring Questions*

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

  Yes. Of greatest concern are non-native hawkweeds. Satellite populations have been detected up to 10 miles from the one main population on Zigzag Ranger District.

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

  Both hawkweed and knotweed form dense populations, displacing native plants. There is great concern that if any of the non-native hawkweeds become established in wet meadows they would overwhelm those habitats. Wet meadows are relatively uncommon in the area and are biologically important. They are important foraging and calving habitat for elk. Forage is a significant limiting factor for elk on the Mt. Hood National Forest. Hawkweeds are unpalatable to elk, and therefore displacement of native forage species by the invasive non-native hawkweeds could have an adverse effect on the health of elk populations. Current hawkweed populations are mostly within a power line transmission corridor that is managed for low-growing vegetation to provide a safe distance between the wires and vegetation. The corridor provides habitat where hawkweed thrives.

Knotweed forms aggressive, dense stands 6 to 8 feet tall along streams, displacing native vegetation and degrading habitat for riparian-associated birds, mollusks, fish, insects, and mammals. Knotweed has a weak root system and does not bind the soil well like native riparian vegetation, leading to increased erosion during peak stream flows in the spring. There is also concern that knotweed can change nutrient input to streams, further affecting aquatic organisms. The result may be degraded fish habitat in important anadromous fish-bearing streams. Currently, known sites for knotweed are at lower elevations along the Salmon River, Still Creek, and Bear Creek and at the Timber Lake Job Corps site in the Clackamas River drainage. Knotweed populations are also located around summer homes in the vicinity of Mt. Hood. The only treatment method presently available to the Mt. Hood National Forest is manual cutting, which has proven to be unsuccessful. Effective control methods using carefully applied herbicide (stem-injected glyphosate) are being used by The Nature Conservancy and others, but this option will not be available to the Mt. Hood National Forest until a noxious weed Environmental Impact Statement (EIS), currently in preparation, is completed by the Forest.

- *Are new infestations occurring?*

  Yes. New populations of knotweed and hawkweed have been detected during FY 2004.

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

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

  Biological controls do not eradicate weeds but do decrease their vitality and hold them to reduced densities. Part of the reason noxious weeds out-compete natives is because the insects and diseases that affected them in their native habitat did not come here with them. The biological controls for the above weeds are all insects that do not significantly affect native plants.

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

  Most, but not all, ground-disturbing activities have mitigation measures implemented to reduce the risk of noxious weed infestation. Mitigation efforts are effective in preventing the introduction of noxious weeds into areas not yet infested. Engineering has been cooperating in disposal of weed-contaminated material from roadside clearing. Greater emphasis has been placed on cleaning up active quarries to prevent the contamination of gravel used on roads.
  Mitigation measures are also in place for activities not considered ground-disturbing such as backcountry horse use where weed-free hay and straw are required.

- *Do herbicide treatments for noxious weeds follow standards and guidelines set in the FEIS for Managing Competing and Unwanted Vegetation?*

  Yes.

# *Results*

Chemical control methods were used to treat high-priority houndstongue and tansy ragwort sites east of the crest of the Cascade Range; knapweed sites on Barlow, Clackamas River, and Zigzag Ranger Districts; and hawkweed on Zigzag Ranger District. These treatments have been effective in reducing the number of plants; however, plants germinating from seed already deposited in the soil will necessitate treatment in future years until the seed bank is depleted. The weeds are so widely established east of the crest of the Cascade Range that eradication is not possible. Treatment has been effective in treating satellite populations preventing the establishment of new large entrenched infestations.

Surveys continue to locate satellite populations of hawkweed associated with the primary infestation along the Big Eddy-Ostrander transmission line from Lolo Pass west to the Forest boundary. These populations have been small and can be manually controlled; however, there is a possibility that some small infestations may be overlooked and grow to a size where eradication using manual control is no longer possible.

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

A small population of yellow star-thistle (*Centaurea solstitialis*) on Hood River Ranger District is being controlled with hand pulling.

Knotweed sites associated with summer homes on Zigzag Ranger District were hand pulled. The experience of others and the literature suggest that this method will not result in controlling or eradicating knotweed; however, at this time it is the only control method available to the Forest. The Forest is currently preparing a noxious weed Environmental Impact Statement (EIS) on herbicide use to control noxious weeds. Knotweed can be controlled by stem-injection of glyphosate, a method used by The Nature Conservancy to treat knotweed populations along river corridors in northwest Oregon.

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

# *Recommendations*

- Continue to cooperate with Bonneville Power Administration to treat the primary hawkweed infestation within the Big Eddy-Ostrander power transmission corridor.

- Knotweeds are riparian weed species with the potential to alter habitat for fish and other species that depend on riparian habitats. Manual control has not been effective. Provide information to summer homeowners on how to limit the spread of knotweed and explore methods which may be used to control infestations.

- All projects that result in ground disturbance need to have mitigations in place to reduce the risk of noxious weed infestation and spread. These mitigations should be reviewed following a project to determine their effectiveness.

- Continue to work with Oregon Department of Agriculture to establish biological controls on the Forest.

## Some Further Background on Selected Major Weeds

The greatest area affected by weeds is the drier east side of the Mt. Hood National Forest where diffuse knapweed and other knapweeds are widespread along roadsides. It is beyond our ability to control these species on the east side except in intensely managed areas and along major roadsides. On the west side, a concerted effort to eradicate every new knapweed site has been effective in keeping it at bay. Knapweeds have little forage value and displace native forbs and grasses. The result is extensive loss of forage for ungulates and cattle. Knapweed colonizes where soil is exposed by disturbance whether as a result of human activity, fire, large animals (e.g., elk, cattle, etc.), or small animals (e.g., gophers). Knapweed colonization is a continuing disturbance process that alters the species composition of herbaceous plants and reduces productivity of forage for native animals and cattle. The result is an ecological legacy of adverse changes in vegetation that are difficult to reverse. Like cheat grass, knapweed is now an entrenched noxious weed of western North American ecosystems. It is spread by wind and animals over short distances and is readily caught under vehicles and transported long distances.

Houndstongue is also rather pervasive but over a smaller area (about 1,400 acres reported) on the south end of Barlow Ranger District. There are some small populations on Hood River Ranger District. Unpalatable and toxic when eaten, houndstongue displaces forage plants for cattle, elk, and deer. Its seeds are covered with tiny hooked barbs that cling to clothing and fur. The faces and sides of cattle are sometimes nearly gray with seed. Houndstongue varies in density from near 100% cover in highly disturbed open areas to scattered under brush and tree canopy. It has continued to move into recently logged stands. Over time, houndstongue does seem to shade out in dense plantations as tree canopy closes. Because its seeds cling to clothing, houndstongue is probably being transported to other recreation sites and to the homes of forest users. Seeds are certainly carried to other sites by forest workers (e.g., tree-marking crews, survey crews, logging workers) and recreational users. The total houndstongue population on the Forest is too large and spread out to eradicate. Control efforts with herbicides are concentrated on satellite populations, roadsides, and heavily used areas such as McCubbins Campground. Prior control efforts using mechanical and hand pulling methods have proved to be ineffective.

Tansy ragwort is common on the west side of the crest of the Cascade Range where the only control is biological. At higher elevations, biological control agents (moths and beetles) have not adapted to the climate and therefore are not very effective. On the east side, populations are smaller and treatment is more effective. We actively treat tansy by hand pulling and using herbicides. Tansy is phytotoxic and unpalatable. It competes well when other factors such as grazing or severe frost limit the native vegetation.

Scot's (or Scotch) broom is mostly a westside problem where it has invaded large areas after logging and is a robust competitor in young forest plantations. The result is fewer surviving trees that take longer to grow over this shrub. It dies out when overtopped by trees but will persist in openings, along roadsides, and particularly in power line clearings. Economical effects are serious. Dense stands also overwhelm native understory vegetation. Scot's broom is generally not treated on the west side because it is beyond our ability to handle with mechanical treatment; herbicides, while effective in treating Scot's broom, are not a viable option. On the east side, Scot's broom is an occasional weed, probably because it is less vigorous in the drier climate. All eastside sites are treated; so infestation there has been kept at low levels.

# Heritage Resources

## *Goal*

The monitoring goal is to ensure that heritage resources are being managed, protected, and interpreted according to the Forest Plan's Standards and Guidelines. The Standards and Guidelines are designed to locate, protect, maintain and/or enhance significant prehistoric and historic sites for scientific study, public enjoyment, education and interpretation. A second monitoring goal is to ensure that American Indian rights are being protected on National Forest lands, and that appropriate coordinating activities are occurring.

To accomplish these goals, four monitoring elements were identified in the Forest Plan.

## 1. Tribal Consultation

The Confederated Tribes of the Warm Springs (CTWS) are consulted in all projects located on tribal lands and usual and accustomed areas. The Barlow District Ranger is the Tribal contact for the Forest and meets on a regular basis with the CTWS to discuss a variety of resource issues. In addition to the formal NEPA scoping, the Forest has developed and maintains informal contacts with the CTWS. The implementation of a Memorandum of Understanding between the Forest and CTWS, signed in July 1997, regarding the management of huckleberry habitat on the Forest continues to be very successful.

The Confederated Tribes of the Warm Springs (CTWS) were contacted at least once for every project. Follow-up consultation is ongoing, primarily in regard to fisheries.

## 2. Historic Preservation Standards

Significant (National Register eligible) historic buildings and structures are maintained, stabilized, and repaired according to historic preservation standards, in consultation with the State Historic Preservation Officer (SHPO). The following preservation projects were undertaken during Fiscal Year 2004.

### *Timberline Lodge (National Historic Landmark)*

A Historic Building Preservation Plan (HBPP) was completed for Timberline Lodge in 1998. This plan provides managers credible alternatives for routine maintenance, rehabilitation and replacement of historic fabric throughout the building. Table 2-5 lists projects approved under plan stipulations during fiscal year 2004 in consultation with the State Historic Preservation Officer (SHPO).

**Table 2-5: Approved Projects at Timberline Lodge**

| Project No. | Description | Finding |
|---|---|---|
| 2004-060609-005 | New Pool Vestibule Door | Within Timberline Lodge Agreement. Emergency authorization. Stipulation III.C.4a. |
| 2004-060609-014 | Guestroom Noise Abatement | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-015 | Room 015 Paneling Refinishing | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-019 | Guest Bathroom Rehabilitation | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-020 | Reconstruction of Pool Vestibule | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-029 | New Guestroom Waste Baskets | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-037 | Lampshade Replicas | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-053 | 2nd Fir E. Wing Corridor Door Refinishing. | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-054 | Guest Bathroom Rehabilitation | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |
| 2004-060609-058 | Lamp Repairs | Within Timberline Lodge Agreement. No Adverse Effect. Stipulation III.C.3b. |

### *Cloud Cap – Tilly Jane National Historic District*

In February 2004, the State Advisory Committee on Historic Preservation approved a boundary increase for the Cloud Cap – Tilly Jane Historic District to incorporate the location of the historic Tilly Jane Ski Trail #643. A management plan for the historic district, located on the north slopes of Mount Hood, is currently under development. Completion of the plan is expected by November 2005.

Historic preservation efforts during 2004 focused on Cloud Cap Inn, built in 1889 and listed on the National Register of Historic Places. Phase V rehabilitation work at Cloud Cap Inn was begun under terms of an existing Memorandum of Understanding with the Crag Rats regarding operations, maintenance, and preservation activities. A "No Adverse Effect" determination was made in 2003 for the proposed work, which included foundation, floor and ceiling repairs, interior and exterior wall repairs, and window replacements. Approximately 30% of the planned work was completed by October 2004. The Deputy SHPO participated in the field inspection of 2004 work.

*Cooper Spur Warming Shelter*

Built circa 1933 by the Civilian Conservation Corps, the Cooper Spur Warming Shelter is a log and stone structure associated with the initial phase of winter recreation development on Mt. Hood. The shelter was determined eligible to the National Register of Historic Places in 1993. In 2004, a preservation plan was developed in conjunction with a local citizens group to repair deterioration. In consultation with SHPO, a "No Effect" ("No Historic Properties Affected") determination was made for proposed replacement of the cedar shake roof, repair of several deteriorated structural elements, and repointing of stone masonry. Preservation work is to be completed in 2005.

## 3. Nominations to the National Register of Historic Places

The last National Register nomination was for Bagby Guard Station in September 1999. A nomination package for the historic Cooper Spur Warming Hut was completed in 1994, but not submitted.

In consultation with the State Historic Preservation Office, the Forest evaluated several historic resources in fiscal year 2004. The historic West Leg Road, once the primary access to Timberline Lodge, was determined eligible for inclusion in the National Register of Historic Places. Four other properties were determined ineligible.

## 4. Interpretation and Public Involvement

Three methods are typically used to facilitate public involvement with the Heritage Resource Program: interpretation, education, and volunteerism. The successful interpretive program at Timberline Lodge reaches thousands of visitors every year. Frequent tours are conducted at the Lodge, and Friends of Timberline oversees changing exhibits and demonstrations relating to the history of the Lodge and recreation on Mount Hood.

Public archaeology and restoration activities have been particularly successful ways to involve volunteers in the management and interpretation of heritage resources. A total of 16 Oregon Archaeological Society volunteers participated in the archaeological survey and site testing project of two historic homesteads in Wasco County, contributing 256 volunteer hours. In September, the Barlow Ranger District hosted an on-site interpretive program on emigrant use of the Barlow Road at White River Station Campground, one of the historic sites within the Barlow Road Historic District.

Volunteers from the Oregon Archaeological Society (OAS) continued participation in the Site Stewardship Program, designed to ensure that particularly vulnerable prehistoric sites receive periodic monitoring and condition assessment. The program operates under the terms of a Memorandum of Understanding between the OAS, Mt. Hood National Forest, Gifford Pinchot National Forest, and Columbia River Gorge National Scenic Area.

# *Conclusions*

Avoidance of impacts to heritage resources has been a goal for all projects implemented during fiscal year 2004. Heritage Program staff routinely monitor the condition of heritage resources during and after project activities to ensure that avoidance procedures and protective measures were effective. No adverse effects were reported.

# *Recommendations*

Heritage Program activities focused on the highest priority projects and resource protection efforts. A number of specific projects were still in progress at the end of the year, and remain to be completed. The following projects are recommended for addition to the program of work for fiscal year 2005, depending on staff availability and workload priorities:

- Complete the consultation process for the Peeled Cedar Management Plan and execute a Memorandum of Agreement for this class of historic resources.

- Complete the management plan for Cloud Cap – Tilly Jane Historic District.

- Expand Site Stewardship Program through partnership with Oregon Archaeological Society including a larger number of sites in the monitoring program.

- Complete evaluations of five historic recreation residence (summerhome) tracts on the Forest.

# Geology

## *Goal*

The goal for the geology program is to sustain the productivity of areas susceptible to landslides. Long-term stability of the area is the overall objective.

There were 10 timber harvest units in FY04 on land mapped as high-risk earthflow. The largest unit was 29 acres. There were 6 timber harvest units in FY04 on land mapped as moderate risk earthflow. The largest unit was 30 acres. All timber harvest units on B8 (earthflow) land were commercial thinnings that temporarily reduced the crown closure to less than 70%. It is estimated that recovery to 70% crown closure will occur in approximately 10 years. In all cases the planned thinning units were reviewed by slope stability specialists and determined to have no measurable effect on earthflow stability. No roads were constructed on B8 (earthflow) land. There were no timber harvest units on mapped landslides other than B8 land in FY04. No roads were constructed on mapped landslides other than earthflows.

No acceleration or initiation of earthflow movement has been measured or suspected as a result of timber harvest or road building activities on B8 land since monitoring began in FY91.

Continued measurements during FY04 at established earthflow monitoring stations will provide valuable information to guide future management activities on earthflows. These measurements are primarily for slope movement rates. Measurements have been made annually since 1993 and are showing movement rates ranging from zero to several feet per year. Much additional effort is still needed in verifying the scientific validity of the standards and guidelines for earthflows, particularly those covering hydrologic recovery.

Additional efforts in 2005 should be focused on continuing the on-the-ground monitoring of the earthflows to enlarge our baseline data to enable the evaluation of future changes due to management activities, continuing the review of the risk classification system for earthflows, and continuing the field verification of the earthflow and landslide boundaries.

# Minerals

## *Goal*

The goal of the minerals program is to provide a sustainable flow of mineral resources while maintaining compatibility with other resources potentially impacted.

There were no commercial leasable or locatable mineral development activities on the Mt. Hood National Forest in FY04. Locatable mineral activities were limited to minor sampling and exploration on the Forest. Three Notice-of-Intents were submitted to the Forest. In all cases the planned activity was limited to mineral exploration. There were 22 inquiries from the public regarding laws and guidelines covering locatable minerals on National Forest managed lands. The Forest responded to 100% of these inquiries.

Most of the minerals activity on the Forest was with salable (common variety) mineral resources. These resources were managed using the Mt. Hood National Forest Rock Resource Plan as a guide. There were 10 projects where a total of 13,000 cubic yards of mineral materials were used by the Mt. Hood National Forest. All of the major projects had operating plans and were field inspected for compliance with the plans. 100% of the transportation plans were reviewed. When necessary operating plans were modified to adjust to changing conditions. Operators were not allowed to leave the source until all the requirements of the operating plan had been met. During FY04 there were 10 operating plans completed for current and future projects. One small quarry was closed and restored.

There were 396 smaller projects where salable mineral materials were used by the public. These projects removed a total of 774 cubic yards. Prices for the various rock products available for sale to the public were adjusted in FY02 following the completion of an appraisal process that examined the prices charged at local commercial rock product businesses.

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

The Mt. Hood National Forest continues to be able to supply high quality rock products to the general public, other government agencies, and for our own use. Rock is a non-renewable resource, however, this forest has large quantities of high quality rock and with proper resource management, should be able to satisfy demand for many years. Many of our sources are being depleted of the easily accessible loose material by the continuing demand for “landscape rock” by the public. An effort needs to be made to inexpensively create additional loosened material at those sources to meet the public demand for small quantities of salable mineral materials.

# Fisheries Program

## *Goal*

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

## *Ecological Integrity*

### Ecosystem Function

*Stream Function & Conditions*

The Mt. Hood National Forest is home to several populations of salmon, steelhead, and resident trout. There are over 1,600 miles of fish-bearing streams on the Forest with approximately 300 miles supporting anadromous (i.e., ocean-going) populations of salmon and steelhead. The primary river basins on the Forest include:

- Clackamas River Basin
- Fifteenmile Creek Basin
- Hood River Basin
- Sandy River Basin
- White River Basin (Deschutes River system)

The federal lands, predominately Forest Service, comprising these river basins make up the vast majority of land ownership. Federal lands, on average, comprise from two-thirds to three-quarters of the total land ownership in these river basins, thereby emphasizing the critical importance of the aquatic habitat conditions on the Mt. Hood National Forest.

Forest Plan monitoring goal:

- To determine if Forest Plan standards and guidelines are effective in maintaining or enhancing aquatic habitat complexity and fish habitat capability.

Given the predominance of federal lands in the primary river basins identified above, the role of federal lands is critical in providing "anchor" habitats for rebuilding fish populations to sustainable levels. "Anchor" habitats are considered as those streams or rivers that provide relatively good to excellent aquatic habitat conditions in large watersheds (20-50 $mi^2$). These areas have the added protective measures afforded to them by statutory federal requirements (e.g., Wild & Scenic Rivers Act, Wilderness Area protection, Roadless Area designation, Northwest Forest Plan Aquatic Conservation Strategy, etc.). While the status of fish populations in each of the primary river basins is of particular concern given the number of Endangered Species Act listings across the Forest (see Table 2-6, below), the maintenance and enhancement of aquatic habitat on federal lands is crucial for their recovery and long-term sustainability. As habitat managers, Forest Service personnel continue to protect and restore valuable stream habitats and riparian areas.

**Table 2-6. Fish Populations of Concern on the Mt. Hood National Forest.**

| Species | Evolutionary Significant Unit | Status | Watershed |
|---|---|---|---|
| Steelhead (*Oncorhynchus mykiss)* | Lower Columbia River | Threatened 3/98 | Sandy River, Clackamas River, Hood River |
| Steelhead (*Oncorhynchus mykiss)* | Middle Columbia River | Threatened 3/99 | Fifteenmile Creek, Mill Creek |
| Chinook *(Oncorhynchus tshawytscha)* | Lower Columbia River | Threatened 3/99 | Sandy River, Hood River |
| Chinook *(Oncorhynchus tshawytscha)* | Upper Willamette River | Threatened 3/99 | Clackamas River |
| Coho *(Oncorhynchus kisutch)* | Lower Columbia River/Southwest WA | Candidate 7/95 | Clackamas River, Sandy River |
| Bull Trout *(Salvelinus confluentus*) | Columbia River District Population Segment | Threatened 5/98 | Hood River |
| Redband trout *(Oncorhynchus mykiss gairdneri)* | N/A | Sensitive | Miles Creeks, Hood River, White River |
| Cutthroat Trout (*Oncorhynchus clarki)* | N/A | N/A | Clackamas, Sandy, Hood River, Miles Creeks |
| Rainbow Trout (*Oncorhynchus mykiss irideus)* | N/A | N/A | Clackamas River, Sandy River, Hood River, Miles Creeks |

**Table 2-7. 2004 Project Scale Monitoring Programs Listed by Fourth Field Watershed.**

| Fourth Field Basin Name | Project Name | Objective |
|---|---|---|
| Clackamas River | Richardson Creek | Monitoring success of side channel restoration |
| Fifteenmile/White River | Catlin Gabel | Document project completion of long-term partnership |
| Sandy River | Clear Creek Campground Restoration | Restoration of wetland and off-channel salmon rearing habitat |
| | Mirror Lake | Restoration and relocation of heavily used dispersed sites |
| | Bull Run Road Decommissioning | Removal and ecological restoration of roads from transportation system |
| | Salmon River and Arrah Wanna Restoration | Ongoing restoration of key habitats in lower Salmon River |

Stream habitat restoration projects are monitored to evaluate their effectiveness for enhancing habitat conditions and documenting success of implementation. District personnel monitor various habitat restoration projects each year. Monitoring of habitat restoration projects may be as simple as photo points, or as complicated as using biofilm collecting tiles in streams to calculate stream productivity. Table 2-7 lists project scale monitoring programs by major watershed.

The actual utilization of habitat by various fish species is far below the overall productive capacity of rivers and streams on the Mt. Hood National Forest. Therefore, Forest Service fish biologists continue to work in partnership with partners dedicated to fish conservation and restoration, and watershed councils across the Forest to assist in all fish recovery aspects at the whole-river basin level**.**

### *Special Habitats*

Fisheries special habitats are habitats that provide a critical function during a certain life stage or time of the year, for example, off-channel rearing areas for juvenile salmonids during winter storm flows.

In the Sandy River Basin the Mt. Hood National Forest has actively pursued restoration of special habitats on both federal and private lands. A few of the more notable examples are listed below:

- Clear Creek Campground Restoration
- Mirror Lake Restoration
- Arrah Wanna Homeowners Salmon River Restoration (private)
- Wee Burn Restoration (private)
- Still Creek instream Restoration
- Salmon Carcass Stream Nutrient Restoration

Descriptions and reports of these projects are described in the Annual Fisheries Accomplishment Report and posted on the Mt. Hood National Forest website, http://www.fs.fed.us/r6/mthood/publications.

### *Invasive Aquatic Species*

Non-native, invasive species such as brook trout and small-mouth bass have been documented on the Forest. Fisheries biologists at the Hood River Ranger District have developed a long-term monitoring plan for Endangered Species Act listed bull trout which includes an assessment of impacts and interactions of small mouth bass and bull trout.

# *Population Function, Structure and Composition*

## Population Viability

Anadromous fish have a complex life history, which includes freshwater, migration and saltwater phases. Monitoring information is used to better understand life history stages of different fish populations, and focus recovery efforts for listed ESA fish. Salmon, steelhead, and bull trout production continue to be monitored in the Clackamas, Fifteenmile, Hood River, and Sandy River basins. Forest Service personnel in collaboration with other federal, state, and non-governmental partners monitor fish production in each basin. Monitoring of smolt production occurs to the largest extent in the Clackamas River Basin, followed by the Sandy River Basin to a lesser extent. On the Sandy River basin, salmonid populations and structure has been monitored for the past 12 years. Each year juvenile and ocean going smolt populations are monitored in the Sandy River using smolt traps at the Still Creek site (ongoing since 1992), the Clear Fork of the Sandy River (ongoing since 2002) and the Salmon River (began in 2004).

**Table 2-8. 2004 broad scale monitoring programs listed by fourth field watershed which track long-term trends of aquatic species and their habitats on the Mt Hood National Forest.**

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

The overall abundance of anadromous fish and bull trout continues to be low in those streams and rivers monitored on the Mt. Hood National Forest. For example, bull trout monitoring in the Hood River system has shown the distribution of bull trout has expanded significantly over the past decade, yet abundance is still quite low. Salmon populations on the Mt. Hood Forest continue to show large fluctuations in size. The most extensive and complete data set on the Forest is in the Clackamas River, where up to eight smolt trap sites have been monitored annually. The ten-year data set has shown general trends of increasing numbers of steelhead smolts, and decreasing numbers of coho smolts.

# *Social Well-Being*

## Collaborative Stewardship

The Sandy River Basin Agreement Team is a consortium of state, federal and local government organizations and private conservation groups interested in the long-term ecological health and management of the Sandy River Basin. Their focus to develop a strategy to maintain and recover salmonids listed under the Endangered Species Act (ESA) in the Sandy River watershed. In 2002, PGE and the Sandy River Basin Agreement Team partners signed off on a settlement agreement to decommission Marmot and Little Sandy dams. In 2004, these partners identified geographic areas in the Sandy River Basin important for the persistence and restoration of salmon and steelhead populations known as the Anchor Habitats project from which restoration efforts will focus to restore salmon and steelhead habitat.

## Stakeholders in the Anchor Habitats Project

- State of Oregon - Dept. of Fish & Wildlife
- Clackamas County
- Association of Northwest Steelheaders
- Oregon Trout
- Native Fish Society
- The Nature Conservancy
- Sandy River Basin Watershed Council
- Federal – Salem District BLM, US Fish & Wildlife Service, NOAA Fisheries, Mt Hood National Forest

# Water Resources

## *Goal*

A key goal of the Mt. Hood and Northwest Forest Plans is to protect and maintain the character and quality of water, providing for long-term sustained production resulting in favorable flows from the watersheds on the Forest. In addition, the unique and valuable characteristics of floodplains, riparian areas, and associated riparian and aquatic ecosystems are to be protected.

Water quality Best Management Practices (BMPs) and related Forest and Northwest Forest Plan Standards have been developed to achieve compliance with the Clean Water Act and state water quality regulations. The objective is to meet Federal Designated Management Agency obligations and responsibilities (under the Clean Water Act) with respect to non-point source pollution control.

The purpose of various water resource-monitoring activities is to assess Forest Service compliance with the Clean Water Act, as outlined in a Memorandum of Understanding with the Oregon Department of Environmental Quality (DEQ). Some of the monitoring activities are designed to collect data on water quality trends and monitor the effectiveness of watershed restoration work, such as road decommissioning.

## *Existing Situation*

The Northwest Forest Plan (1994) prescribed various standards and guidelines for resource management activities, many of which are more stringent than those prescribed in the Mt. Hood National Forest Plan. A good example is the Northwest Forest Plan standard for riparian reserve widths, which are typically one or two site potential tree heights. Riparian reserve widths of one or two site potential tree heights are more than adequate for protecting practically all stream shading. As a result, water temperature monitoring for the effectiveness of riparian reserves to protect stream temperature at the project level is no longer needed.

Monitoring funds for water temperature are now being used for water temperature trend monitoring at about 57 sites across the forest, to gather data on existing water temperature conditions, water temperature recovery in certain watersheds, and compliance with State water quality standards for temperature.

## *Implementation Monitoring*

### Cumulative Watershed Effects Analyses

During 2004, a watershed cumulative effects analysis was completed for the Cloak timber sale on the Clackamas River Ranger District using the Aggregate Recovery Percentage (ARP) methodology. On the Eastside of the Mt. Hood National Forest, the Juncrock Environmental Impact Statement (EIS) was completed and work continued on the Bear knoll EIS also incorporating a cumulative effects analysis using the ARP methodology.

A cumulative watershed assessment using the ARP methodology was also completed for the Tamarack Quarry Expansion project and the Timberline Lodge Express ski area expansion draft EIS on the Zigzag Ranger District.

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

# *Effectiveness Monitoring*

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

- Observing the effectiveness of waterbar spacing and construction for preventing erosion off a skid trail. During 2004, this type of effectiveness monitoring was primarily done by timber sale administrators and watershed specialists making visual observations during the course of their field visits.

- Monitoring turbidity (water clarity) following the removal of a culvert on a decommissioned road in the Bull Run watershed, to determine whether mitigation measures are minimizing sediment inputs to the stream.

## Best Management Practices (BMPs)

BMPs are those practices used to achieve compliance with State water quality standards and protect the beneficial uses of water. Two kinds of BMP monitoring typically occur, implementation and effectiveness. The former is the determination of whether or not specified BMPs were implemented as prescribed, and the latter determines whether the prescribed BMP was effective at preventing or minimizing the undesirable impacts it was intended to mitigate.

Nine (9) timber sale units were monitored on the Clackamas River Ranger District using the BMPEP (Best Management Practices Evaluation Process) process. The monitored units were from the Borg and the Bonanza III timber sales originated from the Bonanza EA. .

**Borg timber sale:** Monitoring shows there was no deviation from planned BMP's except for a relatively short section of temporary road between units 6 and 5 which had not been scarified because the temporary road will be needed to access other harvest units of the Borg timber sales. There is a minor amount of sheet flow down this temporary road, but the temporary road surface is rocky and there are no streams nearby. It is expected this section of temporary road will be scarified, seeded, fertilized, and mulched after it is no longer needed. The temporary road near units 8 and 10 was scarified and mulched as planned.

Overall the harvest units monitored had good residual ground cover, consisting of woody debris, vegetation, and rocks. In many areas skid trails were not readily visible, and only a minimal amount of soil disturbance was visible. There was a minor amount of sheet flow off a skid trail in Unit 7, but it drained onto a flat area away from streams. A small area in Unit 5 was somewhat compacted, but overall the level of soil disturbance in this unit was low.

**Bonanza III timber sale**: Monitoring showed there was no deviation from planned BMP's in unit 7. The amount of soil disturbed by skyline yarding was minimal, with very good ground cover consisting of plants and woody debris. Natural drainage patterns were not disturbed by the skyline yarding operation. Riparian protection was good, with gentle slopes and no visible sediment movement.

There was minimal ground disturbance from the skyline and ground-based harvesting operations in unit 21, with excellent ground cover from plants and woody material. The measured riparian leave area was approximately 50 feet wide with many leave trees beyond the designated riparian reserve.

Of the 15 BMPs monitored for both timber sales, 14 (93 %) were implemented and effective as planned. One BMP was not yet fully implemented.

## Bull Run Road Decommissioning Monitoring

Forest Service monitoring activities within the Bull Run Watershed focused on the Bull Run Road Decommissioning Project. The 1999 Bull Run Road Decommissioning Project has been ongoing, with approximately 7.5 miles decommissioned in 2000, 14.2 miles decommissioned in 2003, and 8.6 miles decommissioned in 2004 for a total of 30.3 miles. The project involved removing 5 third order stream crossings, 19 second order stream crossings, and 52 first order stream crossings during 2000, 2003, and 2004.

The primary objective for this project oriented monitoring program is to assess the level of impacts from road decommissioning activity on water quality that eventually serves as raw water for Portland's drinking water supply and also provides important aquatic habitat for a variety of organisms. A secondary objective is to assess levels of compliance with the Bull Run water quality standards and the Clean Water Act for turbidity, suspended solids, and temperature which may be affected by these activities. A third objective is to assess levels of potential cumulative effects to water quality from road decommissioning activities.

Road decommissioning activities included the removal of stream crossing structures, culverts and a bridge, and the fill materials covering pipes and behind abutments. The monitoring program includes several levels of monitoring: procedural, inventory, and water quality sampling. The information obtained from this monitoring program may be used to help evaluate agency annual compliance and reporting with the Bull Run Management Act, PL 95-200 as amended by the Oregon Resources Conservation Act (ORCA), 1996.

## Procedural Monitoring

Annual effectiveness monitoring visits were made to the entire project to review how well the applied BMP's functioned. The 1015 road was surveyed in the fall of 2004 for the entire section that was decommissioned in 2003. Results of this survey indicated that water quality protection measures were functioning as designed for the most part, with minimal surface erosion or stream bed and bank erosion noted. The notable exception to this is the headwaters of a stream on road 1015144 where there was some stream bed and bank erosion associated with the high stream flows in January of 2004. This erosion is attributed over steepened streambanks (outside those recommended in the EA) and a post project stream width that was less than bankfull (also not consistent with recommendations in the EA).

## Inventory Monitoring

Inventory monitoring is a process to evaluate activities which could affect water quality, but which cannot be measured through water sampling. An example would be the use of photo points to measure obvious erosion, surface or mass movements, at road crossings and to monitor the rate of re-vegetation.

Photos detailing stream crossings at Nanny Creek, West Fork Hickman Creek, Hickman Creek, Log Creek, and No Name Creek, and Falls Creek have been completed and are planned to be re-photographed in the summer of 2005.

## Water Quality Sampling

Stream sampling sites above and below road crossings have been established at Nanny Creek, No Name Creek (at the junction of the 1015 and 1015144 roads), and Falls Creek in order to evaluate water quality effects for turbidity. At the project monitoring sites a comparison of the turbidity data above and below the project area before, after, and during the project will be used to characterize levels, duration and changes in sediment production from representative project sites.

After some brief limited increases in turbidity during initial project activities, there were no statistically significant differences during a post activity storm event in turbidity levels between the upstream and downstream sites on Falls Creek.

Post activity monitoring in No Name Creek indicates similar differences between the upstream and downstream sites as those during a pre-activity storm after an initial pulse of sediment moved through during the first large storm event after project activities. These results appear to indicate that best management practices associated with Bull Run Road Decommissioning are protecting water quality at culvert removal sites.

# *Trend Monitoring*

Trend Monitoring is conducted to monitor the quality of water quality (temperature, turbidity, pH, etc.) flowing from larger watershed areas over time. Water quality data collected during trend monitoring is not designed to determine whether BMPs are effective for a specific project, but rather to provide information that may be helpful in assessing whether Forest and Northwest Forest plan standards and guidelines are protecting water quality in a watershed where various resource management and restoration activities have been conducted over a period of time. Trend monitoring also provides important information to determine whether water quality is being maintained or improving over time.

## Water Temperature Monitoring

Water quality standards are regulatory tools used by the Oregon Department of Environmental Quality (DEQ) and the federal Environmental Protection Agency (EPA) to prevent pollution of our waters. States are required to adopt water quality standards by the federal Clean Water Act. States submit their standards to EPA for approval. New, more stringent, DEQ water temperature standards were in effect on March 2, 2004.

Stream temperature was measured during the summer and in some cases year-round on 57 sites on the Mt. Hood National Forest. In most cases water temperature was recorded every hour with an Onset brand data logger. On the Clackamas River Ranger District, 3 out of 21 streams monitored met all the new DEQ stream temperature standards. On the Hood River Ranger District, 5 out of 17 streams didn't meet one or more of the standards, while on the Zigzag Ranger District 13 out of 19 streams didn't meet the standards.

As described above, various streams monitored Forest-wide do not meet one or more of the recently adopted (March 2, 2004) DEQ water temperature standards, even though these same streams in most cases provide very good water quality for fish. There is some uncertainty as to whether many of the streams that do not meet one or more of these standards would have met them prior to the onset of various resource management activities.

Where past management activities did result in stream shade removal, these areas are rapidly recovering stream shade which will eventually result in lower water temperatures. The Northwest Forest Plan riparian area management standards direct that riparian reserves be left along streams and reserves during resource management activities, to enable maintaining existing stream shade conditions and current water temperatures.

**Table 2-9. 2004 Eagle Creek Monthly Water Quality Parameter Averages.**

| Month | 2004 Water Quality Parameters (monthly averages), Eagle Creek | | | |
|---|---|---|---|---|
| | Turbidity (NTU) | Water Temperature (°F) | pH | Conductivity microS/cm |
| January | 4.3 | 39.5 | 7.1 | 31.5 |
| February | 1.2 | 41.0 | 7.2 | 31.6 |
| March | 0.7 | 42.3 | 7.2 | 30.6 |
| April | 0.3 | 45.6 | 7.2 | 32.0 |
| May | 0.9 | 48.4 | 7.2 | 33.0 |
| June | 0.5 | 51.7 | 7.2 | 33.7 |
| July | 0.4 | 60.8 | 7.7 | 41.7 |
| August | 0.9 | 60.6 | 7.9 | 42.4 |
| September | 0.5 | 52.4 | 7.8 | 36.6 |
| October | 0.9 | 49.0 | 7.7 | 39.1 |
| November | 1.8 | 43.9 | 7.6 | 37.2 |
| December | 2.6 | 42.2 | 7.6 | 34.2 |

## Continuous Water Monitoring Stations

*Eagle Creek*

An automated water monitoring station was installed in December 2001 on Eagle Creek, just a short distance upstream of the U.S. Fish and Wildlife Service fish hatchery, and approximately 4.0 miles downstream of the National Forest boundary. The monitoring station was located as close to the National Forest boundary as possible, but potential influences on water quality from lands in other ownerships downstream of the National Forest boundary may exist. One of the key objectives of this monitoring station is to quantify water quality downstream of National Forest lands on Eagle Creek, where the Eagle Creek timber sale was partially implemented several years ago. Turbidity, water temperature, pH, conductivity, and flow depth are continuously monitored at 15 minute intervals.

Average monthly water quality data for 2004 are listed in Table 2-9, based on a preliminary analysis of the data. The peak water temperature reached about 71.1º F. on July 24, 2004. The 7 day average maximum water temperature was 69.1º F, which is above the 60.8º F State standard for core coldwater habitat. The 7 day average maximum water temperature approximately 4.0 miles upstream near the National Forest boundary was 64.4 º F, and 63.1º F at the boundary of the Salmon Huckleberry Wilderness. The difference in water temperature between the Eagle Creek fish hatchery and the National Forest boundary is due to natural warming and possibly stream shade removal. The average water temperature during July was 60.8º F.

Average turbidity at this monitoring site is relatively low throughout the year, with average values of 2.0 NTUs or less from February through November, 2004. The maximum recorded turbidity in 2004 was 119.3 NTUs, during a high flow event (1.5 year flood) on January 29. In some cases, measured peak turbidity values may be affected by Eagle Creek Fish Hatchery personnel cleaning leaves and other debris off the intake structure a few feet upstream from the monitoring station.

During the winter of 2005/2006 fish hatchery personnel will be asked to record when they clean the intake structure, so erroneous turbidity measurements can be eliminated from the dataset.

Overall water quality at this monitoring site was very good for much of the year.

*Clackamas River (Carter Bridge)*

The Carter Bridge water monitoring station was established in December 1999 to record the water quality of the Clackamas River as it left the Mt. Hood National Forest, and to provide the downstream water providers an early warning of turbidity problems. The station is located on the Clackamas River at Carter Bridge, one half mile below the confluence of Fish Creek. Data recorded at 15 minute intervals are date and time of collection, turbidity, water temperature, depth, specific conductivity and pH. Water quality data is available via telephone at various Mt. Hood National Forest and Clackamas River water providers offices. In March 2005, the USGS began operating this monitoring station with funding provided by the Clackamas River water providers.

Average monthly water quality data for 2004 are listed in Table 2-10 below, based on a preliminary analysis of the data. Average turbidity at this monitoring site is relatively low throughout the year, with average values of less than 2.0 NTUs from April through October, 2004. During non-storm periods turbidity is normally between 0.2 and 2.0 NTUs. During stormy periods when the river rises, instream turbidities can increase to about 150 NTUs. The maximum recorded turbidity in 2004 was 154.3 NTUs, during a high flow event (1.5 year flood) on January 29.

The peak water temperature reached about 63.7º F. on August 16, 2004. The 7 day average maximum water temperature was 62.8º F in mid August 2004. The average water temperature during July was 58.3º F. Overall, water quality is very good at this particular monitoring site on the Clackamas River.

**Table 2-10: 2004 Clackamas River (Carter Bridge) Monthly Water Quality Parameter Averages.**

| | 2004 Water Quality Parameters (monthly averages), Carter Bridge, Clackamas River | | | |
|---|---|---|---|---|
| Month | Turbidity (NTU) | Water Temperature (°F) | pH | Conductivity microS/cm |
| January[1] | 9.4 | 38.7 | --- | 45.7 |
| February | 5.3 | 40.7 | --- | 45.6 |
| March[2] | 2.4 | 42.6 | 7.6 | 43.7 |
| April | 1.3 | 45.5 | 7.6 | 41.7 |
| May | 1.3 | 49.1 | 7.6 | 44.6 |
| June | 0.7 | 53.4 | 7.8 | 51.0 |
| July | 0.3 | 58.3 | 8.0 | 67.1 |
| August | 0.6 | 57.6 | 8.1 | 72.0 |
| September | 0.6 | 52.5 | 8.1 | 70.6 |
| October | 0.7 | 48.6 | 7.9 | 71.8 |
| November | 2.0 | 43.8 | 7.8 | 65.9 |
| December | 3.3 | 41.5 | 7.8 | 58.8 |

[1] No pH data collected during January and February. Data collected December 22, 2003 thru March 23 with a YSI 6600 sonde (temporary) while equipment was being repaired. The YSI 6600 sonde was not equipped with a pH probe.

[2] pH data based on data collected from March 23 through 30, 2004.

*Alder Creek*

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

These stream gaging stations measure stream stage and turbidity with the data telemetered to the Zigzag Ranger Station. In water year 2004 both sites were out of operation. The equipment at the East Fork Alder Creek site was destroyed when a limb fell out of a tree and destroyed the shelter housing the data logger and cell phone modem. The in-stream equipment at the Alder Creek site was destroyed by a large streamflow event in January of 2004.

Plans are under way to relocate the in-stream equipment in Alder Creek because the current location is not suitable due to extreme stream velocities where the equipment is located.

# *Other Monitoring*

## Mt. Hood Meadows Water Quality

Baseline data for the Mt. Hood Meadows Ski Area continues to be collected on the Hood River Ranger District. This effort consists of two monitoring stations owned and operated by the Mt. Hood Meadows ski area, which have been operating for about nine years. Turbidity, water temperature, conductivity, and stage are monitored continuously. The Mt. Hood Meadows staff checks the monitoring equipment periodically, about every two weeks, and reviews the monitoring data for abnormal readings.

## Stream Discharge (Outside of Bull Run)

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

## Timberline Ski Area Water Quality Monitoring

This is a brief summary of the Monitoring Report prepared by Golder Associates Inc. Seattle, Washington. A more detailed summary report regarding this monitoring is on file at the Zigzag Ranger District Office.

The Timberline Ski Area has operated a skiing venue for over forty years at the Palmer snowfield on Mt. Hood, Oregon. Salt is applied to the Palmer snowfield during summer months to condition the snow surface and maximize its use for skiing. Salt (sodium chloride) has been applied on the Palmer snowfield since the early 1950's, and has expanded since that time to accommodate increased skiing opportunities on the Palmer snowfield.

Timberline Ski Area has conducted an on-going annual surface water-monitoring program since 1988 to evaluate any potential effects to downstream surface water from salting on the Palmer snowfield. Over the years, additional data needs have been recognized, and the surface water-monitoring program has been modified and expanded to fully characterize the potential effects of salting on the environment. Currently, Timberline Ski Area manages a comprehensive environmental monitoring program that incorporates surface water quality monitoring, environmental fate assessments, salt composition analyses, and an overall salt management program.

*Conclusions*

Annual reports for the Timberline Ski area present summaries of short term and long term water quality trends in Salmon River and Still Creek down gradient of the Palmer snowfield. Detailed analysis of the data are presented in these reports. After 17 years of monitoring the effects of salting on Palmer streams, it is apparent that salt levels gradually increase during the summer period of salt application, and decrease to background levels over the winter non-salting months. No long-term adverse trends have been observed.

## Olallie Lake Complex Burned Area Emergency Stabilization and Rehabilitation Monitoring (2004)

Straw wattle status and vegetation (Projects #14 and #19) established in treatment areas designated in the Straw Wattle and Critical Area Seeding projects of the Olallie Lake Complex Burned Area Emergency Stabilization and Rehabilitation Plan were monitored in the fall of 2004. The Native Plantings and the Reforestation projects were also observed. The full monitoring report is located at the district.

*Background*

Portions of the Olallie Lake Complex Fires burned on Mt. Hood National Forest lands in mid August 2001 on the Clackamas River Ranger District. The treatments recommended by the Interagency Burned Area Emergency Response Team (BAER) for the lakeshore slopes of the Dark Lake Fire and Peninsula Fire included the following projects:

*Project #14, Straw Wattles:* Wattles were installed October and November 2001 on slopes directly bordering Olallie, Monon and pothole lakes with moderate and high erosion susceptibility.

*Project #16, Native Planting*: Native plants were transplanted from areas near the Dark Lake Fire to the shorelines of Olallie and Monon Lake to prevent erosion and to stabilize the high severity burned areas. Blue flagging and/or wire flags identified plant locations.

*Project #19, Critical Area Seeding:* Blue wild rye and annual ryegrass seed was applied to high severity burned areas immediately adjacent to Monon Lake, Olallie Lake and unnamed pothole lakes south of Olallie Lake by helicopter in October 2001. Monitoring in spring 2002 indicated a need for rework of some areas. Reseeding by hand was accomplished October 10 and 11, 2002.

*Project #20a, Reforestation:* Lodgepole pine, white pine, and noble fir seedlings were planted November 2002 within high fire severity areas of the Dark Lake fire on USFS land. Trees were planted on a 16 foot spacing. The Peninsula Fire was not planted.

On September 22, 2004 Ivars Steinblums (Forest hydrologist), Steve Lenius (district BAER program coordinator for the Olallie fire recovery projects), and Gwen Collier (district soil scientist) viewed the status of wattles and type and extent of vegetation providing effective ground cover. The area was visited September 23 and 24, 2004 to re-take photos at 29 of the 39 photo point locations set up in 2001. The following observations were made:

- Straw wattles: Most wattles had weathered to a light gray color and were flattened, probably due to snow loads. In some areas a greater number of grass plants were growing just upslope of the wattles than below, indicating that seed transported down slope during overland flow of water, had caught behind the wattles prior to germinating.

- Native vegetation: Natives are continuing to become well established. Higher rates are occurring where the fire burned lighter and left a layer of duff covering the soil. Grass was not applied to these areas. Areas that burned with a high fire severity, resulting in exposed mineral soil or ash covering soil, have a smaller variety and number of native plants returning. Native plants observed included beargrass, huckleberry, fireweed and penstemon. Moss was growing well on many of the ash surfaces and in many areas where a burned duff crust covered the original soil surface.

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Critical Area Seeding: Blue wild rye and annual ryegrass were established in all of the reseeded treatment areas. Extent of coverage varied with soil rock content and soil moisture conditions. In most areas, bark from burned trees had sloughed off and was providing additional effective ground cover.

- Tree seedlings: Almost all trees planted in November 2002 were doing well. In the area walked through, three planted seedlings were dead. A few natural regeneration lodgepole pine seedlings were observed in the Peninsula Fire area where seedlings had not been planted.

- Native Plantings: Many planted native shrubs (alder, huckleberry, etc.) were visible along the southern shore of Olallie Lake in project area B. Some of the blue ribbons and flags indicating planting sites were still visible, with most spots growing healthy shrubs. Some flagged areas had no live plants.

# *Recommendations*

## Best Management Practices

- Continue implementation of the Best Management Practices Evaluation Process (BMPEP).

- Forest Headquarters hydrology staff will assist Districts in accomplishment of BMP monitoring.

## Watershed Effects Analyses

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

## Trend Monitoring

Continue both baseline and project-related water temperature monitoring Forest-wide. For those streams identified as exceeding state water quality temperature standards, do additional monitoring in 2005 to determine if the water temperatures are naturally elevated. If the elevated water temperatures are a result of management activities or wildfire, evaluate restoration options. Continued water temperature data collection will most likely be required as part of the Implementation Plan for the recently released TMDL for the Hood River Basin.

Continue implementing the program to monitor turbidity at key locations on the Forest, focusing on streams/watersheds which are source areas for domestic/municipal water supplies.

## Road Decommissioning Monitoring

Continue planned implementation, effectiveness and water quality monitoring of road decommissioning activities in the Bull Run watershed.

## Timberline Ski Area Water Quality Monitoring

The following recommendations are made based on review of the long-term trends and conclusions presented above:

- Field sampling at all monitoring stations three times per week throughout the summer salt application period should continue for the foreseeable future. Monthly field sampling should continue throughout the winter months at all monitoring stations. The purpose of the field sampling is to provide backup to the data logger data, and to provide information on background stream water quality.

- Mineral Spring and Mineral Creek should be added to the list of monitoring stations for WY 2005. In addition, monthly stream flow measurements should be made at these locations. These stations are added to evaluate possible variations in flow and water quality at these locations in dry water years. Water year 2005 is likely to be one of the lowest precipitation months of the monitoring period, and variations in Mineral Creek may exert a larger influence on Still Creek at these times.

- The data loggers in Salmon River and Still Creek provide hourly measurements of chloride, conductivity, and temperature throughout the year. Timberline should continue collecting data logger measurements in Salmon River and Still Creek. The purpose of the data logger reporting is to provide water quality monitoring at these station on a nearly continuous basis.